ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT

REPORT AND RECOMMENDATION TO THE CONGRESS OF THE UNITED STATES

AND FINAL LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

APPENDIX--PUBLIC COMMENTS AND RESPONSES

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UNITED STATES

DEPARTMENT OF THE INTERIOR

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,

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In accordance with Section 1002 of the
Alaska National Interest Lands Conservation Act,
and the National Environmental Policy Act

Prepared by the U.S. Fish and Wildlife Service
in cooperation with U.S. Geological Survey
and the Bureau of Land Management

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ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT

Report and recommendation to the Congress of the United States and final legislative environmental impact statement, 1987

Volume 1–Report
Volume 2–Appendix (Public comments and responses)

Copies are available from:

U.S. Fish and Wildlife Service
Division of Refuge Management
18th & C Streets, NW., Room 2343
Washington, D.C. 20240

U.S. Fish and Wildlife Service
Division of Planning
1011 E. Tudor Road
Anchorage, Alaska 99503

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Dallas, TX	Room 1C45, Federal Building, 1100 Commerce Street
Salt Lake City, UT	Room 8105, Federal Building, 125 South State Street
Spokane, WA	Room 678, U.S. Courthouse, West 920 Riverside Avenue

Recommended citation for this report shown in Volume 1.

COVER PHOTOGRAPH

A typical view southward across the coastal plain toward the foothills and the Brooks Range.

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT

APPENDIX
PUBLIC COMMENTS AND RESPONSES

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APPENDIX

PUBLIC COMMENTS AND RESPONSES

On November 24, 1986, the draft Arctic National Wildlife Refuge Coastal Plain Resource Assessment and legislative environmental impact statement (LEIS) were made available for public review and comment. Originally scheduled to close January 23, 1987, the comment period was extended to February 6, 1987, at the request of the Governor of Alaska and others. Public meetings were held January 5, 1987, in Anchorage, Alaska; January 6, in Kaktovik, Alaska; and January 9, in Washington, D.C.

More than 200 individuals participated in the public meetings and submitted oral or written statements, or both. Transcripts of these three hearings are available for public review in the following locations:

U.S. Fish and Wildlife Service
Division of Refuges
Room 2343, Main Interior Building
18th and C Streets, NW.
Washington, D.C. 20240

and

U.S. Fish and Wildlife Service
Alaska Regional Office - Planning
1011 East Tudor Road
Anchorage, Alaska 99503

Copies of the draft report/LEIS were sent to all Federal, State, and local agencies with jurisdiction by law or special expertise, to the Government of Canada and the Yukon and Northwest Territories, to conservation organizations, oil and gas industry, selected libraries, the media, and others who requested copies.

During the comment period, 11,361 letters were received. The vast majority of these letters (11,244) were generally a statement either that the area should be opened to further oil and gas activity or that the area should be designated as wilderness. Of these letters, 7,491 favored leasing and 3,707 favored wilderness designation. Forty-six letters expressed no definite opinion. Statistical summaries by State and position are presented in the adjacent table.

Many of the letters were the results of various mail-in campaigns inspired by industry and conservation organizations. A variety of these comment letters have been reproduced in this volume. They were selected at random and represent examples of the pro and con statements, petitions, individually thought-out responses, and mail-in campaigns. All these comment letters are available for public review in the Washington Office of the U.S. Fish and Wildlife Service, address provided above. Included in the 11,244 letters were responses from 821 organizations, industries, associations, etc.; and 10,423 private individuals.

Responses to proposed recommendation in the draft LEIS.

State/Country	Yes	No	Total
Alabama	18	2	20
Alaska	1,311	407	1,718
Arizona	90	28	118
Arkansas	21	1	22
California	564	839	1,403
Colorado	138	43	181
Connecticut	98	46	144
Delaware	27	6	33
District of Columbia	16	5	21
Florida	258	124	382
Georgia	42	33	75
Hawaii	4	4	8
Idaho	13	7	20
Illinois	230	130	360
Indiana	86	140	226
Iowa	27	21	48
Kansas	134	7	141
Kentucky	35	4	39
Louisiana	181	21	202
Maine	13	9	22
Maryland	53	50	103
Massachusetts	53	118	171
Michigan	62	105	167
Minnesota	55	57	112
Mississippi	26	4	30
Missouri	94	46	140
Montana	84	33	117
Nebraska	55	7	62
Nevada	21	11	32
New Hampshire	10	14	24
New Jersey	156	67	223
New Mexico	66	19	85
New York	169	289	458
North Carolina	41	28	69
North Dakota	42	1	43
Ohio	142	50	192
Oklahoma	609	17	626
Oregon	34	44	78
Pennsylvania	547	128	675
Rhode Island	13	12	25
South Carolina	15	48	63
South Dakota	18	2	20
Tennessee	35	19	54
Texas	1,192	64	1,256
Utah	25	3	28
Vermont	4	34	38
Virginia	90	41	131
Washington	128	422	550
West Virginia	208	7	215
Wisconsin	58	74	132
Wyoming	51	7	58
Canada	1	5	6
Total	7,491	3,707	11,198

Substantive comments on the contents of the report itself were received from the remaining 117 respondents and are published in their entirety in this volume, in the following categories:

Federal governments and agencies
State and local governments
Industry
Organizations
Private individuals

If written testimony filed at the public meetings contained substantive comments, it has also been reproduced in this section.

Each of the 117 letters was analyzed and substantive issues or additional information were delineated. Oral testimonies presented at the hearings and documented in the transcripts were reviewed, and the concerns and issues raised addressed in the report and responses as appropriate.

Over 1,650 individual comments are contained in the 117 letters. These substantive comments have been summarized by major topic or issue, and detailed responses are included below. The final report/LEIS was modified as appropriate based on comments received.

The substantive comment letters and the letters concerning the overall issue of whether or not to open the coastal plain of the Arctic National Wildlife Refuge to further oil and gas activity follow the "Responses to Comments" section in this appendix volume.

RESPONSES TO COMMENTS

Environmental Issues (Chapters II and VI)

CARIBOU

The anticipated effects on the Porcupine caribou herd (PCH) and, to a lesser extent, the Central Arctic Herd (CAH), generated more public comment than any other aspect of possible oil and gas activity in the 1002 area. This topic has been extensively revised in both Chapters II and VI based on these comments. Additional information has become available since the draft LEIS/report was prepared, and has been reflected in the analysis in the final. Although the comments were numerous, most were repetitive of a few major concerns, which have been summarized and responded to below.

PCH CORE CALVING AREA

On the basis of respondents' comments, it was obvious that the draft report's designation of a "core" calving area was being misinterpreted as a very specific area absolutely essential to the viability of the PCH.

The term "core" was used to identify areas repeatedly used by large numbers of calving caribou (density of at least 50 animals/square mile as described in the draft LEIS/report). Areas were identified as core calving areas in the draft report where surveys indicated concentrated use in at least 5 of the 14 years for which detailed observations have been made. Information received since the draft report was prepared added another year of calving distribution information to this data base.

Data leave little doubt that there are important birthing areas in spite of some broad variations from year to year (fig. II-5 and pl. 2A). Based on further review and consultations with Canada, it is questionable to conclude that the repeatedly used concentrated calving habitat on the Jago River is "unique and irreplaceable on a national basis or in the ecoregion" (Resource Category 1 designation, FWS mitigation policy), or that displacement would be sufficient to threaten the viability of the PCH. Accordingly, designations of a "core" calving area and Resource Category 1 habitat have been deleted from the final report.

We believe that the documentation of PCH calving within the 1002 area and additions to the discussion of the importance of calving in the caribou life cycle adequately address this issue without using strictly subjective measures for impact analysis.

PCH DISPLACEMENT VS. DECREASE IN POPULATION

Several commenters, including those from Canada, were concerned with what seemed to be a 20 to 40 percent projected population decline for the PCH.

The draft report did not predict a 20 to 40 percent decrease in herd size. The percentage was related to distribution changes, but through an editing error in punctuation, the relationship was obscured. However, this prompted the FWS to conduct further analysis and consideration of concentrated calving patterns which has suggested that quantifying a percentage in change of distribution (that is, percent displaced) would be highly speculative. Therefore, such information has been dropped from the text and clarification provided.

AREA OF DISPLACEMENT

One of the more controversial aspects of the environmental analysis for caribou concerned the assumption that caribou would be displaced 3 km out from either side of development, roads, and associated facilities. The draft LEIS described this area as 2 miles (3 km = 1.86 mi) in conformance with use of English units throughout the report. However, all computer analyses of areas which would be affected on the basis of this displacement used 3 km, as reported in the literature (Dau and Cameron, 1986). Because several commenters expressed confusion over the use of 2 miles, the references and discussion in the final LEIS were changed to 3 km to be consistent with the literature.

The text has been modified to correct the implication that there would be a complete loss of habitat values within this 3-km area. There would be a reduction in habitat values in varying degrees throughout the area within 3 km of development, with significant declines most likely 2 km outward from the development facilities. This is based on the Dau and Cameron study which showed such decreases in use from disturbance levels much lower than are likely to occur under the full and limited leasing scenarios. Further information on the Dau and Cameron (1986) study, which was the basis for the 3-km displacement zone, has been provided.

Because of concerns over use of the Dau and Cameron data, the Alaska Department of Fish and Game (ADF&G) met with representatives of the oil industry February 13, 1987, to clarify data collection and analysis procedures. Additional statistical tests were applied to the data; reanalyses confirmed displacement, and consistently supported the results and conclusions of the original Dau and Cameron report. Oil industry representatives agreed that displacement of caribou from the Milne Point road had occurred even though the Dau and Cameron study was conducted during periods of very low traffic activity. On February 27, 1987, the ADF&G and oil industry representatives presented the clarified data to FWS. The analysis in Chapter VI has been revised to reflect this clarification.

MAPPING AREAS OF PCH CONCENTRATION

A few commenters suggested that the maps and calculations concerning areas of concentration and densities of PCH on their calving grounds did not reflect all available information.

Further information on the caribou densities in observed concentration areas has been provided in the report, including the assumptions used to calculate densities of between 46 and 128 caribou/square mile for each concentration area in 1983 and in 1984. Limited measurements made in 1972 near the Jago River showed densities ranging from 8.2 to 375 caribou/square mile. Because the difference between high density concentrated and low-density scattered calving areas is readily apparent, use of the term "concentrated" by previous observers was assumed to reflect densities of similar magnitude.

Since preparation of the draft report, additional information has been made available to the FWS concerning the distribution of PCH calving. This has permitted refinement in mapping and analyzing calving distributions in Alaska and Canada for 1972-81. Some of these refinements have been made possible through the recent preparation of large-scale maps of calving distribution for the years 1978-81 by the Yukon Wildlife Branch. The Yukon Wildlife Branch maps were based on field notes and maps prepared by the original investigator, and are more accurate than the small-scale maps used by the FWS for preparation of the draft report.

For the years 1972-77, large-scale maps prepared by the original investigators were destroyed in a fire, leaving only small-scale maps for use in preparing the draft report. Working with the FWS, D. G. Roseneau, one of the field investigators working on the Arctic Refuge during the Arctic Gas studies, identified and corrected inaccuracies in the maps in the draft report for calving distribution for 1972-77. Earlier inaccuracies resulted from the FWS interpretation and transformation of small-scale maps to a larger scale. The refinements are based upon Roseneau's field notes and recollection.

The refined concentration areas are depicted in figure II-5 and plate 2A of the final LEIS and included in all quantifications of calving areas.

CARIBOU INSECT RELIEF

Numerous comments addressed the issue of insect relief, the areas and conditions sought by caribou for relief, and the significance of insect avoidance behavior in relation to the effects of possible development. The report has been revised to clarify or expand the discussion of insect relief phenomenon.

Insect relief is generally meant to include avoidance of both mosquitoes and oestrid flies. On the 1002 area oestrid flies are not believed to be the nuisance to the PCH that they are to the CAH. The majority of the PCH have generally left the area by peak oestrid fly emergence, although some flies may be present in early July. Generally, PCH movements to insect-relief habitats appear to be in response to mosquitoes.

Evidence suggests that insects play a very strong role in influencing caribou behavior, activity and movements. The text in Chapter VI has been expanded to reflect this fact.

Some commenters suggested that use of coastal areas for insect relief was inconsistent. The FWS disagrees. During the last 15 years, coastal insect relief was used on the average of every other year by extremely large numbers of PCH caribou (Garner and Reynolds, 1982, 1983, 1984, and 1985).

These and other commenters pointed out that the main oil pipeline should present no obstacle to PCH in their movements to coastal relief habitats, based on CAH crossing success in the Prudhoe Bay area. Even large groups (a few thousand) in the CAH that successfully negotiate pipelines, roads, and other developments are much smaller than postcalving aggregations of the PCH (up to 80,000). If these large groups of PCH caribou react negatively to disturbance as some observations suggest, there could be large-scale exclusion of caribou from coastal areas.

POLAR BEARS

There were numerous comments that loss of the one or two bears known to den on the 1002 area each year did not indicate a moderate impact to the Beaufort Sea polar bear population. This section in Chapter VI has been clarified. Figures presented in the text are for known dens, based on radio-telemetry studies of only a fraction of the total denning bears within the Beaufort Sea population. Only 5 to 20 percent of the approximately 150 females which den each year are radio tagged. Thus, there are probably numerous other bears denning on the 1002 area which could also be adversely affected by development. These numbers are even more important when considering that 10 of the 12 land dens found during the 1981-86 radio telemetry studies were located on the Arctic Refuge. Seven of those dens were within the 1002 area.

CARRYING CAPACITY

A few commenters noted that carrying capacities of the Arctic Refuge coastal plain are not presented in the Baseline Study, as was required by Section 1002(c)(b), or in the draft LEIS/report. Despite the extensive baseline studies that have been conducted, current knowledge is inadequate to address the concept of carrying capacity on the 1002 area for the various fish and wildlife species that seasonally occupy the coastal plain. This fact is noted in the final Baseline Report and throughout Chapters II and VI of the report.

The use of primary productivity (annual growth of vegetation) by the various secondary consumers (herbivores) is not well documented for the Arctic. Similarly, the role of interspecific and intraspecific competition of herbivores in altering the biotic carrying capacity of the coastal plain of the Arctic Refuge has not been quantified. Also, nonhabitat factors (predation, disease, behavior, weather, etc.) that can modify the carrying capacity of the area are not well understood. Carrying capacity of tertiary consumers (predators and omnivores) is dependent upon the distribution and abundance of their prey species. Therefore, carrying capacity of tertiary consumers can only be established after the carrying capacity of their prey has been established. Until data are available to address these information gaps, valid estimates of carrying capacity of the 1002 area are not possible.

TRANSBOUNDARY CONSEQUENCES

The Government of the Yukon felt that there was inadequate treatment of the transboundary consequences of those direct impacts on wildlife that use the coastal plain and Canadian habitats or are important constituents of a larger regional population. This point is well taken, and Chapters II and VI have been expanded to address the effects on transboundary wildlife species: caribou, waterfowl, and marine mammals.

BASELINE REPORT

A few organizations commented that the final baseline report was unavailable at the time the draft report/LEIS was made public. This was true due to printing difficulties; however, the final baseline was available by January 1987, allowing sufficient time for review. Despite its length, that report provides updates and summaries of previous annual baseline reports published and publicly available since April 1982. The reports were prepared by those who also contributed to the preparation of the 1002 report, so, inevitably, the report reflects information in all the baseline studies. In fact, these baseline studies have provided the basis for the biological and socioeconomic portions of Chapters II and VI, as they were intended to do.

The final report/LEIS also has been updated to include the 1985 baseline information. The 1985 baseline is in press, and the entire baseline series will be available for the Congress and the public when the Congress begins consideration of the report and the Secretary's recommendation.

REGULATORY PROCESSES

The Environmental Protection Agency concluded that the discussion of the regulatory process and its relationships to the alternatives needed to be expanded. The focus of their comments was on:

o The existing regulatory process including examples of how existing regulations are applied on the North Slope for oil and gas development.

o The Section 404 program, in particular the success of Abbreviated Permit Process, designed to expedite oil and gas development on the North Slope.

o The potential applicability and use of the advanced identification process for advanced planning.

Department of the Army Section 10/404 permits are the primary basis for current FWS involvement in existing North Slope oil and gas developments. The FWS does not believe that the effectiveness of this process has been impaired by development of the Abbreviated Permit Process. Also, the FWS has supported the advanced identification process, and considers it to be useful for making concerns known early in the decisionmaking process.

MITIGATION

Comments relevant to mitigation, ranging from criticism that ameliorative measures were too stringent to complaints that they were totally inadequate, revolved generally around the following issues:

1. Some reviewers criticized the FWS mitigation policy and its habitat-based evaluation system. They contended that animal populations in the Arctic have not been shown to be regulated by habitat availability. They further contended that the most biologically effective approach to assessing and mitigating effects is to determine how oil development will adversely affect given populations and then apply mitigative measures that avoid or minimize impacts.

   Animal populations are considered by many experts to provide an unreliable basis for evaluating fish and wildlife impacts. Sampling errors, cyclic fluctuations of populations and the lack of time-series data all contribute to the problem. Therefore, FWS feels that determining habitat value provides a better basis for developing mitigation recommendations. But the use of population information is not foreclosed. In fact, concern for potential population losses led to the formulation of the general policy to seek to mitigate all losses to fish, wildlife, their habitat, and uses thereof. The FWS believes that mitigation of potential population losses is a necessary aspect of this policy.

   The FWS mitigation policy mirrors the consideration of mitigation as required by the CEQ regulations (40 CFR 1502.14, 1502.16, 1505.2(c) and 1508.20). It sets out goals and planning guidance for the development of FWS mitigation recommendations. The policy does not require absolute strict adherence to a required standard.

   The discussion of mitigation in Chapter VI has been revised and expanded to clarify the use of the FWS mitigation policy in establishing mitigation goals and developing mitigation recommendations.

2. Concern was expressed that many mitigation measures imposed on industry at Prudhoe Bay were found to be unnecessary, ineffective, or, in some cases, detrimental to the environment. Blanket restrictions were viewed as inefficient and less desirable than mitigation measures based on case-by-case evaluations.

   Some mitigation measures originally imposed on frontier oil and gas development activities at Prudhoe Bay either have been ineffective or have been found to be unwarranted. Preventive techniques are continually being improved with advances in state-of-the-art technology and additional biological data on the effects to fish and wildlife from various development activities in the Alaskan Arctic. Mitigation measures must be viewed in the light of past experience and present technology. Flexibility should also be maintained to rescind or add mitigative measures as determined necessary on the basis of day-to-day experience. This approach was reflected in the draft report/LEIS and is reaffirmed in the final.

3. A number of comments expressed concern that, in evaluating potential impacts of oil development in the 1002 area, the report relied too heavily on mitigation techniques used in the Prudhoe Bay area. The general theme of these comments was that serious impacts have occurred at Prudhoe Bay, in spite of mitigation measures, and that impacts of similar activities might be greater in the 1002 area.

   Experience gained at Prudhoe Bay has been relied on as a basis for evaluating impacts where appropriate. Parallels relative to certain types of activities are obvious; that is, many studies contain conclusive evidence of impacts that will occur under certain conditions or circumstances, regardless of location. On the other hand, there are dangers in drawing analogies where conditions, potential scenarios, or habits of affected species are significantly different. The text in Chapter VI has been modified to emphasize this point and to more clearly explain the rationale for the use of FWS mitigation policy as a means for determining potential loss of habitat values as a basis for impact measurement and evaluation.

   It is unrealistic to expect that all impacts will be ameliorated or that there may not be unavoidable impacts having significant adverse effects. For example, potential impact on wilderness values is perhaps the most significant adverse impact likely to occur, as well as the least possible to effectively mitigate.

   Section 1002(h) of ANILCA does not require "no significant adverse impact" as a standard for further oil exploration and development, as was used in the previous seismic exploration program on the 1002 area. It does require "an evaluation of the adverse effects that the carrying out of further exploration for, and the development and production of, oil and gas within such areas will have on the resources." Although there is a risk of significant population declines for PCH caribou and muskoxen, the likelihood of these "catastrophic consequences" is very low. Also, such consequences would not be permanent, because most perturbations would disappear with depletion and shutdown of oil activities and the restoration of the coastal plain (primarily removal of infrastructure).

4. A number of respondents felt that the draft report did not adequately acknowledge the mitigative effects of existing regulatory programs of Federal, State, and local governments having jurisdiction over the 1002 area.

   We believe that the importance of these controls is adequately recognized in the report, although some additional information has been provided. We generally believe it (1) unnecessary to belabor well-known regulatory processes and (2) more important

to focus on areas where additional mitigation may be necessary to ensure that refuge resources are not subject to unnecessary adverse effects.

5. Although a number of comments were critical of the draft LEIS/report in not adequately acknowledging the mitigative effects of existing regulatory programs, an almost equal number voiced concern that existing regulations, standards, and stipulations are inadequate to ensure mitigation.

   As stated in Chapter I, more than 36 Federal laws, 5 State of Alaska laws, and 111 separate regulations currently apply to oil and gas activities in Alaska. The FWS believes that these laws and regulations provide ample guarantee for protection of the resources of the 1002 area. Laws such as ANILCA and the National Wildlife Refuge System Administration Act give additional controls to FWS which are lacking on nonrefuge lands.

WATER AVAILABILITY AND DEVELOPMENT

A variety of comments were received regarding 1002 area water supplies large enough to support oil and gas exploration and development. The following information is expanded on in the final report.

The limited availability of fresh water on the Arctic coastal plain is not unique to the 1002 area, nor has it precluded development. Sources used and methods developed to satisfy water requirements in other areas in the Arctic would apply to activities in the 1002 area. Solutions to providing/obtaining water would be considered on a site-by-site basis. Sources and methods used to obtain winter water supplies in earlier exploratory development and production activities in Arctic Alaska are discussed in Chapter II of the report.

AIR QUALITY

Many commenters criticized the lack of information and analysis of effects regarding air quality in the draft report. Additional information has been made available to the Department, and expanded discussions have been included in Chapters II and VI. Several issues were raised:

1. One commenter indicated that the draft LEIS should include a discussion of the process for regulating air quality in the 1002 area. Another commenter expressed confidence in the current process for regulating air quality in Alaska and suggested that changes were not needed in the regulatory framework.

   It is difficult to predict the impacts on air quality in the 1002 area without knowing the scope, timing, and location of oil development. However, the existing regulatory structure is designed to assess the potential effects of oil development on air quality once such critical variables are known. Under this structure, the State of Alaska Department of Environmental Conservation must grant permits prior to any construction on the 1002 area. For significant activities, permits require that major sources of pollution apply best available control technology, that minor sources apply new source performance standards, and that Alaska's control requirements be written into State implementation plans.

2. Several commenters suggested that the final LEIS include results from modeling emissions estimates for the 1002 area.

   The Department does not believe that current information permits reliable modeling of the impact of 1002 area oil development on air quality. Moreover, given that the current regulatory structure and the mitigation measures that it requires are adequate, such modeling is unnecessary at this time. Air-quality modeling would be an important component of subsequent deliberations by the State on whether to grant permits for activities in the 1002 area.

3. Several commenters expressed concern about the potential contribution of oil development on the 1002 area to a buildup of carbon dioxide (CO_2) concentration levels in the Earth's atmosphere.

   Development in the 1002 area would not lead to a significant increase in the CO_2 concentration in the atmosphere, which could, in turn, via the "greenhouse effect," raise the earth's temperature. This is true for several reasons. First, CO_2 concentration is a global phenomenon. The potential resources on the 1002 area, though sizable, are relatively insignificant in relation to worldwide fossil fuel consumption. Second, if the 1002 area's oil resources are not developed, it is likely that other fossil fuel resources would be developed in their place. Some fossil fuels, such as coal, can have greater air-quality impacts than oil. Third, fossil fuel combustion is only one of the ways which contributes to CO_2 buildup. Fourth, CO_2 is only one of several gases contributing to the "greenhouse effect." Some investigators believe that, over the next 50 years, these other gases may play an equally important role in CO_2 buildup. Finally, there is substantial uncertainty about the likelihood of global warming.

4. Some commenters expressed concern that the impact of oil production on ambient ozone concentrations could be significant and that it should be dealt with in the final report.

   Ozone is formed by a complex series of atmospheric reactions between volatile organic compounds and

nitrogen oxides in the presence of sunlight. Generally, ozone formation is not expected to be significant in Alaska, and especially in the 1002 area, because the intensity of sunlight and temperatures--two critical factors in the formation of ozone--is quite low.

5. There was some concern that there could be significant effects from acid rain and that this issue was ignored in the draft LEIS.

   Chapter VI deals with this issue explicitly. Sulfate deposition is expected to be relatively low even under the 5-percent-probability case. Moreover, data from the Prudhoe Bay vicinity, where the FWS has been measuring pH values of ponds and lakes since 1983, show that these surface waters are neutral or alkaline.

GRAVEL

Several commenters found the implied shortage of gravel in the 1002 area to be somewhat overstated in light of the difficulties encountered with gravel in drilling seismic shotholes during the 1983 exploration season. Also pointed out was the fact that shothole logs and samples from the entire area were made available to the Department. The drillers' logs are not adequate for a detailed geotechnical analysis, but they do indicate the presence of widespread, thick upland and channel gravel deposits. Even though the gravel may not be optimally located for all possible developments in the 1002 area, generalizations about gravel shortages are inappropriate. The text has been revised accordingly.

ENERGY CONSERVATION

Many comments noted the importance of conservation in meeting national energy goals. The Department of Energy is responsible for the development of national energy policy, including means of achieving conservation. The Department of the Interior's role in this energy policy is to comply with its legal mandate to manage the development of energy resources on Federal lands in an environmentally acceptable manner. The focus of this report/LEIS is to respond to the statutory questions about the potential petroleum and biological resources in the 1002 area, not to review the full scope of national energy policy. Nonetheless, a discussion of alternative energy resources, including energy conservation, has been added to Chapters V and VI, to give the reader a better idea of the impacts if energy development is forgone on the 1002 area. Conservation and increased domestic production are, of course, complementary components of a broader national energy policy.

USE OF "WORST CASE" ANALYSIS

Many commenters, especially those from industry, criticized the FWS for using a "worst case" analysis in determining environmental effects.

Leasing and development, from field exploration through oil production, transportation, rehabilitation and abandonment, would be sequential on the 1002 area. For purposes of impact assessment, it was assumed that Blocks A, C, and D (for Alternative A) were leased and that exploration was successful. It was further assumed that each of these blocks, plus Block B which would be crossed by the main pipeline, would at some point in time have some concurrent activity, whether it be winter seismic work; exploration and development well drilling; construction of airstrips, port developments, pipelines; or rehabilitation. If some of the currently prospective areas that were assessed contain no economically recoverable oil (of which there is an 81-percent chance), then predicted impacts would be substantially less, probably limited to those associated only with exploratory well drilling and cleanup. This would be particularly true if delineated prospects in Blocks C and D produced "dry holes." Not only would development of the fields not occur, but the main pipeline could be shortened by a significant amount, and the Pokok port site would be unnecessary. Such speculation, however, precludes meaningful analysis.

Therefore, as required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22) for purposes of impact assessment, oil-related activities reasonably foreseeable at some point in time in the 1002 area were assessed.

The lands under consideration are National Wildlife Refuge System lands, lands that by their designation and through the legislative history have been deserving of special resource protection. Therefore, the impact assessment must clearly provide the Secretary of the Interior the information necessary for his decision as to the recommendation to the Congress. Through such an analysis he can understand and answer the question, "What is the most that can reasonably be expected to happen if the 1002 area is opened to further oil and gas activity; what natural resource risks and tradeoffs are involved?" It does not present analysis and probable conclusions as to what is the worst that can happen. The text has been clarified accordingly.

As further required by the CEQ's regulatory amendments (40 CFR 1502.22(b)(3) and (4)), Chapter VI summarizes existing credible scientific evidence relevant to evaluating reasonably foreseeable significant adverse impacts, based upon theoretical approaches or research methods generally accepted in the scientific community. There is substantial uncertainty about the ability of wildlife in the 1002 area to adapt to oil activity or to seek out other appropriate habitats. In the report, the FWS has taken special care to identify areas of biological uncertainty. Biological conclusions that can not be drawn with certainty have been noted as speculative.

The report also recognizes, and in fact places some assurance on, the ability and willingness of the oil industry to work with State and Federal regulatory and management

agencies in consolidating facilities and developing other mitigating technology and techniques for environmentally acceptable Alaska North Slope operations. Even with this assurance it cannot be assumed that oil and gas activities on the 1002 area will not result in population declines, changes in distribution, or behavioral changes in certain wildlife species which use the 1002 area for critical segments of their life cycles.

CUMULATIVE EFFECTS

A number of individuals commented that the potential cumulative effects of oil and gas leasing and other development activities within the Canadian and Alaskan Arctic regions had not been fully addressed. In response to these concerns, a section on cumulative effects has been added to Chapter VI. The discussion of this issue is brief, because the programmatic LEIS/report is intended to focus on the 1002 area and the specific natural resource questions raised by the Congress. The issue of cumulative effects would be addressed in detail as part of the comprehensive environmental reviews that would be required if the Congress authorizes the leasing of oil resources within the 1002 area.

OIL SPILLS

The Alaska Oil and Gas Association, by telegram, expressed its concern about the 23,000 oil spills referenced in the draft report. They contended that this number of spills appeared to be erroneously attributed to the North Slope alone, and asked that the information in Chapter VI be verified. The figure was obtained through staff communications between the FWS and the Alaska Department of Environmental Conservation, which advises now that the information cannot be verified without extensive record reviews. Therefore, the reference to 23,000 spills has been removed from the final report, and the discussion clarified.

Socioeconomic Issues (Chapters II and VI)

SOCIOCULTURAL CONCERNS

Concerns that the sociocultural issues were ignored in the draft have been addressed. A section on "Sociocultural System" has been added to Chapters II and VI, and the "Socioeconomic" environment has been retitled the "Human" environment. The importance of cultural values from activities such as subsistence, accelerating changes to traditional Native activities, and potential benefits of increasing social services are discussed in the new sections.

Canadian government entities and some villages were concerned that the potential impacts on Canadian Native subsistence opportunities had not been adequately considered. The discussions have been expanded in Chapters II and VI.

RECREATIONAL USE

A few commenters wanted precise statistics concerning recreational use of the area. Precise data on the average number of recreational visits to the 1002 area are not available. Best estimates for recreational use are presented in Chapter II. As stated in the report, data on the number of unguided recreational users is not available. A comparison with other areas of the State would have little meaning. Special-use permits are issued only for commercial activities or "nonprogram" uses (50 CFR 27.97 and 29.3). They do not reflect the number of recreational users visiting the coastal plain, because recreational hunters, fishermen, backpackers, hikers, rafters, etc., do not need permits. A summary of the number of permits issued per year would be a poor index to the actual recreational use of the 1002 area.

WILDERNESS REVIEW

A few commenters were concerned about a perceived lack of wilderness review as a part of the report/LEIS.

Section 1002(h) does not require a wilderness review pursuant to the Wilderness Act. The public land order that established the Arctic National Wildlife Range recognized the wilderness values of the range, including the 1002 area. The Congress recognized this again in 1980 when it passed ANILCA, as well as recognizing the possibility that large quantities of oil and gas may exist on the 1002 area. It excluded the coastal plain from the area within the Arctic Refuge that it did designate as wilderness, pending consideration of the 1002 area study and further congressional action. Nonetheless, this report/LEIS evaluates a wilderness alternative to comply with NEPA.

COMPLIANCE WITH TITLE VIII

Section 810 of ANILCA requires, prior to any Federal agency determination to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any of the provisions of the law authorizing such actions, that the head of the Federal agency evaluate the effects on subsistence uses and needs. Although subsistence uses and needs were identified, and the impacts assessed as part of the draft LEIS/report, the Department of the Interior did not conduct a formal 810 evaluation.

This final LEIS/report represents recommendations for legislative action, rather than a determination under existing provisions of law. Formal procedural requirements pursuant to Section 810 are not required to be met at this point in time. If, however, the Congress decides to open all or part of the 1002 area to oil and gas leasing, formal 810 Evaluations and Findings would be conducted. The statute requires that if such an evaluation resulted in a finding of significant restriction to subsistence uses and needs, public hearings would be conducted in the vicinity of the 1002 area. If further determination is made that the significant restriction is necessary, the statute requires that the minimum amount of public lands must be considered, and steps to minimize adverse impacts to subsistence must be assured.

Oil and Gas Resource Assessment Issues (Chapters III and VII)

MARGINAL PROBABILITIES FOR COMMERCIAL HYDROCARBON OCCURRENCE

Several comments indicated a misunderstanding of the term marginal probability, as defined as an output of the PRESTO model. The text of Chapter III has been revised and expanded at several points to clarify the definition generally, and the derivation and significance of the marginal probability reported for the 1002 area. The effect of the minimum economic field size on the marginal probabilities of occurrence generated by the PRESTO model cannot be overemphasized, particularly for remote, high-cost frontier areas such as the 1002 area.

As noted in the revised text, the reported 19 percent or a "one in five" chance for the 1002 area can hardly be characterized as a "high risk" when viewed in the context of the statistical success rates for discoveries of significant size, to say nothing of the field sizes expected in the 1002 area. The statement that there is a 19-percent chance of finding recoverable oil in the 1002 area needs to be interpreted in the context of past experience in oil exploration and resource assessment. Generally speaking, the chance of oil's being present will be lower, the smaller the unexplored area being considered. The 19-percent chance for the 1.5-million-acre 1002 area thus indicates a very high potential when compared to the 27-percent chance for the 37-million-acre Navarin Basin or the 22-percent chance for the 70-million-acre St. George Basin (table III-1).

The text in Chapter III has been revised to include references to probability of occurrence where appropriate.

SMALL AND UNIDENTIFIED PROSPECTS

Several commenters expressed concern that the economically recoverable resource estimate does not adequately account for potential resources in unidentified prospects, and in the smaller identified prospects.

With respect to unidentified prospects (stratigraphic traps and structures smaller than the seismic grid), the text has been expanded to emphasize the concept that the recoverable estimate represents an "identified minimum" volume.

The PRESTO model does include resources from small, apparently subeconomic, prospects on those Monte Carlo simulation passes where optimum values for volumetric parameters are sampled from the distributions. Naturally, this occurs less often for smaller prospects, and so their relative contribution to the aggregate area resource is less than for larger prospects. Also, the "most favorable case" economic scenario (table III-3) provides some idea of the effect of lower costs and lower minimum field sizes.

PROBABILITY DISTRIBUTIONS

Some comments indicate a lack of understanding of the manner in which both the in-place and recoverable resource estimates are presented.

Owing to the uncertainty inherent in all oil and gas resource estimates, current and almost universal practice is to use ranges of values for many of the input variables which affect the volume of resources in a geologic play or prospect, and to report the results as a range of values with an associated probability distribution.

Three "measures of central tendency" are associated with probability distributions. These are the mode, the median, and the mean. For the purposes of characterizing a resource distribution curve, the mean is considered most appropriate, because it takes into account the size, as well as frequency of occurrence, of values in the range. Technically, the "most likely" value, or mode, is the value which occurs most frequently in the range, not the lowest value as suggested by one commenter. The median is simply the midpoint in the range.

GEOLOGIC RISK

The discussion of area, prospect, and zone risk factors used for the Recoverable Resource analysis has been revised and expanded, as has the discussion of marginal probabilities. This will clarify the crucial differences between prospect and area risk factors, and between input risk factors and output marginal probabilities.

EXISTENCE OF THE ELLESMERIAN SEQUENCE

A number of comments focused on the question of the presence or absence of Ellesmerian sequence rocks, particularly the Ivishak Formation, in the subsurface in the 1002 area. Certainly, as has been pointed out by several commenters, the seismic data alone cannot conclusively resolve this question. Nevertheless, the data do provide some basis for considering the possibility in a more favorable light than in the 1980 resource assessment.

As noted in the description of structure in Chapter III, the only horizon which can be mapped with any semblance of continuity across the entire 1002 area is the top of the pre-Mississippian basement complex. In many parts of the area, parallel and locally continuous reflectors are associated with the mapped horizon, indicating substantial thicknesses of stratified rocks which have different structural characteristics from the overlying, intensely deformed Brookian rocks. Some limited reprocessing and detailed analyses of seismic data from the eastern part of the 1002 area indicate a similarity in character to reflectors known to be associated with Ellesmerian rocks west of the Canning River.

Uncertainty about the existence of the Ellesmerian sequence was accounted for in risk factors applied to pertinent play and prospect attributes. Uncertainty about quantitative attributes was accounted for in the ranges of values used for volumetric parameters, and reflected in the range of resource estimates.

TABLE III-1 (OCS PLANNING AREAS)

Several comments suggested that marginal probabilities for commercial hydrocarbon occurrences for OCS planning areas and for the 1002 area be added to table III-1. The table has been modified to show conditional resource estimates for unleased areas only, and the marginal probabilities have been added. The source for OCS estimates is Cooke (1985).

The information in table III-1, as revised, may be subject to misinterpretation unless certain considerations are kept in mind:

1. For areas where a commercial discovery has occurred, no matter how small, the marginal probability for occurrence of commercial hydrocarbons is by definition 100 percent.

2. For OCS planning areas, some of the reported marginal probabilities may be based on the probability of occurrence of commercial gas accumulations. For the 1002 area, only oil was considered.

3. The relatively high marginal probability for the Beaufort Sea planning area may be a consequence of a "potentially commercial accumulation" at Seal Island (Cooke, 1985, p. 33), which extends into the planning area. If the planning area were subdivided, it is very unlikely that the eastern Beaufort Sea offshore from the 1002 area would have such a high probability for commercial hydrocarbons.

4. In making comparisons between the areas shown in table III-1, both the volume of resource and the probability of occurrence should be considered (see Cooke, 1985, p. 13).

5. Planning areas are different sizes; the larger the area, the greater the likelihood that hydrocarbons will be present.

FIGURE III-2 (PROSPECT SIZES)

A number of comments indicate some confusion about the intent and proper interpretation of the graphic field size comparisons shown in figure III-2.

Figure III-2 is not intended to imply that undrilled prospects in the Arctic Refuge are directly comparable to proven fields. The purpose of figure III-2 is to illustrate the range of possible prospect resources in terms of known quantities that a layman can relate to. The caption for the illustration has been revised to reflect probabilities associated with the 1002 prospect resources.

Some commenters apparently have equated the solid black pattern (95-percent probability range) for the 1002 prospects with the same pattern for proven fields. The pattern has been changed to avoid this confusion.

The text discussion of prospects shown in figure III-2 has also been revised to reflect probabilities of occurrence.

DATA CONFIDENTIALITY

A few commenters were concerned by what they perceived to be a failure to release for public review and comment the geologic information critical to the assessment process. The subsurface seismic information was collected by a permittee--Geophysical Service Inc. (GSI)--and submitted to the U.S. Government under 50 CFR Part 37. It is protected under the these regulations which require the Government to hold confidential or proprietary the geologic data collected by a permittee on the 1002 area.

Analysis in the report is based on government-processed data resulting from processing industry's raw data (seismic tapes). The Department will make raw data available to the public after the report is formally submitted to the Congress, pursuant to regulations (50 CFR Part 37.54). Industry-processed, analyzed, and interpreted data obtained as a result of exploration activities by the permittee or a third party will not be released to the public until 10 years after the submission of such data or information, or until 2 years after any lease sale, whichever period is longer, in accordance with the regulations.

The volume of geologic data and the proprietary nature of the seismic data precluded including all data in the Chapter III summary of the geology of the 1002 area. Scientists of the GS and BLM reviewed all the data to present this condensed report for the government and the public. A more comprehensive technical report (USGS Bulletin 1778) will follow later this year.

Conversely, GSI's comments focused on what they perceived to be a breach of the regulations concerning some of the data and level of detail in Chapter III and the accompanying plates. Because of continued concern from members of the GSI participant group, the Department thoroughly reviewed its data confidentiality policy during 1986, and the regulations implementing the exploration program (50 CFR Part 37). The review led the Department to reaffirm its previous decision that the government-processed data (government seismic record sections) are not required to be withheld pursuant to 50 CFR 37.54(a). Data in the report are based entirely on government-acquired information, and raw data (seismic tapes) acquired by GSI.

OIL PRICES

Many commenters questioned the assumptions regarding oil prices used for economic analyses which are the basis for the minimum economic field size estimates in Chapter III.

Oil price assumptions used in the economically recoverable resource analysis were developed for the year 2000 and beyond, when crude oil production from the 1002 area was forecast to begin. Therefore, these prices are not directly comparable to current crude oil prices. The $33 per barrel (1984 dollars) oil price assumed in the most likely case analysis for 1002 area crude oil was set at an intermediate level from the range of future oil prices projected in numerous price forecasts. These forecasts were conducted by the Department of Energy (DOE); private research firms, such as Data Resources Incorporated; and several oil companies such as Chevron Corporation, Texaco, Conoco, and Ashland Oil, and were the latest available at the time the analysis was completed. Recent, unpublished DOE projections indicate an 8-percent reduction from DOE estimates available at the time the analysis was completed.

A complete and thorough discussion of the sources of oil price forecasts and related assumptions is included in Young and Hauser (1986).

OIL PRICE GROWTH RATE

Several comments suggest that the rate of increase in oil prices used in the report should be the same as used by the U.S. Minerals Management Service (MMS).

In the recently published MMS 5-year Outer Continental Shelf Oil and Gas Leasing Program for 1987, the starting oil prices ranged from $9 to $34, in 1987 dollars. The year 2000 prices ranged from $10 to $45, in 1987 dollars. The $33/barrel price (1984 dollars) used in this LEIS clearly falls within that range when the MMS figures are adjusted to 1984 dollars. The figures used herein are thus consistent with the MMS figures.

NATURAL GAS

Comments on the subject of natural gas resources in the 1002 area fall into two categories:

1. Section 1002, NEPA, and CEQ require an assessment of the environmental effects of exploration for and development of natural gas, as well as oil.

2. The potential significance and future value of natural gas deposits are not adequately addressed.

With respect to the first concern, exploratory wells in the 1002 area could encounter dry gas, oil, oil with associated gas, or water. The impacts of exploratory drilling would be the same regardless of what is found. The effects of natural gas development and production would be somewhat less intensive than for oil, due to wider well spacing and smaller production facilities, but would involve virtually the same surface area. That is, for the purposes of impact analysis, the same prospects would be considered. In the unlikely event that only gas would be produced from the 1002 area, impacts associated with a trunk pipeline would likewise be less, inasmuch as "hot oil"/permafrost engineering problems would not be a factor. It might be possible to bury a gas pipeline over most of its length. Concurrent development and production of oil and gas from the same prospect and the area would have roughly the same impacts as for oil alone, as was pointed out in the draft report.

With respect to the second concern, the method used for the estimation of economically recoverable resources in the 1002 area requires the estimation of a minimum economic field size for each prospect, which in turn, requires demonstration of a positive net present value. Given the current economics of North Slope natural gas, and the immense proven gas reserve base elsewhere, natural gas from the 1002 area simply cannot be demonstrated as having any present economic value using standard discounted cash flow procedures. See Young and Hauser (1986) for a complete discussion of natural gas economics for the 1002 area.

ECONOMIC SCENARIOS

Several commenters expressed the opinion that a "pessimistic" or low-side recoverable resource assessment should be included based on lower oil prices, as well as the "optimistic" or "most favorable" case.

Sensitivity analyses were conducted to determine effects of variations in several economic parameters, including oil prices, on the economics of "typical" prospects in the western and eastern parts of the 1002 area. The lowest oil price modeled was $22/barrel (year 2000 price, 1984 dollars). The minimum economic field size for the eastern 1002 area prospect using this price is over 2 billion barrels (recoverable). For the western 1002 area

prospect, the minimum field size would be about 1.4 billion barrels. Minimum field sizes for actual prospects in the 1002 area, using this price, were not estimated, but it is likely that the minimum for the area would be close to that for the "typical" western prospect (1.4 BBO). All else being equal, the effect of this would be to lower the marginal probability for commercial hydrocarbons from the 19-percent "most likely" case.

National Need Issue (Chapter VII)

MARGINAL PROBABILITIES AND THE NATIONAL NEED

Many commenters suggested that the National Need analysis in Chapter VII is misleading, and that projected economic benefits are overstated, because the analyses are based on conditional recoverable resource estimates.

The economic and domestic supply benefits described in Chapter VII (and the environmental consequences of development described in Chapter VI) are conditional on the discovery of commercial quantities of oil in the 1002 area.

The purpose of estimating economically recoverable hydrocarbon resources was to provide a basis for assessing possible environmental and socioeconomic effects of development, and for projecting potential economic benefits of developing. For the 1002 area, the Congress specifically requires an evaluation of how the potential resources of the area relate to domestic oil and gas supply-and-demand projects. None of these types of analyses can be conducted using risked resource estimates.

Other Issues

CONSULTATION AND COORDINATION

The North Slope Borough and a few other commenters expressed concern that there appeared to be no specific mechanisms outlined in the report to ensure public involvement in Federal decisionmaking concerning development of the 1002 area.

Chapters I, IV, V, and VI recognize the existing statutes that require coordination and consideration during the various stages of development, if the 1002 area is opened for oil leasing. It would be premature to outline specific measures at this point in the process. The final LEIS/report provides a broad, programmatic discussion of management options for the Congress to consider.

This report is not intended to be, nor should it be used as, a local planning document by potentially affected communities. The facility locations and transportation scenarios described in this LEIS represent very broad assumptions that were made as a basis for identifying characteristic activities and any resulting environmental effects. These assumptions do not represent a Department of the Interior recommendation, preference, or endorsement of any facility, site, or development plan. Local control of events may be exercised through planning, zoning, land ownership, and applicable State and local laws and regulations.

If the area is eventually made available for further exploration or leasing, site-specific NEPA compliance, and compliance with sections of ANILCA and numerous other Federal, State and local requirements, would ensure full coordination with all entities that would be affected.

CONSULTATION WITH CANADA

The Canadian Government was concerned that consultations had not been adequate. The following information leads the Department of the Interior to conclude differently:

The Canadian Wildlife Service (CWS) and its Yukon Wildlife Branch independently conducted studies of the Porcupine caribou herd (PCH) during 1978-81 relative to potential oil and gas developments in the Yukon Territory and Northwest Territories. In conducting the studies for preparation of the baseline reports and the Report to Congress, the FWS worked closely with biologists from the CWS, and the State of Alaska as well.

Before assessing the effects of oil and gas development, production, and transportation in the 1002 area, the FWS conducted a Caribou Impact Analysis Workshop, as explained in Chapter VI of both the draft and final LEIS/reports. Canadian biologists participated at FWS invitation. The forum provided the opportunity for FWS biologists to compare research results and gain valuable information on what impacts the Canadian's own transportation and exploration activities may have had in and near the PCH's migration routes and concentrated calving and wintering areas.

In addition to the technical consultations that have occurred independent of the 1002 process, representatives of the FWS and CWS had been negotiating a PCH agreement for the past several years. This agreement calls for both countries to take appropriate steps to ensure international cooperation and coordination of actions that may affect this internationally shared resource, in order to conserve the species and its habitat. The agreement would establish an advisory board to assist in management. Such an agreement will enhance consultation on future activities.

Once the draft 1002(h) LEIS/report was made available to the Congress and the public for review, the Assistant Secretary of the Interior for Fish and Wildlife and Parks sent the Embassy of Canada a letter of invitation to consult on the draft report. To date, three consultation

sessions have been held--two in Ottawa and one in Washington, D.C. The Government of Canada submitted written comments on the report. The consultations have further provided both countries the opportunity to discuss the biological and geological data upon which the assessments are based, and to address the assessment of potential impacts on the PCH and other internationally shared wildlife resources from possible development activities. Either country may initiate further consultations.

PUBLIC HEARINGS

The Department was criticized for the number of public hearings scheduled. As noted elsewhere in this section, public hearings were held in Anchorage and Kaktovik, Alaska, and Washington, D.C. The hearings satisfied the requirements of the National Environmental Policy Act, and the court's order in Trustees for Alaska, et al., v. Donald P. Hodel that public hearings be held in Alaska and elsewhere. Furthermore, the report was widely distributed and received international media coverage. Most of the media used Interior-prepared press releases and emphasis was placed on the fact that oral testimony and letters of comment submitted through the mail were given equal consideration.

Because the concerns expressed at the three hearings were comprehensive and substantially the same as written comments received, additional hearings would have provided a forum for people to express their opinions, but probably would not have raised any new matters warranting further revision of the report. The Department believes, as was its intent with an LEIS, that the proper forum for this debate is the Congress. The Congress will make the actual decision, after the Secretary's role of analysis and recommendation. There will be ample opportunity for public input during congressional consideration of this report.

SUBMERGED LANDS

The State of Alaska criticized the report for not addressing the ownership status of the beds of nontidal navigable waters. The State asserts ownership of the submerged lands underlying the Aichilik, Jago, Okpilak, Hulahula, Sadlerochit, Staines, and Canning Rivers within the 1002 area. The FWS does not recognize the State of Alaska's claim to these submerged lands. Although the State usually has ownership status for the beds of navigable waterways, the Federal Government claims lands submerged under navigable waters that were reserved to the Federal Government prior to statehood (January 3, 1959). The Arctic Refuge lands were withdrawn for military purposes prior to this date (Public Land Order 82, 1943).

ARCTIC REFUGE LAND EXCHANGE

Several commenters expressed concern about the Department's participation in negotiations with the State of Alaska and with a number of Alaska Native corporations regarding the possible exchange of limited oil and gas interests on the 1002 area for Native and State owned inholdings within other National Wildlife Refuges in Alaska. Of primary concern was the lack of discussion of an exchange and its associated environmental and economic impacts in the draft report.

The determination as to whether the Department would propose such an exchange could not be made until after the Secretary had decided upon his recommendation to the Congress regarding future management of the 1002 area. A discussion of the exchange was not included in the draft or final reports. Exploration and development of State or private oil and gas interests within the 1002 area would be subject to the same regulations and environmental controls as Federal lands in the area, and so the draft and final reports do in effect describe the potential impacts of such operations on Arctic Refuge resources and subsistence use.

Although section 910 of ANILCA exempts land exchanges with Alaska Natives from compliance with the National Environmental Policy Act, the FWS ascertainment reports which would accompany any exchange proposal that may be submitted to the Congress would specifically address impacts of any land exchange on the 1002 lands, as well as on the refuge inholdings to be acquired, and would discuss the economic effects of exchanging limited 1002 area oil and gas interests. The ascertainment reports would also discuss other options considered and the rationale for selecting a land exchange as the means of acquiring Alaska refuge inholdings.

The Department's efforts related to a possible land exchange have been independent of those aimed at preparing and submitting the 1002 report, and have therefore, not compromised the objectivity of the report or the Secretary's recommendation. An exchange agreement will be submitted to the Congress only if the Secretary determines the exchange to be in the public interest. Furthermore, implementation of a land exchange will be contingent upon Congress opening the 1002 area to oil and gas exploration, development, and production, and upon congressional approval of any exchange agreement.

Although an exchange of this nature would create private interests on the Arctic Refuge, it would actually result in a net reduction of private inholdings on Alaska refuges due to the multiple return expected for each acre exchanged on the 1002 area. Also, only subsurface oil and gas interests in the Arctic Refuge would be exchanged. Surface ownership and control would remain vested in the Federal Government. Any exchange agreement would contain such surface use provisions as are necessary to ensure protection of refuge resources and maintain the integrity of the area.

DEVELOPMENT AND TRANSPORTATION SCENARIOS (CHAPTER IV)

Much of the original (draft) description of facilities, equipment, procedures, and practices included in Chapter IV was obtained through consultation with oil companies, from trade publications, or from exploration and development plans and proposals. Most of the comments received on Chapter IV are likewise from oil companies or trade associations and concern recent advancements in technology or alternative technological approaches not considered in the draft LEIS. These comments have been accommodated by minor changes in the text. However, where there is some question as to the universal applicability of an improved or alternative technology cited from the Prudhoe Bay area, the technology is acknowledged in the text as a possibility, but not necessarily endorsed as being applicable for the 1002 area.

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POSITION PAPER

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UNITED STATES DEPARTMENT OF THE INTERIOR'S DRAFT

"ARCTIC NATIONAL WILDLIFE REFUGE,

ALASKA COASTAL PLAIN RESOURCE ASSESSMENT"

OTTAWA

FEBRUARY 3, 1987

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POSITION PAPER OF THE

GOVERNMENT OF CANADA

ON

THE DRAFT "ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT"

The Government of Canada has reviewed in detail the content and recommendations of the draft "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment" prepared by the U.S. Department of the Interior. Within the time constraints imposed, the draft Environmental Impact Statement (EIS) has been closely studied by Canadian territorial governments, native groups, the Canadian Porcupine Caribou Management Board and federal government agencies. On the strength of this analysis, the Government of Canada firmly believes and urges that the 1002 lands should be given wilderness designation and dedicated to those primary values for which the Alaska National Interest Lands Conservation Act (1980) (ANILCA) was passed: "to preserve for the benefit, use, education, and inspiration of present and future generations certain lands and waters in the State of Alaska that contain nationally significant natural, scenic, historic, archeological, geological, scientific, wilderness, cultural, recreational, and wildlife values ...." The measures which the U.S. has taken to protect complete arctic ecosystems have helped convince Canadians to proceed with complementary protection mechanisms including the three million acre North Yukon National Park. It would indeed be regrettable if these advances were lost, based upon an incomplete understanding of the total spectrum of the values of the region. Accordingly, in addition to urging that the lands in question be given wilderness designation, Canada proposes that both governments

mark the international and regional significance of the area by undertaking to twin the protected areas on both sides of the border.

The following analysis which underpins Canada's views addresses these major themes: the nature of the wildlife resources which will be affected and their importance for Canadians; the hydrocarbon potential; and identified and unidentified risks. It is the conclusion of the Government of Canada that in this case the risks associated with opening the coastal plain to development far outweigh the potential benefits. The core of the Canadian position is the international significance of developments on shared transboundary wildlife resources. A separate technical appendix on this subject is attached. This Canadian position paper concludes with some notes on the consultative process.

Transboundary Resources: The wildlife species along the Alaska/Yukon border and the fragile ecosystem upon which these resources depend are important resources which are shared by Canada and the United States. The draft EIS, however, does not address the fact that the most heavily affected species are shared resources. A significant reduction in shared wildlife migratory resources such as caribou, Lesser Snow Geese, Polar Bears, fish or marine mammals, occasioned by developments envisaged in the 1002 area, would entail unacceptable damage to Canada. The attached technical appendix on wildlife resources addresses in detail the Canadian concerns.

Subsistence needs: The shared resources in question are critical to the well-being of certain Canadians in the communities of Dawson City, Mayo, and Old Crow in the Yukon, and Fort McPherson, Arctic Red River, Alkavik, Inuvik, and Tuktoyatuk in the Northwest Territories, and their ability to maintain a traditional way of life. Caribou, waterfowl and other transboundary wildlife species are essential to the subsistence economies of certain groups of native Canadians.

The principal concern here is for the caribou. For instance, the 1002 area contains some 78% of the core calving grounds of the Porcupine Caribou Herd (PCH). The draft EIS predicts that full leasing "could result in a major population decline and a change in distribution of 20-40 percent" of the PCH. A population decline of this magnitude and the likely prospect of a disruption of traditional migratory patterns would mean the principal source of the subsistence enonomy would be unavailable. Subsistence users of caribou are principally located in Canada. The estimated annual harvest of the PCH is approximately 5,000 which varies with the movement of the herd. In some years 80 percent of the harvest is in Canada. Canadian caribou-using communities depend heavily on these animals. The draft EIS largely underestimates the significance of development to Canadian subsistence users. The EIS does not mention the possible impact from the loss of caribou to the Mackenzie Delta communities such as Fort MacPherson, Arctic Red River and Aklavik which are now the largest users of the herd. In addition, the Alaskan community of Kaktovik may have access to the Central Arctic herd, but the residents of Old Crow have no alternative and they and the communities in the Northwest Territories may not be able to harvest enough to meet their needs if the predicted impacts on population and distribution occur.

Cumulative effects: Canada notes that the draft EIS does not provide for an assessment of the cumulative effects of development on 1002 lands with other regional developments. Any decision to proceed with 1002 development, through the availability of infrastructure and services, will make development on the Outer Continental Shelf more likely. Equally true is that offshore development will render 1002 development more probable. Until the cumulative impacts of various development proposals have been fully studied and understood great caution must be exercised if major and perhaps irreversible damage is to be avoided. Site-specific mitigative

measures are without any lasting results when negated by detrimental activities elsewhere in the region.

Oil and gas estimates: Since the full technical data set is not available to Canadian geoscientists, it has not been possible to undertake a comprehensive hydrocarbon assessment for the area. Canada questions some of the assumptions upon which the assessment is based. These assumptions have lead to an optimistic view of the resource potential of the area, which has directly influenced the recommendations.

The 1002 area is largely undrilled and should be regarded as rank wildcat territory. As a consequence, the assessment is based on the extension of geological trends from outcrop and well control located to the west and south. Fundamental to the assessment is the comparison with the geology and discovered pools in the Prudhoe Bay area. In Canada's view, the critical assumptions are as follows.

The primary reservoir unit at Prudhoe Bay has been assumed to underlie a portion of the area. Since a significant fraction of the oil potential is ascribed to this reservoir section, the risk of its absence is critical. Further, most of the potential in the unit is assumed to be contained in a few very large structures. However, the seismic data indicate that these features are internally structured, leading to a greater uncertainty in the identification of the key seismic reflectors and the possibility that each feature could consist in fact of smaller pools rather than one large feature. This observation of complex structuring also applies to other plays in the assessment. Finally, the pool size distribution predicts four large pools, each roughly one-third of the size of Prudhoe Bay. While the possibility of large pools in the range exist, the likelihood of several in this size range is remote.

In summary, each of these assumptions has led to an optimistic assessment of the oil and gas potential of the area, which has directly influenced the overall recommendation.

The Prudhoe Bay comparison: Canada notes that while the draft EIS attempts to extrapolate the experience acquired in Prudhoe Bay to the 1002 areas, there are serious inconsistencies between the Recommendations (p. 169-170) and the content of the preceeding parts of the document. These contradictions are outlined in greater detail in the attached technical appendix. The Recommendation puts great emphasis on the situation at Prudhoe Bay noting that despite petroleum development "the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy" and that "the Central Arctic caribou herd (CAH) has increased substantially during the period that development has occurred within the heart of its range" (p. 169). In contrast, the preceeding sections of the assessment stress that the CAH has increased because of lighter hunting and greater calf survival. In addition, "movements, density, and traditions of the PCH differ from those of the CAH" (p. 106).

Nothing in the Prudhoe Bay experience provides a basis for evaluating or mitigating the effects of oil and gas activities on staging Snow Geese. Clearly, the Prudhoe Bay experience should not diminish Canadian or U.S. concern for the wildlife resources of the 1002 area.

Water and Gravel: The report acknowledges that specific locations and sources of water and gravel for exploration and development activities have not been identified (p. 75). It further states that these resources are not readily available on the 1002 area. It should be expected that the acquisition and transport of adequate water and gravel supplies and their subsequent storage will further exacerbate

problems associated with degradation of habitat and disturbance to wildlife.

Consultations: Section 1005 of ANILCA directs the Secretary of the Interior to work with various U.S. interests in preparation of the EIS. The same section continues "In addition the Secretary shall consult with the appropriate agencies of the Government of Canada in evaluating such impacts particularly with respect to the Porcupine Caribou Herd". There was no consultation with the Government of Canada prior to the release of the draft EIS. Neither the ongoing negotiations with respect to the Agreement on the Conservation of the Porcupine Caribou Herd which predate ANILCA, nor the opportunity afforded Canadian territorial governments and agencies to comment on the draft EIS, can be construed as responding to the U.S. legislative requirement for consultation with a sovereign neighbour and friend. Had consultation taken place prior to the release of the draft EIS it is to be hoped that the document would have dealt with the serious Canadian concerns identified in this paper.

Canada welcomes the establishment of this dialogue and looks forward to its continuation. In particular, Canada would seek further consultations with the United States before the EIS is finalized particularly if the Secretary of the Interior's final recommendation to Congress is to propose any of those options which will have negative impact on Canada and Canadians.

Conclusion: Mr. Justice Thomas R. Berger, former Judge of the Supreme Court of British Columbia, in submitting his Report on the Mackenzie Valley Pipeline Inquiry to the Canadian Government made the following point:

his Report on the Mackenzie Valley Pipeline Inquiry to the Canadian Government made the following point:

> "There is a myth that terms and conditions that will protect the environment can be imposed, no matter how large a project is proposed. There is a feeling that, with enough studies and reports, and once enough evidence is accumulated, somehow all will be well. It is an assumption that implies the choice we intend to make. It is an assumption that does not hold in the North ...
>
> We should recognize that in the North, land use regulations, based on the concept of multiple use, will not always protect environmental values, and they will never fully protect wilderness values. Withdrawal of land from any industrial use will be necessary in some instances to preserve wilderness, wildlife species and critical habitat." (pp. xi-xii)

Canada commends to the attention of the United States Government the impressive body of evidence collected by the U.S. Fish and Wildlife Service which demonstrates serious deleterious effects on the quality of the habitat of the area and on shared transboundary wildlife resources. Canada urges that the United States recall that the Arctic National Wildlife Range was established "for the purpose of preserving unique wildlife, wilderness, and recreational values" and that ANILCA established the Arctic National Wildlife Refuge primarily "to conserve fish and wildlife populations in their natural diversity ..." Canada has set aside lands for conservation to meet the same goals. Specifically, the Yukon North Slope (the Arctic watershed) falls under a special conservation regime whose dominant purpose is the conservation of wildlife, habitat and traditional native use. Within that regime, the Northern Yukon National Park has been established to include the

Canadian calving grounds of the PCH. Similar conservation measures are being negotiated for lands south of the Yukon North Slope.

"Long-term losses in fish and wildlife resources, subsistence uses, and wilderness values would be the inevitable consequence of a long-term commitment to oil and gas development in the area" (p. 143). A decision to develop commits the 1002 area to petroleum operations for a period of 30-90 years, to pressure to use this area as a base to service exploration and development of the Beaufort Sea, and to pressure to open adjacent areas designated as wilderness to oil and gas exploration.

The Government of Canada, following careful analysis of the EIS, has concluded that the risks of oil and gas development far outweigh the benefits. Canadian native people are working to develop local economies sustained by renewable resources. Canada regrets the general lack of appreciation of the immense value of Porcupine Caribou to northern native cultures.

Canada urges the United States Government to recognize the serious implications for Canada of development of the 1002 lands, and to adopt Option E - Wilderness Designation. Canada further proposes that both our governments mark the regional and international importance of this area by considering a twinning of protected areas on both sides of our border.

Canadian Government Review of the Wildlife Aspects
of the November 1986 Draft
"Arctic National Wildlife Refuge, Alaska,
Coastal Plain Resource Assessment"

Technical Appendix

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Canadian Government Review of the Wildlife Aspects
of the November 1986 Draft
"Arctic National Wildlife Refuge, Alaska,
Coastal Plain Resource Assessment"

"The wildlife resources of the Arctic symbolize our common heritage. Their preservation, being a matter of deep concern to both nations, provides a challenge and hopefully an opportunity for co-operation"... James Smith, Commissioner of Yukon, 1970.

Introduction

Northeastern Alaska and the adjacent northern Yukon are unique in North America in the high diversity of fauna and flora that they support in relatively undisturbed ecosystems. The close proximity of mountains to ocean with an intervening coastal plain produces an impressive variety of habitats on both unglaciated and glaciated terrain. The flora and fauna of the area are an unique mixture of species which survived the last glaciation essentially in situ and those that have invaded from the south and east since deglaciation. Many of the resultant ecosystems are truly unique and irreplaceable. The value of the area has long been recognized and led to the establishment of the Arctic National Wildlife Range in 1960 and to the recommendation of Justice Thomas Berger in his 1977 Report of the Mackenzie Valley Pipeline Inquiry that all of northern Yukon be set aside as a wilderness park.

Justice Berger also urged that the Governments of Canada and the United States of America establish an International Wilderness Park in recognition of the international importance of those lands in northern Yukon and northeastern Alaska. Many of the species of wildlife using the area are shared populations that depend on habitats in both countries.

Since the U.S. creation of the Arctic National Wildlife Range and Justice Thomas Berger's Report, Canada has put in place the following measures in order to better protect the northern renewable resources shared with the United States:

All lands in the Yukon Territory north of the Porcupine and Bell Rivers were withdrawn from development in 1978 by the Government of Canada;

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a) The 3,000,000 acre Northern Yukon National Park (Zone 1 in attached Figure) was established by the "Western Arctic (Inuvialuit) Final Agreement and Claims Settlement Act" of 1984 with preservation of the wildlife and wilderness character of the park for present and future its primary goal.

b) East of Northern Yukon National Park on the north slope are lands included in the Inuvialuit Final Agreement (Zone 2). The lands all fall under a "special conservation regime whose dominant purpose is the conservation of wildlife, habitat and traditional native use".

c) Zone 3a is proposed for addition to the existing National Park.

Although all of the Northeastern Alaska and adjacent northern Yukon areas are important for wildlife, some are more critical than others. One of these areas lies, in part, within the lands designated under Section 1002 of the Alaska National

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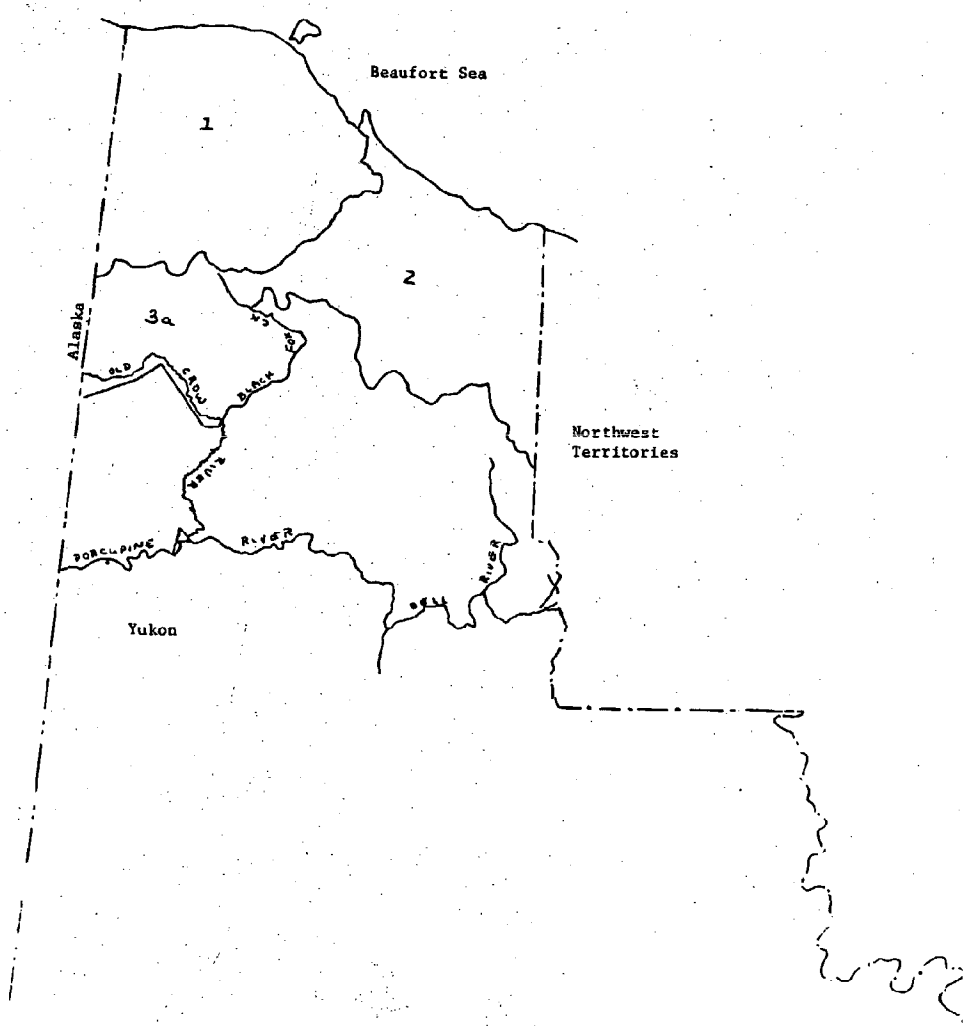

Interest Lands Conservation Act.

The southeastern portion of the area, Block D and parts of Blocks B and C, which is about 19% of the 1002 area, contains the core calving area of the Porcupine Caribou Herd and much of the critical feeding area for Lesser Snow Geese. As noted in the draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment (hereinafter referred to as the EIS or 1002 Assessment): "The Porcupine Caribou Herd (PCH) core calving area is considered unique and irreplaceable. Habitat in this area has been designated Resource Category 1 because of its high fish and wildlife values, particularly for PCH caribou. The U.S. Fish and Wildlife Service normally recommends that all losses of Resource Category 1 habitat be prevented, as these one-of-a-kind areas cannot be replaced" (p 98).

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Knowledge of wildlife in northeastern Alaska and northern Yukon may be the most comprehensive of any equivalent size area in the North. In the 1970s, extensive studies were conducted in relation to a proposed gas pipeline across the area. Studies conducted since 1981 to assess the impact of petroleum activities on the wildlife resources of the 1002 area are thorough and add substantially to the body of knowledge. In addition, studies on Lesser Snow Geese, Polar Bears and the Porcupine Caribou Herd have been conducted since the early 1970s cooperatively between Canada and the United States. Knowledge of the impact of petroleum activities on wildlife is adequate due to work done in the Mackenzie Delta area and to the extensive studies done at Prudhoe Bay. Possible mitigative measures are known and their efficacies have been evaluated. We now know that the degree of impact of an activity and the efficacy of a mitigative measure are time and area dependent; they vary throughout the annual cycle of a species and among populations of the same species.

The majority of wildlife species using the 1002 area also depend on Canadian habitats to some degree, but this review will concentrate on three shared key species of particular importance to Canada: the Porcupine Caribou Herd, Western Arctic Lesser Snow Geese and Beaufort Sea Polar Bears. These would suffer major or moderate effects should oil and gas activity proceed as proposed. Throughout these comments reference is made to the pages of the EIS. In preparing the report, the U.S. Fish and Wildlife Service has done an excellent job of reviewing the information available and in estimating the potential effects of petroleum development.

Caribou

> "Caribou are the deer of the North. Shaped by the snows of millennia, they are completely at home in the country of winter. Theirs are the lands so recently emerged from beneath the snow and glaciers of the great ice age: the windswept tundra, the "land of little sticks" where the stunted trees of the boreal forest cease their northward march, the ice-hung cordilleras. Over these meagre lands they travel, obeying the commands of the seasons: the melting of snow, the budding of plants, the hatching of mosquitos, the freeze-up of lakes and rivers. Like the wind that passes over the tundra wilderness and is gone, caribou are forever on the move. They appear on one distant horizon and vanish on the other. And it is their comings and goings that set the cadence of life on the barren-lands."... George Calef 1981.

The Porcupine Caribou Herd (PCH) is one of the largest caribou populations in the world and it is critical to the well-being of a number of communities in Alaska, Yukon and the Northwest Territories.

The 1002 area is critical to the long-term well-being of the PCH as it contains 78% of the core calving area, is used for calving by up to 82% of the cows and supports 80,000 or more caribou in postcalving aggregations (p 28-29). Full leasing of the 1002 area could result in a major effect on the PCH even with the mitigation measures proposed (p 112). Loss of habitat values on 32% of the core calving area and reduced use or avoidance of 29% of the insect-relief habitat are considered to be unavoidable impacts (p 105-112, 131-132). "These changes ... could result in a major population decline and change in distribution of 20-40 percent"of the PCH (p 112, 132).

The estimates of impact on the PCH given in the EIS are conservative because the effects of reduced use of aggregation and insect-relief habitats were evaluated only from a short-term energetic point of view (p 109-110). Postcalving aggregations of the PCH form even in the absence of insects, although less dramatically, and likely also serve a social function. Disruption of this linking of the nursery bands with the other segments of the herd could conceivably fracture the herd. In addition, the strategies employed by the post-calving aggregations to avoid insects are important. Bands of caribou usually either travel north to the coastal insect-relief areas or south to insect relief areas in the foothills of the Brooks Range. Caribou that move south usually remain in the southern Brooks Range throughout the period of severe insect harassment (July and early August) whereas the majority of the PCH moves to the coast and then moves rapidly east to the Richardson Mountains for the period of severe insect harassment.

The Richardson Mountains provide the best insect-relief habitat within the entire range of the PCH. It is possible that if caribou were prevented from reaching coastal insect-relief habitat in the 1002 area the majority of the PCH would seek the less favourable insect-relief habitat of the Brooks Range. The

overall movement patterns of the PCH would, therefore, be affected such that, at a minimum, the majority of the PCH would not return to Canada until late August or September, and, possibly, such that overall migration patterns of the PCH are altered, thereby reducing or eliminating its availability for harvest to some of the communities that depend on the PCH.

Lesser Snow Geese

The Western Arctic population of Lesser Snow Geese consists of over half a million individuals that nest primarily in Canada on Banks Island and in the Mackenzie Delta region and winter primarily in central California and New Mexico. The commitment of both countries to this shared resource was made through the Migratory Birds Convention in 1916,and reiterated in 1986 in the signing of the North American Waterfowl Management Plan. Work on this population by both countries is presently the focus of the Arctic Goose Joint Venture being carried out under the Plan.

Four large Canadian Arctic Migratory Bird Sanctuaries demonstrate Canada's concern and commitment to this shared resource. Ninety-nine percent of the 1002 area is classified as wetlands, a habitat type considered critical for breeding, staging and migrating waterfowl such as the Snow Geese and other shared migratory birds. A major goal of the North American Waterfowl Management Plan is wetland conservation, and protection of the 1002 area would contribute a valuable addition to that goal.

Major economic and cultural benefits of these Snow Geese flow to a large number of residents of both Canada and the United States. The 1002 area is critical to the long-term wellbeing of Snow Geese as it contains preferred staging habitat used by an

average of 105,000 birds per year, approximately 15-20% of the Western Arctic population (p 35). "Staging Lesser Snow Geese congregate on the Arctic Refuge coastal plain in mid-August and may remain through late September. Staging geese move up to 225 miles west of their southward migration corridor on the Mackenzie River in order to take advantage of the food resources on the Yukon and coastal plain of the Arctic Refuge. The geese feed heavily to accumulate fat reserves for the fall migration flight" (p 35). When fall staging grounds are unavailable on account of snow cover, the coastal plain of the Arctic Refuge can be vital to the welfare of these geese. In some years, Lesser Snow Geese stay on the coastal plain as late as mid-October feeding and ridding themselves of internal parasites before making the migration south to the United States.

The distribution of staging Lesser Snow Geese is highly variable and the geese shift preferred areas annually, likely in response to overgrazed vegetation caused by heavy feeding in previous years. Over half of the Western Arctic Lesser Snow Goose population have used the 1002 area in a single year (p 121). Full leasing of the 1002 area could result in a major effect on Lesser Snow Geese (p 122). Loss of habitat values on up to 45% of the preferred staging area that is used by approximately 75% of the Lesser Snow Geese using the 1002 area in any given year is considered to be an unavoidable impact of petroleum development (p 121,132). That could result in a reduction or change in distribution of an average of 5-10% of the Western Arctic Lesser Snow Goose population, although the effect could be much greater in some years (p 122). In addition, Lesser Snow Geese are extremely sensitive to aircraft sound disturbance when on the tundra feeding grounds in the fall. A major decline in the Western Arctic Lesser Snow Goose population would have a direct, widespread economic and cultural impact on both the U.S. and Canada.

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Polar Bears

The Beaufort Sea population of Polar Bears is estimated to be 2,000 individuals and, while harvest of bears may be small in the U.S., the combined Canada/U.S. harvest and mortality may be at the sustainable limit now. Harvest of Beaufort Sea Polar Bears is important to the wellbeing of a number of coastal communities in both Canada and Alaska. Both countries have shown their commitment to the conservation of this population through participation in the International Agreement for the Conservation of Polar Bears (1976) and cooperation in research and management.

It is projected that 12-13% of the adult females in this population den on land and Polar Bears are known to be particularly sensitive to human activities during the denning period (p 33, 117-118). Disturbance can cause premature abandonment leading to the death of the cubs.

The Beaufort Sea Polar Bears are the only population of bears in which the majority of the females appear to have their maternity dens on sea ice rather than on land. It may be that this behavior developed on the northern Alaskan coast because the females that showed fidelity to denning areas on land in earlier years were shot. Since then, females in dens have been protected for part of the time and, since the enactment of the U.S. Marine Mammals Protection Act of 1972, have been hunted less (though not protected) because there was no market for the hides. It could be that the female bears whose dens have been located on land along the coast recently are, in effect, recolonizing that habitat. If so, it could be important and steps should most certainly be taken to minimize disturbance. The only significant onshore denning area is on, and adjacent to, 1002 land, and both proposed marine ports sites (Camden and Pokok) are confirmed denning areas, especially Pokok on the east side of 1002 lands.

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Leasing of 1002 land for petroleum development could result in a moderate effect on the Beaufort Sea population (p 118, 136). Probable loss of the eastern portion of the 1002 area as denning habitat is considered to be an unavoidable impact under either development alternative (p 118, 131, 136, 139). Because of the importance of the area for denning, the adverse effects are mainly associated with the proposed port facilities (p 118, 136). The most prudent course of action for the conservation of Beaufort Sea Polar Bears would be the designation of the 1002 area as wilderness.

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Fish and Marine Mammals

Should development on the coastal plain proceed, it is likely that associated marine transportation and coastal development will impact the marine resources. Any future offshore development will compound these effects. Development of port facilities and near shore artificial islands would affect inshore migratory patterns of fishes and could change salinity patterns. Additionally, the 15 million gallons of fresh water required for development of each well will have some effect on the marine resources, both inshore and offshore. The effects upon shared fishery resources have not been assessed. However, it is known that five species of white-fish such as the Arctic Cisco migrate along the Alaska/Canada coast seasonally and are important subsistence food resources in both countries.

Coastal waters of the Beaufort Sea in Alaska are reported to contain sixty-two marine and anadromous fish species, including Arctic Charr and Arctic Cisco. Near shore waters and the brackish lagoon systems which provide migration corridors and feeding areas and are important spawning, rearing and over-wintering areas for some fish, are vulnerable to degradation resulting from coastal plain development. The effect upon the fisheries resources which are shared by Alaska and Canada have not been determined.

Thirteen species of marine mammals may occur off the coast of the Arctic Refuge. The four species of significance to Canada are Ringed Seal, Bearded Seal, Beluga Whale and Bowhead Whale. Most, if not all, constitute shared resources which are important in the subsistence economies of both countries.

The EIS concludes that marine mammals are not unduly affected by high levels of marine traffic and disturbance from oil and gas activity. However, the studies which relate are from site-specific research conducted at exploratory sites and may not be representative of the effects of full-scale development and exploitation. If such development occurs, this may become one of the most congested sea coasts in the Arctic with year-round open water transportation corridors. Beluga and Bowhead Whales migrate through these areas. Any impact and consequential reduction in the availability of Bowhead in Alaska would result in a compensatory increase in Beluga take which would adversely affect the Canadian harvest.

Contradictions in the Report

In reading the 1002 Assessment, the Canadian government is struck by the contradictions and inconsistencies between the Secretary's Recommendation (p 169-170) and the content of the preceeding parts of the document.

The Secretary's Recommendation	Impact as Forecast in the EIS
The CAH Comparison	
The Recommendation puts great emphasis on the situation at Prudhoe Bay noting that despite petroleum development "the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy" and that "the Central Arctic caribou herd has increased substantially during the period that development has occurred within the heart of its range" (p 169).	In contrast, the preceeding sections of the EIS stress: "Analogies comparing the effects of current oil development on the CAH [Central Arctic Herd] and effects of potential 1002 area development on the PCH must be drawn with caution. Movements, density, and traditions of the PCH differ from those of the CAH. Because of the greater density of PCH on their calving grounds, the PCH would interact with oil development much more extensively and intensively than the CAH has interacted with oil development in the Prudhoe Bay area" (p 106).
The Recommendation concludes that "Although circumstances within the 1002 area may be somewhat different, the evidence derived from the Prudhoe Bay experience leads one to be quite optimistic about the ability to explore	"Displacement of the CAH from historic calving grounds in response to oil development at Prudhoe Bay

for and develop the hydrocarbon potential of the 1002 area without significant deleterious effects on the unit's wildlife resources" (p 170).	has been documented" (p 107) and "The apparent herd increase has been attributed to high calf production and survival as well as relatively light hunting pressure" (p 106). The EIS continues: "Because some habituation would presumably have occurred, animals in the CAH may be more likely to cross an oil-field development than the PCH which would encounter such developments for only 2 or 3 months each year" (p 109).
Mitigation	
The Recommendation states that "most adverse environmental effects would be minimized or eliminated through mitigation" (p 170).	This is clearly not the case for the three key international species using the 1002 area. The EIS notes that "Mitigation of the loss of caribou habitat in Resource Category 1 (242,000 acres of core calving area) is not possible" (p 111) and that "even with effective mitigation, herd displacement or reduction could be as great as 20-40 percent" (p 144).

No specific mitigation measures are suggested for staging Snow Geese despite a predicted major impact for that species. Nothing in the Prudhoe Bay experience provides any basis for evaluating or mitigating the effects of the proposed activities on staging Snow Geese.

The single most important mitigation measure for Polar Bears, withdrawal of the Pokok port site, is not proposed.

Habitat Quality

The Recommendation states that: "Development would proceed with the goal of no net loss of habitat quality, and unnecessary adverse effects would not be allowed to occur" (p 170).

This statement is clearly at odds with the list on p 131, 132 of "Unavoidable Impacts" which includes:

"Loss of habitat values on approximately 78,000 acres of caribou core calving habitat....";

"Reduced use or avoidance of approximately 72,000 acres of insect relief habitat for caribou.";

"Probable loss of the eastern part of the 1002 area as denning habitat for polar bears."; and,

"Loss of habitat values from between 162,000 and 236,000 acres of snow goose preferred staging habitat within the 1002 area.".

Compensation

It is further noted in the Recommendation that the leasing program

"must ensure that any unavoidable habitat losses are fully compensated" (p 170).

Given the previous list of "unavoidable" losses of habitat quality, it is difficult to see how one could fully compensate for the long-term loss of up to 72,000 Porcupine Caribou and 60,000 Snow Geese. It is even more difficult to see how one could fully compensate for the loss of almost one third of the core calving area since the E.I.S. earlier notes that: "The Porcupine Caribou Herd (PCH) core calving area is considered unique and irreplaceable" (p 98).

"The FWS normally recommends that all losses of Resource Category 1 habitat be prevented, as these one-of-a-kind areas cannot be replaced". Since the goal of "no net loss of habitat quality" cannot be met, the "unnecessary adverse effects" should "not be allowed to occur". The recommendation for full leasing of the 1002 area appears to be based on several false assumptions of its likely impact on wildlife resources. From the EIS's own observations, it appears impossible to achieve the goal of no net loss of habitat.

Conclusion

The migratory wildlife populations that range between Canada and the United States are a special category of resource. They are not owned exclusively by either country; they are held in common by both. Each country, therefore, has obligations to conserve these stocks and their habitats so that the value of the wildlife to the other country is not unacceptably reduced.

This principle has guided cooperation in migratory bird management by Canada and the United States for 70 years, resulting in great economic and cultural benefits to both countries. The same principle applies to migratory caribou and shared stocks of Polar Bears, and fish.

On the evidence produced by the U.S. in the 1002 Assessment, petroleum development in that area of northeastern Alaska will cause major damage to migratory wildlife that range over that area and northwestern Canada. This damage could continue for 90 years. Canadian citizens have major and continuing subsistence, cultural and economic interests in these wildlife.

Petroleum development of the 1002 area will cause significant damage to major wildlife resources that Canada shares with the United States with unavoidable repercussions for subsistence users in Canada. These are the primary considerations which lead the Government of Canada to urge the Government of the United States to protect the 1002 area by establishing it as wilderness.

Canada-U.S. Consultations on the
U.S. Department of the Interior's Draft
"Arctic National Wildlife Refuge, Alaska
Coastal Plain Resources Assessment"
Ottawa
February 3, 1987

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Northwest Territories Renewable Resources

30 January 1987

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Arctic National Wildlife Refuge, Alaska
Coastal Plain Resource Assessment

Our government appreciates the opportunity to comment on the environmental impact assessment report on proposed hydrocarbon developments affecting the Arctic National Wildlife Refuge. We have several concerns and suggestions which are described in the enclosed "Statement by the Government of the Northwest Territories on the Arctic National Wildlife Refuge, Alaska Coastal Plain, Resource Assessment".

We acknowledge the importance of Arctic oil development in contributing to the safeguarding of national interests for future energy supplies. However, we believe that the scenario put forward for full scale hydrocarbon development within the national wildlife refuge poses serious international risks which have not been adequately addressed in the assessment report.

Our greatest concern relates to the predicted major impact on the Porcupine Caribou Herd due to disruption of key calving and insect-relief habitats. This is intolerable given the importance of this herd for domestic use by residents of the western Northwest Territories. Proposed development in the 1002 area would, therefore, seriously prejudice our government's management responsibilities as outlined in the U.S./Canada Porcupine Caribou Management Agreement initialled in December 1986.

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The polar bears inhabiting the Arctic National Wildlife Refuge and adjacent waters represent another significant resource shared by our countries and the need for cooperative management is recognized in the International Agreement for the Conservation of Polar Bears. We believe that the report does not fully explore the possible impacts on polar bear denning habitat due to oil spills, port and harbour development or related offshore developments.

Finally, the report overlooks the importance of the coastal plain area as a primary fall staging area for one-fifth of the total snow goose population which breeds on Banks Island, Northwest Territories. Given our shared management obligations for waterfowl, as defined in the Migratory Birds Convention and the North American Waterfowl Management Plan, we believe this constitutes a serious oversight in the assessment process.

Recognizing the Beaufort coastal zone as a common ecological unit, we welcome further opportunities to communicate our concerns and work together towards the long term protection of our shared wildlife resources.

J. W. Bourque,
Deputy Minister

Enclosure.

Statement by the

GOVERNMENT OF THE NORTHWEST TERRITORIES

on the

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA COASTAL PLAIN RESOURCE ASSESSMENT AND DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

submitted to

U.S. Fish and Wildlife Service, Division of Refuges,

DEPARTMENT OF THE INTERIOR
GOVERNMENT OF THE UNITED STATES OF AMERICA

Yellowknife, N.W.T.
January 1987

G.N.W.T. STATEMENT IN RESPONSE TO THE ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA COASTAL PLAIN RESOURCE ASSESSMENT

1. INTRODUCTION

The Department of Renewable Resources, Government of the Northwest Territories has responsibility for the management of wildlife under the authority of the N.W.T. Wildlife Act and pollution control under authority of the N.W.T. Environmental Protection Act. Actions by this department directly influence, and are influenced, by a large number of northern communities which are striving to maintain a viable renewable resource based economy. Maintenance of renewable resources is vital to the welfare of Dene, Inuit, Inuvialuit, Metis and non-native people throughout the north.

Departmental staff are charged with the responsibility of enforcing the Environmental Protection Act and managing wildlife populations and habitat, including caribou, muskoxen, and polar bear. In addition, government staff have played a major role in the development of the North American Waterfowl Management Plan, and have contributed to the management and research of geese.

The native peoples maintain special bonds to the land, and to the wildlife which derive their existence from the land. People who pursue traditional life-styles place high value on the opportunity utilize indigenous animal and plant life, life-styles which allow the reaffirmation of personal and community identity. Such opportunity allows the maintenance of traditional skills, provides for an important social and educational exchange between young and old, and perpetuates a sense of self reliance.

Everything in this world is connected to everything else, and the action taken by one party can affect many other parties. Wildlife are distributed over the land in response to their biological needs; they pay little attention to political boundaries. The wildlife resources of the North Slope are a shared resource. The management actions implemented by one country will unquestionably affect the other country.

The Arctic National Wildlife Refuge represents a significant part of the arctic ecosystem and currently supports major wildlife resources shared by the United States and Canada. The alteration

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of this area, whether abrupt or incremental, could adversely affect the peoples of Alaska, the Yukon, and the Northwest Territories. Clearly, the issue at hand is a transboundary one. The transboundary issues have not been adequately addressed by the Environmental Impact Statement.

2. CONCERNS

2.1 Agreement with YTG Submission

We have noted the issues raised by the Yukon Territorial Government in their presentation at the Public Hearings held in Kaktovik, Anchorage, and Washington, D.C. We share their main concerns, namely:

a) The insufficient attention paid to section 1005 of the Alaska National interest Lands Conservation Act (1980) that calls for official consultation about the 1002(h) Report. The G.N.W.T. was never consulted, nor were its agencies, native citizens or interest groups (such as the Beaufort/Mackenzie Delta Development Impact Zone Group);

b) The inadequate reference given by the Report to the potential cumulative impacts of the possible development in the whole Beaufort area.

c) The lack of acknowledgment by the report of the ecological responsibilities shared by both the U.S. and Canada to ensure that the coastal plain on both sides of the border is managed to meet conservation oriented objectives.

Moreover, the Government of the Northwest Territories has the following additional points to raise:

2.2 PLANNING AND COORDINATION MECHANISMS

The 1002(h) Report does not adequately address the mechanisms that would ensure the proper coordination needed between the development of nearshore and onshore environments. As the Department of Commerce has still not formally approved the North Slope Borough's Coastal Management plan under the Coastal Zone Management Act, the strategic framework to affect this coordination is absent.

2.3 WILDLIFE CONCERNS

We are distressed to read the statement on page 112 of the report concerning the Porcupine Caribou Herd stating that changes in habitat availability and value, combined with increased harvest could result in a major population decline and change in distribution of 20 to 40 percent, based on the amount of calving and insect-relief habitats to be adversely affected. This is an intolerable figure based on the International Porcupine Caribou Management Agreement initialled in December 1986 by both the Government of the Northwest Territories and federal government of Canada, as well as your Department.

While the Report acknowledges the potential impacts on the Porcupine Caribou herd, there is no mention of the importance of this herd for domestic use by the people of the western Northwest Territories. This is a particularly glaring omission in light of the above mentioned agreement to protect the herd and its habitat and its recognition of native use by Government of the Northwest Territories. As signatories to that Agreement, we are concerned to note the apparent lack of contact between the Secretaries of Department of Interior and State Department on this matter, not to mention contact with the signatories to the Porcupine Caribou Herd Management Agreement itself.

The Government of the Northwest Territories has offshore responsibilities in the Canadian Beaufort for wildlife management, particularly polar bear. The Beaufort population extends from Tukoyaktuk, Northwest Territories to at least as far west as Point Barrow, Alaska. While the oil companies are justifiably proud of their safety record (at least no major Arctic spills), the potential mortality from even a localized spill in a denning area could be serious. As well, port and harbor development to support coastal plain and related offshore development could lead to abandonment of denning areas.

Approximately 1/5 of the total snow goose population of Banks Island, Northwest Territories use the coastal plain as a staging site in the fall. This is not mentioned in the Report, nor is the obligation both nations share under the Migratory Birds Convention and North American Waterfowl Management Plan for the protection of the species and its habitat.

3. **CONCLUSION**

The 1002(h) Report admits the importance of the coastal plain area to the entire national wildlife refuge. While it is only a small portion (5 percent), this area is critical as a calving ground and insect-relief habitat for the Porcupine Caribou Herd, as migratory wildfowl and as denning grounds for polar bear. The full leasing alternative is unacceptable to our government.

The report includes optimistic projections about the potential for oil discovery (a 95 percent chance of the 1002 area containing 4.8 billion barrels in-place) and much is made of the need to safeguard the national interest for future oil supply. We agree that these are important considerations, but the transboundary risks inherent in proceeding with the full leasing alternative constitute unwarranted trade-offs.

The need for improved consultation between Canadian and U.S. interests in this area is apparent, particularly in ensuring that mutual obligations for wildlife and related habitat protection are met. The Government of the Northwest Territories must be involved in any cooperative natural resource management agreements that are struck, and policies and guidelines for development affecting shared resources should be agreed to jointly.

This 1002(h) area is arguably the most important part of the refuge from an ecological viewpoint. The extent of development proposed for this area and its potential impacts must be more carefully weighed before an irrevocable decision is made. We urge the acceptance of Alternative 5, wilderness designation.

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Stephen Fuller

Mailing Address Dept of Renewable Resources

10 Burns Road, Whitehorse YT

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☒ I am speaking for Gov of the Yukon

(please enter name of organization you represent)

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STATEMENT BY THE

GOVERNMENT OF THE YUKON

IN RESPONSE TO

DEPARTMENT OF INTERIOR

DRAFT ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

ANCHORAGE, ALASKA

JANUARY 5, 1987

Presented by:

S.P. Fuller, Policy Advisor

Department of Renewable Resources

GOVERNMENT OF THE YUKON PRESENTATION TO
THE DEPARTMENT OF INTERIOR DRAFT ANWR EIS HEARINGS
(Anchorage, Alaska, January 5, 1987)

Mr. Chairman, Panel Members, Ladies and Gentlemen.

Allow me to begin these remarks by sincerely thanking you for the opportunity to appear before you today. The Government of the Yukon appreciates the privilege you have provided in allowing us to make this presentation and we value greatly the growing spirit of cooperation that has developed between our two great regions. We trust that you will carefully consider both the general and specific concerns that we have identified during our review of the draft EIS.

In the time available today, I will briefly outline the highlights of our general concerns with the EIS, and I will be tabling a written text of my remarks as well as a more detailed written "interrogatory", containing specific technical observations and questions concerning a number of specific aspects of the EIS. We understand that the detailed materials will also form a part of the record of these proceedings, and that we can anticipate a written response to our questions in due course.

To begin, we would like to complement the authors of the report, for providing a succinct, well written exposition of the baseline environmental and socioeconomic data, the impact significance criteria and the summary comparisons of environmental effects and consequences. Although we are critical of some aspects of the EIS, we believe that the public review process and the nature of the discussion and inevitable debate is substantively aided, when options and opportunities are clearly evaluated in this matter. It certainly makes the job of external analysts such as ourselves far far easier and we sincerely appreciate that fact.

Our first major criticism of the EIS as it is now structured however, deals not with the present contents, but rather with several significant omissions.

In particular, although the EIS fairly identifies major or moderate impacts on the populations of caribou, snow geese and other waterfoul, polar bears and musk oxen, there is no adequate treatment of the transboundary consequences of those direct impacts. In each case the populations in question are shared with Canada either as a result of migration (in the case of caribou and waterfowl) or as an important constituent of a larger regional population (in the case of musk oxen and polar bear).

In both countries, these four species are valued for their subsistence use and for their intrinsic value as part of the diminishing wilderness resource of our continent. Yet the EIS establishes the significance of the impact solely on the basis of the effects of a population decrease in Alaska.

The best example of this deficiency is provided by the EIS discussion of the Porcupine Caribou Herd. The potential decrease in herd size of 20 - 40% due to impacts in the heart of the calving area, is very correctly described as a major impact, however, the effects in Old Crow and other largely subsistence-based communities in northern Canada are only given passing attention in an entirely separate portion of the report. Fully four-fifths of the subsistence use of the herd is estimated to occur in Canada and there is no treatment of the consequence of a major decline in herd size on such use.

Mr. Chairman, there are similar omissions in the treatment of snow geese, polar bear, and musk oxen, which we have elaborated in our background submission and I will not discuss further at this time. Rather, I want to emphasize with you that the EIS appears to nearly completely ignore transboundary effects and it cannot be considered complete until this omission is corrected. In particular the effects on northern native peoples and their hopes for the sustainable development of the renewable resource economies must be acknowledged.

In some ways, Mr. Chairman, we would be happy if this message was the only one we delivered to you today. In light of the principles and optimism that lead to the development of our domestic Porcupine Caribou Herd Management Agreement, and have formed the basis for our negotiations towards an international agreement with your country, we believe that transboundary cooperation on resource management problems and issues is fundamentally important. The present omissions from the EIS do not well serve our mutual interests and concerns.

The second fundamental deficiency in the EIS is the lack of acknowledgement of the cumulative effects of 1002 oil and gas development proposals with those of the various offshore OCS lease sales. Surely the consideration of the effects of the developments on several significant species cannot be considered to be adequately assessed unless these various proposals are

considered together. Incremental direct effects and the cumulative effects of habitat loss or modification should be evaluated, at least additively, before any judgements are made about the significance of impacts and the ultimate acceptability of those impacts.

In addition it is important that with respect to migratory waterfowl, snow geese in particular, it should be acknowledged that the 1002 lands are a critically important staging area, but are only one part of the habitat of the species. Consideration of the significance of cumulative effects should therefore acknowledge the potential for habitat loss in other portions of the habitat away from the north slope region. Most migratory waterfowl species are under considerable stress in the southern portions of their habitat and that habitat is increasingly reduced or circumscribed by human users. The potential for negative synergistic effects if such stress and habitat reduction is replicated in the north is considerable and must be considered in your analysis and decision making. We were quite encouraged to note that last year in the March 1986 issue of Ducks Unlimited's journal Assistant Secretary Horn acknowledged that it would be necessary to stop the continued loss of some 458,000 acres of habitat each year in the United States. In response to a question about the feasibility of the North American Waterfowl Management Plan's ambitious goal of an additional 5 million acres of protected habitat by the year 2000 he states that he was well aware that there was a need to "arrest the alarming loss of wetlands" and "to get the finger in the dike and stop the leaking". We suggest that full protection for the ANWR north slope would be a very fine way to achieve this.

The third major theme which we would like to stress with you today Mr. Chairman is primarily a procedural matter. Although there are several references to what apparently were informal consultations with various Canadian interests, there in fact, was no direct consultation with any community, interest group, or government agency. Such consultation was mandated in Section 1005 of the Alaska National Interest Lands Conservation Act, but even if it had not been prescribed in this manner the benefits of mutual cooperation on transboundary resource management questions are such that consultation should have occurred without recourse to legislation.

This point has been raised with your government on several recent occasions Mr. Chairman and a formal meeting between the Government of Canada and the Government of the United States will occur in the near future. While this will no doubt be a productive and meaningful session, which will meet the "letter of the law" in question, we would like to emphasize our interest in establishing early and continuing formal liaison on such questions in the future. The traditional knowledge of our native population and the scientific knowledge of our professional biologists should be shared on questions of this magnitude.

Mr. Chairman, in addition to our three basic concerns about transboundary effects, cumulative effects and the need for consultation, we would also like to report to you, a set of historical occurences that are both mildly ironic and disturbing in light of the recommendations in the draft EIS.

About the time of the passage of the ANILCA legislation, various international bodies, the United Nations included, were finalizing The World Conservation Strategy. The WCS is a development strategy with the complementary aims of encouraging sustainable development of resources, ensuring the protection of ecosystem integrity and maintaining species-specific genetic diversity. The WCS has been adopted by some 40 countries, including Canada, and at the time of the initiation of the WCS, the ANILCA legislation was considered a landmark, a significant tool that would substantively aid implementation of the WCS goals by protecting arctic ecosystems. In June of 1986 a major international conference on updating the WCS in Ottawa, recommended that the WCS would be improved if a circumpolar folio was added to the WCS, outlining the relative importance and necessity of viewing northern regions in an integrated and holistic manner, leading eventually to international agreements on the management of the very species in question here today. Unfortunately, oil and gas developments in the ANWR at the scale proposed in the draft EIS would be a significant step backwards in any effort to achieve such an objective.

At the present time in the Yukon we are working quite diligently, with other government agencies, both territorial and federal, towards the implementation of the WCS. This includes coordinating initial work on a northern circumpolar conservation strategy; working towards a Yukon Conservation Strategy; and initiating a local conservation strategy for Old Crow which covers much of the Canadian portion of the Porcupine River Basin.

Development of a conservation strategy in the Yukon and around Old Crow will do much to complement the substantive aspects of formal land use designations that have been achieved in recent years, to truly secure the future for internationally significant resources like the Porcupine Caribou herd. The new North Yukon

National Park, and environmental screening and review processes established as a result of our Inuvialuit Settlement Agreement have resulted in significant protection for the Canadian north slope. Such protection was sorely lacking until 1984; we lagged behind the progressive steps taken by your government when you established ANWR. It will indeed be ironic if the historical circumstances are reversed as a result of this draft EIS, leaving Canada with a more complete system of protection for the international north slope resources.

Finally, Mr. Chairman, we would like to restate that the draft EIS does not adequately report the international significance of the ANWR lands and resources. ANWR is nearly unique in the world, intended to protect a complete spectrum of undisturbed arctic ecosystems in North America; and the 1002 area is the heart of the most biologically productive part of ANWR. Given the biological richness of the area and the proposed scale of development under the proposed leasing scenario the potential adverse environmental effects are unprecedented and, with all due respect, unacceptable.

Although the draft EIS suggests that experience from the Prudhoe developments can be used to mitigate the effects of new developments, this suggestion is not correct. Such experience does not answer any questions about what will happen if the Porcupine Caribou herd is substantially displaced from the calving grounds and no alternative habitat of similar quality exists.

Mr. Chairman, it is the opinion of the Government of the Yukon that it is unacceptable for you to allow the proposed developments in the heart of the Porcupine Caribou herd's calving grounds, and that the draft EIS is deficient in asserting that such a displacement, which would lead to a decrease in herd size of 20 - 40% is in any respect acceptable.

Mr. Chairman, the writers of the Executive Summary of the EIS assert , (quotes) "development on the 1002 lands would proceed with the goal of no net loss of habitat quality and that unnecessary adverse effects would not be allowed to occur" (close quotes). We do not believe, given the exposition of facts in the main body of the EIS, and our own observations, that such a goal is even remotely achievable and the statement stands as a poor representation of the reality of the situation.

Mr. Chairman, there is a continuing need for more research, more examination of data, and hard decisions about the future of the 1002 lands. We believe that, at this time, you should decide in favour of increased and enhanced protection of 1002 lands. Cooperatively the governments of the United States of America, Canada, Alaska and the Yukon can protect one of the world's remaining truly wild places in perpetuity.

Thank you very much for this opportunity.

STATEMENT BY THE

GOVERNMENT OF THE YUKON TERRITORY

IN RESPONSE TO THE
DEPARTMENT OF THE INTERIOR
DRAFT ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT

WASHINGTON, D.C.
JANUARY 9, 1987

PRESENTED BY:

W.J. KLASSEN, DEPUTY MINISTER,
DEPARTMENT OF RENEWABLE RESOURCES
W. OPPEN, DIRECTOR, INTERGOVERNMENTAL RELATIONS BRANCH
EXECUTIVE COUNCIL OFFICE

GOVERNMENT OF THE YUKON PRESENTATION TO
THE DEPARTMENT OF INTERIOR DRAFT ANWR EIS HEARINGS
(WASHINGTON, JANUARY 9, 1987)

MR. CHAIRMAN, PANEL MEMBERS, DISTINGUISHED OBSERVERS, LADIES AND GENTLEMEN:

MY NAME IS WILLIAM J. KLASSEN. I AM THE DEPUTY MINISTER OF THE DEPARTMENT OF RENEWABLE RESOURCES FOR THE GOVERNMENT OF THE YUKON. OUR DEPARTMENT HAS THE PRIMARY RESPONSIBILITY FOR MANAGEMENT OF THE PORCUPINE CARIBOU HERD WHEN IT IS PRESENT ON THE CANADIAN SIDE OF THE ALASKA/YUKON BORDER.

WITH ME TODAY IS MR. WILLIAM OPPEN, THE DIRECTOR OF THE INTERGOVERNMENTAL RELATIONS BRANCH OF THE YUKON GOVERNMENT'S EXECUTIVE COUNCIL OFFICE. MR. OPPEN HAS THE PRIMARY RESPONSIBILITY FOR LIAISON BETWEEN OUR GOVERNMENT AND OTHERS.

WE WOULD LIKE TO BEGIN OUR REMARKS TODAY BY THANKING YOU FOR THE OPPORTUNITY TO MAKE THIS PRESENTATION. THE RESOURCES OUR TWO COUNTRIES SHARE ALONG THE ALASKA/YUKON BORDER ARE CRITICALLY IMPORTANT TO THE PEOPLES OF THE YUKON SO WE ARE TRULY THANKFUL FOR THE PRIVILEGE OF REPRESENTING OUR INTERESTS IN THESE MATTERS.

IN THE TWO PREVIOUS HEARINGS THIS WEEK IN KAKTOVIK AND ANCHORAGE, THE DEPARTMENT OF THE INTERIOR HAS HEARD PRESENTATIONS BY PROFESSIONAL STAFF OF OUR DEPARTMENT, FROM THE PEOPLE AND ELDERS OF THE COMMUNITY OF OLD CROW, FROM OUR PORCUPINE CARIBOU MANAGEMENT BOARD, AND FROM THE COUNCIL FOR YUKON INDIANS. AS WELL, TODAY, WE ARE TABLING A TECHNICAL ANALYSIS OF THE DRAFT EIS.

WE ARE HERE TODAY TO REPEAT AND REINFORCE THE COMPLEMENTARY MESSAGES IN THESE DIFFERENT PRESENTATIONS - AND TO URGE YOU TO RECONSIDER THE RECOMMENDATIONS FOR FULL DEVELOPMENT CONTAINED IN THE DRAFT EIS. WE SINCERELY BELIEVE THAT CRITICAL WILDLIFE HABITATS AND RESOURCES ON THE ALASKAN AND CANADIAN NORTH SLOPE SHOULD BE STRONGLY PROTECTED, AND THAT THE NORTH SLOPE ITSELF SHOULD BE MANAGED ACCORDING TO CONSERVATION-ORIENTED OBJECTIVES. ANY DEVELOPMENT IN THIS REGION SHOULD BE PERMITTED ONLY IF IT WOULD NOT CONFLICT WITH THE CONSERVATION OF THE WILDLIFE RESOURCES.

WE FURTHER BELIEVE THAT REASONS FOR PROTECTING THE 1002 LANDS ARE FAR MORE COMPELLING THAN THE OFTEN LIMITED TECHNICAL REASONS

FORWARDED IN THE REPORT. ALTHOUGH THE DRAFT EIS DOES IDENTIFY THE TRADEOFFS WHICH WOULD BE REQUIRED TO ALLOW FULL DEVELOPMENT IN THE 1002 LANDS, IT DOES NOT ADEQUATELY ADDRESS THE TANGIBLE REALITY THAT THE MOST HEAVILY IMPACTED SPECIES ARE TRANSBOUNDARY RESOURCES OF CONSIDERABLE INTERNATIONAL SIGNIFICANCE.

WITH RESPECT TO THE PORCUPINE CARIBOU HERD, FOR EXAMPLE, A MAJOR IMPACT IS IDENTIFIED DUE TO THE ENCROACHMENT OF DEVELOPMENT INTO THE HEART OF THE CALVING GROUNDS. THE EIS SUGGESTS THAT SUCH AN ENCROACHMENT COULD LEAD TO A 20-40% REDUCTION IN THE SIZE OF THE CARIBOU HERD. FOR THAT REASON ALONE, WE BELIEVE THAT ANY SUCH IMPACT SHOULD BE CONSIDERED ENTIRELY UNACCEPTABLE. HOWEVER, WE FURTHER BELIEVE THAT THE DRAFT EIS CONSIDERABLY UNDERESTIMATES THE SIGNIFICANCE OF A REDUCTION OF THAT MAGNITUDE TO THE SUBSISTENCE USERS OF THE HERD, WHO ARE PRIMARILY LOCATED IN COMMUNITIES IN CANADA INCLUDING OLD CROW IN THE YUKON AND FORT MCPHERSON, ARCTIC RED RIVER, AKLAVIK, INUVIK AND TUKTOYAKTUK IN THE NORTHWEST TERRITORIES. BY IGNORING SUCH TRANSBOUNDARY EFFECTS THE DRAFT EIS IS FUNDAMENTALLY FLAWED.

WE ALSO MUST VOICE OUR CONSIDERABLE DISAGREEMENT WITH THE WRITERS OF THE EXECUTIVE SUMMARY WHO SUGGEST THAT DEVELOPMENTS ON THE CARIBOU CALVING GROUNDS CAN BE UNDERTAKEN WITH NO NET LOSS OF HABITAT QUALITY. SUCH A STATEMENT CONTRADICTS THE MAIN BODY OF THE DRAFT EIS AND WE BELIEVE SUCH AN ACHIEVEMENT IS LIKELY IMPOSSIBLE.

WE HAVE SIMILAR CONCERNS ABOUT THE OTHER SIGNIFICANT TRANSBOUNDARY SPECIES.

THE MUSKOXEN PRESENT IN ALASKA ARE SLOWLY REPOPULATING THE ARCTIC NATIONAL WILDLIFE REFUGE AREA AS WELL AS THE NORTHERN YUKON, WHERE THEY WERE EXTIRPATED DURING THE LAST CENTURY. THIS IS A VALUABLE AND IMPORTANT OCCURENCE WHICH SHOULD BE PERMITTED TO CONTINUE.

THE MIGRATORY SNOW GEESE POPULATIONS, WHICH USE THE 1002 LANDS AS AN IMPORTANT STAGING AREA, ARE ALSO UNDER CONSIDERABLE THREAT FROM THE PROPOSED DEVELOPMENTS, AND THERE IS VERY LITTLE ACKNOWLEDGEMENT OF THE INTERNATIONAL IMPORTANCE OF THE SPECIES.

HOWEVER, WE DO NOTE THAT THE DEPARTMENT OF THE INTERIOR RECOGNIZES THE IMPORTANCE OF WATERFOWL HABITATS. WE WERE VERY ENCOURAGED TO READ IN A RECENT ISSUE OF THE DUCKS UNLIMITED JOURNAL THAT ASSISTANT SECRETARY HORN IS WELL APPRISED OF THE

INTERNATIONAL SIGNIFICANCE OF WATERFOWL HABITATS SUCH AS THE ARCTIC NATIONAL WILDLIFE REFUGE NORTH SLOPE. WITH REFERENCE TO THE NORTH AMERICAN WATERFOWL MANAGEMENT PLAN, WHICH HAS THE GOAL OF PROTECTING AN ADDITIONAL FIVE MILLION ACRES OF HABITAT BY THE YEAR 2000, ASSISTANT SECRETARY HORN STATED THAT "THE PLAN GOES AFTER HABITAT ACQUISITION SO THAT WE CAN START TO BUILD HABITAT BACK UP, ONE OF THE CRITICAL ELEMENTS IN HELPING PUT OUR WATERFOWL POPULATIONS BACK TOWARD THE 100 MILLION LEVEL. THE OBJECTIVE NOW IS TO GET THE FINGER IN THE DIKE AND STOP THE LEAKING". IN OUR OPINION, PROTECTING THE ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN WOULD DO MUCH TO ACHIEVE THIS.

SIMILARLY, POLAR BEARS PRESENT IN THE AREA ARE PART OF A LARGER REGIONAL POPULATION THAT SHOULD BE ASSESSED IN A MORE COMPREHENSIVE MANNER THAN THAT PROVIDED IN THE DRAFT EIS.

CARIBOU, POLAR BEAR, WATERFOWL AND OTHER MIGRATORY SPECIES PLAY A CRUCIAL ROLE IN THE SUBSISTENCE ECONOMIES OF THE LARGELY NATIVE COMMUNITIES IN THE YUKON AND IN THE NORTHWESTERN CORNER OF THE NORTHWEST TERRITORIES. IN RECENT YEARS WE HAVE BEGUN TO BETTER MANAGE THESE SPECIES, BOTH FOR THEIR OWN SAKE AND TO ENSURE THAT THE SUBSISTENCE ECONOMY IS SUPPORTED IN A MANNER WHICH CAN BE SUSTAINABLE INTO THE FUTURE. THESE MEASURES HAVE INCLUDED THE ESTABLISHMENT OF THE NORTH YUKON NATIONAL PARK AND HERSCHEL ISLAND TERRITORIAL PARK AND THE SETTLEMENT OF THE INUVIALUIT LAND CLAIM, WHICH ESTABLISHES A CONSERVATION-ORIENTED REGIME FOR MANAGEMENT OF THE YUKON'S NORTH SLOPE. IN ADDITION, THE GOVERNMENTS OF CANADA, THE NORTHWEST TERRITORIES AND THE YUKON GOT TOGETHER WITH NATIVE INTERESTS TO CREATE AN IN-CANADA AGREEMENT ON MANAGEMENT OF THE PORCUPINE CARIBOU HERD. THIS AGREEMENT HAS BEEN IMPLEMENTED THROUGH THE PORCUPINE CARIBOU MANAGEMENT BOARD. IT IS WORTH POINTING OUT THAT THE STIMULUS FOR MANY OF THESE MEASURES WAS THE CREATION OF THE ARCTIC NATIONAL WILDLIFE REFUGE IN 1980, AND OTHER CONSERVATION MEASURES ENACTED IN ALASKA.

THESE LAND ALLOCATIONS AND MANAGEMENT STRUCTURES HAVE BEEN PUT IN PLACE TO PROTECT HABITAT FOR PORCUPINE CARIBOU AND OTHER SPECIES, AND TO ENSURE AN APPROPRIATE, SUSTAINABLE ALLOCATION OF THE HARVEST IN THE REGION. THEY ARE AN ACKNOWLEDGEMENT OF THE DEPENDENCE OF THE PEOPLE OF OLD CROW ON THE HARVEST OF THE PORCUPINE CARIBOU HERD AND AN ACKNOWLEDGEMENT OF THE CONSIDERABLE IMPORTANCE OF THE HERD, GENERALLY, TO THE PEOPLE OF THE YUKON, THE NORTHWEST TERRITORIES AND CANADA. IN ADDITION, THEY ARE AN

INDICATION OF OUR GOVERNMENT'S STRONG COMMITMENT TO THE IMPLEMENTATION OF THE WORLD CONSERVATION STRATEGY.

MR. CHAIRMAN, NONE OF THESE VERY SIGNIFICANT FACTORS ARE IDENTIFIED IN A MEANINGFUL WAY IN THE DRAFT EIS, WHICH NONETHELESS PROPOSES TO IMPOSE A DRASTIC REDUCTION IN THE SIZE OF THE HERD THAT WILL POTENTIALLY HAVE A HUGE EFFECT ON OUR PEOPLE AS WELL AS YOURS.

MR. CHAIRMAN, ALL OF THE SPECIES AT RISK FROM THE PROPOSED DEVELOPMENT HAVE BOTH UTILITARIAN AND INTRINSIC VALUE AS PART OF THE ARCTIC ECOSYSTEM. THEY ARE INTERNATIONALLY SIGNIFICANT AND FIGURE HIGHLY IN THE NORTH AMERICAN UNDERSTANDING OF THE IMPORTANCE OF ARCTIC REGIONS. PROTECTING COMPLETE ARCTIC ECOSYSTEMS WAS THE PRIMARY VISION OF THOSE WHO DEVELOPED THE ARCTIC NATIONAL WILDLIFE REFUGE AND WHO LATER HELPED TO CONVINCE THE GOVERNMENT OF CANADA TO PROCEED WITH COMPLEMENTARY PROTECTION MEASURES. IT WOULD INDEED BE EXCEPTIONALLY UNFORTUNATE IF THIS VISION WERE FORSAKEN, BASED ON AN INCOMPLETE ASSESSMENT OF THE VALUES OF THE REGION.

MR. CHAIRMAN, IN OUR VARIOUS PRESENTATIONS THIS WEEK WE HAVE POINTED OUT A RANGE OF PROBLEMS WITH THE DRAFT EIS: WE HAVE TECHNICAL CONCERNS ABOUT ASPECTS OF THE INTERPRETATION OF BIOLOGICAL DATA; WE HAVE DISAGREEMENTS WITH THE RATING OF THE SIGNIFICANCE OF SOME IMPACTS; AND WE ARE DISTURBED BY THE TRADEOFF THAT HAS BEEN CHOSEN BY THE AUTHORS OF THE DRAFT EIS. PARTICULARLY IN THE LATTER CASE THERE IS A FAILURE TO ACKNOWLEDGE THE TRANSBOUNDARY EFFECTS OF DEVELOPMENT. WHEN ONE CONSIDERS FURTHER THAT THERE IS NO ASSESSMENT OF THE CUMULATIVE EFFECTS OF DEVELOPMENTS ON 1002 LANDS WITH THE PROPOSED DEVELOPMENTS ON THE OUTER CONTINENTAL SHELF LEASE SALES OR OTHER POTENTIAL DEVELOPMENTS OR ACTIVITIES IN ALASKA AND THE IMMEDIATELY ADJACENT AREAS OF CANADA, ONE CAN ONLY CONCLUDE THAT THE DRAFT EIS DOES NOT PROVIDE AN ADEQUATE ASSESSMENT OF THE NEGATIVE CONSEQUENCES OF DEVELOPMENT.

WE WOULD ALSO ADD THAT IF WE CONSIDER THIS UNDERESTIMATE OF ENVIRONMENTAL EFFECTS IN LIGHT OF THE EXTREMELY PROBLEMATIC NATURE OF THE ENERGY RESOURCE ESTIMATES, WE ARE NOT CONVINCED THAT THE TRADEOFF PROPOSED IN THE DRAFT EIS IS EITHER A REALISTIC OR A COMPLETELY FAIR EXPOSITION OF ALL THE FACTORS AT RISK IN THE SITUATION.

THE CUMULATIVE EFFECTS OF SEVERAL DEVELOPMENTS COULD ONLY BE DEALT WITH THROUGH JOINT PLANNING WITH ALL RESOURCE USERS ON BOTH SIDES OF THE BORDER. THIS RAISES THE ISSUE OF CONSULTATION WITH OUR GOVERNMENT AND OTHER CANADIAN JURISDICTIONS. ALTHOUGH REQUIRED UNDER SECTION 1005 OF THE ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT, NO CONSULTATIONS WITH OUR GOVERNMENT OR OTHER CANADIAN AGENCIES, INTEREST GROUPS OR NATIVE ORGANIZATIONS OCCURRED. IN THE HEARINGS IN ANCHORAGE ON THE OFFSHORE LEASE SALES, WE MADE AN INTERVENTION IN WHICH WE EXPRESSED OUR CONCERNS ABOUT THE LACK OF CONSULTATION WITH AGENCIES IN CANADA. WE WOULD LIKE TO EMPHASIZE THAT SAME CONTINUING CONCERN HERE TODAY. ONLY BY ACTIVE AND ONGOING CONSULTATIONS BETWEEN OUR JURISDICTIONS CAN WE ENSURE COORDINATED AND CONSISTENT MANAGEMENT OF THE TRANSBOUNDARY RESOURCES THAT WE SHARE. THE GOVERNMENT OF CANADA, THROUGH THE FEDERAL DEPARTMENT OF EXTERNAL AFFAIRS, HAS FORMALLY REQUESTED A MEETING OF UNITED STATES, ALASKAN, YUKON AND FEDERAL CANADIAN OFFICIALS TO FULFILL THE REQUIREMENTS OF SECTION 1005. ALTHOUGH IT HAS NOT BEEN CONFIRMED, IT IS OUR UNDERSTANDING AT THIS TIME THAT THE MEETING MAY BE HELD LATER THIS MONTH IN OTTAWA.

TO SUM UP, MR. CHAIRMAN, WE HAVE THREE MAIN CONCERNS WITH THIS EIS. FIRST, WE WOULD NOTE THAT, DESPITE THE REQUIREMENTS OF SECTION 1005 OF ANILCA, NO CANADIAN GOVERNMENTS, AGENCIES, NATIVE GROUPS, ENVIRONMENTAL GROUPS OR OTHER INTEREST GROUPS WERE OFFICIALLY CONSULTED ABOUT THE 1002 REPORT. SECOND, THE EIS DOES NOT ADEQUATELY CONSIDER THE POTENTIAL CUMULATIVE EFFECTS OF THE VARIOUS DEVELOPMENT POSSIBILITIES IN THE ALASKAN NORTH SLOPE AND THE ADJOINING CANADIAN LANDS AND WATERS. THIRD, THE RECOMMENDATIONS IN THE EIS DO NOT REFLECT THE BROADER ECOLOGICAL RESPONSIBILITIES THAT OUR GOVERNMENTS SHARE TO ENSURE THAT THIS GLOBALLY-SIGNIFICANT WILDLIFE RESOURCE IS MANAGED TO MEET CONSERVATION-ORIENTED OBJECTIVES.

IN VIEW OF THESE AND OTHER CONCERNS WE HAVE RAISED, MR. CHAIRMAN, WE WOULD STRONGLY URGE THE DEPARTMENT OF THE INTERIOR TO RECONSIDER THE SUBSTANCE AND THE CONCLUSIONS OF THIS DRAFT EIS. THE RESOURCES AT RISK ON THE 1002 LANDS ARE NOT SIGNIFICANT SOLELY FROM AN ALASKAN PERSPECTIVE. THEY ARE ALSO OF CONSIDERABLE SIGNIFICANCE TO CANADA AND HAVE WELL-ACKNOWLEDGED INTRINSIC INTERNATIONAL SIGNIFICANCE, AND SHOULD BE MANAGED ACCORDINGLY. IN THE LAST 15 YEARS, BOTH IN ALASKA AND IN CANADA SIGNIFICANT STEPS HAVE BEEN TAKEN TO PROTECT THESE RESOURCES. IN OUR OPINION, HOWEVER, THE FULL-LEASING ALTERNATIVE RECOMMENDED IN THE DRAFT EIS WOULD BE A STEP IN THE WRONG DIRECTION.

THANK YOU VERY MUCH FOR THIS OPPORTUNITY.

Not Man Apart

Superfund comes through

After years of wrangling over where the taxes for toxic waste cleanup would come from, both Houses of Congress in early October passed, by overwhelming margins, a joint conference bill creating an $8.5 billion "Superfund" program for cleaning up abandoned hazardous waste dumps.

This year's Superfund bill, which is supported by environmentalists as well as chemical companies and chemical cleanup firms, provides five times as much money as the original Superfund created in 1980, which raised $1.6 billion. Environmental lobbyist Dan Becker of Environmental Action called it "a great improvement" over the previous program because it carries stricter standards for cleanup, including a requirement that all contaminants at the sites be rendered harmless, among other strengthening provisions.

The compromise bill is many months in the making, having passed the Senate on Sept. 26, 1985 and the House Dec. 10, 1985. The primary difference between the two versions was who would pay for the $8.5 billion, 5-year program. The House bill put much of the burden on the petrochemical industry, the Senate bill on all industry. The final conference agreement calls for getting $2.75 billion from a tax on petroleum, $1.4 billion from a tax on chemical feedstocks, $2.5 billion from a broad-based industrial tax, $1.25 billion from general revenues, and $600 million from interest and from companies responsible for toxic dumps.

Environmentalists consider it a victory because it strengthens the cleanup program in various ways. The bill prohibits transferring of wastes from one site to another and imposes liability provisions for polluters by extending responsibility for cleanup (to haulers, producers and others liable) for as long as the wastes remain toxic. There are also statutes to allow citizens to sue polluters in federal court (instead of just state courts), as well as strong "right to know" provisions requiring companies to disclose what chemicals are at their sites. In a provision that industry fought hard against, the bill also specifies that cleanup sites cannot violate *any other* environmental laws.

Despite the broad support of Senate and House Republicans for "Superfund," President Reagan is threatening to veto the bill. Because the bill was approved by the Senate just before the end of the session, there exists the possibility that Reagan might use a "pocket veto" against Superfund. By the Constitution, the President has 10 days to either sign or veto a bill sent to him by Congress. But *if Congress is not in session* when the ten days are up, the bill fails to become a law.

Republicans are especially worried that the President's veto would be perceived as Republican opposition to what is generally a very popular bill—and therefore hurt their chances for re-election. Some house members have asked their leadership to delay adjournment to stop such a move. This would be unusual in general, and especially unlikely in an election year with Congressmen anxious to return home and campaign.

—Mark Nelson and Mary Mehdiur

Hazardous waste cleanup can't go forward without Superfund.

Landmark Hydroelectric Bill Protects Fish and Wildlife

For the first time, the government is mandated to give "equal consideration" to such concerns as fish and wildlife, energy conservation and recreation in licensing hydroelectric power plants. At the close of the 99th Congress, both houses forwarded to the President a bill (S.426) making these and other major environmental reforms in the hydroelectric power program administered by the Federal Energy Regulatory Commission (FERC).

For 66 years the FERC and its predecessor, the Federal Power Commission, have conducted hydro dam licensing with a power first and an environment last approach. Environmentalists have regarded the agency's actions as contributing significantly to large-scale declines in the once great fisheries of the Pacific Northwest and New England. Too often, for questionable power benefits, it has allowed the destruction of recreational and scenic river areas and sometimes major adverse impacts on wildlife.

This legislation now makes environmental *protection an explicit statutory responsibility* of FERC's licensing program. Also, the bill greatly enhances the stature of state and federal fish and wildlife, natural resource and regional planning agencies in setting the terms under which hydroelectric dams and water diversions are built and operated.

For non-utility type projects as proposed new dams where power is sold to utilities under special marketing incentives of the 1978 Public Utility Regulatory Policies Act (PURPA), projects must meet a series of new environmental tests, including mandatory conditions set by fish and wildlife agencies, a finding that they are not located on state scenic rivers or protected areas, and that projects must not have "substantial" environmental impacts. PURPA Projects with already filed license applications are *exempt from new tests but they,* like all others, must meet a new more stringent round of fish and wildlife reviews.

At this writing, it is expected that President Reagan will sign the bill into law. Strong credit goes to Reps. John Dingell (D-MI) and Edward Markey (D-MA), leaders of the House Energy and Commerce Committee, and to Sen. Dan Evans (R-WA) of the Senate Energy and Natural Resources Committee for the roles they played in securing these environmental provisions in the bill.

—David Conrad

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From the editor

Political Purity

In a Doonesbury cartoon last month, political candidate Clyde challenged Lacey Davenport to a drug test, swearing to fight a "clean campaign." "Friends, I have come to give a specimen!" he shouted to cheering crowds.

Life imitated the Cartoon in election campaigns this fall, as candidates crusaded against cocaine kingpins and Crack users and extolled the massive drug bill that rolled up and down Capitol Hill like a ball of snow—no pun intended—reaching $1.8 billion in a matter of weeks.

Drugs, to be sure, are a terrible menace and the number of victims is growing at a runaway rate. But why should this election-eve bill, the effectiveness of which many question, be the crowning achievement of the session? Plus, as bad as the drug problem is, it's certainly not the only life-and-death issue facing voters.

Drugs might be the "destroyers of Youth," but then what are the countless chemicals that the government admits are leaking from hazardous waste dumps into drinking water supplies, or the thousands of pesticides that go untested by the government but which find their way into our fruits and vegetables? Just because the results of Crack are more visible and instantaneous doesn't mean that environmental carcinogens—the effects of which take 20 or 30 years to show up—aren't every bit as deadly. Yet as David Baker points out in this issue, key environmental laws have failed to make headway in this Congress.

Why don't politicians go after the current "decadence" toward environmental protection with the fervor Congress went after drugs or the fury that Ed Meese went after pornography? What do environmentalists have to do to give a high profile to their issues? One couldn't ask for more wholesome, All-American campaign material: The right to breathe clean air and drink clean water, to protect the health of the children and the unborn. Yet despite the conservative climate, wholesomeness doesn't sell these days. The drug bill called for the death penalty for drug dealers, and, though liberals predicted this clause would kill it, that didn't seem to.

If legislation has to have a Rambo rhythm to move, why don't environmentalists call for hanging corporate polluters by their thumbs, public flaying for midnight dumpers? Why not adapt the Supreme court ruling on sodomy to prosecute polluters for "crimes against nature?"

Environmentalism, in all seriousness, ought to adopt some of the same moral outrage that conservatives have applied to campaigns against smut. They ought to be waging war against the "perversion" of pollution laws, to strengthen the fiber of the laws already on the books, and to strictly punish offenders. One encouraging sign is EPA's crackdown on toxic crime (see the story in this issue), with its new swat teams to put corporate polluters behind bars. Amen. Let's send the perverts to prison!

—F.L.

FOE Hires New Executive Director

We're pleased to announce the hiring of Cynthia E. Wilson as the new Executive Director of Friends of the Earth. She becomes the first woman to head FOE and will be the only woman member of the so-called "Group of Ten" environmental leaders.

Ms. Wilson, who began work on October 1, has been involved with environmental issues since 1965 and has worked for citizens' groups and the government. "I'm looking forward to helping FOE become the best, most hard-hitting environmental group in the country," she said. "I've worked with FOE's staff over the years and know what a great organization this is. The task before me is straightforward: to get us back on sound financial footing so that FOE's staff can concentrate 100 percent on conservation issues."

As head of the Washington, D.C office of the National Audubon Society from 1969 to 1977, Cynthia worked extensively on pesticides, predator control (the Compound 1080 case), the passage of the Endangered Species Act, and the Federal Lands Management Policy Act (FLMPA).

She also served as Assistant to Secretary of the Interior Cecil D. Andrus from 1977 to 1981. While at Interior Wilson coordinated the Department's role in the successful Alaska Lands campaign. Over 100 million acres of federal land were ultimately designated as new national parks and wilderness.

Cynthia Wilson

Since leaving the federal government in 1981, she has worked as an environmental consultant, opposing efforts to weaken the Endangered Species Act and the Alaska Lands Act. Most recently, Wilson completed work for the American Society of Landscape Architects.

Cynthia takes over the reins from Acting Director Geoff Webb, who returns to his former position as Conservation Director. "I'm very glad to have Cynthia on board," said Webb. "FOE needs someone with her experience, talent, and energy." Webb will oversee international campaigns on acid rain, nuclear power and tropical deforestation.

Not Man Apart

. . . the greatest beauty is organic wholeness, the wholeness of life and things, the divine beauty of the universe. Love that, not man apart from that . . .
—Robinson Jeffers

[illegible]

FRIENDS OF THE EARTH
530 7TH STREET S.E.
WASHINGTON, D.C. 20003

NEWS BRIEFS

Nuclear Liability Bill Stalls

For years Anti-nuclear activists have argued that the present $665 million cap on liability for nuclear power facilities is a gross underestimate of the potential costs of a serious nuclear accident. The Chernobyl accident, for example, has resulted in an estimated $2.5 billion in property damages alone. Legislation to amend the Price- Anderson Act, which sets the cap on liability, failed to win approval in this Congress.

A House bill would have raised the liability cap to $6.3 billion, but some congresspersons wanted to try and increase the utilities' liability every five years to account for inflation. The proposed amendments would have required too much time on the floor of the House, and, with Congress trying to adjourn for the year, the Rules Committee decided to postpone the issue until next year. Environmentalists have been pushing for unlimited liability, with each utility, in the event of an accident, putting up $5 million a year until all damages are paid.

Lost Worlds

Despite the popularity of Banana Republic clothing stores and Harrison Ford movies, students' understanding of geography seems to be appalling. That's why the National Geographic Society is budgeting $4 million to improve geographic education, they are giving geographic methods workshops to high-school instructors and school-year pilot programs in Washington, DC, and Los Angeles, according to *Newsweek*. Two years ago, college students surveyed in various states displayed their dismal geographical knowledge by locating Africa in North America, put the "state" of Atlanta next to North Carolina and the USSR on the border of Panama.

Robots to the Rescue

Recognizing the limits of their own intelligence, the Tennessee Valley Authority (TVA) regards "artificial intelligence" as the way to save nuclear power. The publicly owned utility invested heavily in nuclear power, but its seven nuclear plants have been shut down due to safety problems.

In the fall issue of TVA's journal, Robert E. Uhrig a scientist at Oak Ridge National Laboratory, argues that an "expert" computer system could have saved Three Mile Island because it could "diagnose the unexpected and perplexing behavior of the plant." Uhrig goes one to say that "artificial intelligence" can "give operators [of nuclear plants] the assistance they need to handle any unforeseen difficulties."

NMA wonders if "any unforeseen difficulties" includes earthquakes, consumer rate shock, or the political fallout from Chernobyl.

Wind Energy Gusts to New High

Between January and May of 1986, windfarms in California produced 581 million kilowatt-hours of electricity, enough to supply 60,000 California homes with electricity for a year, according to Tom Gray, Executive Director of the American Wind Energy Association (AWEA). It would require 600,000 barrels of oil to produce the same amount of electricity, which would release an estimated 3.8 million pounds of pollutants into the atmosphere.

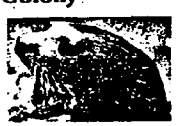
According to AWEA, windpower output in this period more than doubled the amount produced last year during this same time. Mr. Gray estimates that windpower could eventually supply more than a million kilowatt-hours, the equivalent of 40 percent of current U.S. demand.

Dupont Favors Controls on CFCs

Recognizing the adverse effect of chlorofluorocarbons (CFCs) on the atmospheric ozone layer, the Dupont Company in October came out in favor of worldwide limits on production of the chemicals. Dupont claims that there is an immediate threat to the ozone layer from current use of CFCs, but acknowledged that science had not defined a safe level of production of CFCs. Scientific consensus is that CFCs used as refrigerants, do deplete the ozone layer, and furthermore, contribute heavily to the "greenhouse effect" that is causing global warming. The Company, which invented the chemicals produces 20 to 25 percent of the world's CFCs.

FWS Proposes Reserve Sea Otter Breeding Colony

The California sea otter, a threatened species making a slow recovery from gill net fishing and oil spills in their limited range may soon get a break. The U.S. Fish and Wildlife Service (FWS) has proposed, to the applause of environmentalists, to relocate a limited number of sea otters to remove San Nicolas Island to establish a protected reserve breeding colony. Explains Martha Naley of FWS's California Outer office, "there is a significant possibility of a major kill from an oil spill at any time." Conservationists are urging FWS to move quickly. The measure is opposed by some shellfishing industry representatives because otters eat shellfish.



*WHAT YOU CAN DO: Send your comments by November 17 to Sea Otter Comments, U.S. Fish and Wildlife Service, Suite 1692, 500 N.E. Multnomah Street, Portland OR 97232.

—*John Moore*

Guest Editorial

Coming of age In Bio-topia

By Peter Berg

What's "bioregionalism?" A new movement that originated in California about 10 years ago, its overarching goal is to rekindle a sense of place and an awareness of human communities' opposing within natural systems, regardless of the political boundaries which they live. Peter Berg, one of the founders, sees this utopian philosophy as the most practical basis for ecological activism, in an essay composed upon returning from last summer's Ninth American Bioregional Congress.

Around a decade ago, the environmental movements began to succeed at establishing legal credibility for basic issues like clear air and clean water. But then the question became: Would that credibility actually lead to building an ecologically based society?

Some activists didn't think so; it seemed to them that the future of that kind of environmentalism would find its limit at lobbying court cases. Rather than forging new social bodies, one-time volunteers tended onto writing checks to support lawyers pursuing suits against polluters. There needed to be, instead, a "pro-active" path for eventually putting ecological considerations at the center of social, economic and cultural decisions.

Ten years ago, roughly, also marked the birth of the concept of "bioregions" and "re-inhabiting," one's chosen home. A "bioregion" was defined in terms of an area's watersheds, native plants and animals, soils, climate and other natural features. Bioregionalists sought to relate these to basic human needs such as food, water, energy and shelter in locally self-reliant and sustainable ways.

The idea was: If we can recognize and adapt to the natural systems of bioregions, we can "re-inhabit" them in a similar spirit to the continents' original natives. We can then sustain ourselves without destroying the life-places that ultimately support us. Failing to do this as industrial society has done, will eventually lead to destroying the entire planetary biosphere.

Working on local issues close to home, bioregionalists are addressing, in a different way, issues tackled by national conservation groups. Take just one: extinction of the prairie.

Within a 500-mile radius of Kansas, amid the vast stretches of land devoted to corn and soybeans agribusiness, there might only be several acres of wilderness prairie left. Most visitors to the Midwest don't even know the difference between the real prairie with its wild grasses and flowers and a sorghum field.

While groups like the Audubon Society have pushed for legislation to protect the Tallgrass Prairie, the Kansas Area Watershed Council (KAW) in the Prairies bioregion has focused on putting residents in touch with the native prairie through nature and cultural awareness programs. KAW teaches participants about the early settlers, various indigenous tribes (Hidatsa, Pawnee and others) that first formed the area, and native plants and animals like the Prairie Chicken and the turkeyfoot bluestem that makes up most of prairie vegetation. "By realizing that people are only a part rather than the center of the ecosystem," wrote one member, " we gain a better understanding of our life on the prairie."

This "bio-centric" approach, based on a vision of bringing human beings into harmony with the overall web of life, made without reference to existing political institutions, made sense to people who sought a framework for long-term commitments. It was taken up by self- reliant homesteaders working on restoration of agricultural lands, activists working on renewable energy, watershed groups doing water testing and streambank erosion control. By the time the first North American Bioregional Congress was convened in 1984, such goals were directing an authentic grassroots movement. Today there are about 75 bioregional groups.

The most distinctive characteristic of bioregional groups is their identification with a natural place. Their names often speak it out: Great Lakes Bioregional Council, Kanati (Cherokee for southern Appalachia) Ohio River Basin Information Service, Driftless Bioregional Network (the unglaciated area of the northern plains) and so on. The place may be as small as a single 60-mile long valley (Mattole Restoration Council in northern California) or as big as Ish River Bioregion (all the drainages into Puget Sound).

There's a strong contrast between this approach and other groups' concern with some of the same issues. The Siskiyou Regional Education Project, representing the California-Oregon border mountains area, for example, sees itself as part of a "new movement reaching beyond the piecemeal approach frequently taken by government, the private sector and special interest groups."

The group's members, for example, actively work to restore the salmon run and do their own water testing, but they don't view a project to restore salmon in the native river as a single act of conservation. Rather, their work is part of the overall long-term restoration of a whole valley that also includes erosion control, reforestation, habitat repair, and many other activities.

This holistic rather than issue-to-issue view is reflected in a wide range of ways. Many bioregional groups, for example, create maps of their area along only natural boundaries, hold equinox and solstice gatherings, promote cooperatives and land trusts and start barter networks to trade skills and wants.

Not surprisingly, even though the bioregional movement is growing, bioregionalists insist on keeping a loose, decentralized structure rather than creating a central organization. At the second North American Bioregional Congress held during the last week of August near Traverse City, Mich., participants divided, among several groups, tasks like keeping an information clearing house, preparing a directory of local groups and developing a skills exchange. It also created a new Green Cities committee, which is strategizing how to join urban area with their bioregions.

Regardless of whether governments have recognized them, bioregions are the natural "countries" of the planetary biosphere and will remain so. They each provide unique models of ecological self-governance that human activities should follow.

(A full report on the latest bioregions congress will be available for $10—write "Alexandra Hart/NABC II Proceedings," P.O. Box 1010, Forestville, Calif. 95436.)

Plastic Clogs The Oceans

Sea life is drowning under waves of plastic refuse. An enemy as 100,000 marine mammals die each year as a result of ingesting plastic, and members of over 50 species of seabird, many already endangered, have died after ingesting plastic pellets.

In addition, entanglement in plastic gill and driftnets (see *NMA*, May-June 1986), lost or abandoned traps, and a variety of plastic bonding materials represents a persistent threat to a multitude of aquatic or ocean-feeding species.

100 million pounds of plastic trash enter the world's oceans each year, not including lost fishing gear. Although the majority of plastic pollutants are introduced from land-based sources (industrial and municipal wastes, supermarket plastic resin pellets, etc., which enter the sea after "escaping" into adjacent streams, rivers, and estuaries), 10 percent is due to direct dumping from ships.

Reports from the Environmental Defense Fund (EDF) indicate that the 70,000 ships in the world fleet dump up to 640,000 plastic containers daily, as part of the total 4 million tons of solid waste attributable to ships each year.

Environmentalists are attacking the problem in a number of different ways. One important tool is Annex V to the 1973 International Conference on Marine Pollution (MARPOL Convention). MARPOL is the primary international treaty for preventing and controlling the discharge of pollutants from ships. Annex V would establish a 25-mile boundary from shorelines for the discharging of plastic and related pollutants, and establish more stringent and enforceable discharge guidelines.

As an August 12 Congressional hearing on "Plastic in the Marine Environment," held by the House Subcommittee on Coast Guard and Navigation, testimony by representatives from a diverse assortment of organizations—from the National Oceanic and Atmospheric Administration (NOAA), Marine Mammal Commission, U.S. Coast Guard, and the Environmental Defense Fund—attested the need for the United States to immediately ratify Annex V of the MARPOL Convention.

The requirements of Annex V are not binding until the treaty is ratified by countries representing at least 50 percent of the world's gross shipping tonnage. At present, 26 countries, representing 44.5 percent of gross tonnage, have ratified Annex V. The United States has delayed signing since the convention due to concerns over MARPOL's effectiveness. Ratification by the United States would bring the total tonnage of signees to 49 percent, which could induce other countries to sign, thus topping the 50 percent mark.

While they support ratification of MARPOL, environmentalists point out that discharging wastes further out at sea will only delay the arrival of plastic refuse to wildlife feeding areas and beaches. They argue that *the best answer is requiring that all ships* generated refuse be kept on board until reaching a dockside waste facility. A prototype system is currently being developed by NOAA in cooperation with the Port of Newport, Oregon. Advocates point out that the Soviet Union has for the last decade required Soviet ships to separate and compact various waste materials pending dockside recycling, and all Soviet ships are equipped with on-board incinerators for the disposal of non- recyclable refuse.

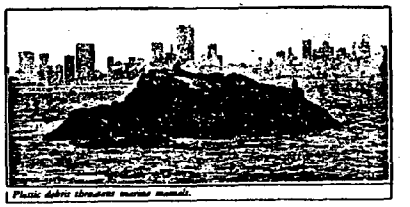
Another potential solution to the problem of plastic pollution is photodegradability of plastic products. Over ten states require photodegradable plastic six-pack holders and other containing devices. On June 25, Senator John Chafee (R-RI) introduced the "Plastic Waste Reduction Act of 1986" (S.2996), calling for similar regulations nationwide, and further requiring the *Environmental Protection Agency to* launch an intensive study on the environmental impact of plastic pollution.

Critics of photodegradability note that little is known about the toxicity of the by-products, or about their effect on the environment. Also, prior to disintegration, nets and other materials will still pose threats to wildlife.

Most environmentalists agree that any solution to marine plastic pollution must integrate a variety of approaches, supplementing the requirements of MARPOL Annex V with land-based policies and technologies (such as recycling), bans on plastic packaging and bio- and photodegradation.

*What You Can Do: Urge your elected representatives to support the ratification of MARPOL Annex V; support passage of the Plastic Waste Reduction Act (S.2996).

—*Joe Kaster*



Plastic debris threatens marine mammals.

False Fronts

"The Clean Air Act is working," proclaimed the letter in the Congressman's mail, with the implied message that we don't need any more acid rain legislation. In July members of the House Energy and Commerce Committee received standardized letters like this from consumers opposing the pending acid rain bill, HR 4567. FOE's Political Director David Baker has since discovered the cause: "Citizens for Sensible Control of Acid Rain," a new lobbying group that has no telephone number and gives as an address a Washington public relations firm.

"Citizens" is actually an industry front, receiving the bulk of its funding from several utility companies, including Southern Power Company and American Electric Power Company. It is spending $3 million to lobby citizens to key Congressional districts with mailers and telegrams which state that HR 4567, a compromise bill praised by environmentalists (see May-June *NMA*), is overly expensive and reckless. "This is a slick, well put together campaign by a group who has seen how successful citizens groups have been. They attempt to wield power by manipulating constituencies," explains Baker.

Such grassroots lobbying by phony groups appears to be on the rise, reports Debbie Baldwin of Common Cause. "It's a new wrinkle on the lobbying scene which is hard to defend against," she adds. When industry lobbies the populace, it causes real citizens to carry that message to Congress. "And you can't call those citizens fake."

Eco-friendly names have been used to mask natural resource exploitation. FOE water lobbyist David Conrad has discovered that many recent proposals for new dam constructions were made by investor groups associated with Louis Roseraens, formerly a key employee at the Federal Energy Regulatory Commission, which grants such hydro permits. Despite the rumor that new dams pose to river ecosystems, Mr. Rosenzweig's ventures adopted such names as "St. Croix Environmentalists," "Auburn Naturalists," and "Henry's Fork Conservationists I and II." The latest proposal involves building two new dams in the Targhee National Forest on one of the most world renowned trout streams, the Snake River.

Today's false fronts are particularly troublesome in the area of deposit legislation for recycling beverage containers. According to Jonathan Puth, recycling lobbyist for Environmental Action, opponents of bottle bills (which call for mandatory recycling) use such names as "Coloradoans for Voluntary Recycling," "National Center for Resource Recovery," "Container Alert," and "Washington Committee to Stop Litter." Even the well- known "Keep America Beautiful" is an industry group opposed to bottle bills. The latter's familiar slogan, "People Start Pollution, People Can Stop It," advocates voluntary litter control, and obscures the main point of bottle bills, which is resource recovery and reuse, not disposal. Puth adds that after so much bogus ecolobbying citizens are easily fooled when voting on state and local initiatives.

Perhaps today's worst threat lies in the health sphere. America is flooded by a steady stream of pro-industry reports and studies churned out by academic or scientific foundations fronting for big business, charges James Hathaway of the National Wildlife Federation. "It amounts to laundering money for industry," says Hathaway.

Particularly villainous is the "American Council on Science and Health," (ACSH) which reports favorably on saccharin, the pesticide EDB, cholesterol, and formaldehide building materials. While calling itself an "independent, pro-consumer health organization," ACSH receives major funding from more than 100 corporations and company-controlled foundations who stand to gain from the Council's reports. Jay Feldman of the National Coalition Against the Misuse of Pesticides finds that "real citizens groups must spend time refuting ACSH's disinformation."

Thais Protest Radioactive Dump

In the wake of the Bhopal disaster in India, some Third World citizens are questioning the benefits of modern industrial manufacturing plants. Last summer a $44 million metal refinery was set ablaze by the citizens of Phuket Island, one of Thailand's most popular tourist resorts. The citizens feared that the highly toxic chemicals used to extract tantalum from tin wastes might poison the population, pollute the environment and harm the island's thriving tourist industry.

Tantalum is a heat resistant metal used in computers, nuclear reactors and warheads. It is found abundantly in the kind of tin slag produced in Thailand, consisting of around 15 percent of the slag. The Phuket plant would have processed 76 tons of tantalum per year, which would mean almost 500 tons of wastes.

The tantalum ore contains uranium, and the waste emits radon and thoron gases, both of which can cause lung cancer. Levels of radiation at a similar tin slag dump in Penang, Malaysia had radiation levels between 1,600 and 2,200 millirads per year, according to the Consumers Association of Penang. Such levels are four times higher than what the U.S. Environmental Protection Agency considers safe. Residents feared that the wastes would be dumped around the refinery to be washed by rain into Phuket's water sources.

Besides the radiation, residents were worried that the highly corrosive hydrofluoric acid used to separate the tantalum from the tin slag would also pollute the island's water supply. The acid is cancerous and can cause bones to become brittle.

The citizens' actions did not come unexpectedly. The government of Thailand had plenty of warning that the people of Phuket means business and did not want their land and livelihoods threatened by radioactive and toxic wastes. In the spring, some 70,000 people gathered to protest against the plant outside the town hall where a high-level committee, set up by Thailand's Prime Minister Prem Tinsulanonda, met to discuss the proposed plant. On June 2, another 50,000 residents of Phuket demonstrated against the plant.

—*Sahabat Alam Malaysia (FOE-Malaysia)*

*WHAT YOU CAN DO: To avoid questionable groups, contact them and ask, "Who started the group? Who's on the board and what are their business ties? Ask where the organization gets its funding. If they won't tell you the law requires incorporated groups to place on public file in the state of incorporation lists of board members and sources of major funding.

—*John Moore*

Polluters to Prison

With the aid of an insider's tip and special night-vision devices, federal Environmental Protection Agency officials caught red-handed the manager of a lead plant who was dumping wastes into a river. William Kaser, the manager of a Nabisco plant in Sumner, Wash. was later sent "up the river"—sentenced in September to a year and a day in federal prison. He was also fined $5,000 after he pleaded guilty to conspiracy to violate the federal Clean Water Act and to mail fraud in submitting false reports to the state Department of Ecology.

This case is typical of a national move to prosecute violators of pollution statutes for criminal, as opposed to civil, laws. Criminal cases carry jail terms, civil cases only fines. According to Randy Lutz, EPA's Director of Criminal Enforcement in Washington, D.C., "prosecutions for environmental crimes began on a significant scale three to five years ago, growing every year." It began with New Jersey having toxic "strike forces" in 1981. EPA followed New Jersey's lead and by 1984 had acquired 20 investigators with full powers of U.S. Deputy Marshalls.

Jail time is what's needed to send the message to other companies and executives who are polluting the environment "that they should not continue their illegal activities," says Assistant U.S. Attorney David Marshall, who handled the Kaser case in Washington state. Marshall had sought a tougher sentence: 18 months in jail and a $25,000 fine.

Attorneys say there are many advantages to criminal prosecutions. "In criminal trials," stresses Illinois Deputy Attorney Jay Magauson, "the state carries a bigger stick. There's a faster trial with more public attention and therefore a greater deterrence factor." In criminal trials the defendants has fewer grounds for delay and dismissal on technical grounds than in civil proceedings. In civil trials a small corporation can escape by claiming bankruptcy, which reduces the governments to ordinary creditor status, and allows a polluter to even avoid paying pollution fines. The bankruptcy alternative is not available to criminal defendants.

Nationally, over the past year, of the 66 defendants in federal environmental prosecutions, 14 have been sentenced to a total of over 31 years of jail terms. However, 26 of those years are accounted for by two terms of 13 years each, as the remaining 12 will average less than 6 months apiece in jail. An additional nine people have received probation.

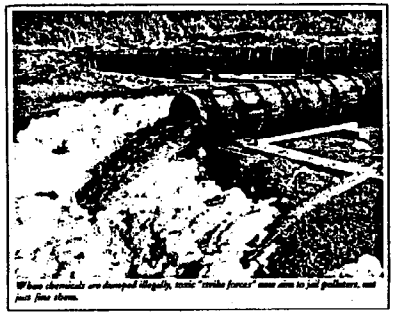
Although the jail terms to date are not impressive, prosecutors feel that they have a high deterrent effect. "A good criminal case is worth 10 administrative fine cases for its deterrence value," says Lutz. Corporations tend to look at monetary penalties as just part of the cost of doing business.

In Chicago, Ill. three top officials of Film Recovery Systems, Inc. were found guilty of murder in June of 1985 in the deaths of immigrant workers (*NMA*, Oct. 1985). The employees had not been warned of the hazards of handling cyanide used in the company's silver recovery processes.

In a similar Illinois case, six officers of Allied Plating Corp. was recently sentenced to three years in prison for ordering a laborer to dispose of hazardous wastes down the drain of a local car wash. Allied had previously utilized toilets and garage drains to dispose of their wastes. The corporation was also convicted on criminal charges and fined $600,000, in addition to the jail term.

Lutz predicts that the number of criminal convictions will continue to grow. "Almost all clandestine dumping and abandonment of drums involves criminal intent. It's just a matter of finding out who did it, which is getting easier as we gain experience investigating environmental crimes."

—Mark Nation and John Moore



Where chemicals are dumped illegally, toxic "strike forces" now aim to jail polluters, not just fine them.

New York Passes Environmental Bond Issue

This November New York voters have the opportunity to pass the largest environmental bond offering specifically for cleaning up hazardous wastes ever issued in the United States. A total of $1.2 billion out of $1.45 billion will be used to clean up the estimated 500 hazardous waste sites in the state and to help close municipal landfills. The remaining $250 million will be used for preserving forest lands, acquiring environmentally important lands, and aiding historic preservation.

Introduced at the request of Governor Mario Cuomo, the bill was passed by both state houses earlier this year and will be on the November 4 ballot for ratification by the voters. Environmentalist support the bill and expect it to pass.

Besides the size of New York's bond issue, what makes it important is that industry will be responsible for financing 50 percent of the debt service on the bonds. The industry money will come from an increase in the state tax on petroleum and petroleum products and an increase in chemical industry fees.

"Bonds allow you to raise a lot of money fairly quickly," said Elizabeth Lyons of the Environmental Planning Lobby, a New York environmental group. Lyons said that raising the equivalent amount through existing taxes would take between 30 and 40 years. "But these sites need to be cleaned up as soon as possible," she added. "Agencies will be able to count on receiving a specific amount of money each year and they can plan for an orderly cleanup."

Toxic waste drums are piling up faster than states can clean them up.

Although California and New Jersey issued bonds a few years ago to specifically clean up hazardous waste sites, New York's proposal dwarfs the approximately $100 million programs that these states have. In fact, the New Jersey Assembly recognized the limits to the present program and passed an additional $200 million toxic waste fund offering bill which will also be on the November ballot.

Many other states have tried to finance hazardous waste cleanup programs by instituting "waste-end" taxes on materials being deposited at dumps. "Usually these fees are very inadequate for raising the amount of money states will need," said Will Collette of the Citizens Clearing House for Hazardous Wastes, a group which represents communities living around chemical waste dumps. Sue Moreland, of the Association for State and Territorial Solid Waste Managers, believes that bond offerings are probably the wave of the future. "The waste-end taxes have shown that they can't raise the necessary money, and more states will probably move in the direction of New York, California and New Jersey."

The bond issue is part of the state's 13 year, $4 billion clean- up program for hazardous waste sites. In addition to the $1.45 billion raised by the bonds, the state expects to recover $2 billion directly from those responsible for creating the hazardous waste dumps, and approximately $800 million from the federal government's Superfund program.

—Mark Silbermann

EPA Bans Pesticide Dinoseb

Dinoseb was used as an herbicide, fungicide, or insecticide on such major crops as soybeans, potatoes, cotton, and peanuts to name a few.

Responding to studies showing that the pesticide dinoseb causes birth defects in lab animals at low levels of exposure, the Environmental Protection Agency (EPA) on October 7 issued an emergency suspension, putting an immediate halt on the chemical's sale, distribution and use.

The toxicity studies, done by industry, show that dinoseb can cause neurological damage and skeletal malformations. Furthermore, EPA documents show that dinoseb or its metabolites can cause both reversible and irreversible sterility in male rats and mice, as well as cancer, immunotoxicity, and eye damage (cataracts). It has been found in the ground water of California, Wisconsin, Maine, Massachusetts, and New York.

This is only the third time that EPA has issued an emergency suspension for a pesticide (2,4,5-T in 1979 and EDB in 1984). The EPA action is important in light of the fact that most reported "uses" of pesticides (through the "accelerated" process) actually allow the product to remain on the market and in use for years if industry challenges EPA's action.

Under an emergency suspension, however, the use, sale, and distribution of the pesticide are immediately prohibited and remain so while industry challenges are adjudicated.

In response to an August EPA warning that it was considering taking strong action on dinoseb, Rhode Island on September 18 banned dinoseb and California prohibited women of childbearing age to mix, load or apply the chemical.

Numerous groups, including The National Coalition Against the Misuse of Pesticides and the United Farm Workers have called for an international ban on dinoseb and the other dinitrophenyl compounds.

—Lenden Marquardt
National Coalition Against the Misuse of Pesticides

The Mississippi:
That Old Dammed River

By Don Pierce

As Mark Twain surveyed the "improvements" to the Mississippi River carried out by the Army Corps of Engineers after the Civil War, he commented: "The military engineers . . . have taken upon their shoulders the job of making the river over again—a job transcended in size only by the original job of creating it."

Since the mid-Nineteenth Century the Corps has transformed the Upper Mississippi (the stretch of the river north from the mouth of the Ohio River) into a "staircase" of lakes impounded between 26 dams and locks. The engineers have lined the banks with levees and built over 800 wing dikes designed to narrow and deepen the navigation channel by trapping sediment. With missionary zeal the Corps has destroyed critical fish and wildlife habitat and reduced the river to a narrow shipaway whose sole function is to facilitate the safe passage of barges.

Paradoxically, however, now that the river has been "tamed," the Twain quote is applicable again; but this time for the opposite reason. Now, if environmentalists have their way, the Army Corps of Engineers will be forced to restore the wildlife habitat that its activities destroyed.

The EMP is designed to preserve and enhance backwater areas. The goal of rehabilitation projects would be to increase the depth of backwater areas, some of which are presently around one foot deep, to between four and six feet. In some areas dikes and levees would be built to keep silt laden water out of important backwater habitat areas. Such levees would also provide protection from waves and turbulence created by wind and towboat wash. Islands would be constructed to decrease wind and wave erosion, and to give large open water a more calm, backwater state.

Although for most species the dam base is thin, scientists do know that Corps' projects can create conditions harmful to fish and wildlife. Backwater habitat areas, the areas to the side of the main navigation channel, are being filled in by sediment—most of which results from erosion-prone upland farming practices—at a rate of one-half to over two inches a year. Unless changes are made in the way the river is managed and the land is farmed, much of this important habitat will become marsh in the next 50 to 100 years. Sedimentation creates a soft bottom substrate that is unsuitable for most emergent and submergent plants. Such plants are one of the foundations of the riverine ecosystem.

Important shoreline habitat is destroyed by levees designed to prevent flooding, fluctuating river levels due to dam releases, and by wave action from heavy barge traffic. Increased turbidity levels—caused by dredging, *the passage of towboats, and increased* erosion upriver—block out light and lower the level of dissolved oxygen, both of which are detrimental to fish and plants. Shoreline animals such as muskrat and beaver suffer from flooding of denning habitat and reduced water quality.

Scientists have a very poor understanding of the fish and wildlife populations dependent on the Upper Mississippi. The Long-Term Resource Monitoring Program is a vital component of the EMP. The two main research areas to be addressed by the monitoring program will be the environmental impacts caused by sedimentation and the increased levels of navigation.

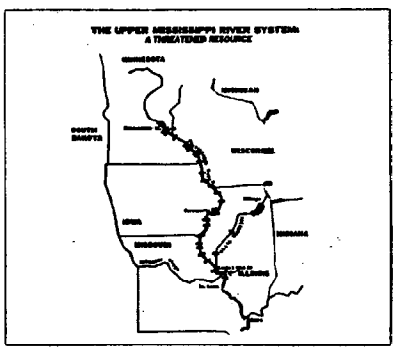
The EMP was the product of years of negotiation and lawsuits around the conflicts between increased navigation and the need to protect the fish and wildlife of the river. In 1974 the Corps planned to quadruple the capacity of Lock and Dam 26 at Alton, Ill., but the Izaak Walton League sued and won, arguing that the Corps had not considered the environmental impacts of lock expansion. Because Alton is just below the point where the Mississippi and Illinois rivers come together, it is a strategic point for those who would increase or decrease barge traffic on the river.

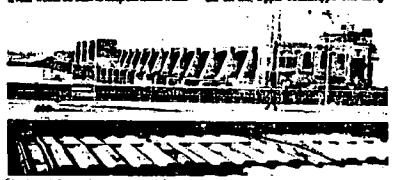
With the Inlands Waterway Act of 1978, a congressional compromise was reached allowing the Corps to build one 1,200 foot lock at Alton, but required that a comprehensive master plan for the Upper Mississippi River system would have to be approved before a second lock could be built. The master plan was completed in 1981 but has never been authorized by Congress. *Authorization for the master plan is in the* Omnibus Rivers Resources Bill, which has passed both houses of Congress and is in a conference committee.

In 1985 the Congress did an end run around the 1978 law and authorized the second lock along with the environmental management plan taken from the recommendations in the unpassed master plan. Stipulations were included requiring that the EMP and the second lock receive equal funding.

But, for 1987, the Corps has budgetted around $4 million for construction of the second lock and only $2 million for the EMP. The master plan, as authorized in the Omnibus Bill recommends $4 million for the EMP in 1987.

Construction on the second lock should not be allowed to continue on the Upper Mississippi until the Corps has aggressively implemented, and Congress has equally funded, a comprehensive EMP. Unless such a plan is implemented fish and wildlife populations will probably be decimated. The FWS has estimated that the costs of mitigating the probable environmental consequences of building the second lock at Alton could be "$29-75 million or more annually." The FWS states in their "Draft Fish and Wildlife Coordination Act Report" on the second lock at Alton (released in June), that without a "strong commitment" from the Corps "we can only conclude that the impacts of any increases in navigation traffic will not be adequately mitigated and balanced use of this nationally significant multipurpose resource will not be achieved."





Lock and Dam 26 is the center of controversy.

WHAT YOU CAN DO: Write to your Senators and Representatives and urge their support for the Upper Mississippi River System Environmental Management Program in the Omnibus Rivers Resources Bill. Remind them that both the EMP and the second lock should be equally funded.

Don Pierce is FOE's Midwest Representative

FOE International Meets in Malaysia

Delegates came from around the world (right) to discuss deforestation and visit the Taman Negara rainforest (left.)

Brower Bids Adieu

David Brower has resigned from both the FOE and FEF boards. One of the founders of Friends of the Earth, and its first chief executive, Brower announced last March his intention to resign if he lost the recall vote in the April FOE elections. He subsequently submitted his letters of resignation in September.

"I'm sorry that Dave feels he cannot work with the board," said FOE Chair Daniel Luten. "FOE has entered a new and exciting phase, and Dave's energy and ideas would have been valued. I think I can speak for all members of both the FOE and FEF boards in wishing him well."

Delegates from Friends of the Earth groups around the world met this fall in Penang, Malaysia to discuss environmental issues and compare notes from the various FOE countries. In addition to the hosts, Sahabat Alam Malaysia (FOE-Malaysia), other countries represented included Belgium, Australia, Japan, Holland, Spain, Canada, Brazil, Hong Kong, Portugal, England, Sweden, Italy, France, Scotland, and the United States.

The conference followed a three day meeting on the crisis of tropical deforestation. Malaysia and other parts of southeast Asia are home to some of the oldest (100 million years), densest, and tallest tropical rainforest in the world. Several FOE leaders stayed after the conference to visit the jungle on a four-day exploratory trip to Taman Negara, a Malaysian national park.

International timber trade in tropical woods, short-term agricultural ventures (including cattle ranching for beef exports), large dambuilding and massive population resettlement projects cumulatively pose a massive assault upon the world's remaining rainforests.

Other topics of high priority to FOE groups were an international acid rain campaign and discussion of the year's biggest environmental event, the Soviet nuclear reactor accident at Chernobyl.

Because acid rain, air pollution and the carbon dioxide buildup problem are truly international issues, Friends of the Earth International has made acid rain a top campaign priority. Several European groups reported success in organizing Acid Rain Week activities last spring, but since they appeared to be limited to Europe and Hong Kong, with no major actions in the U.S. or Canada, the campaign has not yet been able to claim global publicity.

Chernobyl, on the other hand, produced an avalanche of press attention and public outcry. The European groups in particular have benefitted from an outpouring of public outrage and concern. Since Friends of the Earth has been warning of the dangers of nuclear power for years, it has been well-positioned to take a high profile on the issue.

With these and other environmental dangers escalating worldwide, the FOE delegates agreed on the imperative to improve joint communication and to work together in campaigns. In the coming year, FOEI will attempt to expand its campaigns on acid rain and tropical rainforests and bring member groups together for a special memorial observance on the anniversary of the Chernobyl catastrophe.

FOE-US Conservation Director Geoff Webb joined five others in being elected to the FOEI Executive Committee. On behalf of FOE-US he pledged to increase cooperation and activity with the international network, including FOE-US involvement with the international acid rain campaign, joint planning for a Chernobyl commemoration, publicity for the tropical rainforest issue and coverage of the activities of FOE groups around the world in the pages of *Not Man Apart*.

In the Shadow of the Shenandoahs

Clockwise from top left: Senator staffer Dale Jones, FEF Board President Michael Slater, FOE Board Member Estella Leopold, Field Representative David Orrman and Political Director David Baker. Photographs by Geoff Webb.

"This is not a retreat, it's an advance," bugled FOE Chairman Dan Luten in the shadow of the Shenandoah Mountains staff and board members gathered in an old Virginia farmhouse to help launch a new beginning for FOE. They came from all across the country—California, Washington, Kansas, Massachusetts, New York, Louisiana, and Washington, D.C.—to welcome new Executive Director Cynthia Wilson to the helm of Friends of the Earth.

Conservation staff reported on recent events as well as accomplishments of the past year. In 1986 FOE played a vital role in trying to prevent weakening of the new pesticide control bill, and rewriting the Federal Power Act with drastically improved protections for fish and wildlife habitat, which had finally passed. FOE staff had played pivotal roles in battles to abolish the Synthetic Fuels Corporation and protect U.S. coastlines from wholesale oil leasing. Our clean water lawsuits against polluters were proving very successful, as was our involvement in the passage of the Safe Drinking Water Act. In these and other efforts, FOE's field staff and lobbyists worked together to achieve results.

The administrative and financial situation, always a staple of such meetings, was reviewed. FOE has overhauled its administrative department, bringing on Wilson as Executive Director and Pat Aronsons, formerly of the Youth Project, as Controller. Both spoke of the need to save money and to fundraise, in order to bring FOE into a new era of financial accountability.

Just back from Malaysia, Geoff Webb reported on the FOE International meeting and his trip to the Taman Negara rainforest. He said that FOE International campaigns would be given a considerable boost if FOE-US decides to get involved. The group agreed to give priority to developing joint actions with FOEI on issues such as acid rain and nuclear power (see accompanying article).

Building on FOE's history of leadership in water policy and rivers protection, Michael Roberts of the Northwest Office and David Conrad from Washington, DC reported on ways they are working to help revolutionize traditional methods of river protection.

According to Roberts, 1987 promises to be a big year for the Northwest Rivers Project. Their approach is beginning to generate grassroots excitement in Washington, Oregon, Idaho, and Montana, where river-by-river protection could be accelerated through a pioneering regional review and broad scale protection process.

Spirits were high and a feeling of optimism pervaded the weekend. Cynthia Wilson epitomized this attitude. Around her neck she wore a necklace that said, "Coyotes Can Win." "Despite all that humans have done, the coyote has survived and, in fact, is increasing its range," she remarked. "With hard work and dedication, I'm convinced that FOE's future is also very bright."

—*Mark Silberman*

U.S. Stalls International Treaty

Locking Horns Over Caribou

By Margie Gibson and Mike Holloway

At the peak of the last Ice Age, some 18,000 years ago, much of interior and northern Alaska and a small part of the adjacent Canadian interior were not covered by ice, although a huge ice sheet lay to the east. During this time large mammals flourished in northern Alaska, which was connected to what is now Asia by a land "bridge." Rangifer tarandus, known as caribou on this continent and reindeer in Europe, were well suited to the conditions that existed.

Today the 180,000 caribou of the Porcupine herd, named for a tributary of the Yukon River within their range, continue to thrive as they have for thousands of years. But the survival of these caribou—and the culture of the indigenous peoples that depend on this herd—is threatened by mounting pressures to extract oil that may lie under the herd's calving grounds.

At the same time, Native peoples in northeastern Alaska have helped convince the State of Alaska to support an international agreement with Canada for protecting caribou habitat. But while that agreement is now under consideration by the U.S. State Department, the State of Alaska and the U.S. Fish and Wildlife Service in Washington, D.C. now are actively negotiating whether or not to retain strong provisions for habitat protection.

On another front, 1.5 million acres of the Arctic National Refuge, which includes parts of the caribou's coastal calving grounds, would be protected in a wilderness bill that has recently been introduced in Congress.

The Native peoples of northeastern Alaska have long been politically active in trying to protect the habitat of the Porcupine caribou herd in Canada and Alaska. These efforts have also involved wildlife biologists, governments, and environmentalists on both sides of the border.

During the debate over the Alaska National Interest Lands Conservation Act (ANILCA), passed in 1980, expanding and protecting the wilderness of the entire Arctic National Wildlife Refuge (ANWR) became a hotly contested issue. That refuge contains the calving grounds for the migrating caribou herd (see map). But issues raised in that debate remain unresolved today.

Back in 1980, Native leaders in northeastern Alaska were satisfied with extension of the refuge but weren't very involved in the politics until a House committee passed their version of the bill in March 1978. Suddenly the coastal plain of the Arctic Refuge was opened to oil and gas exploration and development. The area of the coastal plain within the refuge is part of the calving grounds of the Porcupine caribou herd.

Local Native people unanimously felt that oil development in the calving grounds, because of the complicated and fragile life cycle of the herd (see sidebar) would likely lead to the demise of a healthy Porcupine caribou herd. Although caribou will practically walk through villages and camps while migrating, cows and calves are easily disturbed by activity during the calves' first months of life.

Although villagers and environmentalists opposed it, and the Canadian Cabinet withdrew Canadian lands lying adjacent to the refuge in 1978, ANILCA (section 1002) mandated oil exploration in the coastal plain of ANWR, subject to a report made to Congress. That report, due in September 1986, was postponed until the spring of 1987 after a successful lawsuit brought by Defenders of Wildlife and others charged that the Fish and Wildlife Service didn't allow public participation in the writing of the report. When the long-awaited report is released, Congress will make the decision for protection or development.

> **Alaska fears that federal officials won't push for strong protection of caribou.**

At the same time that Native peoples became involved in the politics of ANILCA in the spring of 1978, the Gwichen and Inuit peoples began renewing old efforts for international protection. Family and political ties were renewed and strengthened across the border. Important relationships with national, Alaskan, and Canadian environmental groups were begun.

Discussions of an "International Convention for the Conservation of Migratory Caribou" reached top levels of governments in the United States and Canada in short order. By 1981, however, the political climate had changed, and then-Secretary of the Interior James Watt brought an end to the process.

Village interest, however, continued on both sides of the border. In December 1982 Inuit and Athabascan representatives from both countries formally created the International Porcupine Caribou Commission (IPCC). The IPCC gradually helped build support in Alaska for a caribou treaty, and in June 1984 Alaska Governor Bill Sheffield announced formation of a State Working Group on the Porcupine Caribou Herd. Representing local Native peoples, recreational hunters, and environmentalists, the group worked with representatives from the Alaska Department of Fish and Game to arrive at a consensus position.

After many meetings, the State of Alaska came out in favor of international protection of the Porcupine herd. In March 1986 the Governor approved the State Negotiating Position for a United States-Canada Porcupine Caribou Herd Agreement."

Alaska's position included strong support for habitat protection and subsistence use, along with future bilateral discussions on designation of an international arctic wildlife range. The habitat protection provisions would ensure the best possible protection for Porcupine caribou and their habitat if any development activities are ever permitted. It would require the best available technology, mitigating measures, and methods of operation, along with rehabilitation of disturbed areas. Activities would be scheduled so the seasonal patterns of the Porcupine Herd would not be interrupted.

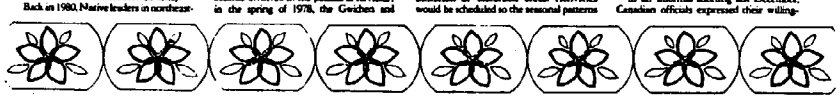
Since the spring, however, the State of Alaska's position has been under review by the U.S. Fish and Wildlife Service (USFaWS). The USFaWS has in turn produced its own "Proposed Principles to Serve as a U.S. Negotiating Position for the U.S.-Canada Porcupine Caribou Herd Agreement." The draft principles produced by the USFaWS Alaska Region included much of the state's position as a result of joint efforts to resolve major differences. But much substance has been lost following revisions by the Department of the Interior in Washington, D.C.

In the new federal position, the Interior Department eliminates a provision agreeing to "avoid where possible, activities which may significantly impede, delay, or disrupt the migration or other essential behavior patterns of the PCH [Porcupine Caribou Herd]."

Other references to habitat protection, or even identification of sensitive habitat, have been removed, including requiring the use of the best available technology, mitigating measures, and methods of operation during development activities. A priority for subsistence use and bilateral discussions on designation of an international arctic range are also missing. The resulting position has few protections left for preserving Porcupine caribou or the people dependent on them.

At press time, the state was very concerned that the U.S. Fish and Wildlife Service would not back off on its intention to remove habitat protections. A letter from Bill Horn, the Assistant Secretary of the Interior, to the governor delivered a veiled bureaucratic threat: "Any insistence that our negotiating position contain items inconsistent with established laws or policies . . . will only prevent the initiation of talks and, in turn, place at risk the dependency of rural Alaskan residents of the herd." Yet the state hasn't proposed anything inconsistent with established law. It's ironic that the USFaWS would suggest that habitat protection is not within their policy.

In an informal meeting last December, Canadian officials expressed their willing-



drawings by marge dan gibson

My Gwichen grandmother

The caribou and the indigenous peoples of Alaska and Canada have an ancient relationship. Archeological finds in the Old Crow Flats in the Yukon Territory have pushed back the date of the earliest known human presence. Among the articles recovered from the permafrost were tools made from the leg bones of caribou. One of these is fashioned to scrape flesh from animal skins. It is dated at between 25,000 and 29,000 years old.

This skin scraper is almost identical to that used by my Alaska Gwichen vitsuu (grandmother), Sarah Frank. Last summer, between 103 and 109 years old and unable to continue tanning moose and caribou skins, she gave me this prized tool. If this skin scraper was perfected 25,000 years ago, how long had it been used before that? How long had the interaction between Gwichen and caribou existed?

—M.H.

ness to negotiate immediately with representatives from the Alaska State Porcupine Caribou Herd Working Group, the Alaska Department of Fish and Game, and the U.S. Fish and Wildlife Service Alaska Region. Although additional informal technical meetings have occurred since then, Canada is waiting for the U.S. position to be finalized so formal negotiations can begin. So far, the position of the U.S. Fish and Wildlife Service in Washington remains the largest obstacle to establishing strong protections for caribou.

In Canada, there has been steady progress for wilderness protection. A proposed oil port at Stokes Point in the Yukon Territory was defeated, partially through efforts by Friends of the Earth. And in the summer of 1985, after the Canadian government concluded a long sought settlement with the Inuvialuit Committee for Original Peoples Entitlement (COPE), a Wilderness Park was created in the coastal plain of the north-

The Cycle of the Caribou

The Porcupine Caribou Herd is the symbol—and essence—of Arctic wilderness. It is one of the largest and healthiest of the remaining great animal herds on the North American continent. Land that is the home of these caribou represents some of the finest wilderness in the world. This is also the home of polar and grizzly bears, musk ox, Dall sheep, wolves, and moose. Thousands of ducks, swans, and loons seasonally share the coastal plain with the caribou herd. This burst of summer life has been decribed as the "Arctic Serengeti." In the fall, migrations of hundreds of thousands of snow geese are as vivid as the first sprinkle of snow on the Arctic tundra.

The Porcupine caribou (named for the Porcupine R... ...onstantly in ... herd occupies ... square miles ... rent areas in ... r. In winter ... —high in ... and summer ... owers, sedges. Large hoofs ... and snow. ... ed hollow ... were cold. ... the move... thousands ... collected at ... Mountains ... of Canada ... early migra... the Porcu... ... to the ... grounds on ... hundreds of ... the caribou ... edge of the ... nd to avoid ... exceede the ... the Yukon ... d Alaska,

joined by other bands along the way—many of which winter in Alaska.

In May the caribou begin to give birth. The calving grounds along the coastal plain are among the first snow-free areas, providing the caribou with new plant growth as well as escape from predators, which come large and small. By the time they get to the plain, usually the wolves have stopped following the caribou in the hills. The winds on the coastal plain provide relief from millions of smaller predators—mosquitoes and flies, which are capable of killing young calves.

After calving, and resting along the coast and storing fat, the caribou again flow together in large post-calving groups or "aggregates," as biologists refer to them, and begin their migrations southward.

By early August large groups begin breaking up and dispersing. In fall they continue south, with major migrations crossing the Porcupine, Driftwood, and Blow rivers. In March the cycle begins anew, as females begin the 400 mile journey to the coast.

—M.G.

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• Groundwater... sage of the Safe Dri... force the Environmenta... to set standards for p... water, but no program exists ... pollution of underground sourc... ing water.»

• Endangered Species—The 99... gress will fail to reauthorize the Endange... Species Act because of disputes over loc... development projects in Idaho, Texas, Wyoming and Alabama that threaten endangered species. Senate Majority Leader Robert Dole (R-KS) has refused to bring up the bill because of objections by senators from these states.

At press time, the Superfund program

LCV via whole House.

Sundown for Western Water

Is the end in sight for large dam projects?

by Jennifer Price

Daniel Webster once asked, "What do we want with this vast worthless area—this region of savages and wild beasts, of deserts of shifting sands and whirlwinds of dust, of cactus and prairie dogs?" He was speaking of the great desolate frontier that Congress opened up to pioneers in the latter 19th century, with laws to promote settlement of the West.

In 1902 the U.S. Reclamation Service (now known as the Bureau of Reclamation) was created to make available and manage the most scarce, critical resource—water—and to "make the desert bloom." First it built small dams, to divert water for irrigation. Then, under the New Deal, it built the largest dams ever—first Hoover, then Grand Coulee, Shasta, and Bonneville, across the "untamable" rivers of the Colorado and Columbia—later thousands more, five dozen on the Missouri River system alone. The West as we know it grew by wrapping itself around these huge water faucets.

Since the 1960s, however, the Bureau has faced criticism by environmentalists and economists alike, who argue that its initial mission of developing the West has been largely fulfilled and question whether many new agricultural projects are justified. President Jimmy Carter's "hit list" of western water projects began the trend toward fiscal conservatism. The Reagan administration has affirmed that policy. Yet the story of water projects is a story of entrenched interests—and one project, the controversial Animas-La Plata project in southwestern Colorado, is managing to stay afloat despite the sinking fortunes of most other federal water projects.

Up a gravel road, through a dry brushy canyon a few miles south of Durango, Colorado, lies a broad valley banked by a high long ridge. The Bureau of Reclamation wants to flood this valley for the proposed Animas-La Plata reservoir and irrigation system, which would criss-cross more than 67,000 acres of land with hundreds of miles of irrigation channels, across Colorado and New Mexico, serving an area 30 miles square.

Mention the Animas-La Plata around Durango and you may uncover emotions as intense as those roiled by Glen Canyon Dam in the 1950s, a project larger and more destructive. Those who want the dam say it would stimulate the farm economy and the business of the region. Critics, however, claim that the Animas-La Plata project would bankrupt farmers, saddle the town with huge costs for water they don't need and generate environmental problems in the process. The project, which still awaits Congressional approval and funding has divided farmers and businesspeople, Native American tribes and environmentalists.

First conceived in 1904, the Animas-La Plata was one of the very first Bureau of Reclamation projects. If it does succeed in getting funding, it may also be one of the last. No major funding for federal water projects passed through Congress between the years 1972 and 1982. Most recently the Reagan Administration has cut budgets further and required cost-sharing by state and local recipients. And now, during the last year, many farmers—the original beneficiaries of the projects—have begun to complain that they cannot afford Reclamation water.

Whether or not Animas-La Plata succeeds or fails will measure the strength of the Bureau's rationales for their whale-sized projects versus the new economic critique water projects face. This valley offers a close-up look at how the Bureau, known not so affectionately as "Bu Rec," builds water projects people love and hate, why it is faltering, and whether it will manage to keep damming.

One Wet, One Dry

The Animas and La Plata rivers, tributaries of the Colorado, rush south into the high mesa country around Durango and Cortez, then meander south into the New Mexico shrub desert. The rivers run roughly parallel, about 15 miles apart. The Animas runs abundantly all the way, but the La Plata, which begins much farther south, dries up in midsummer, unable to meet the demand for water from nearby towns. That is the problem.

The U.S. Reclamation Service first noticed this problem in 1904, when it began drafting a plan to route Animas River water into the La Plata channel. Although the project was originally slated to provide water for irrigation, today, 80 years later, it is planned to supply water for recreation, to provide city and industry water supplies, and, (perhaps most important for its approval), to satisfy claims for water rights by Native American tribes.

Bu Rec proposes diverting the water in two, large stages. In the first, a 13-pump pumping plant, just south of Durango, would lift Animas water up 325 feet through a 2-mile conduit to create a 2270-acre lake—Ridges Basin Reservoir—plugged by a dam 313 feet high. In the second stage, a second pumping plant at the reservoir would lift the water another 330 feet, straight through a ridge three miles by tunnel and out into a 20-mile canal that crosses the La Plata. Five more pumping plants, a second reservoir, two more dams, two 3-mile canals, and 200 miles of lateral ditches would provide irrigation water. Because of concerns about its cost, the project was split in two, but Phase 2, which is not federally funded, may never be built. The $316 million project would send two pipelines to Durango, one directly to the town and the other to the reservoir, as well as pipelines to the downstream New Mexico towns of Farmington, Aztec, and Bloomfield.

But the most crucial component of the project is that it would settle claims for water rights by two Native American tribes—the Ute Mountain Utes and the Southern Utes—by providing them with irrigation, municipal, and industrial water. Yet, as critics point out, if Phase 2 is never built, the water will remain stored 30 miles away from their reservations—usable only for sale, to coal companies, for example.

The Animas-La Plata project is likely to come up for funding next year now that the states and federal government have come up with a cost-sharing plan. The issue now is over Indian water rights and whether or not the states will agree to let the Indian tribes export the water out of state. The Indian tribes would like to use the water to develop their coal reserves.

But the project could still fail if it loses its local support. Even after other agreements are reached, voters in the district will have to decide whether or not to agree to the contract which sets the terms for repaying construction and operations for the project—the cost of each acre/foot of water. And farmers are beginning to balk at its costs.

The Animas La Plata stays afloat while most other projects sink.

The economics of irrigation today is "kind of scary," says dryland farmer Bob Taylor.

The Water Barons

Local boosters of the dam think it is worth the expense. For Frank "Sam" Maynes, a lawyer in Durango and perhaps the most outspoken local proponent, money is no object. "Cost is a relative term," says Maynes. "Compared to what? Compared to foreign aid? To Star Wars? . . . I like water projects, some big city legislators like welfare programs . . . everybody's got that type of thing."

pporters believe that the region faces
us water supply problems and that the
ct would solve them in one, neat pack-
Maynes feels the Indian settlement is
most crucial component. "If the Indians
gone to court," he says, "they may well
ended up with a water right which
d have taken away the water from peo-
who had used the water for over 80
" Maynes' interest in the Indians is not
sing. His firm specializes in Indian
water law and represents both the
nas-La Plata Water Conservancy Dis-
and the Southern Utes.
nother supporter is John Murphy, pres-
of the water district, who grew up on
Dryside," the dry plateau land along
a Plata River. When Murphy returned
the Army in the 1940s, he decided he
not want to "gamble with the uncer-
y of the water supply." Rather than
ning to the farm, he went to work for
lata Electric, where he became man-
Now retired, he refers to project oppo-
s as "negative thinkers."
urphy defends the enormous size of the
ct for one reason—storage, a concept
h serves as a kind of refrain when he
about Animas-La Plata. "You'd have
ng storage project out there you can call
f water. You can't beat it."
her proponents support the project
more skepticism. Bob Taylor, a La
farmer, says that the project "isn't the
solution. But it's the only one. If the
tion becomes, why don't they go to an
native, they'd have to go back to ground
They would've lost millions of dollars.
I'm afraid if they started over, we'd not
anything."
et a growing number of critics say there
easible alternatives, such as expanding
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the Animas-La Plata Referendum
R), a group with about 15 active
bers which claims hundreds of suppor-
charges that the costly federal water
prove unnecessary and unaffordable,
that inevitable inflation will drive costs
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Durango will require more water in the
re than its existing facilities can provide,
not nearly the quantity that Bu Rec
ns it will need. TAR believes that
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ump water uphill, where much of it will
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The Bureau totally blew it on the popula-
estimates [for water demand]," says
Mass, local chair of TAR. An ex-
… and now a cabinetmaker,
s first joined TAR in 1979 because of
ronmental concerns—principally the
ury and heavy metals contamination
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He says, however, that as he learned
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ics of the project. TAR argues that it is
ppropriate for the water district, which
ot elected by taxpayers but is staffed by
ointed officials, to ask citizens to foot the
for a project they planned (see story
t page).
wo independent engineering studies,
mmissioned by the city, concluded that
ango could gradually expand its facili-
to meet future needs, far more cheaply
n participation in the project. Further,
TAR, water conservation has been

Continued on page 12

Courtesy of Durango Herald

TAR: A Tempest and a Tea Party

By Connie Albrecht [illegible]

One stormy, snowy evening in January 1979 a group of residents gathered in Durango, Colo., a small city at the foot of the San Juan Mountains.

A local water conservancy district was about to be formed, which would have, among other powers, the power to levy property taxes to build the Animas-La Plata irrigation project. The fledgling group thought they would nip this plan in the bud by spending a few days circulating counter-petitions in the community.

"We were so naive," recalls Jean McCulloch, one of the original members and its present coordinator, whose home resembles a regional switchboard, political boarding house and activist library all rolled into one. "And here we are seven years later still fighting that dam! And we've met every Tuesday evening all these years except when we were in Washington, D.C. lobbying against it."

They call themselves TAR and it's an appropriate name, since no citizens' group has stuck to their task more persistently than the collection of folks in southwest Colorado that make up "Taxpayers for the Animas-La Plata Referendum." No other group in history has attempted a frontal assault on the cornerstone of the state's water establishment—the undemocratic formation and operations of non-elected water districts. In their quest to defeat the powerful water development interests, they've used the organizing tactics best formulated by famed community organizer Saul Alinsky.

"Ridicule is man's most potent weapon." —Saul Alinsky

Carrying out Alinsky's dictum that "Ridicule is man's most potent weapon," TAR staged a Boston tea party in December 1985 to protest the water district's "taxation without representation." Dropping boxes of tea into the Animas River, they decried the appointed boards and their lack of "accountability." And they raised the hackles of the opposition in the process. "That's part of their ongoing cheap propaganda," the director of the water district was reputed to say. "I bet it wasn't even tea."

Nothing is more galling to TAR members than that they are being taxed by non-elected districts, which, in turn, hire a legion of water attorneys, engineers, and developers to promote projects of questionable value. "These water districts have taxation and condemnation powers," says Jean McCulloch, "but their boards of directors are appointed by local judges and county officials. Of course they appoint more good ol' boys who persist in lobbying the federal government to build more dams to supposedly keep California from taking our water."

When TAR lost their try at forcing a referendum vote to prevent the Animas-LaPlata water district from being formed, they decided to go to court. They believed the state law in question was so biased in favor of water development interests that they had a good case in challenging its constitutionality. However, although their suit went all the way to an appeal in federal court, it was mooted because the Colorado State legislature passed a bill re-establishing all water districts in the state in one fell swoop.

TAR's current efforts are directed at gaining grassroots support for state legislation to require elections for water districts, as well as to oppose the district's ability to levy new taxes for construction of water projects. The group is also lobbying the federal government to prevent further funding for Animas-La Plata.

But the water district has tried to thwart their efforts at every turn, using tactics some TAR members consider illegal. TAR alleges that the district has denied information to them under the state public records act and violated the state's "open meetings" act. In just one case, member Preston Ellsworth tells how he was locked out of an Animas-LaPlata water district meeting—"executive session" they claimed. Not being one to give up, Ellsworth got down on the floor and eavesdropped on the meeting from a crack under the door. One of the more interesting tidbits he said he heard was the district's board members discussing "how they were going to get" TAR members Jean and Tom McCulloch.

Like many citizens' groups, TAR is loosely structured with a small hard-core group—about 15—that does most of the strategizing, but the group's growing supporters in the southwest region number in the hundreds. Some, however, do no more than send anonymous donations, because, for political and financial reasons, they can't afford to be associated with TAR in a community controlled by pro-water project politicians.

As a response to concerns about public association with their "radical" group, TAR developed a unique form of activist gamesmanship—a "non-membership" card, by which people who are attacked can whip out and show the accuser the 'card-bearer has never been a member of TAR.' In no way, though, is the bearer restricted from 'opposing the Animas-LaPlata water project or similar boondoggles.'

Official membership in TAR continues to be uncertain; supporters come and go in the region. Despite the group's 'collective anarchy,' as one supporter describes it, TAR seems united behind a crucial Alinsky directive: 'the price of a successful attack is a constructive alternative.' It has developed a set of recommendations that would eliminate the major dam and canals in the Animas-LaPlata project, yet still deliver water to towns and reservations and fill the Indian claims to reserved water rights (See related story).

TAR has carried on its long struggle in an isolated corner of the West, but its platform—seeking the democratic elections of board members for the water conservancy districts—has touched a chord throughout the region. In Garfield County, 150 miles away, for example, county commissioners last August passed a resolution recommending that water district boards be elected. So the issue is catching fire across sagebrush country.

•WHAT TO DO: For more information on how you can help defeat dam building in the West, contact Jean McCulloch, Taxpayers for the Animas-LaPlata Referendum, 2914 Aspen Dr., Durango, CO 81301.

Connie Albrecht is the Western Water Representative for Friends of the Earth. She has been an adopted member of TAR for some time and recently moved to Durango, Colo.

ignored as a strategy to increase water supply, even though Durango presently loses over one half of its water through its municipal system.

TAR contends that the original purpose of the project, irrigation, makes the least sense of all. "The Dryside," is a dry plateau at 7500 feet, hemmed in by mesa, where sage and some juniper grows wild. "Nice to look at, hard to farm," says Jean McCulloch of TAR. Limited by a 100-day growing season and frequent cold nights in summer, crop yields, even with irrigation, are inherently low. Opponents feel that having more water wouldn't make it substantially more productive.

Bob Taylor, a "Dryside" farmer who supports the project primarily because the Indian settlement would secure La Plata water rights, is just as glad his dry farm got booted into Phase 2, which is not federally funded. "Right now," he says, "the economics of putting water on is kind of scary." In 1977, when Bu Rec drew up its plans for the Dryside, the farm economy was in a healthy bloom. Now it is not.

Farmers staving off bankruptcy—and there're plenty in the area—will be hard pressed to buy new sprinkler systems and to pay for water pumped uphill from an adjacent river valley. Furthermore, the few crops that grow well on the Dryside, particularly alfalfa, are now in surplus on the national market. Other federal agencies are paying farmers to take land out of production, in the same set of counties where Bu Rec proposes to increase productivity with irrigation.

But while other water projects are stalled in part because of the uncertain economics for farmers, the Animas-La Plata dam has made it this far, proponents and opponents agree, "because of the Indians." "We've got the state of Colorado, the governor, the state legislature, the Attorney General, all saying that they're willing to spend $60 million in cost-sharing to build this Animas-La Plata project. And why? Because it's going to solve the Indian water rights issue," says Maynes. "You know, without the Indians involved in this thing, hey, this would be just another garden-variety type water project that hasn't been and isn't going anywhere over the last few years."

In 1908, the Supreme Court handed down the Winters Doctrine, which implied that many Indian tribes hold earliest water rights on some rivers. In 1976, the U.S. Attorney's office filed claims on behalf of tribes on virtually every river in southwestern Colorado. If the Utes should press their claims, they could substantially dry up Anglo rights on the Animas and La Plata rivers. In return for the Animas-La Plata project, the tribes would sign off on their Winters claims.

Yet opponents question first, whether supplying water to the tribes warrants a project of this size, if other reasons aren't justified, and second, whether the Indians are really gaining that much from it.

Ironically, the Indian tribes are not actually getting Animas-La Plata water delivered to their reservations. The delivery systems were kicked into Phase 2 of the project and are thus, as opponents charge, "paper water." Under the plan, water is being stored for them, which they plan on selling to coal companies in or out of state (depending on how the dispute over exporting water is settled). Additionally, the tribes receive several provisions in the dam agreement—$60.5 million in development funds, and a domestic-water pipeline for the Ute Mountain Utes from the Dolores Project, a newly-completed Bu Rec project on the nearby Dolores River.

A sky high storage vat

The cost-sharing agreement between the states and the federal government reached this summer divided the project into Phase 1, creating the 2270-lake Ridges Basin, all built with federal aid, and Phase 2, lifting water to a second pumping plant, to be built at some unspecified later date, without federal funds. Of the Phase 1 water— 22 percent is being stored for the tribes to use at some future date, and much of the water for the towns is being stored to meet needs of future growth that may never occur.

Only 16 percent of the total in Ridges Basin is definitely scheduled to be used for irrigation. Yet this water Bu Rec plans to pump uphill an extra 330 feet. As much as 75 percent of the water may never be used for a least 20 years.

All told, Ridges Basin Reservoir stands to be an enormous storage vat, a pretty lake tucked under a conifer-velveted, dark-green ridge and holding a lot of water slated for Southwestern Colorado that may very well never be tapped. Fifty four percent of the water is "dead storage," used to achieve a certain lake level, pumped in once and never pumped out. Twenty six percent of the "active storage" water for Phase 2 irrigation will be stored idle, to wait for future construction that would depend on the health of the state's economy. "Maybe Phase 2 will never be built," admits Sam Maynes. "I don't know."

Sentiments for storing as much water as possible echoes up and down the Western Slope. That mindset has existed for decades. A local farmer says, "More people'll fight you more than anything else over water. We've been programmed since we was that high: [to want] water." Coloradoans for the last century have been sensitive about the water that flows fresh out of their high country, across state lines, and into the fields and sewage systems downstream. And down below, California and Arizona have always itched to get that water. You can mark historical time in the West by several compacts made to divide the Colorado River between the Upper Basin and Lower Basin states.

Having a ready supply of water was a major rationale for Bu Rec projects. After the 1930s, when Bu Rec proved it could work wonders for Western growth and subsidize it, with Hoover Dam and others, water projects, writes Mark Reisner in his book *Cadillac Desert*, became "a kind of currency, like wampum." What had begun as an emergency program to put the country back to work," writes Reisner, ". . . grew into a nature-wrecking, money-eating monster . . . " Donald Worster, in *Rivers of Empire*, tracks the fate of the small farmer, who, he says, got drowned in the expense of Bu Rec water and was increasingly replaced by the corporate farmer that could afford the water, and the migrant worker.

Desert Revolution

Yet a change in thinking may be overtaking small farmers. Anxious to keep their farms, they're beginning to reject expensive water. That, at least, seems to be the way the issue is being resolved in a similar situation in neighboring Montezuma and Dolores counties. Those counties are dry places, like La Plata County. Sagebrush lines the dirt county roads and pinto bean fields, settled against the mesas, turn yellow under a late August sky, nearly ready for harvest. Bu Rec just built the multi-purpose Dolores irrigation project for $461 million. And over there, the farmers are in revolt.

The Dolores project, similar in size and intent to Animas-La Plata was built in large part to irrigate dry-farm land similar to the Dryside. It was also built for municipal water supplies and to settle Ute Mountain Ute water claims. Costs escalated from a [illegible] $465 million. Cortez, the major municipal recipient, claimed it could not afford the water, and since population growth estimates had not materialized, did not need much of it anyway. Two-thirds of the farmers asked for relief from their repayment contracts.

One year away from the first delivery of water, a group of recipient farmers plans to sue the local water conservancy district and Bu Rec to be released from its repayment contracts. In 1977, the farmers were nearly all for it—19 out of every 20 farmers signed contracts, with no cost ceiling on repayment. Bu Rec told them that increased yields, plus a more diverse crop set would make for hefty profits—and that water would cost only $19 per acre-foot. In Spring 1986, water costs reached $40 to $41 per acre-foot; and with their crops in surplus, two thirds of the 158 farmers petitioned for relief; and one-third do not want the water at all. Due to insufficient funds, the pipeline to the Ute Mountain Ute Reservation was never built—the same pipeline now tacked on to the Animas-La Plata project.

Farmers there consider dryland farming to be more economical in the short run. They are bolstered by a 1986 study done by Colorado State University, which concluded that irrigation farming won't yield a profit, given crop prices, productivity constraints and the terms of the repayment contracts.

Ringleader R.B. "Junior" Hollen, who farms 1000 acres of pinto beans and dryland wheat, believes that farmers who are forced to buy the water, and the necessary state-of-the-art sprinkler system, the same systems slated for Animas-La Plata, will face bankruptcy. The local banks have already made it known that they will not make loans for the system. "They made it sound so good," says Hollen, "that personally, I was greedy. Now I'm like the mouse that gets caught in a trap with cheese, says to hell with the cheese, get me outta this trap."

"They made it sound so good that I was greedy. Now I'm like a mouse in a trap."

To explain the plight of the farmers, Bu Rec and the Dolores Water Conservancy District blame the national farm economy. "The problems with the Dolores," says Rege Leach, Planning Team Leader at Bu Rec, "have more to do with the farm economy than the cost of water." Hollen disagrees. Bu Rec, he contends, did an extraordinarily shabby job on the feasibility studies. The studies mention neither the growing season nor the altitude, and overestimate the crop yields, he maintains. "They have things in there, like sorghum, that take a 160-day season," says Bessie White, Hollen's sister who farms down the road. "They say, well, they project long term. I say, well, maybe they'll change the growing season."

These farmers present a major threat to Bu Rec's rationale. After all, Bu Rec, imbued with a strong Jeffersonian spirit, meant to open up the West for the independent farmer. Even with the advent of the multi-purpose project, irrigation remained the backbone purpose and it has accounted for the lion's share of the ideology, if not the cost.

Dolores farmers say the Bu Rec project is sending them into debt. "They didn't build it for the farmers. They built it as a monument to the Bureau of Reclamation," says Hollen. "As long as they've got a working project in here," says White, "they don't care who owns the farms, or how many times they change hands . . . The Bureau of Reclamation needs [the farms] so they can build these projects . . . They destroy the farmers in the process, and then they move on."

The coming election over Animas-La Plata will be telling. Some Animas-La Plata farmers are listening to the Dolores farmers complaints. They're wondering if they could have some of the same problems 12 years from now. The irrigation systems of both are nearly identical. There's no guarantee that Bu Rec's feasibility studies are any better.

It's questionable whether settling Indian claims will compensate for the disintegration of the right-sounding purpose of irrigation for the family farmer. Many feel that it is unlikely that the Animas-La Plata could go through without the support of the Dryside farmers. Even if farmers stick with it, despite the general rise in discontent with the costs and practicality of Reclamation water, and if the Animas-La Plata floods a river valley, the project—one of the first on Bu Rec's drawing boards—may be one of the last.

Jennifer Price, is a free-lance writer living in New Mexico.

ELECTION SPECIAL

The Unfinished Agenda

By David Baker

In a report on the upcoming elections, a newscaster quipped, "What would happen if you held an election, and nobody showed up?" Voter turnout in a non-presidential election year is usually light, but in primaries across America this year the turnout has been even more dismal than usual.

Pundits give many explanations for this voter apathy. The continued entrenchment of the "me generation," the selling of a "feel good about America" strategy by the President, and, as many observers have noted, the lack of any theme to describe these elections. Others are ignoring this year's elections and are focusing on the 1988 Presidential race.

It's easy for environmentalists to fall into this trap of looking to 1988, in our eagerness to see the end of the Reagan "reign of error" on environmental issues. However, ignoring the 1986 elections would be a disastrous mistake for environmentalists. The last few years have seen some major pollution control laws passed, such as reauthorizations of the Safe Drinking Water Act (SDWA) and the Resource Conservation and Recovery Act (RCRA), but the stakes for the ecosphere are still high. Many pieces of important legislation will be left for action by the 100th Congress. These include:

• Pesticides—The House and Senate have both passed compromise versions of the Federal Insecticide, Fungicide and Rodenticide Act. It is unclear at press time whether Congress will be able to iron out differences between the two bills before they adjourn.

• Clean Air—A compromise acid rain control bill garnered over 175 cosponsors in the House but has been successfully stalled by opponents in committee. But the issue is sure to be revived in 1988 as presidential candidates give their support to controls to be competitive in the first primary in New Hampshire.

• Toxic Chemicals—The Toxic Substances Control Act, the primary law for screening and regulating these materials, will come up for reauthorization in the next Congress.

• Groundwater Protection—The passage of the Safe Drinking Water Act will force the Environmental Protection Agency to set standards for purifying drinking water, but no program exists for preventing pollution of underground sources of drinking water.

• Endangered Species—The 99th congress will fail to reauthorize the Endangered Species Act because of disputes over local development projects in Idaho, Texas, Wyoming and Alabama that threaten endangered species. Senate Majority Leader Robert Dole (R-KS) has refused to bring up the bill because of objections by senators from these states.

At press time, the Superfund program for cleaning up abandoned hazardous waste dumps had passed the Senate (88-8) in a stunning victory for environmentalists (see news story, page 1). But President Reagan threatened to veto the bill. Likewise, Congress finally reauthorized the Clean Water Act, calling for $18 billion in sewage treatment over the next eight years, but it too could be vetoed by the President.

This staggering agenda suggests what is at stake for environmentalists in the 1986 election. The winners will determine how this legislation is designed and how much money EPA and other federal agencies will have for implementing and enforcing environmental programs. Numerous votes on weapons systems and the Reagan "Star Wars" could determine nothing less than the fate of the earth. These laws hang in the balance because of many close votes in this sharply divided Congress. The prospects for passage of strong versions of these laws rests heavily on the outcome of this November's elections.

Looming over this undone environmental agenda are several potential changes in the next Congress. These changes have created such uncertainty that it is impossible to predict what will occur next year. If the Senate changes from Republican to Democratic control it could completely overturn the current political coalitions now blocking the passage of environmental legislation like the new acid rain bill. However, Democratic leadership would displace the chairs of key committees like the Environment Committee, which has been led by pro-environment Sen. Robert Stafford (R-Vt.) since 1980. Important changes will occur in the leadership of the House of Representatives. Speaker of the House Tip O'Neill is retiring and probably will be replaced by conservative *Majority Leader* Rep. Jim Wright of Texas, a longtime friend of oil interests.

The convergence of legislative flux and voter apathy are a perennial sign of troubled times, but it also presents many opportunities for environmental activists to get the most out of our issues. By electing more environmentalists to Congress we can take advantage of the political vacuum created by changes in leadership. We need to win only a few key House races and one or two Senate seats to make the difference.

Although much attention has been given to the battle between Democrats and Republicans for control of the Senate, environmentalists are fighting their own battle to establish a bipartisan majority for the environment, regardless of which party is in control. Local action can influence national politics as never before. The lack of a national theme means that local and regional issues, and thus local groups and individuals, can have a larger impact on Congressional races.

During the early 1970's the environmental movement changed the way Congress looked at issues involving the environment. Votes on water projects changed from debates on transportation and irrigation to debates on damage to watersheds. Votes on toxics changed from debates on jobs to debates on health. Votes on nuclear weapons changed from debates on national defense to debates on survival.

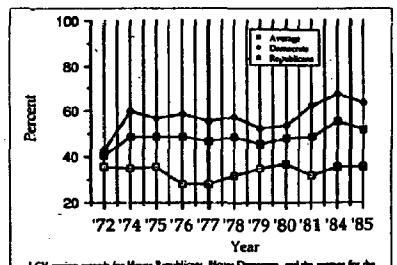
This change occured for two reasons. *First*, events like *Earth Day* fostered the rise of an organized environmental movement that changed how people viewed issues involving the planet as a whole. Second, the oil crisis and world economic depression created an awareness of the financial need to protect our resources.

Industry can no longer afford waste. Recycling and reduction of waste streams will become not only environmentally and aesthetically desirable, but economically essential for many businesses.

Ronald Reagan attempted to reassure the old order in 1980. Although he has set the debate on nuclear weapons issues, he has been repelled on most other environmental fronts. Former EPA administrator Anne Gorsuch-Burford tried to eviscerate the Clean Air Act, while former Interior Secretary James Watt attempted to sell off huge chunks of the public estate for energy development. Their efforts were defeated, and ultimately both were forced by public pressure and scandal to resign.

With their resignations, the first great battle of the Reagan anti-environmental era was won. However, the war continues. We have made some progress and passed a few laws, but each day the Reagan EPA and other agencies either refuse or are fiscally unable to enforce the laws they are charged with administering. We stand on the verge of getting tougher Congressional requirements for environmental protection, but our success could hinge on who wins and loses in this fall's elections.

In any election where voter turnout is low, the side that wins is the one most able to mobilize its people. If we can energize those who are concerned about environmental protection and get them out to vote, we can make the 1 or 2 percent difference that could swing a close election. Your vote counts like never before. On the following pages are the 1986 FOE endorsements for elected office. Please vote for these candidates. Lend them your volunteer support during the final days of the campaign when get-out-the-vote efforts will be critical. Please support these candidates and FOEPAC in our struggles to preserve and protect the ecosphere.



LCV voting records for House Republicans, House Democrats, and the average for the whole House of Representatives, 1972-85.

David Baker is Friends of the Earth's political director.

F-94

PAC PIC

HOUSE INCUMBENTS

Morris Udall (AZ)
Jim Bates (CA)
Anthony Beilenson (CA)
Barbara Boxer (CA)
George Brown (CA)
Ronald Dellums (CA)
Mel Levine (CA)
George Miller (CA)
Leon Panetta (CA)
Henry Waxman (CA)
Patricia Schroeder (CO)
Sewall McKinney (CT)
Bruce Morrison (CT)
Jim Leach (IA)
Richard Stallings (ID)
Cardiss Collins (IL)
Cooper Evans (IL)
Sidney Yates (IL)
Silvio Conte (MA)
Barney Frank (MA)
Edward Markey (MA)
Gerry Studds (MA)
James Oberstar (MN)
Gerry Sikorski (MN)
Bruce Vento (MN)
Bill Clay (MO)
Alan Wheat (MO)
Pat Williams (MT)
Stephen Neal (NC)
James Florio (NJ)
Sherwood Boehlert (NY)
Tom Downey (NY)
Bob Mrazek (NY)
Ted Weiss (NY)
Mike Synar (OK)
Les AuCoin (OR)
Peter Kostmayer (PA)
Doug Walgren (PA)
Claudine Schneider (RI)
John Bryant (TX)
Rick Boucher (VA)
Jim Jeffords (VT)
Mike Lowry (WA)
Bob Kastenmeier (WI)
Jim Moody (WI)
David Obey (WI)

HOUSE CHALLENGERS

David Skaggs (CO)
Jim Jones (IN)
Collin Peterson (MN)
Mike Espy (MS)
Bill Clarke (NC)
David Price (NC)
Louise Slaughter (NY)
Rosemary Pooler (NY)
David Jackson (OH)
Tom Sawyer (OH)
Peter DeFazio (OR)
Bill Wachob (PA)
Tim Johnson (SD)
Wayne Owens (UT)

Brock Adams
Washington

Kent Conrad
North Dakota

Peter DeFazio
Oregon

Gov. John Evans
Idaho

Rep. Harry Reid
Nevada

Rep. Tim Wirth
Colorado

Sen. Alan Cranston
California

STATE RACES

Bruce Cohen (NM-Lieutenant Governor)
Ray Powell (PM-Governor)

S IN '86

Tim Johnson
South Dakota

Louise Slaughter
New York

Rep. Tom Daschle
South Dakota

Rep. Bob Edgar
Pennsylvania

Bill Wachob
Pennsylvania

Mike Espy
Mississippi

Gov. Bob Graham
Florida

SENATE INCUMBENTS

Sen. Dale Bumpers (AR)
Sen. Alan Cranston (CA)
Sen. Patrick Leahy (VT)

SENATE CHALLENGERS

Gov. Bob Graham (FL)
Rep. Wyche Fowler (GA)
Gov. John Evans (ID)
Kent Conrad (ND)
Mark Green (NY)
Rep. Harry Reid (NV)
Rep. Bob Edgar (PA)
Rep. Tom Daschle (SD)
Lt. Gov. Hunter Woods (MD)

Election '86

Fear of Losing on the Campaign Trail

In Republican and Democratic areas alike, where polluted ground water and hazardous waste dumps are increasingly visible, voters want action, not grandstanding and posturing. These FOE-endorsed candidates for the House of Representatives fit that bill.

House Challenges

Professor David Price of North Carolina's Fourth District has been riding a wave of opposition to DOE's proposed siting of a nuclear waste dump in local crystalline rock formations. Price has attracted the support of environmentalists with his advocacy of tougher Clean Air and Clean Water Acts; he is also a believer in a strong Superfund. Incumbent Rep. Bill Cobey is out of step with the electorate on this issue. His LCV rating ranges from 20 to 30. He has voted consistently against toxic waste cleanup appropriations.

The 11th district of North Carolina is home to some of the state's most spectacular wilderness areas, and former Rep. James Clarke has worked effectively in the past to preserve them. From 1982 to 1984, Clarke sat on the House Interior Committee, where he led the North Carolina Wilderness Act to passage. He also earned the committed support of environmental activists by blocking construction of the ecologically damaging Horsepasture River Dam. Rep Bill Hendon's reputation as a "Reagan robot" should garner him fewer votes this year than it did in '84. Clarke has an excellent chance to regain his position as the leading environmentalist of the North Carolina delegation.

Over strenuous local objections, the 7th district of Minnesota has been targeted by DOE as a possible nuclear waste site. This has met with considerable antinuclear political posturing by both candidates, but only Collin Peterson's protests have credibility. Peterson built up an outstanding record in the Minnesota State Senate as an environmental leader: he helped draft the state's "Superfund" bill, wetlands protection laws, prairie protection laws, and legislation aimed at protecting local wildlife. Rep. Stangeland has voted with the Reagan Administration against pesticide controls, clean water legislation, toxic waste controls, and has voted for all major nuclear weapons programs. An agent of Ronald Reagan's environmental policy, Stangeland has not acted in the interests of his constituents.

Rosemary Pooler of Syracuse could bring environmentalists an important victory in New York's 27th district. As a utility commissioner in this factory town, Pooler developed a popular reputation for standing up to local industry in support of consumers' rights. Republican incumbent Fred Wortley has no such grassroots support. Low environmental ratings include votes against the toxic waste "right to know" bill and legislation enabling victims of chemical poisoning to press their claims in federal court.

The 5th District of Indiana is no hotbed of environmental activism, but Democrat State Sen. Jim Jontz could shake things up. His approach to campaigning is as energetic as his approach to environmental legislation, and both have caught voters' imaginations. In the Indiana State Senate, Jontz has sponsored or authored the solar energy tax credit, improved toxic waste laws, the Indiana Youth Conservation Corps, the Wildlife Habitat Act, and hazardous waste manifest tracking and tax legislation. The incumbent Congressman is retiring, and Jontz's election would be a major improvement for the district.

Akron Mayor Tom Sawyer has been endorsed by retiring Ohio Congressman John Seiberling in his bid for the House. Sawyer shares his predecessor's commitment to a strong Superfund program and public lands protection.

Environmental Action's Dirty Dozen: The Top 12 Contributing Petrochemical and Nuclear PACs of the 86 Campaign

PETROCHEMICAL PACS		NUCLEAR INDUSTRY PACS	
1. Tenneco	$91,500	7. General Electric	$74,650
2. Amoco	$76,000	8. So Cal Edison	$41,750
3. Shell Oil	$56,250	9. Westinghouse	$38,125
4. U.S. Steel	$53,300	10. Southern Company	$28,250
5. Dow Chemical	$45,000	11. Florida Power	$21,250
6. Chevron	$40,265	12. Texas Utilities	$21,250

House Incumbents

In addition to supporting challengers who, we hope, can bring valuable pro-environmental voices to the House, FOE endorses 50 incumbent Representatives seeking reelection. Here is a sampling:

Les AuCoin of the Oregon's First District, is a key environmental advocate on the Interior Appropriations Subcommittee. He has worked to protect America's shorelines from wholesale oil leasing plans pushed by the Reagan Administration. The Columbia Gorge Protection Bill and the Oregon Wilderness Bill are among his recent accomplishments. This year, as always, AuCoin is under fire from powerful Oregon timber interests.

Howard Wolpe of Michigan is the only member of Congress to retain a 100 percent LCV rating over four consecutive years. Wolpe led the fight to cut funding from the dangerous Clinch River Breeder Reactor and succeeded in replicating that coalition in the long battle to deauthorize the U.S. Synthetic Fuels Corporation. With Rep. Dan Glickman of Kansas, he authored and engineered the successful passage of the Soil Conservation Bill. Wolpe has a perfect SANE rating and has been a leader in the international effort to halt nuclear proliferation. He is simply among the very best in the U.S. Congress. Rightwing PACs have tried unsuccessfully to knock Wolpe out of his seat for years, and they are trying again in 1986.

Peter Kostmayer's informed approach to river and wetlands preservation has earned him the support of environmentally concerned citizens in the Republican 8th District of Pennsylvania. He has been campaigning hard against the Point Pleasant Diversion Project, designed to pump 95 million gallons of the Delaware River through the proposed Limerick nuclear power plant. That project, now coming before public hearings, is opposed by local residents and environmentalists. Kostmayer has also been a motivating force behind the Delaware River Wilderness Protection Bill which gives the Upper and Middle portions of the Delaware River status as a wild and scenic waterway. The Kostmayer-sponsored Pennsylvania Wilderness Bill set aside some 70,000 acres of national park and was the first of its kind in the state. Kostmayer, like Edgar in the neighboring 7th district, has a permanent position on anti-environmental hit lists.

Richard Stallings is a voice of moderation in an Idaho district which has in the past been held by rabid anti-environmentalism. Stallings beat convicted felon George Hansen by just over 100 votes in 1984. It is important to the environmental community that he retain his seat in 1986. If Governor John Evans can win the Senate Seat and Stallings returns to the House, an effective Idaho Wilderness bill might be passed in the 100th Congress.

Senate Incumbents

Among Senate incumbents, Patrick Leahy and Alan Cranston need no introduction. They have been valuable allies in nuclear and environmental issues for years, and they will no doubt continue supporting our causes in the Senate. Dale Bumpers also receives our endorsement. In addition to accumulating an excellent LCV record (94 percent in 1984), Bumpers has played a key role on the Energy Committee, challenging Ronald Reagan's energy and public land policies. Wyche Fowler of Georgia is challenging Star Wars advocate incumbent Sen. Mack Mattingly. Fowler has worked on the *House Ways and Means Committee* and pushed for energy conservation tax credits and solar power subsidies.

A final expression of support goes out to Mark Green, Democratic Senate candidate from New York. He is faced with a formidable Republican war chest, but his credentials as an environmental candidate are truly impressive. Green worked for 16 years as the organizer of Ralph Nader's Congress Watch. He has been a leader in the fight for Superfund, against nuclear power, and against acid rain. Green's expertise is matched only by his determination. He won the Democratic nomination against a man who spent $6 million compared to Green's $500,000. With his grassroots approach Green could surprise incumbent Sen. Alfonse D'Amato in November.

DIRTY DOZEN TAKERS

Top Twelve Senators Accepting Campaign Contributions from Nuclear Industry and Petrochemical PACs

1. James Broyhill (R-NC)	$84,325
2. Steve Symms (R-ID)	$78,735
3. Bob Dole (R-KS)	$76,900
4. Don Nickles (R-OK)	$64,569
5. Frank Murkowski (R-AK)	$64,141
6. Jim Abdnor (R-SD)	$57,550
7. Arlen Spector (R-PA)	$50,775
8. Rep. Henson Moore (R-LA)	$48,116
9. Alphonse D'Amato (R-NY)	$47,550
10. Dan Quayle (R-IN)	$45,335
11. Bob Kasten (R-WI)	$44,008
12. Slade Gorton (R-WA)	$42,169

Contributions examined from Jan. 1, 1983 through June 30, 1986 for Senate incumbents and candidates other than those who presently hold House seats. Contributions to candidates now in the House of Representatives were reviewed from Jan. 1, 1985 through June 30, 1986.

by Ernest Callenbach

A Green City Sermonette

We could have green cities, it seems to me: cities habitable for the human species. My particular fantasies along this line are cities filled with trees that comfort us by reminding us of our origins in the forest. Protecting us from wind and smog and the dullness of our rectangular architecture. I would like to see green cities with creeks running through them— not put into pipes—so that the water would remind us of our eternal dependence on the great cycle of evaporation and rain and all the rivers returning to the sea.

The private automobile is the dragon we must slay.

I want green cities with piazzas, plazas, spacious and protected from cars—lively with the natural sociability of our species, giving centers to our neighborhoods. Places where we can meet each other at cafes and restaurants so we can eat together, break bread together. Places to have the spontaneous cultural and business conversations that lead to the kind of particular liveliness that cities contribute to our civilization.

I want green cities with markets with fresh fruit. Foods grown in the neighborhood, or grown near the city, fresh and uncontaminated. I would like to see cities with transportation systems that move goods in and out underground, out of sight, invisibly. And move people quickly around the surface in mini-buses, cable cars, streetcars and buses. Maybe even free bicycles on the "Amsterdam Plan"—bikes that you would pick up when you need them and lay them down when you're finished so somebody else can use them.

We need cities that encourage walking. Streets that are safe for loitering, as the great film director Jean Renoir said. Cities, in short, that offer the privileges that are taken for granted by village dwellers in any healthy peasant society.

We need cities with residential structures that are integrated with commercial, amusement, and light industrial uses on the well-tried European model—not zoned into great ghettos far apart, with car travel required to get from home to job to shopping.

We need cities with a decent density to make all these things possible, to be energy-efficient and people-efficient. We need many wild places in our cities, shorelines, parks, ravines and creek-canyons where we can share parts of our cities with wild creatures so that we're constantly reminded that we are not the only species to live here.

If we have too much concrete, break it up and make a rock garden. Wherever possible plant native plants that don't need irrigation. As Gary Snyder says, learning the plants that naturally grow in our area is the *first step toward getting to know where you really live.* Plant edible plants: artichokes and asparagus for shrubbery, kiwis and grapes for vines; strawberries for ground cover; nut and fruit trees for shade. If your street lacks trees, get into your city tree-planting program. Turn out to help do gardening in the parks which are starved for money almost everywhere. Help start a community vegetable garden.

And acting as citizens there's lots more that we can do. We can put pressure on our planning department and planning commissions. Help get them off the steel-and-concrete kick. We can form neighborhood associations to increase our political leverage on city hall. We can get active in park and recreation departments. There's a whole lot of greening of our cities that we can accomplish through this kind of work.

But in any sermon about a green paradise, we also have to deal with the devil, right? And one happens to be ready at hand—the private car. The main enemy of green cities is, in fact, the private car. The car is everywhere triumphant. Indeed cities everywhere on earth, not just in America, are being overrun by cars. The greatest cities that humans have contrived in the whole history of our species are in danger. Cars are *multiplying faster than people.* They're crowding us, too. They're using up our land area. They're using up our economic strength.

There was a professor named Donald Appleyard who studied in great, careful, objective and even mathematical detail exactly how increasing traffic ruins a street and destroys streetlife and neighborhood vitality. He did his work in San Francisco, and he published these studies in a book called *Livable Streets,* ending the book with some wonderful examples from Dutch cities of cul-de-sacs called "woonerfs" where traffic can only come in slowly, is on an even footing with pedestrians, including children, and generally doesn't wreck the neighborhood. Appleyard knew there was a crucial difference in citizenship between drivers and walkers. Driving, even the best of us are just passing through. We don't live there. We can't care for the place we are driving through as home.

In sober literal fact, it is them or us: cars or people. But of course it's also true, as Pogo likes to say, that "We are them." Probably most of us here tonight who have come to celebrate this great astronomical turning point came by car—a mighty collective self-contradiction.

Let me remind you what our cars are doing to us and to the prospects of green, inhabitable cities. For one thing, if you do much driving, you know they're ruining our civility, our feeling of shared civilized territory. Behind the wheel we all have a terrible tendency to become signal-jumpers and pedestrian-clippers.

Cars wreck our balance of trade as a nation. We are selling our topsoil—turned into corn and soybeans—to pay for the forty billion dollars a year of imported oil that we need to support our car habit. Cars consume an eighth or more of all our national wealth, our national income. For many individuals it is even more in the cost of insurance, repairs, costs, and police. Like our military outlays, cars impoverish our national economy.

Cars are, at least in the vision of this Ecotopian Preacher, mobile eyesores. They are shiny, ungainly, smelly, and dangerous —killing more than 50,000 of us each year and injuring almost two million more—a toll enormously greater than that of any military war in our history. That is, as Hobbes said about human beings at their nastiest, "a war of all against all."

There is no escaping the terrible indictment *of the automobile*—our joy and our destroyer. We love the thing that will destroy us, it has been said, and this is indeed the case here. Very likely our society will go down if we do not somehow confront the car and control it. The car is the dragon we have to slay if we are going to achieve green cities.

We can seek ways to make life more difficult for cars and easier for people, plants and animals. I like particularly the "slow streets" idea that has been proposed by the Urban Ecology organization in Berkeley. This is not to barricade a street the way we have tried in Berkeley and some other cities. But simply to make a street difficult for cars to pass through quickly, so no driver in his or her right mind would try to go that way in order to get somewhere. They would only go in if they lived there.

This means speed bumps. It means chokers that make the area for a car narrower, planters and barriers that drivers have to go around. And potholes. If the traffic seems too fast on your street you might want to go out and help some of those cracks turn into real potholes. That will persuade people to drive somewhere else, or even not to drive at all.

But most of all, we have to try and kick *the car habit in our own daily lives as far as* we can. Nobody's going to be perfect in this. I'm not asking superhuman dedication and abnegation, but we can all find ways to be less dependent on cars. We can try to live near our work. We can relearn how to walk, as even New Yorkers do. We can explore and experiment with the nearby resources of our neighborhoods—the shopping, and recreation, and friendships, and community activities that are done at hand with people whom we might learn to rely on and have them rely on us—in preference to things that are happening across town.

We can have green cities. We must have green cities if we want them once more to feel livable, secure, familiar—cities that will feel like home.

Ernest Callenbach is author of Ecotopia *and* Ecotopia Emerging. *This article was given as a speech at a winter solstice celebration for the Planet Drum Foundation, and is excerpted with permission from Raise the Stakes.*

BOOK REVIEWS

The Nemesis Affair

By David M. Raup

W. W. Norton, New York
1986, $14.95, 220 pages
Reviewed by Peter Wild

Here a comes, folks. Nemesis. The Death Star." It's rocketing toward the Oort Cloud, a cluster of comets parked near our sun. The speeding star will arrive like a runaway eighteen-wheeler smashing into a lot full of cars. Comets will fly off everywhere. Inevitably, at least one will plow into our earth.

At that, life on this planet, as they say, will never be the same again. In fact, there may not be much of it left.

The whom-whom of a sci-fi writer? The hoped-for disaster of the gloom-and-doom set?

No, but a scenario espoused by some of the most careful authorities in the field. Scientists at Berkeley, Harvard, and the University of Chicago are backing the astral script; they claim it's happened before. Every 26 million years or so an errant billiard ball from outer space slams into our soft, vulnerable globe. Hence, the periodic demise of dinosaurs and other creatures that bad scientists scratching their chins until this recent theory offered an explanation.

Why read about it? Raup goes beyond his admirable building of a solid case for Nemesis, and, as a participant in the theory's birth, gives us the repercussions of its development. Early computer modeling on Nemesis led Carl Sagan and others into further studies of the environmental impacts of atomic warfare. Feuds that grew the recent debates on nuclear winter. And that in turn led to fresh looks at the ongoing ravishment of the earth's rain forests.

Much to our further instruction, and numerous delights. Raup sets himself the accompanying task of showing how science works in accepting or rejecting new ideas. At times, it works in the same Machiavellian atmosphere that poisons other human endeavors: back stabbing, smear tactics, downright egotism. Still, he concludes, it does work, bumping and lurching, but finally, belaboredly, grinding out the truth.

The media's strange combination of hunger for sensationalism and yawning nonchalance doesn't help the process. On the one hand, television wants experiences with "flashing lights that make loud noises." On the other, sighs Raup, a major newspaper can ax report of the Nemesis theory next to "a picture of an existentialist hockey fan in the act of baring her breasts to distress the Edmonton Oilers."

With Raup as our guide through science's hair-raising labyrinths, we come away from this book not only with a better appreciation of how astrophysicists and paleobiologists labor, but determined to have a kindly word for the next scientist we meet.

Peter Wild is a frequent contributor to Not Man Apart.

NATURAL RESOURCES BOOKS

Managing the Oceans: Resources, Research, Law
Jacques G. Richardson, editor
$28.95

Violent Forces of Nature
Robert Rapaport
$19.50

Available from
LOMOND PUBLICATIONS, INC.
P.O. Box 88
Mt. Airy, MD 21771
1-800-443-6299

Agricide: The Hidden Crisis That Affects Us All

By Michael W. Fox

Schocken Books, New York, 1986
194 pages, $7.95
Reviewed by Michael Cavigelli

The current crisis in agriculture is more than a temporary lapse in an industry whose history is plagued by cyclical highs and lows. As Wes Jackson has said, it is a failure of culture, especially that aspect which reflects our relationship with nature.

To Michael Fox, veterinarian, Scientific Director of the Humane Society of the United States, the root of this problem is our desire to dominate nature. Fox's purpose in writing this book is to "convince all sectors of agribusiness, as well as consumers, that a system of agriculture has evolved over the past twenty years which is so flawed as to be ultimately self-destructive." In our quest to be in control he says, we have been blind to the laws of nature and have accepted, often at the expense of all other values, the industrial concept that ever greater exotkmic efficiency will solve all our problems.

Applying this tenet to our food production has given us a myriad of technologies which have overemphasized efficiency, reduced the human element in farming, destroyed rural communities, increased socio-economic safety, and further separated us from the land that sustains us. The result is an agriculture that is not sustainable over the long term.

Fox heartbreaks the reader with statistics about the environmental, political, social, economic, and spiritual ills of our current agricultural system, most of which readers will be familiar with. He discusses, for example, agrichemical contamination of water, soil, and food; the internationalization of chemical- and capital-intensive agriculture; and the increasing number of pests which are developing resistance to pesticides. Fox also touches on less familiar topics: The inadequate nutrition of commercial pet foods; the gross inadequacy of the federal meat inspection program; and the connection between the arms race, the federal deficit, and the declining number of farms and farmers.

These topics are all important and relevant, but Fox attempts to cover too much ground in only 176 pages. As a result he's forced to jump from topic to topic, often without the benefit of introductory or transitional sentences, and he spends too much time on some topics, especially the more familiar ones, while he does not cover others in sufficient depth.

Most regrettably, even Fox's unique message—that the mistreatment of animals in agriculture is one of the more significant causes, disturbing abuses resulting from our deification of efficiency— becomes buried beneath this barrage of statistics and unclear connections. Even the chapter devoted to the ethics of our traditional exploitative relationship with animals fails to make a strong case for this position. This is unfortunate because animal welfare is usually Fox's forte, and it is a topic which needs further attention in the growing literature on alternative agriculture.

Fox concludes by listing a number of actions that consumers and producers can take in creating a more sustainable food production system. He advocates vegetarianism, buying locally grown food and organic food, and educating yourself about the true nature of our agricultural system. Regrettably, although the issues are important and are gaining popularity, the preceding chapters do not form a compelling argument for his viewpoint.

Michael Cavigelli is a free-lance writer living in Whiting, Kansas.

Where There's a Will

If you don't write a will, the state you live in has already written one for you. A brochure called "Another Way of Giving," produced by Friends of the Earth Foundation, describes the advantages of writing a will and describes various techniques for those considering leaving part of their estate to Friends of the Earth or its foundation.

There are many techniques available for writing your will— bequests of various types, testamentary trusts, and pooled income funds. The field of "planned giving" is a complicated but probably necessary one, and we think you should be aware of the choices available. For a copy of "Another Way of Giving," contact Deborah Ogden, Development Department, FOE, 530 7th Street, Washington, DC 20003, (202)543-4312.

New & Noteworthy

Bankrolling Disasters
By Steve Schwartzman
Sierra Club, San Francisco
1986, $5, 32 pages

Much attention has been focused on the role of international lending institutions, like the World Bank, in the destruction of tropical rainforests. This Sierra Club booklet explains how the various development banks work and shows how concerned citizens can influence their lending decisions. Includes a partial list of groups and individuals in other countries working on development issues, and selected readings.

Proven Profits From Pollution Prevention
Institute For Local Self-Reliance
Washington, DC
1986, 316 pages, $26.50

The Environmental Protection Agency will soon issue stricter regulations for disposing of toxic wastes, which will make it more expensive for companies to dispose of their refuse. *Proven Profits* is a compilation of case studies of how different companies have reduced waste in their production processes and increased profits in the same cases.

LETTERS

To the editor:
I wasn't planning on contributing any more, because I was so pissed off about how you kept members in the dark while you wasted our contributions on an internal power struggle.

But I've released—your intelligent coverage of the ozone depletion in the issue *Not Man Apart* convinced me. I think global warming ranks with overpopulation as one of the two most important ecological problems of this century (I list overpopulation because of habitat destruction in the Third World.) I hope NMA runs more articles on this topic. Keep up the good work!

—*Dr. Francis Verter*
Goddard Space Flight Center
National Aeronautics and Space Administration

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Dear Editor:
As usual, your most recent edition, July-August, was helpful and informative, but I found it ironic that you failed to highlight or even mention the connection between two of the major issues dealt with in the issue. That is, the climatic change resulting from the "greenhouse effect" and the role of tropical rainforests in mitigating this effect.

While Francesca Lyman does mention the "scientific uncertainties . . . as what rate the oceans and forests will stop absorbing emissions of carbon dioxide," never is it clearly stated that tropical rainforests fix carbon dioxide, thus functioning to lower atmospheric CO2. The continued destruction of the rainforests, therefore, succeeds in hastening the greenhouse effect. For lack of a better term, I have come to call this the "backend" of the greenhouse effect.

As the nations of the world eventually realize the disastrous results of global warming, this connection should help to serve as a major argument for rainforest protection.

—*Joel Kaufman*

◆

Dear Editor:
The July/August issue had considerable coverage of one of my main areas of concern: the weather. I found three interesting articles on the weather, but all with the same theory: the earth is warming. I think that if you are going to really cover a subject, you should investigate other points of view. Such an opposing theory is that of John Hamaker and Don Weaver in the book *The Sawmill of Creation*, published in 1982.

The news reports from radio and TV seem to be reporting one disaster after another. Hurricane after hurricane, "When does snow on the Riviera have to do with the drought in Ethiopia? What does a recent forest fire in Borneo, the largest forest fire in recorded history, have to do with the dying of the Black Forest in Germany? As you read Hamaker and Weaver the reasons become clear.

Hamaker says an interglacial period normally lasts from 10,000 to 11,000 years, and we are 10,800 years into the present one. He adds that during an Ice Age, the glaciers crush rock onto the earth's surface and this blows to all parts of the globe, providing the fertile soil needed during interglacial periods. At the end of an interglacial period a critical stage is reached in which the available minerals become so scarce that most of the minerals in the soil are used up. Don Weaver, co-author with Hamaker, explains: "This gradual process over 10,000 years leaves a shrinking, sickening, very fragile worldwide plant/forest cover which grows increasingly susceptible to . . . insects, disease, acid rain, climatic extremes and fires, and loses its capacity to utilize carbon dioxide as it could earlier in the interglacial period."

Could the odd weather conditions of the last two decades—the droughts in Africa, the severe winters in New England, and the recent excessive rains in California—be harbingers of another period of glaciation? Some cherry climes already glaciers have come down from the North."

—*Vivian Monaker Haines, Alaska*

The author responds: There's no question that tropical deforestation has greatly added to atmospheric carbon dioxide. That's why the editor's note (p. 2) said that the "greenhouse effect" issue is "a natural companion to the procession of tropical deforestation, a vital campaign issue for many FOE international groups, since cutting these forests is a prime contributor to the greenhouse effect problem . . . trees absorb carbon dioxide, yet they release it when they're cut down."

If my feature on the politics of the debate thicked the forest issue it's because the more now is that policymakers are finally looking seriously at emissions, particularly chlorofluorocarbons and other gases, which account for again as much as all CO2 emissions put together. Deforestation is thought to be a source of only 15 percent of the CO2. One scientist, George Woodwell of Woods Hole Oceanographic Institute, however, claims the figure's more like 30 percent. But it's agreed that it will be less of a culprit in the future for the sad reason that "we'll run out of forests before we run out of coal," as one EPA official put it.

In any case, there are no easy answers. It's clear that a solution will have to come from various strategies—yes, halting deforestation and conducting reforestation, but primarily changing society to reduce emissions and generally conserve. Otherwise, the forests we worry about in the future will not be those someone had the choice of cutting down but those that die out, blighted by strange climate shifts. –

On the second point: the scientific establishment has only recently embraced the theory that we are undergoing a severe warming trend. From the 1940s to the 1960s, the scientific establishment thought the climate was cooling. But the Ice Age theories of John Hamaker described in the above letter do not have any credibility in today's National Academy of Sciences, according to Steve Seidel of EPA. I myself have not investigated the plausibility of these theories.

◆

Dear Editor:
I grimaced when I saw the flip headline on your lead story in the July-August issue, "World Population Hits High Five" had the mark of an article gleaned from the daily press and finished out with information from the World Almanac. While the population explosion is certainly a problem that we all need to know more about and subsequently address, this article pretends to explain in six short paragraphs one of the more complicated global problems we face.

I lived in Bangladesh, the epicenter of the population explosion, for two years, and have spent lesser amounts of time in India, Haiti, and other areas of the Third World where I witnessed the effects of First World solutions on the lives of very real Third World people.

Family planning in those countries does not mean making a visit to your friendly Planned Parenthood counselor for some compassionate planning advice. It is more likely to mean an unexpected x, and unwelcomed visit to your village from a member of the elite class, a person so separated from you by caste and culture that normal social interaction is unheard of. Blindly planning in this situation becomes more a case of the landowner class telling the peasant class what to do with their lives, again. And since pills certainly won't be effective (how can you be sure the women will take them day after day without your presence?), it falls to either of two methods to get the job done: sterilization or injectable contraceptives. Sterilization too often becomes a tool of coercion, with monetary rewards or punitive laws serving as the carrot and the stick.

The second "choice" is a long-term contraceptive that is injected once every two or three months. The problem here is that too often these contraceptives are still being tested on lab animals in the U.S. while they are being administered en masse in Third World countries.

In How the Other Half Dies, author Susan George explains the situation very succinctly. "If we stopped looking just for a moment at what we consider to be the problems of the poorest people ('too many children') and tried to look at life from their point of view ('my children are my only wealth'), then we might realize that [family planning] without social changes making children less necessary cannot possibly have any effect." In short, we would be far better advised to learn why poor people want and need children than to worry about alarming population figures. It applaud the decision to cover global population in the pages of *NMA*, but please, treat the topic with at least as much research as you would an environmental threat closer to home.

—*David Perrenoc*
Missoula, Montana

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Robert for the record

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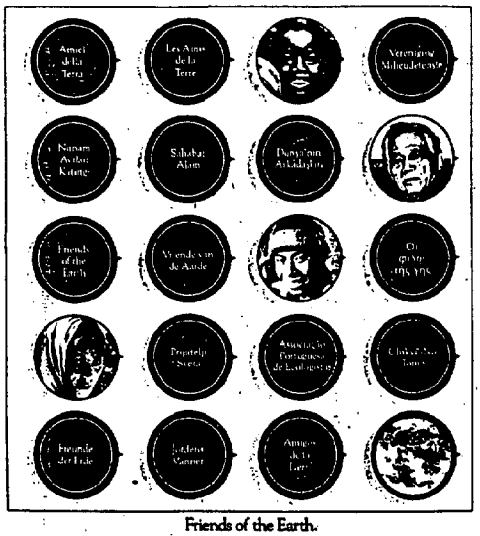

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ELECTION SPECIAL

Not Man Apart

VOLUME 16 NUMBER 5 SEPTEMBER-OCTOBER 1986 $2

The Newsmagazine of *Friends of the Earth*

FACING THE FUTURE:
CAN FARMERS AFFORD FEDERAL WATER?

GREEN CITIES CARIBOU TOXIC CRIMINALS

Yukon Government

News Release.....

FOR RELEASE
January 6, 1987 #005

CONCERNS RAISED ABOUT PROPOSED ALASKAN OIL AND GAS EXPLORATION

WHITEHORSE - Renewable Resources Minister Dave Porter announced today that the Yukon government is increasing its efforts to persuade the United States Department of the Interior to not allow oil and gas exploration and development in the Artic National Wildlife Refuge in Alaska.

Porter told the Yukon Legislative Assembly today that presentations are being made to implement a unanimous motion of the legislature that was passed in December in opposition to the U.S. proposals.

Concern has been expressed on both sides of the Yukon/Alaska border that the proposal will have serious consequences on the future of the Porcupine caribou herd which uses the proposed region as its calving grounds.

The renewable resources minister told the legislature that an official from his department had made a presentation yesterday to a hearing in Anchorage, Alaska and had pointed out a number of serious omissions in the draft environmental impact statement.

" A presentation was also made by the Council for Yukon Indians and additional interventions are being made tonight in the village of Kaktovik, Alaska by the Porcupine Caribou Management Board and the band council of Old Crow," Porter said.

"On Friday of this week my deputy minister and a representative from the Executive Council Office will make a further intervention in Washington, D.C.

...../2

"Further to these initiatives, the federal government hopes to present its position on the issue to the U.S. Department of the Interior at a meeting in Ottawa on January 23. The Yukon government will also be represented at that meeting," the minister said.

Porter told the legislature that it was ironic and disturbing that the U.S. government was proposing to reduce protection for the wildlife in the Arctic coastal plain after years of urging Canada to do a better job of protecting resources on its side of the border.

"It is even more disturbing that they would write an impact statement which only makes passing reference to the effects in Canada, when, in fact, several important subsistence species are involved and most of the negative socio-economics effects would be experienced in Canada generally and by Old Crow in particular.

"The Yukon government is deeply concerned about moves toward oil and gas drilling in Alaska that could have unfortunate and unnecessary long term effects on the ability of the Old Crow people to harvest the Porcupine caribou herd as they have traditionally harvested the herd for generations," the minister said.

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Dennis Senger
Public Affairs Bureau
(403) 667-5431

Government of Yukon
Box 2703
Whitehorse, Yukon, Y1A 2C6

MINISTERIAL STATEMENT

DATE: 06 JANUARY 1987

BY: HONOURABLE DAVID P. PORTER

RE: YUKON GOVERNMENT PRESENTATIONS TO U.S. DEPARTMENT OF INTERIOR HEARINGS ON THE FUTURE OF THE ARCTIC NATIONAL WILDLIFE REFUGE, COASTAL PLAIN

MR. SPEAKER, I AM PLEASED TO ANNOUNCE TODAY THAT I HAVE TAKEN STEPS TO ENSURE THAT THE YUKON GOVERNMENT, AS WELL AS SEVERAL MAJOR INTEREST GROUPS, ARE MAKING COMPREHENSIVE PRESENTATIONS TO THE UNITED STATES GOVERNMENT, OPPOSING THEIR PROPOSAL TO OPEN UP THE HEART OF THE PORCUPINE CARIBOU HERD CALVING GROUNDS TO OIL AND GAS DEVELOPMENT IN ALASKA. THESE PRESENTATIONS REPRESENT THE ACTIONS WE ARE TAKING TO IMPLEMENT THE UNANIMOUS MOTION OF THIS HOUSE SEVERAL WEEKS AGO.

YESTERDAY IN ANCHORAGE, OFFICIALS OF THE DEPARTMENT OF RENEWABLE RESOURCES SPOKE TO A NUMBER OF VERY SERIOUS OMISSIONS IN THE DRAFT ENVIRONMENTAL IMPACT STATEMENT. THE DEPARTMENT OF INTERIOR IS PROPOSING TO OPEN UP A VAST AREA ON THE NORTHERN SIDE OF THE ARCTIC NATIONAL WILDLIFE REFUGE TO OIL AND GAS LEASES: WITHOUT FIRST CONSULTING CANADA; WITHOUT CONSIDERING THE TRANSBOUNDARY EFFECTS ON CANADA; AND WITHOUT LOOKING AT THE TOTAL CUMULATIVE EFFECTS OF ALL THE DEVELOPMENTS ON THE CARIBOU, POLAR BEARS, SNOW GEESE AND MUSK OXEN.

A PRESENTATION WAS ALSO MADE BY THE COUNCIL FOR YUKON INDIANS AND ADDITIONAL INTERVENTIONS ARE BEING MADE TONIGHT IN THE VILLAGE OF KATOVIK, ALASKA BY THE PORCUPINE CARIBOU MANAGEMENT BOARD AND THE BAND COUNCIL OF OLD CROW. ON FRIDAY OF THIS WEEK MY DEPUTY MINISTER AND A REPRESENTATIVE FROM THE EXECUTIVE COUNCIL OFFICE WILL MAKE A FURTHER INTERVENTION IN WASHINGTON, D.C. FURTHER TO THESE INTIATIVES, THE FEDERAL GOVERNMENT HOPES TO PRESENT ITS POSITION ON THE ISSUE TO THE U.S. DEPARTMENT OF INTERIOR AT A MEETING IN OTTAWA ON JANUARY 23. THE YUKON GOVERNMENT WILL ALSO BE REPRESENTED AT THAT MEETING.

MR. SPEAKER, IT IS A LITTLE IRONIC AND VERY DISTURBING THAT THE U.S. GOVERNMENT IS PROPOSING TO REDUCE PROTECTION FOR THE WILDLIFE OF THE ARCTIC COASTAL PLAIN, AFTER YEARS OF URGING CANADA TO DO A BETTER JOB OF PROTECTING RESOURCES ON OUR SIDE OF THE BORDER. NOW WE HAVE A NATIONAL PARK AND SPECIAL MANAGEMENT MECHANISMS IN PLACE AND HAVE IN EFFECT CAUGHT UP WITH THE U.S.; THEY SEEM TO BE HEADED IN THE OPPOSITE DIRECTION.

IT IS EVEN MORE DISTURBING THAT THEY WOULD WRITE AN IMPACT STATEMENT WHICH ONLY MAKES PASSING REFERENCE TO THE EFFECTS IN CANADA, WHEN, IN FACT, SEVERAL IMPORTANT SUBSISTENCE SPECIES ARE INVOLVED AND MOST OF THE NEGATIVE SOCIO-ECONOMIC EFFECTS WOULD BE EXPERIENCED IN CANADA GENERALLY, AND BY OLD CROW IN PARTICULAR. THE YUKON GOVERNMENT IS DEEPLY CONCERNED ABOUT MOVES TOWARD OIL AND GAS DRILLING IN ALASKA THAT COULD HAVE UNFORTUNATE AND UNNECESSARY LONG TERM EFFECTS ON THE ABILITY OF THE OLD CROW PEOPLE TO HARVEST THE PORCUPINE CARIBOU HERD AS THEY HAVE TRADITIONALLY HARVESTED THE HERD FOR GENERATIONS.

IN LIGHT OF THESE CIRCUMSTANCES WE HAVE INSTRUCTED OUR OFFICIALS TO MAKE VERY STRONG STATEMENTS ON BEHALF OF OUR GOVERNMENT AND IN THE INTERESTS OF THE PEOPLE OF OLD CROW AND THE PEOPLE OF THE YUKON AND THE NORTH. COPIES OF THE STATEMENT MADE IN ANCHORAGE ARE AVAILABLE FOR YOUR REVIEW.

STATEMENT BY THE

GOVERNMENT OF THE YUKON TERRITORY

IN RESPONSE TO THE
DEPARTMENT OF THE INTERIOR
DRAFT ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT

WASHINGTON, D.C.
JANUARY 9, 1987

F-41

PRESENTED BY:

W.J. KLASSEN, DEPUTY MINISTER,
DEPARTMENT OF RENEWABLE RESOURCES
W. OPPEN, DIRECTOR, INTERGOVERNMENTAL RELATIONS BRANCH
EXECUTIVE COUNCIL OFFICE

GOVERNMENT OF THE YUKON PRESENTATION TO
THE DEPARTMENT OF INTERIOR DRAFT ANWR EIS HEARINGS
(WASHINGTON, JANUARY 9, 1987)

MR. CHAIRMAN, PANEL MEMBERS, DISTINGUISHED OBSERVERS, LADIES AND GENTLEMEN:

MY NAME IS WILLIAM J. KLASSEN. I AM THE DEPUTY MINISTER OF THE DEPARTMENT OF RENEWABLE RESOURCES FOR THE GOVERNMENT OF THE YUKON. OUR DEPARTMENT HAS THE PRIMARY RESPONSIBILITY FOR MANAGEMENT OF THE PORCUPINE CARIBOU HERD WHEN IT IS PRESENT ON THE CANADIAN SIDE OF THE ALASKA/YUKON BORDER.

WITH ME TODAY IS MR. WILLIAM OPPEN, THE DIRECTOR OF THE INTERGOVERNMENTAL RELATIONS BRANCH OF THE YUKON GOVERNMENT'S EXECUTIVE COUNCIL OFFICE. MR. OPPEN HAS THE PRIMARY RESPONSIBILITY FOR LIAISON BETWEEN OUR GOVERNMENT AND OTHERS.

WE WOULD LIKE TO BEGIN OUR REMARKS TODAY BY THANKING YOU FOR THE OPPORTUNITY TO MAKE THIS PRESENTATION. THE RESOURCES OUR TWO COUNTRIES SHARE ALONG THE ALASKA/YUKON BORDER ARE CRITICALLY IMPORTANT TO THE PEOPLES OF THE YUKON SO WE ARE TRULY THANKFUL FOR THE PRIVILEGE OF REPRESENTING OUR INTERESTS IN THESE MATTERS.

IN THE TWO PREVIOUS HEARINGS THIS WEEK IN KAKTOVIK AND ANCHORAGE, THE DEPARTMENT OF THE INTERIOR HAS HEARD PRESENTATIONS BY PROFESSIONAL STAFF OF OUR DEPARTMENT, FROM THE PEOPLE AND ELDERS OF THE COMMUNITY OF OLD CROW, FROM OUR PORCUPINE CARIBOU MANAGEMENT BOARD, AND FROM THE COUNCIL FOR YUKON INDIANS. AS WELL, TODAY, WE ARE TABLING A TECHNICAL ANALYSIS OF THE DRAFT EIS.

WE ARE HERE TODAY TO REPEAT AND REINFORCE THE COMPLEMENTARY MESSAGES IN THESE DIFFERENT PRESENTATIONS - AND TO URGE YOU TO RECONSIDER THE RECOMMENDATIONS FOR FULL DEVELOPMENT CONTAINED IN THE DRAFT EIS. WE SINCERELY BELIEVE THAT CRITICAL WILDLIFE HABITATS AND RESOURCES ON THE ALASKAN AND CANADIAN NORTH SLOPE SHOULD BE STRONGLY PROTECTED, AND THAT THE NORTH SLOPE ITSELF SHOULD BE MANAGED ACCORDING TO CONSERVATION-ORIENTED OBJECTIVES. ANY DEVELOPMENT IN THIS REGION SHOULD BE PERMITTED ONLY IF IT WOULD NOT CONFLICT WITH THE CONSERVATION OF THE WILDLIFE RESOURCES.

WE FURTHER BELIEVE THAT REASONS FOR PROTECTING THE 1002 LANDS ARE FAR MORE COMPELLING THAN THE OFTEN LIMITED TECHNICAL REASONS

FORWARDED IN THE REPORT. ALTHOUGH THE DRAFT EIS DOES IDENTIFY THE TRADEOFFS WHICH WOULD BE REQUIRED TO ALLOW FULL DEVELOPMENT IN THE 1002 LANDS, IT DOES NOT ADEQUATELY ADDRESS THE TANGIBLE REALITY THAT THE MOST HEAVILY IMPACTED SPECIES ARE TRANSBOUNDARY RESOURCES OF CONSIDERABLE INTERNATIONAL SIGNIFICANCE.

WITH RESPECT TO THE PORCUPINE CARIBOU HERD, FOR EXAMPLE, A MAJOR IMPACT IS IDENTIFIED DUE TO THE ENCROACHMENT OF DEVELOPMENT INTO THE HEART OF THE CALVING GROUNDS. THE EIS SUGGESTS THAT SUCH AN ENCROACHMENT COULD LEAD TO A 20-40% REDUCTION IN THE SIZE OF THE CARIBOU HERD. FOR THAT REASON ALONE, WE BELIEVE THAT ANY SUCH IMPACT SHOULD BE CONSIDERED ENTIRELY UNACCEPTABLE. HOWEVER, WE FURTHER BELIEVE THAT THE DRAFT EIS CONSIDERABLY UNDERESTIMATES THE SIGNIFICANCE OF A REDUCTION OF THAT MAGNITUDE TO THE SUBSISTENCE USERS OF THE HERD, WHO ARE PRIMARILY LOCATED IN COMMUNITIES IN CANADA INCLUDING OLD CROW IN THE YUKON AND FORT MCPHERSON, ARCTIC RED RIVER, AKLAVIK, INUVIK AND TUKTOYAKTUK IN THE NORTHWEST TERRITORIES. BY IGNORING SUCH TRANSBOUNDARY EFFECTS THE DRAFT EIS IS FUNDAMENTALLY FLAWED.

WE ALSO MUST VOICE OUR CONSIDERABLE DISAGREEMENT WITH THE WRITERS OF THE EXECUTIVE SUMMARY WHO SUGGEST THAT DEVELOPMENTS ON THE CARIBOU CALVING GROUNDS CAN BE UNDERTAKEN WITH NO NET LOSS OF HABITAT QUALITY. SUCH A STATEMENT CONTRADICTS THE MAIN BODY OF THE DRAFT EIS AND WE BELIEVE SUCH AN ACHIEVEMENT IS LIKELY IMPOSSIBLE.

WE HAVE SIMILAR CONCERNS ABOUT THE OTHER SIGNIFICANT TRANSBOUNDARY SPECIES.

THE MUSKOXEN PRESENT IN ALASKA ARE SLOWLY REPOPULATING THE ARCTIC NATIONAL WILDLIFE REFUGE AREA AS WELL AS THE NORTHERN YUKON, WHERE THEY WERE EXTIRPATED DURING THE LAST CENTURY. THIS IS A VALUABLE AND IMPORTANT OCCURENCE WHICH SHOULD BE PERMITTED TO CONTINUE.

THE MIGRATORY SNOW GEESE POPULATIONS, WHICH USE THE 1002 LANDS AS AN IMPORTANT STAGING AREA, ARE ALSO UNDER CONSIDERABLE THREAT FROM THE PROPOSED DEVELOPMENTS, AND THERE IS VERY LITTLE ACKNOWLEDGEMENT OF THE INTERNATIONAL IMPORTANCE OF THE SPECIES.

HOWEVER, WE DO NOTE THAT THE DEPARTMENT OF THE INTERIOR RECOGNIZES THE IMPORTANCE OF WATERFOWL HABITATS. WE WERE VERY ENCOURAGED TO READ IN A RECENT ISSUE OF THE DUCKS UNLIMITED JOURNAL THAT ASSISTANT SECRETARY HORN IS WELL APPRISED OF THE

INTERNATIONAL SIGNIFICANCE OF WATERFOWL HABITATS SUCH AS THE ARCTIC NATIONAL WILDLIFE REFUGE NORTH SLOPE. WITH REFERENCE TO THE NORTH AMERICAN WATERFOWL MANAGEMENT PLAN, WHICH HAS THE GOAL OF PROTECTING AN ADDITIONAL FIVE MILLION ACRES OF HABITAT BY THE YEAR 2000, ASSISTANT SECRETARY HORN STATED THAT "THE PLAN GOES AFTER HABITAT ACQUISITION SO THAT WE CAN START TO BUILD HABITAT BACK UP, ONE OF THE CRITICAL ELEMENTS IN HELPING PUT OUR WATERFOWL POPULATIONS BACK TOWARD THE 100 MILLION LEVEL. THE OBJECTIVE NOW IS TO GET THE FINGER IN THE DIKE AND STOP THE LEAKING". IN OUR OPINION, PROTECTING THE ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN WOULD DO MUCH TO ACHIEVE THIS.

SIMILARLY, POLAR BEARS PRESENT IN THE AREA ARE PART OF A LARGER REGIONAL POPULATION THAT SHOULD BE ASSESSED IN A MORE COMPREHENSIVE MANNER THAN THAT PROVIDED IN THE DRAFT EIS.

CARIBOU, POLAR BEAR, WATERFOWL AND OTHER MIGRATORY SPECIES PLAY A CRUCIAL ROLE IN THE SUBSISTENCE ECONOMIES OF THE LARGELY NATIVE COMMUNITIES IN THE YUKON AND IN THE NORTHWESTERN CORNER OF THE NORTHWEST TERRITORIES. IN RECENT YEARS WE HAVE BEGUN TO BETTER MANAGE THESE SPECIES, BOTH FOR THEIR OWN SAKE AND TO ENSURE THAT THE SUBSISTENCE ECONOMY IS SUPPORTED IN A MANNER WHICH CAN BE SUSTAINABLE INTO THE FUTURE. THESE MEASURES HAVE INCLUDED THE ESTABLISHMENT OF THE NORTH YUKON NATIONAL PARK AND HERSCHEL ISLAND TERRITORIAL PARK AND THE SETTLEMENT OF THE INUVIALUIT LAND CLAIM, WHICH ESTABLISHES A CONSERVATION-ORIENTED REGIME FOR MANAGEMENT OF THE YUKON'S NORTH SLOPE. IN ADDITION, THE GOVERNMENTS OF CANADA, THE NORTHWEST TERRITORIES AND THE YUKON GOT TOGETHER WITH NATIVE INTERESTS TO CREATE AN IN-CANADA AGREEMENT ON MANAGEMENT OF THE PORCUPINE CARIBOU HERD. THIS AGREEMENT HAS BEEN IMPLEMENTED THROUGH THE PORCUPINE CARIBOU MANAGEMENT BOARD. IT IS WORTH POINTING OUT THAT THE STIMULUS FOR MANY OF THESE MEASURES WAS THE CREATION OF THE ARCTIC NATIONAL WILDLIFE REFUGE IN 1980, AND OTHER CONSERVATION MEASURES ENACTED IN ALASKA.

THESE LAND ALLOCATIONS AND MANAGEMENT STRUCTURES HAVE BEEN PUT IN PLACE TO PROTECT HABITAT FOR PORCUPINE CARIBOU AND OTHER SPECIES, AND TO ENSURE AN APPROPRIATE, SUSTAINABLE ALLOCATION OF THE HARVEST IN THE REGION. THEY ARE AN ACKNOWLEDGEMENT OF THE DEPENDENCE OF THE PEOPLE OF OLD CROW ON THE HARVEST OF THE PORCUPINE CARIBOU HERD AND AN ACKNOWLEDGEMENT OF THE CONSIDERABLE IMPORTANCE OF THE HERD, GENERALLY, TO THE PEOPLE OF THE YUKON, THE NORTHWEST TERRITORIES AND CANADA. IN ADDITION, THEY ARE AN

INDICATION OF OUR GOVERNMENT'S STRONG COMMITMENT TO THE IMPLEMENTATION OF THE WORLD CONSERVATION STRATEGY.

MR. CHAIRMAN, NONE OF THESE VERY SIGNIFICANT FACTORS ARE IDENTIFIED IN A MEANINGFUL WAY IN THE DRAFT EIS, WHICH NONETHELESS PROPOSES TO IMPOSE A DRASTIC REDUCTION IN THE SIZE OF THE HERD THAT WILL POTENTIALLY HAVE A HUGE EFFECT ON OUR PEOPLE AS WELL AS YOURS.

MR. CHAIRMAN, ALL OF THE SPECIES AT RISK FROM THE PROPOSED DEVELOPMENT HAVE BOTH UTILITARIAN AND INTRINSIC VALUE AS PART OF THE ARCTIC ECOSYSTEM. THEY ARE INTERNATIONALLY SIGNIFICANT AND FIGURE HIGHLY IN THE NORTH AMERICAN UNDERSTANDING OF THE IMPORTANCE OF ARCTIC REGIONS. PROTECTING COMPLETE ARCTIC ECOSYSTEMS WAS THE PRIMARY VISION OF THOSE WHO DEVELOPED THE ARCTIC NATIONAL WILDLIFE REFUGE AND WHO LATER HELPED TO CONVINCE THE GOVERNMENT OF CANADA TO PROCEED WITH COMPLEMENTARY PROTECTION MEASURES. IT WOULD INDEED BE EXCEPTIONALLY UNFORTUNATE IF THIS VISION WERE FORSAKEN, BASED ON AN INCOMPLETE ASSESSMENT OF THE VALUES OF THE REGION.

MR. CHAIRMAN, IN OUR VARIOUS PRESENTATIONS THIS WEEK WE HAVE POINTED OUT A RANGE OF PROBLEMS WITH THE DRAFT EIS: WE HAVE TECHNICAL CONCERNS ABOUT ASPECTS OF THE INTERPRETATION OF BIOLOGICAL DATA; WE HAVE DISAGREEMENTS WITH THE RATING OF THE SIGNIFICANCE OF SOME IMPACTS; AND WE ARE DISTURBED BY THE TRADEOFF THAT HAS BEEN CHOSEN BY THE AUTHORS OF THE DRAFT EIS. PARTICULARLY IN THE LATTER CASE THERE IS A FAILURE TO ACKNOWLEDGE THE TRANSBOUNDARY EFFECTS OF DEVELOPMENT. WHEN ONE CONSIDERS FURTHER THAT THERE IS NO ASSESSMENT OF THE CUMULATIVE EFFECTS OF DEVELOPMENTS ON 1002 LANDS WITH THE PROPOSED DEVELOPMENTS ON THE OUTER CONTINENTAL SHELF LEASE SALES OR OTHER POTENTIAL DEVELOPMENTS OR ACTIVITIES IN ALASKA AND THE IMMEDIATELY ADJACENT AREAS OF CANADA, ONE CAN ONLY CONCLUDE THAT THE DRAFT EIS DOES NOT PROVIDE AN ADEQUATE ASSESSMENT OF THE NEGATIVE CONSEQUENCES OF DEVELOPMENT.

WE WOULD ALSO ADD THAT IF WE CONSIDER THIS UNDERESTIMATE OF ENVIRONMENTAL EFFECTS IN LIGHT OF THE EXTREMELY PROBLEMATIC NATURE OF THE ENERGY RESOURCE ESTIMATES, WE ARE NOT CONVINCED THAT THE TRADEOFF PROPOSED IN THE DRAFT EIS IS EITHER A REALISTIC OR A COMPLETELY FAIR EXPOSITION OF ALL THE FACTORS AT RISK IN THE SITUATION.

THE CUMULATIVE EFFECTS OF SEVERAL DEVELOPMENTS COULD ONLY BE DEALT WITH THROUGH JOINT PLANNING WITH ALL RESOURCE USERS ON BOTH SIDES OF THE BORDER. THIS RAISES THE ISSUE OF CONSULTATION WITH OUR GOVERNMENT AND OTHER CANADIAN JURISDICTIONS. ALTHOUGH REQUIRED UNDER SECTION 1005 OF THE ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT, NO CONSULTATIONS WITH OUR GOVERNMENT OR OTHER CANADIAN AGENCIES, INTEREST GROUPS OR NATIVE ORGANIZATIONS OCCURRED. IN THE HEARINGS IN ANCHORAGE ON THE OFFSHORE LEASE SALES, WE MADE AN INTERVENTION IN WHICH WE EXPRESSED OUR CONCERNS ABOUT THE LACK OF CONSULTATION WITH AGENCIES IN CANADA. WE WOULD LIKE TO EMPHASIZE THAT SAME CONTINUING CONCERN HERE TODAY. ONLY BY ACTIVE AND ONGOING CONSULTATIONS BETWEEN OUR JURISDICTIONS CAN WE ENSURE COORDINATED AND CONSISTENT MANAGEMENT OF THE TRANSBOUNDARY RESOURCES THAT WE SHARE. THE GOVERNMENT OF CANADA, THROUGH THE FEDERAL DEPARTMENT OF EXTERNAL AFFAIRS, HAS FORMALLY REQUESTED A MEETING OF UNITED STATES, ALASKAN, YUKON AND FEDERAL CANADIAN OFFICIALS TO FULFILL THE REQUIREMENTS OF SECTION 1005. ALTHOUGH IT HAS NOT BEEN CONFIRMED, IT IS OUR UNDERSTANDING AT THIS TIME THAT THE MEETING MAY BE HELD LATER THIS MONTH IN OTTAWA.

TO SUM UP, MR. CHAIRMAN, WE HAVE THREE MAIN CONCERNS WITH THIS EIS. FIRST, WE WOULD NOTE THAT, DESPITE THE REQUIREMENTS OF SECTION 1005 OF ANILCA, NO CANADIAN GOVERNMENTS, AGENCIES, NATIVE GROUPS, ENVIRONMENTAL GROUPS OR OTHER INTEREST GROUPS WERE OFFICIALLY CONSULTED ABOUT THE 1002 REPORT. SECOND, THE EIS DOES NOT ADEQUATELY CONSIDER THE POTENTIAL CUMULATIVE EFFECTS OF THE VARIOUS DEVELOPMENT POSSIBILITIES IN THE ALASKAN NORTH SLOPE AND THE ADJOINING CANADIAN LANDS AND WATERS. THIRD, THE RECOMMENDATIONS IN THE EIS DO NOT REFLECT THE BROADER ECOLOGICAL RESPONSIBILITIES THAT OUR GOVERNMENTS SHARE TO ENSURE THAT THIS GLOBALLY-SIGNIFICANT WILDLIFE RESOURCE IS MANAGED TO MEET CONSERVATION-ORIENTED OBJECTIVES.

IN VIEW OF THESE AND OTHER CONCERNS WE HAVE RAISED, MR. CHAIRMAN, WE WOULD STRONGLY URGE THE DEPARTMENT OF THE INTERIOR TO RECONSIDER THE SUBSTANCE AND THE CONCLUSIONS OF THIS DRAFT EIS. THE RESOURCES AT RISK ON THE 1002 LANDS ARE NOT SIGNIFICANT SOLELY FROM AN ALASKAN PERSPECTIVE. THEY ARE ALSO OF CONSIDERABLE SIGNIFICANCE TO CANADA AND HAVE WELL-ACKNOWLEDGED INTRINSIC INTERNATIONAL SIGNIFICANCE, AND SHOULD BE MANAGED ACCORDINGLY. IN THE LAST 15 YEARS, BOTH IN ALASKA AND IN CANADA SIGNIFICANT STEPS HAVE BEEN TAKEN TO PROTECT THESE RESOURCES. IN OUR OPINION, HONEVER, THE FULL-LEASING ALTERNATIVE RECOMMENDED IN THE DRAFT EIS WOULD BE A STEP IN THE WRONG DIRECTION.

THANK YOU VERY MUCH FOR THIS OPPORTUNITY.

GOVERNMENT OF THE YUKON

SUMMARY OF
TECHNICAL ISSUES AND CONCERNS
WITH THE U.S. DEPARTMENT OF INTERIOR
DRAFT ARCTIC NATIONAL WILFLIFE REFUGE, ALASKA
COASTAL PLAIN RESOURCE ASSESSMENT

PRESENTED IN WASHINGTON, D.C.
JANUARY 9, 1987

SUMMARY OF TECHNICAL ISSUES AND CONCERNS

Following a technical review of the draft EIS by the professional staff of the Department of Renewable Resources and the Intergovernmental Relations Office, the Government of the Yukon offers the following comments and concerns which should be addressed in the final EIS.

A. GENERAL

The Arctic National Wildlife Refuge (ANWR) is nearly unique as a conservation system that is intended to protect a complete spectrum of various undisturbed arctic ecosystems in North America; the 1002 area is biologically the most productive part of ANWR. Given the biological richness of the area and the proposed scale of development under the full leasing scenario, the potential adverse environmental effects are unprecedented and not at all analogous to the Prudhoe Bay (PB) Development.

The pro-development nature of the Executive Summary is in direct contrast to the rather well balanced section on Environmental Consequences prepared by the USFWS. DOI proposes full leasing of 1002 lands and to control development by "imposing appropriate mitigative measures". DOI will do this by ensuring that "unnecessary adverse effects on the environment are avoided and that compensation for unavoidable loss of habitat occurs". These are reassuring words but fundamentally impossible to implement.

There is a lack of strategic land use planning on the Alaska North Slope that confounds the ability to predict effects of development. There appears to be no coordination between landowners or proposed oil/gas leasing schemes (OCS sale'97, sales on private or State lands/waters, etc.). The cumulative impacts, and their effects on Yukon North Slope development, must be considered before one can realistically evaluate environmental impacts. Site-specific mitigative measures are rendered useless when regional development as on 1002 lands, is uncontrolled.

As with the OCS sale '97, no Canadian agencies, governments, native or environmental groups were officially consulted on the 1002 report.

B. ENVIRONMENTAL ISSUES

Caribou

Seventy-eight percent of the core calving area for the Porcupine Caribou Herd lies within 1002 lands; the proposed east-west running pipeline/haul road could affect access to 80% of coastal insect-relief habitat. Displacement from the calving area represents a complete loss of habitat that cannot be mitigated; the magnitude of adverse effects is speculative but suitable alternative calving areas for the Porcupine Caribou Herd are not apparent.

Loss of calving habitat and barriers to free movement would reduce access to insect relief and feeding areas and result in increased levels of stress and disturbance. Cumulatively, these effects would reduce both available habitat and habitat values on remaining areas, resulting in population declines.

Repeated references in the Executive Summary to the Prudhoe Bay Oil Field (PBOF) and its "minimal" impact on the wildlife resource, are misleading and not applicable to the 1002 lands for the following reasons:

1. The Central Arctic Herd (CAH) has not increased because of oil development; its growth is due to high calf production/survival and relatively light hunting; the PBOF has displaced CAH calving without apparent adverse effects because only a small part of calving grounds are affected and suitable alternative high quality habitat is available. There are a lot fewer caribou in the CAH (13,000) than the PCH (180,000) and the CAH is not yet using the available habitat to capacity.

2. The partial habituation to oil development apparent in CAH (particularly among bulls) that may spend most of the summer, and some all year, near PBOF or the pipeline is not necessarily evidence that is transferable to PCH. PCH spend only 1 - 2 months on 1002 lands in much higher densities and in much larger groups (linear developments are more likely to become barriers to large groups of caribou); thus habituation to oil development is less likely for the PCH particularly since it consists mainly of pregnant cows or cows with calves.

3. The TAPS corridor runs north-south along the migration route of CAH. The proposed road and pipeline on 1002 lands runs

east-west and separates calving area from coastal insect relief, habitat and is therefore more likely to become a barrier.

4. Experiences with PBOF and CAH do not answer questions of what happens when caribou are displaced from their calving ground; concerns over similar developments on other herds are still valid.

The stated intent, under the full leasing scenario, is to leave the PCH calving area until last to allow experiences from the rest of 1002 to be used in developing mitigation for the calving area; this would protect calving area but still inhibit access to coastal insect relief habitat.

The importance of the PCH for subsistance use in Yukon and western N.W.T. must be stressed; in some years up to 80% of the harvest occurs in Canada; thus adverse effects on the PCH will be magnified in Canada.

Muskox

Impacts on muskoxen are considered major as they will be exposed to year-round activity throughout most of their existing habitat. There is no information available on the response of muskoxen to sustained oil development activities but given their non-migratory, localized feeding behavior and conservative winter energy budgets, one could expect a major change in distribution and population growth. The herd on the coastal plain is the only population on the Alaskan North Slope and groups or individuals have moved across to the Yukon where a subpopulation may now be established. The continued expansion of this muskox population is unlikely given full scale development.

Protection of the PCH calving area would only protect a small portion of muskox population.

Polar Bear

The Beaufort Sea population of polar bear ranges from Barrow to Tuktoyuktuk and numbers about 2000 bears. The population is currently stable and cannot withstand further mortality without resulting population decline. We have concerns over direct

mortality from oil spills and we can foresee abandonment of maternal denning areas. The only significant onshore denning area is on, and adjacent to, 1002 lands and both proposed marine port sites are confirmed denning areas, especially Pokok on the east side of 1002 lands.

Most denning occurs offshore and sites have been confirmed throughout the OCS Sale '97 area; a good example where the cumulative impact of two developments (1002 plus Sale '97) has the potential for major adverse impacts on an important subsistence species shared internationally. This is not addressed in the EIS.

Waterfowl

Ninety-nine percent of 1002 area is considered wetland which is often considered critical habitat for breeding, moulting, staging and migrating birds. A major impact is expected on snow geese that breed on Banks Island and use 1002 area as staging sita in the fall; between 100-300,000 snow geese or 15 - 20% of the Banks Island population use the area. These birds are a shared resource with considersble subsistence value. The subsistence issue is not addressed in the EIS, nor is the international significance adequately covered.

Further it is not apparent that the EIS adequately considers the potential volumatric demand for drilling water nor the spatial extent of the impacts of stream diversion and potential damming. Seasonal flow patterns of coastal streams are quite likely to be modified and the effects of this are as yet unassessed.

C. CONCLUSION

The draft EIS confirms the considerable biological signficance of the ANWR lands, and the fact that most of the Porcupine Caribou Herd (PCH) calving area and insect-relief habitat is located in the 1002 lands (78%). However, based on the initial winter seismic exploration of the region, the DOI computer models predict that there is a 19% change of economically recoverable oil reserve (at $33.00/bbl). Assuming Oil is discovered the computer model predicts there is a 95 percent chance that 0.6 billion barrels of recoverable oil is available and there is a five percent chance of 9.2 billion barrels available. Given the shape of the probability distribution, the most likely discovery

will be 3.2 billion barrels of oil under the plain. U.S. demand for oil is estimated at 16 milli on barrels per day by the year 2000. If the ANWR area were developed and the oil discoveries were indeed achieved, the total U.S. demand would be met for 200 days.

The Department of Interior takes the position that the likelihood of discovery of oil, outweighs the acknowledged negative environmental impacts, including a 20 - 40% decrease in the size of the PCH.

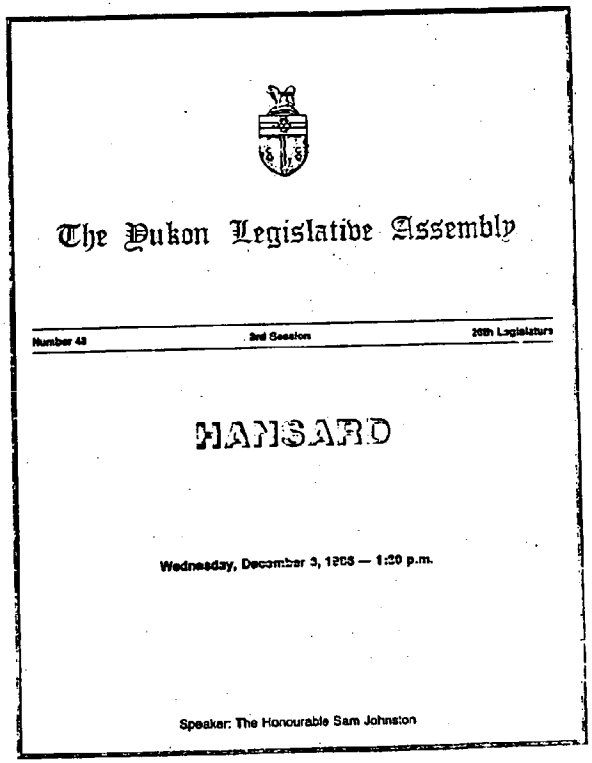
We do not agree that the very uncertain potential for recovering 3.2BB is balanced by the loss of

1. a significant portion of the PCH calving area
2. the continued expansion of the only North Slope muskox population
3. an unknown but potentially important segment of the Beaufort Sea polar bear population
4. wetland habitat for internationally important migratory snow geese
5. wilderness values in an ecologically unique area
6. subsistence lifestyle not only in Kaktovik but also in Old Crow that have few alternatives to the PCH.

To suggest, as is done in the Executive Summary, that "development on 1002 lands would proceed with the goal of no net loss of habitat quality and that unnecessary adverse effects would not be allowed to occur" is an unfortunate misrepresentation and will not be achievable.

We believe the draft EIS should be amended to account for the various technical points raised above. If the Department of Interior disagrees with any of the technical points we have raised we would appreciate receiving a written explanation of the reasons for the disagreement.

Thank you.



The Yukon Legislative Assembly

Number 48 — 2nd Session — 26th Legislature

HANSARD

Wednesday, December 3, 1903 — 1:20 p.m.

Speaker: The Honourable Sam Johnston

and graduated as a lawyer. Now, to sit there as a Member of the Yukon Legislature would give me great pride and great pleasure.

We hope that the costs involved will not be prohibitive, and I have no hesitation in directing the House Leaders to make every possible effort to reach an agreement by which a sitting could be arranged to take place in Dawson in 1987. Thank you.

Applause

Hon. Mr. Kimmerly: I am glad the previous speaker mentioned costs, because that is part of the subject of my addition to this debate. When we get to it in the Capital Supplementaries, Members will discover that there is money allocated in Justice for this building. What we are going to do is reconstruct the old desks, which existed there in the Chambers' heyday. This will be, of course, a little more expense than buying modern furniture, however it will enable local economic stimulation in that the cabinet work can be done in Yukon and we can copy the *old desks. I am* told that two of them exist, which are in poor shape, but it is possible to reconstruct that old furniture.

» **Hon. Mr. Kimmerly:** This will, of course, add to the tourism potential of that room, especially in that building, as it can be a room that can be displayed to tourists. It will also be used for the circuit court when it sits in Dawson if the court consents to sit in a room that displays a crest, which exists in the building as well.

Hon. Mr. Penikett: I would like to join this debate briefly. Unlike the fortunate Member for Porter Creek West, my education is *not complete* and in some way one might argue that daily attendance in this House contributes to that process, but I must say that it is a toss-up some days as to which was the more pleasant of the two experiences, school or this institution to which I now attend.

Let me say quite simply that having moved the motion referred to by the Members here and having been joined in debate on that occasion by the then Minister responsible, the Member for Riverdale South, and seeing the readiness to respond to this initiative, I am, as the Minister of Renewable Resources said, extraordinarily pleased to have been blessed with the opportunity in my present role to see it through to completion.

Let me say without hesitation, in my view, that this is the most beautiful building in the Yukon Territory. Architecturally I think it is the most appealing. I also think the use of fir and native woods throughout is a wonderful example of what can be done, or what was done, by our forefathers with local materials and the building materials of the day.

On the last occasion that I was in that building, which, as the Member for Porter Creek East said, the locals refer to as the Museum Building, I wandered up into the Legislative Chamber. It was, as I said in 1983, a very sad occasion for me. As someone who is perverse enough to actually like legislators and is monomaniacal on *the subject not to have visited every single one in* this country at one point or another, and is even soft-hearted enough to feel quite sentimental about such facilities and their importance to our culture and civilization, and not just our political life, I was disturbed by the condition of the Chamber as it was then. There was furniture on its side with cobwebs and dust. It was in a general state of disrepair.

» Even though the Chamber is not yet furnished, even naked like it is, it is a beautiful sight. It is wonderful to see what has been done in the restoration of that building. I, for one, will look forward with great anticipation to the opportunity of holding a sitting, even a brief one, even a ceremonial one, at some occasion next year in that place.

I think it is important that, as a Legislature, we do that, not just as a gesture, as the Member for Faro suggested, towards a rural visibility. I think it is also important for us to do to maintain a sense, as few Members — save and except the Leader of the Official Opposition — will have, of the continuity and the longevity of this institution. I think you can make a convincing argument, for example, that this Legislature, as an institution, is older than Saskatchewan's. That is something that I think few Canadians would appreciate.

Because we are in a new building, in a new facility, in a new capital, I think we lose the sense of that. We lose touch with the past. I think it is as dangerous to neglect one's history as it is to be absentminded about one's future. I think it is very important that we celebrate the past — the roots, if you like — of this institution by having at least a ceremonial sitting in that place.

I would like to join the observation of the Member for Porter Creek West, with respect to the building not being just a building that has been restored and sitting there. It is not a dead artifact. It is a living, breathing building. Not only are museum people there, but offices of several government departments are there. I think it will be a building that is used and enjoyed and treasured by not only the people of Dawson and the people of the Yukon Territory, but by many visitors, as well, for years to come.

I think it ought to be a source of pride to the people of this territory that the territorial government did this restoration, rather than Parks Canada. The work we did in this case is commendable. It is something that is laudable, something about which we should feel very proud.

I would want to pay tribute to the architects, the Iredale partnership of Vancouver, BC and the general contractors, Klondike Enterprises, and the workers who performed so marvelously in the job. As we comment on the facility today, and the prospect of having this House sit there, I can only resume my place with much appreciation of the fact that the desire to go there is shared on all sides of this House, and I welcome the day when we arrive and relive, in some sense, the experience of our predecessors in this institution.

»

Speaker: The honourable Member will close debate if he now speaks. Does any other Member wish to be heard?

Mr. Webster: Judging from the remarks during debate, it appears that this motion has been received favourably, and I welcome all of you to the special sitting in the old council chambers in the OTAB, hopefully some time next year.

One of the difficulties or hardships facing a representative of the Klondike riding is the fact that the workplace, the Yukon Legislative Assembly, is 330 miles from home. For once, it will be interesting that *Members of the House will themselves experience* commuting to and from work. For this reason, among others, I am very much looking forward to this special occasion.

Motion agreed to

Motion No. 65

Mr. Clerk: Item No. 3, standing in the name of Ms. Kassi.

Speaker: Is the honourable Member prepared to proceed with Item No. 3?

Ms. Kassi: Yes.

Speaker: It has been moved by the honourable Member for Old Crow:

THAT this House requests that the Government of Yukon seek immediate communication by the Government of Canada to the Government of the United States expressing the deep concern of this House and of Yukon people over activity in Alaska which may harm the Porcupine Caribou Herd, a resource that people of both countries depend upon; and

THAT the Government of Canada be specifically requested to emphasize the importance of concluding an international agreement on caribou prior to the United States making any decisions on activity in the Arctic National Wildlife Refuge which may harm the herd.

Ms. Kassi: This motion is before the House today because of events in the United States, which may take place in Alaska in the near future. These events concern the Porcupine caribou herd, which many people rely on. I think all honourable Members are aware of the importance of this herd to my people as well as to the people nearby in the Northwest Territories and Alaska.

We are talking about the proposal by the Department of the Interior of the United States government. This proposal suggests that the United States government allow oil and gas exploration on the Alaska North Slope in the calving grounds of the Porcupine caribou herd. Most honourable Members are aware that the calving grounds of this herd are limited a great deal by geography.

» There is a fairly narrow strip of coastal plain between the British Mountains and the Beaufort Sea that are used for calving grounds. Simply put, if the caribou lose the use of these grounds for whatever reasons, then the population of the herd will be reduced, perhaps drastically. That means that a lot of northern people will suffer as a result. This exploration will take place between Prudhoe Bay, the Yukon border, and the Arctic National Wildlife Refuge, an area that the US federal government has control over.

The report resulted from the Alaska *National Interest Lands Act* of 1980, which required detailed assessment of the impact of oil and gas potential in the area involved. This report has been released. It states that full-scale petroleum exploration should proceed. They say that in doing this the impact on the caribou herd would be to reduce its population, and they seem to think that this is fine.

Obviously, the US Department of Interior did not consider the costs to my people or to other Yukoners, perhaps not even to Alaskans. As well, the people of Old Crow will not benefit from this petroleum exploration in Alaska. I doubt if Alaskans will in the long run, as well. The point is that the actions of this government could well hurt my people by hurting the caribou herd. Right now we have achieved a management agreement for users of the herd in Canada. This is a great accomplishment, and, once again, I commend all concerned, including our Yukon and federal governments.

At the moment, negotiations are underway between Canada and the United States for an agreement between these two countries on the international management question. This is because both countries recognize how important this herd, this great natural resource, really is, and because international management is what we must achieve to protect the herd for our children and our children's children.

However, now we find a US government department deciding that the herd is not worth saving or, at least, that jeopardizing its future is an acceptable risk for a few barrels of oil. From my point of view, and from the point of view of my people, the natural environment, which has meant a continued survival for so many years, is too often threatened by industrial development. Pollution, over-population, and all these sorts of problems around the world mean more and more natural wildlife habitats disappear each and every year. We see that every day when we look to the south; it goes on here in the north, as well.

My people, the Gwich'in, have cherished and protected our lands as long as we have been here, and we will continue to do so. We will work to ensure the preservation of a natural habitat for the wildlife forever. The land and the natural habitat it provides is our spirit, our culture, and our way of life. We hold a moral obligation to respect and preserve this natural environment, which we are a part of. *The circumpolar north is the only vast wilderness left*, and we must fight together to preserve it as long as we can.

» The caribou are our main livelihood. The caribou are our life. It has never been otherwise in my village of Old Crow. Caribou have migrated near our village for many thousands of years, and this is why the village is located where it is today. Our people have hunted this herd and depended on it for many thousands of years. We have conserved that herd. We have our ways to do so, and it remains the main source of food and clothing for my people.

The coastal plain is critical to the life cycle of the caribou herd. Calving time in that part of the year when the young caribou are on the calving ground is very critical to the health of that herd. The caribou are extremely sensitive to intrusions at this time. Exploration in this area would cause disturbance and harm to the herd. Their food base would be diminished, disasters will set in and, as a result, the population will become more vulnerable to predators, and the population would decline. The Porcupine caribou still range freely, but they are being attacked from all sides, from Prudhoe Bay, from the Beaufort, from the Dempster, and from the Northwest Territories. The herd are under pressure now; they should not be squeezed anymore. The caribou have roamed freely for centuries in northern Yukon and Alaska. We should leave them free and healthy.

The intent of my motion is to express, through the proper channels of the Department of External Affairs, to the United States government the importance of this herd to all Yukoners and the importance of achieving an international agreement on the Porcupine caribou before decisions can be taken on the *petroleum* exploration on the Alaska north coast and in the Arctic National Wildlife Refuge. With that, I will end my opening remarks and ask all hon. Members for their support to this motion.

Applause

Mr. Phelps: I would like to begin by thanking the Member for Old Crow for bringing this motion forward. It concerns a very important subject matter not only to the people of Old Crow, whom she represents, but, of course, to all Yukoners, all northerners. It really deals with a significant and unique world resource.

We have, and I have, a special interest in the Porcupine Caribou Herd because of the time that I spent, along with many other people, working to try to bring together a management agreement on the Canada side. That agreement was finally achieved and signed in Old Crow just a little over a year ago — time flies by.

» All the community user groups had representatives from the Canadian side, and some from the Alaskan side, present at that very important signing. I want to express my appreciation for having been invited by the Minister of Renewable Resources. I accept that as a very gracious gesture.

I was pleased, at that time, to meet with many of the Elders of Old Crow whom we have had negotiations with; they have been at the table on numerous occasions, many of the Elders from the other communities, such as Fort McPherson and Aklavik and Inuvik, who have partaken of the strenuous ongoing negotiations, and to meet with some of the other negotiators, such as Bob Delevry from the COPE people, Grafton Njootli had carried the ball for a considerable period of time, as well as then Chief Johnny Abie, later Stanley Njootli. There was a tremendous number of people from Renewable Resources, from this government, who were involved and very dedicated in attempting to find a solution, which was very difficult to achieve, given the conflicting problems that all parties had.

There were so many *user groups, each trying to get a fair share of* the resource. There were territorial rights to sort out. There were the differing interests sometimes between the governments because of their special concerns.

All involved realized that these kinds of competing interests had to be put aside for the betterment of the herd.

What was achieved, as the Member for Old Crow has ably expressed this afternoon, was a partial solution, because it dealt only with the Canadian side. As most people know, the herd ranges across the international border into Alaska. A significant area for its calving grounds are in Alaska. The next step is to try to achieve agreement internationally with the State of Alaska and the user groups and then the federal governments, as well, bringing everything together into an international treaty.

It is a huge undertaking. We have come part of the way, but it is almost overwhelming when one really sits down and considers all the various parties that attend and have significant interests in arriving at a solution to try to ensure that this herd is and will be, in perpetuity, protected as well as it can be within the competency of mankind.

» I am pleased to see that there are some people from Old Crow in the audience today. It is a significant fact that Old Crow's dependency on the herd is unique, unique in that, of the community user groups, it is the community that relies on the *the herd*.

The communities in the NWT have other herds that they do hunt that they can turn to. It is that unique dependency that made us extra careful in negotiating the agreement to ensure that that was recognized and that, if there were hard times during any period of years, Old Crow's interests would be protected in a very, very careful fashion.

I am convinced that, because of the work done by all of the people who were in attendance at the meetings, we did accomplish

that very important goal. What has happened now has to be of tremendous concern to us all. It has to be particularly alarming to the Old Crow people whose very lifestyles are dependent on the health of the herd. Again, I thank the Member Member for Old Crow for pointing out some facts that I will repeat, in part at least, because they are significant ones and they have been very correctly stated.

The first point that people have to be aware of is that this large herd calves in a very restricted physical area, restricted because it is a narrow coastal plain, the Beaufort Sea on one side and the mountains on the other. When activity does take place, it certainly does not leave much room for that herd to get out of the way of mankind's development. That has to be of tremendous concern, not only to us, but especially to the Old Crow people.

The Member for Old Crow has spoken about the possible reduction of the herd, and that is certainly one consequence. Yet another consequence, and one about which we must really be alarmed about, is the potential for the herd to change its migratory patterns.

» This has happened already, from time to time, often for reasons that the biologists do not know. There is a large degree of unpredictability. It is a difficult situation to manage for that reason. If the migratory patterns change, they could bypass Old Crow at such a distance that it would have the same effect as a disaster to the herd itself, so that has to be a sincere concern shared by all of us.

I take a great deal of pleasure in standing up to support the motion. I am sure that it will be passed unanimously in the House. I am sure that that very fact will have some significance on the political process whereby the Government of the United States will be making its determinations regarding the possibility of allowing oil production on the north coast.

Once again, we will be fully in support of this important motion.

Applause

Hon. Mr. Porter: Like the previous speaker, I, too, would like to acknowledge the presence in the gallery of the representatives from the community of Old Crow and would like to welcome those individuals to these Chambers. I think their being here today makes a statement as to the degree of concern that they have on this issue and, more specifically, on the future of the Porcupine caribou herd. Maybe their presence here today might mean that there will be some dry meat on my desk when I get back. I will have to wait until the break.

With respect to this particular question, I was contemplating an announcement earlier on with respect to the initiatives that this government is undertaking regarding the international talks. It was during the discussions with the department concerning the drafting of that announcement that we learned of the most recent events. In the last two weeks we have become aware that a new draft report from the US Department of the Interior recommends a major expansion of oil and gas leasing and exploration of some critical portions of the Porcupine caribou herd's range, particularly the calving grounds.

Needless to say, it is a disturbing development that, potentially, runs counter to many of the incremental habitat protection improvements that have been achieved on both sides of the border in recent years.

»The US report acknowledges that there will be negative effects on the Porcupine herd and thereby there are potential negative consequences for the people who use that herd. I think we have heard in earlier debates the importance of the Porcupine caribou herd to all of the people who live in the area of the caribou habitat, and I think that we are very well apprised of what that particular resource means to those people.

For me, as the Minister of Renewable Resources, there are at least two necessary reactions to the announcement made by the US Department of the Interior.

First, I think we have to redouble our efforts to negotiate an effective international agreement, and, secondly, I believe that this House should make its immediate concerns about the proposed oil and gas leasing clearly known to our US friends. We have an ideal opportunity to do so because public hearings are to be held in Kaktovik, Anchorage and Washington, DC before January 23, 1987.

I have outlined before that in our International Management Agreement we need the strongest possible assurances of the strongest possible habitat protection measures. We need an equitable management and allocation system, and we need to ensure that the use of the herd can be sustained in perpetuity. These messages must also be taken as directly as possible to the United States bureaucratic decision-makers and the politicians. We need to ensure that the decision-making that is now taking place truly reflects the needs of Alaskan and Canadian users of the Porcupine herd and to ensure that the precedent that could be established, if the Department of Interior report is accepted, does not destroy our ability to jointly manage the herd before the agreement to do so is even negotiated and signed.

Almost seven years ago, the United States government passed the *Alaskan National Interest Lands Conservation Act* after years of effort to protect the incredible wilderness resources of Alaska. Traditional subsistence activities were designed into the management of the Arctic National Wildlife Refuge, but the fact that the area became a wildlife refuge with only 50 percent zoned wilderness was the result of a major political compromise. The coastal plain remained in limbo, and the Department of Interior was asked to study the oil and gas issue in more detail before any decisions were made.

Now, after seven years of wrangling and negotiating, their report basically states the well-known fact that heavy development will have negative effects on the Porcupine herd and obviously negate the wilderness characteristics of the coastal plain, but it is a value judgment.

Hard evidence of oil and gas is not available. The preliminary results of seismic work and drilling on private land near Kaktovik were inconclusive, and the report says there is 95 percent chance of a relatively small oil field and a five percent chance of a large oil and gas field. I basically think that the value judgment that we are discussing here, which is being made in other parts of the world, is a very critical one, and I think that when we do make that judgment, we have to balance the interests of the people of that area, the caribou and, as well, the wilderness values of that particular region.

» It is ironic that for many years the Americans, specifically the Alaskans, have asked us to do something about joint protection. The Arctic International Wildlife Range idea was hashed over many years ago, and the US made most of the early tangible strides to gain real protection for the Arctic landscapes. Now we are potentially faced with a real decrease in the level of US protection while we, in Canada, at this time have quite good and improving measures that are being incorporated onto our books on laws and regulations.

I have often mentioned that we need to speak about environment and development rather than always thinking in terms of environment against development. As Donald McDonald stated in the recent Commission on the Canadian Economy, "Although the Government of Canada has talked about balanced development, not enough has been done to protect areas of outstanding natural significance. We must recognize the intrinsic values of the northern ecosystem. We must all learn to value the wilderness and the unspoiled aesthetic virtues of the north. The environment is the very ground of our existence and intrinsicly wanting of our respect and even of our awe".

I want to express the theme once again and argue to all Members of this House to consider this motion and to give it unanimous consent. In conclusion, I think that what the Leader of the Official Opposition has said about the intentions of his party to support this measure is welcomed by this side, particularly myself.

I would also like to convey a statement of congratulations to the Leader of the Official Opposition for the way in which he approached, and spoke to, this measure. I believe the Leader of the Official Opposition when he says that he has the best interests of those people at heart. I believe the Member has some very real honest concerns with respect to the whole question of the North Slope and its development. I think it is an important statement today that over the last couple of days we may have been wrangling about what some may deem as to be petty and inconsequential administrative issues that we can come together on a substantive issue of policy and philosophy and make a joint statement. I think that demonstrates to the people, whom we represent, that the system does work.

With respect to the motion before us, I would thank the Member for Old Crow for doing the work to bring this motion to the attention of the House. I would like to thank all Members for giving their support to this issue.

Thank you.

» *Motion No. 65 agreed to*

Motion No. 62

Clerk: Item number 7, standing in the name of Mr. Brewster.

Speaker: Is the hon. Member prepared to deal with item number 7?

Mr. Brewster: Yes, Mr. Speaker.

Speaker: It has been moved by the hon. Member for Kluane

THAT this House urges the Canada Mortgage and Housing Corporation and the Yukon Housing Corporation to amend the current Rural and Native Demonstration Program to provide a thirty-year, no interest loan rather than an outright grant for building materials.

Mr. Brewster: I presented this motion to help straighten out the important housing situation that exists in Carmacks as a result of the Rural and Native Demonstration Program provided jointly by CMHC and YHC.

If Members have been reading the local newspapers, I am sure they have noticed a whole series of letters to the editor explaining both sides of this issue. A major controversy about the program is currently raging in Carmacks. I had a talk with many people about the program, and most people agree that there is considerable merit to it; however, where the problem comes in is how the program is implemented.

The major objections to the program concerns its giveaway nature. There is no return to the taxpayers. How can the program be perceived as being fair when outright grants are being given that enable the recipient to have title within five years. The average homeowners are locked into a 25 to 30 year mortgage and have to pay a substantial amount of interest before they receive title to their house.

It should be remembered, as well, that it is the average homeowner who is paying for this program through their taxes. The current program, besides being unfair, is seriously flawed. Theoretically, a person who receives one of these houses could sell it after five years and make a substantial profit, courtesy of the taxpayers. This just should not be.

I have also heard that the people who will receive these houses effectively pay for them through their labour, something called sweat equity. Well, I just do not buy that argument. I know of very few homeowners with mortgages who have not done a great deal of work on their own home, and they are not getting any credit for their labour.

The program is well-intentioned, but it is flawed. The motion I have presented to you for your consideration would correct the situation and make the program more acceptable to everyone. The support of this House would certainly help the proposal being adopted, and I call upon you all for your unanimous support.

Hon. Mr. McDonald: As the Member for Kluane pointed out, the Rural and Native Demonstration Program has been the matter of some controversy in Carmacks and on the front pages of the paper and in the media generally over the past few weeks, largely because there has been some concern expressed by the criteria supporting the program, a program which is sponsored by CMHC.

» The program, in its original incarnation, which was not particularly long ago, and is a pilot project after all, was sponsored primarily to encourage a self-help home ownership program in the interests of social housing. Clearly, many of the programs across the country have not encouraged the home-ownership aspect in social housing and have not done enough to encourage the self-help approach to housing development. This program was meant to be modelled after a similar program currently existing in the Northwest Territories to encourage both those components: self-help and home ownership.

As the media has pointed out, and as the Concerned Residents of Carmacks Committee has pointed out in the media, there are some legitimate concerns with respect to the criteria associated with the program. In order to ascertain what the concerns are in some detail, officials of the Yukon Housing Corporation have travelled to Carmacks to speak personally with the Concerned Residents of Carmacks Committee and also to speak to others in the territory who have expressed a desire to make improvements to the program.

The motion before us today calls on the Canada Mortgage and Housing Corporation and on the Yukon Housing Corporation to amend the program to provide specifically for a 30-year, no-interest loan rather than an outright grant for building materials.

The wording is very, very tight and very, very specific and clearly, as the Member for Kluane pointed out, there are a number of concerns with respect to the criteria upon which this program is based. I have not heard any criticism with respect to the general principles supporting the program, but primarily the criteria.

The pointed points from the Member are well taken in that respect. I would recognize, however, that in the motion itself the recognition of the desireability of a no-interest loan is, in fact, a grant of a kind, but it certainly is something that is worth pursuing and doing some number crunching on to determine whether or not it is the best approach to take.

» As the Member has pointed out, there are other criteria changes that may be worth altering in the interests of making this pilot project a worthwhile program for the territory. The Yukon Housing Corporation has already cleared with CMHC the necessary steps to make sure that criteria can be changed and can make this program a true Yukon program.

The Housing Corporation Board of Directors has taken it upon themselves as well to review the program. They have been making some suggestions for improvements to the program, recognizing that a financial analysis of the various options should be undertaken prior to any representation being made to CMHC. I understand that they are currently reviewing a number of the criteria in order that the program can be made better. Those include the payback provisions that the Member mentions, the eligibility requirements and the method of selection, which has also been expressed as a concern, as well as the flipover provision.

There has to be some obligation on the part of the Housing Corporation, and housing programs generally, to review, develop and implement programs with a mind to local market conditions in any community.

In response to the motion, we, as a government, have asked the Housing Corporation to ensure that consultation done for this program, and other programs in the future, be done thoroughly, and they have taken it upon themselves to do just that. The Housing Corporation is currently in consultation with the concerned residents of Carmacks, and there will be other meetings that will be addressing this and other issues. I would, therefore, think it to be somewhat inappropriate to simply design amendments to the program without completing the consultation with people who brought many of the problems to our attention.

For that reason, I would be premature to impose a provision, whether it be the issue of payback, the issue of eligibility requirement, or the issue of method selection, on CMHC or the Yukon Housing Corporation, until such time as consultation has been conducted.

» I do not think that there is any doubt in our minds that improvement can and should be made to this program. I think that the general principles of self-help and home ownership are valuable principles to promote. For that reason, I would hate to see a good program go down because the criteria had not been altered to speak to the problems.

In the interests of ensuring that consultation does take place and so that people do not feel that we are simply imposing a solution or

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
P.O. BOX 898
ANCHORAGE, ALASKA 99506-0898

REPLY TO ATTENTION OF:
Regulatory Branch
Special Actions Section

Director, U.S. Fish and Wildlife Service
Division of Refuges
Room 2343 Main Interior Building
18th and C Street Northwest
Washington, D.C. 20240

Dear Sir or Madam:

This letter is in response to the Draft Arctic National Wildlife Refuge (ANWR), Alaska, Coastal Plain Resource Assessment, Report and Recommendation to the Congress of the United States and Legislative Environmental Impact Statement, published in November 1986 (1002 H Report) and to your notice in the Federal Register on November 24, 1986.

The 1002 H Report is well written and overall is a good source of reference for the ANWR area. There are some points of uncertainty that need clarification. Enclosed are detailed comments on various aspects of the report.

F-50

In addition to the enclosed, I want to highlight several of the comments:

a. I support most of the expected impact conclusions (although in some respects they are overly pessimistic) as being a worst case scenario for the on-shore development. However, the potential for substantial impacts due to marine development has been understated or avoided. Additional discussion of potential causeway related impacts should be included in the final report.

b. I recommend you avoid extensive monitoring programs to determine mitigation by assessing expected impacts and required mitigation up-front before allowing development, if possible.

c. Needed mitigation should be part of specific U.S. Fish and Wildlife Service (USFWS) authorizations to the maximum extent possible and not rely solely on our permitting process to determine and require mitigation as a permit condition.

d. We request to be a cooperating agency for any future Environmental Impact Statement that may be prepared. This is due to our expected regulatory role for most of the projected development proposals. As the 1002 H Report has correctly stated, a major portion of the 1002 H area is under Department of the Army (DA), Clean Water Act Jurisdiction and DA permits will likely be required for most development activities.

e. I want to point out the existing regulatory mechanisms (tools) available to us to tailor our Regulatory role to that needed to serve the public interest. Our options, which we would coordinate closely with you covers the full range of programmatic general permits, an Abbreviated Processing Procedure (APP), advanced identification of generally suitable and unsuitable disposal sites with the Environmental Protection Agency, and a Special Area Management Plan (SAMP) option. All of these or any one of them can be applied as appropriate to protect the public's interest in these areas.

Your 1002 H Report, with few exceptions, has presented a clear and reasonable picture of potential environmental consequences for Congressional consideration. If Congress decides it is in the public interest that the ANWR 1002 H area be developed for oil and gas production, we agree it can be accomplished satisfactorily in a carefully planned and regulated manner. Together we have sufficient regulatory tools and restraints in place to minimize potential impacts and to ensure the public interest will be protected.

We look forward to working with the USFWS to ensure our respective interests and authorities are well coordinated and to ensure concurrent and timely development decision if Congress gives the "go ahead" to development.

I am forwarding a copy of this correspondence to the agencies on the enclosed list.

If I may be of further assistance please contact me directly. If your staff has questions concerning the comments or Regulatory process they should contact Larry L. Reeder, Chief, Special Actions Section, Regulatory Branch, at the address above or by telephone at (907) 753-2712.

Sincerely,

William T. Gregory

Wilbur T. Gregory, Jr.
Colonel, Corps of Engineers
District Engineer

Enclosures

Commander
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Alaska District U.S. Army Corps of Engineers
Comments on ANWR 1002 H Report

EXECUTIVE SUMMARY

1. Page 1, 2d column, 3d paragraph: "...developing mitigation for activities in the calving area..." and "...require compensation in the event of significant unavoidable losses of habitat quality."

   These statements imply a monitoring program would be established to determine mitigation needed at a later date. I recommend and urge that expected impacts be determined up-front and that appropriate mitigation be determined in advance of work authorizations being granted. Monitoring programs, in our experience, can be as costly as the mitigation itself and indicate that you may not have enough information available to make the development decision. Avoid monitoring programs, for the purpose of determining mitigation, if possible. I agree that monitoring should be done to ensure that development is being accomplished as authorized and that required mitigation has been accomplished (and to see if more may be needed), but it is preferable that mitigation decisions be made in advance, not after the development has occurred.

   I also note on page III, 1st column, 2d full paragraph, that "Mitigation of the loss of caribou habitat in Resource Category 1...is not possible." This statement (which is likely correct) contradicts the inference made in the Executive Summary. A statement should be made that expected losses will be mitigated to the maximum extent practicable (obtainable?), however, some losses will occur that cannot be compensated.

2. Page 1, 2d column, 5th paragraph: "...some long-term effects on the area's water resources..." (emphasis added)

   This statement should be clarified to include loss of resources due to both direct and indirect impacts of fill placement and dust and disturbance impacts. The 1002 H Report adequately covers these impacts in its discussions, but the ambiguous "some" needs to be expanded in the Executive Summary.

3. Page 2, 1st column, first full sentence: "Most adverse effects would be minimized or eliminated through carefully applied mitigation using the lessons learned and technology acquired from development at Prudhoe Bay..." (emphasis added)

   While I agree that impacts can be minimized or avoided through carefully applied onsite mitigation measures, this statement implies that we already have "mitigation" techniques developed that will

compensate (eliminate?) unavoidable impacts; this is not the case. In fact, in light of industries' reluctance to develop and use compensatory mitigation/restoration techniques, none has been applied on the North Slope of Alaska, except to a very limited experimental extent. The technology has not been developed at present. Other than onsite, project specific design mitigation, what "carefully applied mitigation" is hinted at to compensate for unavoidable losses that will occur? Also see comment 1.

4. Page 2, 1st column, 1st paragraph: "Hence, it is reasonable to assume that development can proceed on the coastal plain and generate similar minimal effects." (emphasis added)

   While it can be supported that minimal effects should occur on-shore, there is no mention here that the likely required near-shore marine structures (causeways) to support the on-shore development has potential for more than minor impacts. This is based on our experience with the existing causeways, particularly West Dock, and the monitoring program which has not yet concluded that minimal impacts have occurred. Depending on the location and extent of needed docking facilities, impacts could be substantial. This should not be overlooked in the impact analysis for the final 1002 H Report.

5. Page 3, 1st column, 1st two full sentences: "Only a few large lakes..." and "A few shallow thaw lakes are found..." (emphasis added)

   While the meaning of a lake may be semantical and rests with the definition used for "lakes", "a few" is a relative term and not very descriptive of the area. The coastal plain has numerous open water bodies used as habitat by various species of wildlife. This is discussed in some detail on pages 34 and 35 under sections on BIRDS; SWANS, GEESE, AND DUCKS; AND SEABIRDS AND SHOREBIRDS where tundra wetlands and their value are described. The discussion on use of these areas infers that there is open water or emergent marsh type wetlands present. Whether they are lakes or not is moot--they are important aquatic resources (see page 36, 1st column, first full paragraph). Using the word "few" tends to either under emphasize the importance of their occurrence or to over emphasize them because they are scarce, depending on the perspective of the reader. I recommend "a few" be deleted from the second quotation and a sentence added that points to their significant resource value that should be protected, consistent with reasonable development, if allowed to occur.

6. Page 4, 2d column, FISH:

   No mention is made of the important year-round fishery that exists at the Sadlerochit Spring area. Although it is discussed on page 26, a sentence stating its existence should be added to the Executive Summary.

7. Page 6, ENVIRONMENTAL CONSEQUENCES OF OIL DEVELOPMENT ON THE 1002 AREA:

   No mention is made of the potential substantial effects of any needed causeway at the docking facilities. Even with substantial breaching, adverse effects are expected. The magnitude will depend on specific siting and extent of extrusion into the marine system. Also see comment 4.

COMMENTS ON THE REPORT

8. Page 9, Chapter 1, INTRODUCTION:

   It appears that leasing the 1002 area would not be contrary to any of the stated purposes of ANWR per ANILCA. None of these purposes would prevent reasonable development for oil and gas if Congress chooses to allow development. If so, the regulatory framework and tools already exist to allow reasonable development to occur in a timely manner under the Clean Water Act.

9. Page 11, 2d column, 1st partial paragraph: "The FWS carefully monitored all activities and no adverse effects to fish and wildlife were observed." (emphasis added)

   Although this statement may be correct in the context of the paragraph, it could be easily misread as applying to all exploration activities or to other times of the year. Suggest you add to the sentence, "... from helicopter supported surface exploration during the summer months." The need for this is supported by the statement on page 118, 1st column, first partial paragraph, which indicates that a female polar bear may have been disturbed from denning in the area by winter time activity. Although it is not conclusive that winter exploration activity was the disruptive influence, the discussion in this section should mention the possible disturbance to denning polar bears from even a carefully controlled exploration activity.

10. Page 12, 2d column. STANDARD FOR ENVIRONMENTAL PROTECTION:

    This section discusses the implementation of the FWS mitigation policy. The FWS is encouraged to fully implement needed mitigation into their respective development decisions. If the determination for needed mitigation is to be deferred until site specific development is proposed, then the FWS special use permit should include all needed mitigation measures. Per 33 CFR 325.4(a)(2), the stipulations on the FWS authorization would be conditional on our permits in that "material changes in, or failure to implement and enforce such program or agreement will be grounds for modifying, suspending, or revoking the permit." The FWS should seek needed mitigation through their own specific authority for refuge management rather than rely on the Department of the Army (DA) permitting process under the Clean Water Act. This point is not made clear in the referenced discussions.

11. Page 12, 2d column, last paragraph: "Leasing and operations would be subject to all appropriate Federal and State Regulations..."

I agree with this statement that proposed development would be subject to Federal regulations under DA control. We have in place the necessary regulatory framework and "tools" we need to ensure reasonable and timely development.

12. Page 13, 1st column, second sentence: "...and a development/production proposal will require a site-specific EIS."

Due to the Corps' expected regulatory role with DA permits being required for most future development, the Alaska District should be included as a cooperating agency in future EISs. As mentioned on page 25, WETLANDS, a major portion of the 1002 H area is wetlands and is thus under Corps jurisdiction.

13. Page 13, 1st column, 2d paragraph: "...all applicable Federal and State regulations would apply...unless they were superceded by the legislation enacted by Congress...".

While Congress does have the discretion to "supercede" application of the Clean Water Act regulations, and others, to the proposed 1002 H development area, the DA already has in place the necessary regulatory framework and mechanisms (tools) to fine tune or tailor our regulatory role to allow timely development to occur. Through appropriate use of programmatic general permits, an Advanced Identification of Generally Suitable and Unsuitable Disposal Sites process, an Abbreviated Processing Procedure, and/or a Special Area Management Plan (SAMP) process, important natural resources can be protected while allowing reasonable environmentally sound development to proceed on a timely basis. As experienced in the Prudhoe Bay and Kuparuk developments, appropriate authorizations can be expedited if site conditions allow and the process will aid orderly, well planned development with full public participation.

14. Pages 34 and 35, discussions on avifauna:

As previously mentioned in comment 5 above, the discussions on "Tundra wetlands" infers the inclusion of tundra ponds and other open waterbodies. This should be clarified and expanded upon in appropriate paragraphs. In particular, page 34, 2d column, 3d paragraph presents a fair description of the value of the lagoon system, but it fails to mention the value of the tundra ponds and drained lake basins. Although probably not as important as the lagoon system, they should at least be mentioned.

15. Page 76, 1st column, last sentence: "Because of uneven ground, the pad-cover thickness may range from 6" at one edge to 3'-5' at the opposite edge."

If this gravel covering is not removed before breakup, there is a potential for permafrost degradation to occur. The discussion does not mention restoration of the exploratory pad. If you are to allow a persistent, multi-year pad to remain in place, then a minimum of 5' of gravel or equivalent insulation will be needed to minimize permafrost degradation. The section should include a discussion of restoration for both single-year and multi-year pads.

16. Page 81, 2d column, MARINE FACILITY:

This section does not include any discussion of the expected need for causeways to be constructed in order to allow movement of heavy modules from the dock to shore. Access to a sufficient water depth will be required and it is likely that a gravel causeway will be industries' choice. The need for beaches in these facilities has been established. This is mentioned on page 101 under conseqences. However, this has been a controversial issue with past developments and should be discussed in this section. Also see comments 4 and 7.

17. Page 85, 1st column, SUBSEA MARINE ROUTES, 2d paragraph: "A marine pipeline presents significantly higher environmental risks than does an onshore pipeline."

This statement as written implies that in all circumstances an onshore pipeline is to be preferred over a subsea pipeline. Although this statement can be supported for the ANWR situation where a pipeline of approximately 150 miles is involved and would cross many unknown or uncertain areas within the ocean, it is not necessarily true for shorter routes in areas where shore fast ice exist and the likelihood of deep ice gouge is remote. With the current level of state-of-the-art technology, the potential for a significant leak of oil (oil spill) or failure of a properly bedded, deeply buried subsea pipeline is almost nil, especially one where proper leak detection monitors are used and automatic shut off valves are employed. If these conditions are present it is unlikely that even a small leak of oil would occur for a long enough period of time to allow a significant amount of oil to escape. Although it is correct there are presently no subsea pipelines in the Alaskan Arctic, there are in fact the equivalent of subsea pipelines presently in use in the Canadian Arctic in the Mackenzie River oil and gas fields. It appears to be just a matter of time before industry will choose the subsea pipeline as their preferred means of transportation from off-shore oil prospects. It is premature to suggest these proposals would in fact present "significantly higher" environmental risks than present on-shore pipelines until we have an opportunity to analyze proposed design criteria. It is also worthy of note that the subsea pipeline alternative was the environmentally preferred alternative" in the EIS for the Endicott proposal in 1984. It was the unanimous choice of Federal resource agencies over a quasi (or at least similar to) on-shore buried pipeline within a proposed gravel causeway. The

causeway is a manmade peninsula of land that provides access and the pipeline would be buried in it. This discrepancy should be clarified for the record in the final report and not left as an emphatic statement that cannot be supported by rigorous analysis at this time.

The remainder of the discussion does accurately reflect the unique engineering challenges industry will need to meet to successfully design a subsea pipeline. However, indications are that with favorable economics, the technology exists today.

18. Page 95, Chapter VI, ENVIRONMENTAL CONSEQUENCES:

This chapter is well written and presents a supportable scenario of developmental consequences. In some respects, with the projected development given, expected impacts are over estimated to some degree. However, the consequences described are usuable as a worst case scenario and is therefore appropriate for Congressional consideration.

Conclusions drawn are supported by past experience with similar development in other areas.

IAWG-2
IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

FWS/RF (918)

Alaska State Office
701 C Street, Box 13
Anchorage, Alaska 99513

February 6, 1987

MEMORANDUM

To: Director, United States Fish and Wildlife Service

From: State Director, Alaska

Subject: Arctic National Wildlife Refuge, Alaska; Coastal Plain Resource Assessment and Draft Legislative Environmental Impact Statement

Thank you for the opportunity to comment on the draft of the Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. Our general comments are listed first, followed by page specific comments.

In Chapter Three there are very few references in the bibliography that support the discussions on geology, geophysics, and geochemistry. Most of the references listed are related to the quantitative resource assessment and the economic analysis. This is a problem because the text introduces new or uncommon stratigraphic nomenclature (such as the Canning formation and Hue Shale) for the Brookian rocks with nothing relating them to previous terminology.

Chapter Three also suffers from the lack of geologic and geochemical data. One plate shows interpreted seismic lines with minimal annotation. The well cross section (plate 4) shows none of the structural deformation. We suggest inclusion of a plate showing a composite of geological and geochemical data (attached) to compare and contrast the petroleum potential of each rock unit in relation to the other information.

Chapter Four contains a formal determination for Alternative A with respect to ANILCA, Section 810. We are not familiar with the USF&WS format for Section 810 compliance, but from our review the determinations are unclear for two of the alternatives, B and C, and missing for Alternatives D and E. We recommend that specific findings be made for each alternative.

Max Brewer of the US Geological Survey should be added as an author of Chapter IV.

Two critical points have been missed or under emphasized in the draft that should be expanded in the final report. These points are 1) the timing of ANWR oil production in relation to TAPS through put and 2) the most likely exploration scenario for ANWR, which is that there is an 80 percent probability that no development and production will occur from the coastal plain. The case in point 1 is that if production does not occur soon after the year 2000, TAPS oil through put will rapidly decrease causing transportation tariffs per unit to increase. This increase would reduce the probability of economic oil development in ANWR.

A fold out plate or full page size map of the topography and physiography of the 1002 area is recommended. It should have more detail than the map on p. 15 of the report. It would be helpful when the text describes locations of gravel sources or deep lakes. We also recommend showing the location of the KIC well on the map on page 52 of the report, even if no geological/geophysical information is available.

Our specific comments are as follows.

Page	Paragraph	
49	Paragraph 1	Delete "for the Department" in the 3rd sentence. In the same sentence, substitute "of that information" for "of that work".
49	Paragraph 4	Change the second sentence to read "These 26 prospects were subjected to petroleum engineering and economic considerations resulting in estimates of conditional recoverable resources."
50	Paragraph 2	We recommend restating the time period considered in the second sentence.
50	Paragraph 2	Delete the word "economically" in line 4 of the first sentence.
50	Figure III-2	The shading in this diagram is misleading. The black shaded areas on the left and right hand sets are not equivalent as the shading suggests because the histograms are not dealing with the same kind of information. Only the histograms on the right are from McCasin, 1986; the histograms on the left are PRESTO outputs from BLM, Anchorage. The word "recoverable" should appear under the left side of the figure and in the statement after "Figure III-2".
51	Paragraph 1	Delete the word "extensive" in line 4 of the first sentence.
51	Paragraph 6	In the last sentence, insert the word "reservoir" after "Furthermore,".
51	Paragraph 8	This paragraph is unclear and appears internally inconsistent. It states that "these rocks are not considered prospective for oil and gas." Yet the paragraph goes on to point out that there are oil and gas reservoirs northwest of ANWR in similarly described basement rocks which implies that they are or should be prospective for oil and gas.

51 Paragraph 9 "At least 6,500 ft. of carbonate rocks . . . . . " Is or could tectonic thickening involved?

51 Figure III-4 The figure does not show the Sabbath Creek conglomerate (over 10,000 feet thick) and does not show the Pt. Thomson sands, a major play. Also, we question whether the basement rocks are shown properly as the Ellesmerian overlays both the Katakturuk Dolostone and Argillite on the North Slope near the ANWR 1002 area.

54 Paragraph 3 Change the penultimate line, "If most of the . . . ", to read "If the prime reservoir Ellesmerian rocks are largely missing from the eastern 1002 area, both the in place and recoverable hydrocarbon reserve estimates will decline significantly.

54 Figure III-5 Well data show truncation of Ellesmerian west of ANWR, however, outcrops south of ANWR show no truncation. Both are from allocthonous blocks.

55 Figures III-6 The truncations may be incorrectly shown. Seismic data and III-7 show the strike of truncation to be more north-south trending, and there is only one outcrop of the Sadlerochit Mountains which may be truncated. Truncations should not extend much further east of Marsh Creek.

58 Paragraph 3 Change "the sea oscillated back and forth" to "the sea level fluctuated" or "the depositional centers moved across the area".

58 Paragraph 4 In the second line substitute the word "extensively" for the word "complexly". In the third line delete the word "complexity." Also, the Brookian rocks may be more complexly folded and faulted because of multiple phases of faulting rather than because they are largely incompetent. The older rocks have undergone fewer phases of deformation and are less deformed. (See also paragraph 7)

58 Paragraph 5 The reference, Plate 5, depicts seismic sections. A structure map would be a better reference. Also, "what is called a fold-and-fault belt" we suggest be "called a foreland fold-and-fault belt". Finally, the sentence beginning "The thrust faults originate . . . . " should be changed to read "The north verging thrust faults originate at depth, tend to cross shales at low angles and cut up-section more abruptly in overlying sandstone and siltstone layers."

58 Paragraph 6 As noted for paragraph 5, a structure map would make a better reference than the seismic map used.

58 Paragraph 7 Change the first sentence to read "Seismic reflections as well as outcrops indicate that Cretaceous and Paleocene rocks are generally much more deformed than either the underlying pre-Kingak or overlying post-Paleocene section."

58 Paragraph 8 The Eocene rocks are "only moderately deformed" in the beginning part of the paragraph, but are dipping 60° at the end of the paragraph. This does not clearly state that the structural deformation was episodic and not the same across the ANWR area.

62 Paragraph 1 The text in the geochemistry discussion makes no attempt to relate thermal maturity to structural domain; i.e., nothing is said to the fact that the outcrop samples from allocthonous rocks are all overmature, and cuttings samples from autothonous blocks are mostly immature or mature.

64 Paragraph 5 The text implies that oils with 21° to 27° API gravity and one oil with 44° API gravity have the same source. Without other data, this information would indicate two distinct oil types and possibly oil from two sources.

65 Paragraph 1 Oil in the Pt. Thomson-Kemik should have oil with a 35° to 45° API gravity, or as low as 18° API gravity and is supposed to have the same source rock as oil in the turbidites which was described as 21° to 27° API gravity. It does not follow that the source rocks are similar as the two API ranges do not overlap.

63-69 This section describes the seven plays, based on stratigraphy, and six prospects, "potential" objectives, but does not explain why or why not the terms sometimes overlap or are entirely different.

70 Paragraph 6 The terms "probability of occurrence" and "geologic risk factor" should be more clearly defined.

76 Paragraph 4 The estimate of 10 acres of ground covered by the pad may be overestimated. The Brontosaurus well on NPRA was drilled from an icepad with ancillary structures which encompassed 3.5 acres.

76 Paragraph 6 The material excavated from the reserve and flare pits is not necessarily ice-rich. The phrase "ice-rich" should be deleted.

76 Paragraph 7 The water shortage situation may be overstated, especially where drilling operations are concerned. This scenario does not account for possible high tech drilling fluids or the use of sea water for drilling versus fresh water. Since the large quantities of water may be required, low water availability exploration scenario could be presented.

76 Paragraph 8 Drilling from shorefast sea ice implies that the drilling is done offshore. Are offshore sites included in the area considered in the report?

77 Paragraph 5 This discussion on multi-winter drilling methods should include the method used by Chevron for drilling the KIC well near Kaktovik. This well was drilled from a wood and timber platform, which provided a thaw-stable base during the summer months without using gravel.

78 Paragraph 8 Drilling technology has continued to advance on the North Slope. The angle of deviation has probably increased from 0 to 45 degrees to 0 to 60 degrees, and the maximum practical angle for drilling is 90 degrees or horizontal drilling. The horizontal drilling technique is used for improved oil production and recovery and would surely be used in the 1002 area if production occurs.

99 Paragraph 9 The reader may benefit from a brief but more specific discussion of the nature of the adverse effects of a significant water loss in the area.

100 Paragraph 3 The "button up" method of abandoning a wellsite is incomplete and does not consider newer methods. Five feet of fill is required in order to insulate the pit contents sufficiently to guarantee freezeback. However, if revegetation can be accomplished over the reserve pit, less fill is required for insulating the pit contents, due to the insulating properties of vegetation. Reclamation of the Brontosaurus wellsite included filling in the reserve pit with excavated material, making sure that the original top organic layer was put on last, thereby facilitating revegetation efforts. Revegetation of the pit has been successful in the sort term, and it appears that freezeback of the pit contents has been achieved. In any event, even if freezeback is not accomplished for a reserve pit, filling it with overburden will prevent the formation of a long term pond with subsequent breaching of the berms and loss of fluids to the tundra. The experience on NPRA with the Button up technique may be limited because it was not common practice at that time. The pit at the east Teshekpuk site was covered, and, although some settling occurred, the site is the only one recently tested that has little to no contamination locally. Other open reserve pits had local contamination that do not meet EPA water quality criteria.

101 Paragraph 3 Part 2 should be expanded to include the potential for gravel mining adjacent to river beds affecting water recharge to the river bed. This would effect any fish eggs or overwintering fish that may be found at these sites.

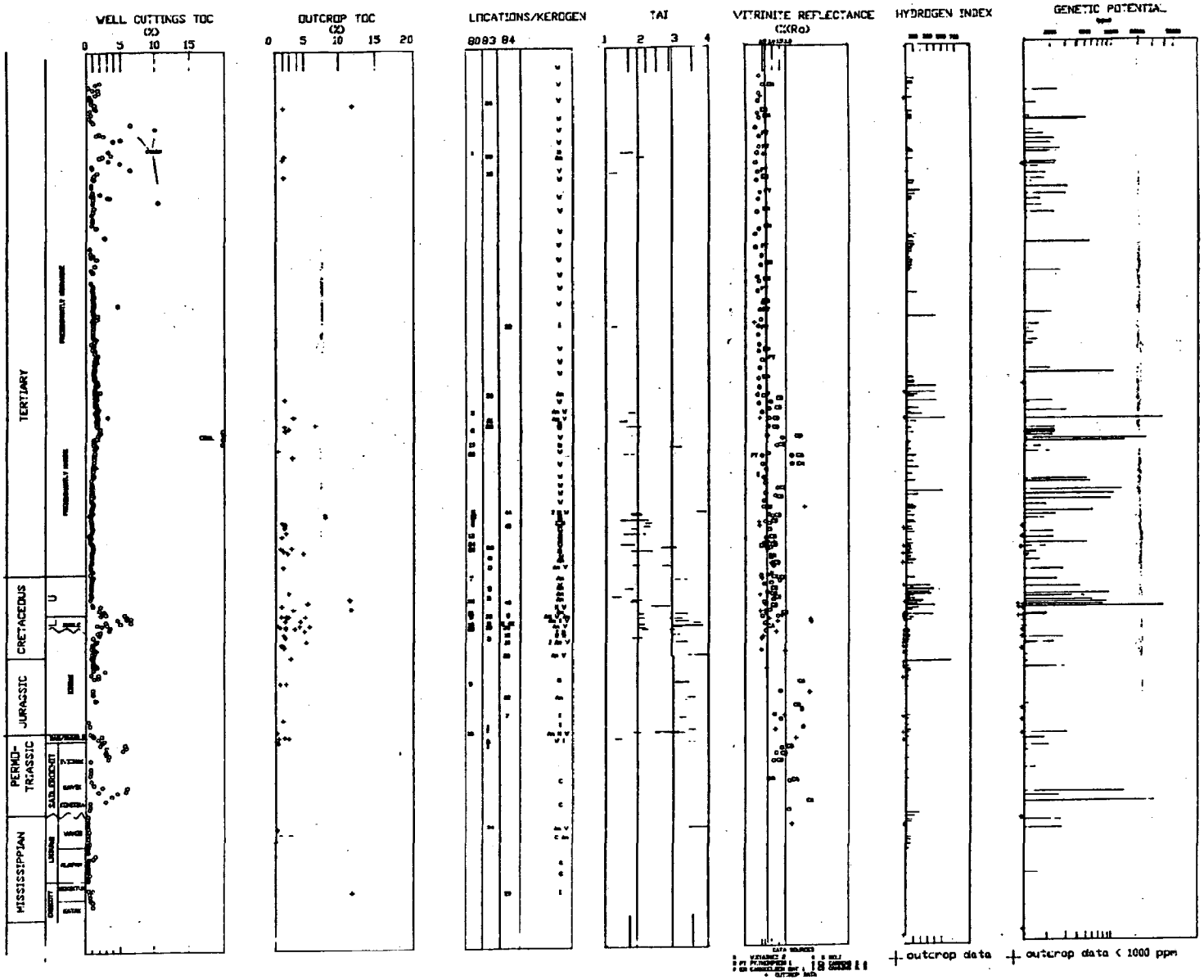
102 Paragraph 7 Foam insulation can break down and erode to smaller pieces that can be very difficult to effectively remove from the tundra.

145 Stipulation 3 We believe ice pads should be considered preferable to gravel, foam and timber pads.

Arthur Hosterman
Chief, Office of Management,
Planning and Budget
Acting

1 Attachment:
1 - Composite Geochemical Profile for ANWR (1 p)

COMPOSITE GEOCHEMICAL PROFILE FOR ANWR



TOTALGC

PLATE COMPOSITE GEOCHEMICAL PROFILE FOR ANWR

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION X

1200 SIXTH AVENUE

SEATTLE, WASHINGTON 98101

February 6, 1987

REPLY TO ATTN OF: M/S 635

Honorable William P. Horn
Assistant Secretary for Fish and Wildlife and Parks
United States Department of the Interior
18th & C Streets, NW
Washington, D.C. 20240

Re: Arctic National Wildlife Refuge, Alaska,
Coastal Plain Resource Assessment

Dear Mr. Secretary:

This letter and the accompanying enclosure provide the U.S. Environmental Protection Agency's comments on the draft Legislative Environmental Impact Statement concerning the proposal to allow oil exploration, development and production within the Arctic National Wildlife Refuge.

EPA believes the Department of Interior needs to revise the Legislative EIS so that our agency would have a better understanding of the environmental impacts. A number of impacts are not discussed fully, and some foreseeable impacts are not discussed at all.

There is no discussion in the Legislative EIS of air quality deterioration, the effects of noise upon wildlife in the refuge, or of the consequences of marine transportation facilities on fish populations. The Legislative EIS acknowledges that water supplies may be inadequate to support all the activities associated with oil development within the refuge, but does not discuss how overcoming these shortfalls will affect the available fresh water resources.

EPA also believes more discussion is needed about impacts on the refuge's core caribou calving area. The core calving area may be of concern to Congress when it considers the development proposal because the area has been designated by the U.S. Fish and Wildlife Service (USFWS) as a unique and irreplaceable wildlife habitat. Since it is clear from the LEIS that the proposal, if adopted, will result in loss of habitat, we believe that Congress needs a more thorough discussion of the consequences of full leasing compared with leasing on a smaller geographical scale, and how the proposal relates to the USFWS Mitigation Policy, particularly concerning Category 1 and Category 2 habitat.

F-59

In reviewing the Legislative EIS, EPA did not expect the document to contain the level of detail normally found in project-specific impact statements. That level of detail would be provided later in subsequent impact statements if Congress were to approve, as a matter of policy, that the leasing should proceed. However, for Congress to make its policy decision, more information and discussion are necessary now. Congress, EPA, and other regulatory agencies need to be fully aware of the environmental implications of oil development in the refuge.

Because of the incomplete discussions in the Legislative EIS, EPA is rating the document in the following manner:

- Alternative A (full leasing): EO-2 (Environmental Objections-Insufficient Information)

- Alternative B (limited leasing): EC-2 (Environmental Concerns-Insufficient Information)

- Alternative C (further exploration): LO (Lack of Objection)

If the Department of Interior has questions about EPA's comments, please feel free to direct members of your staff to contact me or Alvin L. Ewing, EPA's assistant regional administrator in Anchorage. We look forward to answering your questions and helping you prepare a final Legislative EIS that will enable Congress to make a reasoned decision.

Sincerely,

Robie G. Russell
Regional Administrator

Enclosure

Review Comments

Our review has identified the following general informational needs which we believe are necessary for informed decision making.

1. Analysis/Assessment: Clarification is needed in the assessment of the effects of the alternatives addressed in this document. Some examples of areas that need further analysis are:

- The draft LEIS acknowledges (p. 6, Executive Summary) that there will be indirect effects from the proposal. Either of the leasing alternatives could cause increased pressure to develop the Canadian Arctic, state lands to the west of the Arctic National Wildlife Refuge (ANWR), and portions of the Beaufort Sea outer continental shelf (OCS). The potential development infrastructure in the 1002 area could provide the major impetus for development in these adjacent areas. These indirect effects are not truly discussed in the environmental consequences section.

- Cumulative effects should he more clearly defined and included as a separate section with the report. For example, the report should address the cumulative effects of existing North Slope facilities combined with those being assumed for ANWR.

- Clarification is needed about the relationship between displacement or distribution change of caribou versus population changes of caribou.

- The analysis of subsistence impacts is focused primarily on Kaktovik with only general and brief mention of other native settlements. The draft LEIS indicates that the primary reason for focusing on Kaktovik is its proximity to the 1002 area. Settlements located further away (Arctic Village, Venetie, Fort Yukon, and Old Crow in Yukon Territory, Canada) are also be dependent upon the caribou herds. According to the draft LEIS, residents from these settlements harvest the caribou when they have migrated out of 1002. However, the draft LEIS does not examine the dependence of these inland settlements on caribou. Because of their inland location, the residents of these settlements could he more dependent on the caribou since they do not have easy access to coastal fishery resources. Thus, the final LEIS should fully examine the effects on the inland settlements of a decline or change in distribution of caribou.

- In many instances, the draft LEIS uses the phrases "unnecessary adverse effects" and "significant unavoidable losses" or "significant adverse impacts." The final LEIS should provide some

framework for the assessment of the terms "unnecessary" and "significant." What criteria are used to determine if impacts are unnecessary or significant? A discussion of the criteria used to establish either condition or a definition of each term, if possible, would facilitate the review of this draft LEIS and support the rationale for selecting a preferred alternative.

- The final LEIS needs an air quality discussion. It should include present estimates of the maximum mass emission rates for oxides of nitrogen, total suspended particulates, carbon monoxide, non-methane hydrocarbons, sulfur dioxide, and lead, as well as any potentially hazardous pollutants listed in EPA's Prevention of Significant Deterioration (PSD) regulation [40 CFR51.24(b)(23)(1)] or covered by the National Emission Standards for Hazardous Air Pollutants (40tCFRtPart 61).

  In addition, any existing ambient air quality data for the 1002 area should be presented and compared to the Alaska ambient air quality standards (AAAQS). Worst case ambient air quality modeling results, using a suitable EPA approved model, should also be presented and discussed in the final LEIS. Modeling results should be compared to the AAAQS and available PSD increments. Mitigation measures sufficient to show attainment of all standards should be presented. Any pollutant emitting activity would need to comply with requirements of the Alaska State Implementation Plan.

- The draft LEIS does not provide any discussion of the potential noise levels associated with exploration, development, and production. Noise can cause adverse impacts to many of the biologfcal populations. Although disturbance is incorporated into the environmental consequences discussion, the final LEIS should provide a general discussion of present noise levels and the potential noise levels associated with the oil and gas exploration, development, and production.

- A more detailed analysis of water supply is needed. Under the proposed development alternative, substantial quantities of fresh water may be required for construction of ancillary support facilities, transportation systems, exploration drilling, and field production facilities, including ice roads, ice airstrips and drilling pads. The draft LEIS notes that water sources in the 1002 area include surface resources and ephemeral lake sources.

  While the draft LEIS clearly states the potential for a major shortfall of natural water sources necessary for the construction of ancillary features and drilling needs, the document does not

adequately discuss the potential impacts of the schemes proposed to supplement those resources. A generic discussion of the options for useable water collection or production should be included in the final recommendation document. In addition, an assessment of the effects on habitat of using the available water is needed. How might the surface hydrology be changed, and how will that change affect waterfowl, shorebird and other habitats?

- The potential effects of marine transportation facilities such as docks, causeways, and staging areas on the near shore and on shore environments need to be identified and assessed. Such analysis should address individual impacts, as well as cumulative effects, with existing North Slope facilities, such as the causeways built into the Beaufort Sea. There should also be a discussion of whether the deletion or change of a suggested marine scenario may alter the viability of any of the alternatives.

2. Mitigation: Clarification is needed to identify the net effect of proposed mitigation. Each alternative component should be outlined without mitigation, with mitigation, and the two compared.

- Any proposed mitigation that is being considered in the assessment of impacts, to offset negative effects, should a) be clearly identified, b) have effectiveness studies referenced, and c) identify regulatory responsibility (strategy) for implementation.

- Interrelationships between mitigation measures and subsistence uses should be identified and assessed.

3. Wetlands: Virtually the entire 1002 area can be classified as wetlands. It appears the Legislative EIS only considered direct impacts from construction and other development activities. Secondary and cumulative impacts such as those associated with road and pad construction should be discussed in general terms to identify their impact on the larger scale hydrologic functions of wetlands in the 1002 area.

4. Regulatory Processes: The discussion of the regulatory process and its relationships to the alternatives needs to be expanded. As charged in Section 1002 of ANILCA (p. 12, Executive Summary), the LEIS should provide an assessment that supports the Secretary's recommendations and "...what additional legal authority is necessary to ensure that adverse effects...are avoided or minimized." The discussion on this point is unclear, vis-a-vis, the need for additional legal authority. Further clarification is needed through discussion and assessment of:

- The existing regulatory process including examples of how existing regulations are applied on the North Slope for oil and gas development.

- The Section 404 program, in particular the success of the Abbreviated Permit Process. This procedure was specifically designed to expedite oil and gas development on the North Slope.

- The potential applicability and use of the advanced identification process (40 CFR 230.80) for advanced planning.

- The draft LEIS mentions that "deferred leasing" will be used to delay leasing in more sensitive habitat areas, the idea being that delaying leasing will allow more time for advancements in either mitigation technology or oil and gas exploration, development, and production technology. The final LEIS should provide a more detailed discussion about what it means, how it will work, and what parts in the 1002 area may be subject to this leasing approach.

- We believe that the LEIS will be the first in a number of environmental documents that will examine the impacts and consequences of the proposed oil resource recovery activities in the 1002 area of the Arctic National Wildlife Refuge. It is our recommendation that specific EIS documentation for exploration, leasing, and production from oil reserves in the area, and construction of pipelines or marine docking facilities be performed. To effectively address and protect the natural resource value in the 1002 area, the USFWS should approach evaluation of these activities in a coordinated manner. Such an approach would more clearly delineate the cumulative impacts of the various interrelated aspects of oil exploration and development in ANWR.

6 February 1987

The Honorable William P. Horn
Assistant Secretary for
Fish and Wildlife and Parks
Department of the Interior
18th and C Streets, NW
Washington, DC 20240

Attention: Division of Refuge Management

Dear Mr. Horn:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Arctic National Wildlife Refuge Coastal Plain Resource Assessment. This report was prepared under section 1002(h) of the Alaska National Interest Lands Conservation Act (hereinafter referred to as "ANILCA"). 16 U.S.C. §3142(h). It assesses the fish and wildlife resources and oil and gas potential of the Arctic Refuge coastal plain (hereinafter referred to as the "1002 area") and sets forth recommendations to Congress for future management of the area. A legislative environmental impact statement has been integrated into the Assessment. The Assessment recommends that Congress open the entire 1002 area to oil and gas leasing, subject to environmentally protective restrictions.

The Assessment indicates, among other things, that:

-- fourteen species of marine mammals, including walrus, beluga whales, polar bears, and the endangered bowhead whale occur in or near the 1002 area and could be affected by oil and gas exploration and development in that area;

-- many of the potentially affected marine mammal and other wildlife species are hunted by Alaskan Natives for subsistence purposes and the availability of these animals could be affected by the proposed action;

-- activities associated with exploration and development could cause female bears to avoid or abandon important denning areas;

-- those activities also could attract polar bears and jeopardize the welfare of both oilfield workers and bears;

-- it apparently is not known how many polar bears den in or near the 1002 area or how disturbance and habitat alteration in the 1002 area, combined with subsistence hunting, disturbance and

habitat alteration in the Canadian Arctic and other parts of Alaska, might affect the size, age/sex structure, and productivity of the Beaufort Sea polar bear population;

-- it is not known whether frequent or continuous vessel operations would cause bowhead whales or other marine mammal species to abandon important habitat areas or lower their reproductive fitness;

-- because the 1002 area has not been fully explored by means such as exploratory drilling, reliable estimates cannot be made of the nature and extent of the recoverable oil and gas resources located there;

-- because the nature and extent of the resources are not known, it cannot be precisely determined where or how much development is likely to occur in the area;

-- an annual sea lift would be the most economical means of transporting supplies, production/support modules, and other cargo. It therefore would be necessary to construct one or more port facilities. At present, however, it is not possible to determine precisely what or where port facilities would be required; and

-- development of port and other support facilities likely would encourage other activities and additional exploration and development activities in adjacent offshore and onshore areas.

In consideration of these and other uncertainties concerning the nature, extent, and effects of exploration and development activities in the 1002 area, the Marine Mammal Commission believes that additional studies and assessments should be conducted before the 1002 area is made available for oil and gas recovery and utilization. As discussed in greater detail below, we consider it necessary to conduct further analyses of the potential impacts, including cumulative and indirect effects, of exploration and development on marine mammal populations, especially polar bears, located in and near the 1002 area. Similarly, additional assessment of the impacts of the development scenarios on subsistence uses of the affected marine mammal populations appears necessary. If exploratory drilling is to be conducted as part of the further assessment, we believe that it should be undertaken in a manner that would not interfere with these studies or compromise the wildlife and other resource values that are subject to the ongoing impact assessment.

Section 1002 provides for a cautious, step-by-step analysis of the fish and wildlife resources of the coastal plain of the Arctic Refuge. Consistent with that approach, the Commission believes that further studies are necessary to determine the numbers of polar bears, bowhead whales, and other species that could be affected by exploration and development, identify the nature of those impacts, establish protective restrictions and

mitigating actions (if exploration or development is to occur), and develop monitoring programs to detect possible unforeseen effects before they reach unacceptable levels. In addition, if exploratory activities can be authorized consistent with the resource protection guidelines described in this letter, more reliable estimates of the quantities and locations of recoverable oil and gas resoruces would be acquired. As a result, it would be possible to better determine how the resources of the coastal plain of the Arctic Refuge can best be utilized in fulfillment of the objectives specified in section 1002 of ANILCA, whether that be through wilderness designation, full leasing and development, or some other alternative. In our opinion, there is insufficient information to make that judgment at this time.

GENERAL COMMENTS

In both ANILCA and the Assessment, it is pointed out that marine mammals are resources of special concern in the 1002 area. As a general matter, and with respect to marine mammals and subsistence uses of marine mammals in particular, the Assessment does not adequately analyze the possible cumulative impacts of oil and gas exploration, development and transportation along the coast of the Beaufort Sea. In addition to the activities that may occur in the 1002 area, a comprehensive assessment of the environmental consequences of the Recommended Action must take into account existing and reasonably foreseeable oil and gas activities in the region. This kind of analysis is required by the Council on Environmental Quality National Environmental Policy Act regulations and case law. See, e.g., 40 C.F.R. §§1502.9, 1502.16, 1508.7, 1508.25; Kleppe v. Sierra Club, 427 U.S. 390 (1976); North Slope Borough v. Andrus, 642 F.2d 549 (D.C. Cir. 1980).

To satisfy this requirement, the Assessment should address the environmental impacts of industrial activities that presently are occurring and are reasonably foreseeable in the National Petroleum Reserve - Alaska, Prudhoe Bay, state lands subject to leasing and development along the Beaufort Sea, and areas in the Canadian Beaufort that have oil and gas potential. If the resource assessments necessary to analyze these cumulative impacts have not been conducted, this information should be required to be obtained as part of the additional studies that we have recommended.

The Assessment's discussion of the impacts of the Recommended Action on polar bears provides an example of why analysis of cumulative effects is necessary. Page 118 of the Assessment states that, "[b]iologists believe that the Beaufort Sea population can sustain little, if any, increase in mortality of females because population surveys and calculations show that the number of animals dying each year is approximately equal to the population increase from reproduction." Even though the Beaufort Sea polar bear population is found throughout areas of existing and potential oil and gas activities that could result in

increased female mortality, the Assessment only addresses the prospect for such a problem developing within the 1002 area. As a result, no information is provided on whether or not female polar bears will experience population pressures and mortality as a result of industrial activity in other areas. Moreover, although the Assessment notes on page 118 that a decline in polar bear natality is not likely to affect the species' overall survival "so long as similar intensive developments did not occur along the entire northern coast of Alaska and Canada," no information is provided on the amount of development that could occur outside of the 1002 area.

The Commission considers this information essential for an adequate review of the environmental consequences and subsistence impacts of the alternatives presented in the Assessment. In addition, this information should be available to Congress when it considers what action to take with respect to the future of the 1002 area. If the analysis of cumulative impacts demonstrates that the Beaufort Sea region will be subject to intensive oil and gas activity, it may be necessary to postpone or prohibit exploration and development in the 1002 area to provide a protected area for wildlife resources.

In addition, consideration should be given to reasonably foreseeable indirect effects. For example, no consideration is given to the effect that disturbances and oil spills could have on the food web that is relied on by polar bears and other marine mammals. Other indirect effects that should be evaluated include possible changes in the behavior of seals and bowhead whales caused by industrial activity and marine traffic and the manner in which these changes would effect the availability of the affected populations for subsistence uses. Such an analysis is required by 40 C.F.R. §1502.16, and we recommend that the required information be obtained and analyzed.

Finally, if additional seismic or other exploration is undertaken, it should be designed and carried out in a manner that would not interfere with the additional wildlife assessments being conducted by the Fish and Wildlife Service and other parties. In this regard, if it has not already been done, the Commission believes that it would be desirable to authorize a single exploratory survey of this area, rather than allowing each interested entity to conduct separate surveys. In addition, we believe that the data obtained from this survey should be made available to and analyzed by the Department of the Interior. The resulting estimates of possible resource levels should be made available to Congress and the general public. Furthermore, any exploratory work should be regulated and monitored by the Department so as to minimize environmental impacts.

SPECIFIC COMMENTS

Page 1, column 1, 4th complete paragraph -- For purposes of calculating the "Net National Economic Benefits" of the projected

recoverable resources in the 1002 area, the Assessment uses values of $33 and $40 per barrel as the price of oil. The present price of oil is substantially below these estimates. As a result, it appears that the benefits of developing the 1002 area have been overestimated.

Pages 12 - 13, column 1, carryover paragraph -- This paragraph states that this legislative environmental impact statement will suffice for initial leasing and that future development will be tiered on the present document. As noted in the general comments, this document does not address the possible cumulative effects and some of the important indirect effects of oil and gas activity in the Beaufort Sea area. Until the information is incorporated into the document, it should not be used for lease issuance or other decision-making actions. In addition, it should specify the actions that will be taken at the leasing, exploration and development stages to ensure compliance with the requirements of section 7 of the Endangered Species Act.

Page 13, column 1, 1st complete paragraph -- The Endangered Species Act and the Marine Mammal Protection Act should be added to the list of statutes that apply to Federal oil and gas activities in Alaska.

Page 27, column 1, 1st complete paragraph -- The Convention on International Trade in Endangered Species of Wild Fauna and Flora should be added to this discussion.

Page 33, column 1, 3rd complete paragraph -- This paragraph indicates that 87% of the polar bear dens located in 1983-85 were offshore and that the most consistently used land denning areas were on and adjacent to the 1002 area. It does not indicate: what onshore and offshore areas were surveyed; how dens were located; whether dens that were located represent all, a known proportion, or an unknown proportion of the dens in the area surveyed; whether the proportion of bears denning onshore and offshore is affected by ice and weather conditions or other variables; whether exploration and development activities in Prudhoe Bay and other areas in the Alaskan and Canadian Arctic may have resulted in more offshore denning; and how reproductive success might be affected by den location.

Without this information, it is not possible to make a meaningful assessment of the possible effects of the alternative development and exploration scenarios on polar bears. Thus, a more complete description and evaluation of the existing information and uncertainties concerning denning locations and requirements should be provided. If information essential to such an assessment is not available, the necessary research and data gathering should be conducted.

Page 33, column 2, 3rd complete paragraph -- This paragraph states that the Beaufort Sea is ice covered year round. This is not accurate. During the summer, the southern edge of the ice can

be 100 or more miles offshore. The resulting expanse of water cannot be correctly termed a shore lead.

Page 33, column 2, 4th complete paragraph -- This discussion should be expanded to indicate how polar bears are "protected" under the Marine Mammal Protection Act. Such a discussion should emphasize the prohibition on taking (including harassment), the goal of the Act to restore and maintain marine mammal populations at their optimum sustainable population levels, and the subsistence opportunities that are provided to Alaskan Natives. Because these requirements apply to all marine mammals, it may be useful to insert this discussion at the beginning of the Marine Mammal section on this page.

Page 34, column 1, 1st complete paragraph -- This paragraph states that bearded seals are chiefly associated with the pack ice edge throughout the year. This statement is not accurate. Bearded seals are widely distributed over the shallow continental shelves of the Bering, Chukchi and Beaufort Seas.

Page 34, column 1, 4th complete paragraph -- This paragraph refers only to subsistence whaling activities at Kaktovik. Discussion should be added concerning subsistence activities at other locations that could be affected if whales are adversely affected by activities in the 1002 area. The same applies to the analysis of subsistence impacts of other migratory wildlife populations that move outside of the Arctic Refuge. This approach has been followed for analyzing the effects on caribou (see, e.g., page 39, column 1, 2nd complete paragraph), but not for bowhead whales, seals and polar bears.

Page 39, column 1, 1st complete paragraph -- The subsistence provisions of the Endangered Species Act and the Marine Mammal Protection Act should be included in this discussion.

Pages 81 - 82, carryover paragraph -- This paragraph indicates that two marine facilities may be necessary under the full leasing and development scenario. The two sites identified -- Camden Bay and Pokok Lagoon -- also are known polar bear denning sites and may be important bowhead feeding areas. The likelihood that these two sites would be developed highlights the need for more detailed assessment of both polar bear and bowhead behavior and habitat requirements. In addition, it suggests the need to consider alternative locations for these activities. This is especially important with regard to the requirements of the Agreement for the Conservation of Polar Bears, which directs member nations to take special steps to protect polar bear denning locations. As noted on page 27 of the Assessment, section 303 of ANILCA requires that the Arctic Refuge be managed to fulfill international treaty obligations. The Assessment should discuss, either here or in the Environmental Consequences section, how this Treaty obligation and the concomitant duty imposed under ANILCA would be satisifed with regard to the polar bear dens at Camden Bay, Pokok Lagoon and elsewhere in the 1002 area.

Page 96, Table VI-1 -- This table defines long- and short-term effects as impacts that last more than 20 years and less than 20 years, respectively. We believe that an effect that lasts up to 20 years cannot be considered short-term. A more appropriate approach would be to define short-term effects as those that last for up to two years, intermediate-term effects as those that last up to 10 years, and long-term effects as those that last more than 10 years.

In addition, neither the text of the Assessment nor the Table indicate what is meant by the terms "widespread," "local," and "considerable severity." To provide a more meaningful basis for judging what the Department of the Interior considers to be major, moderate, minor, and negligible effects, these terms should be defined.

Page 118, column 2, Mitigation -- This section should be expanded to include the following mitigating actions:

1) Workers in the area should be instructed on polar bear behavior and habitat concerns and the procedures to use when bears are encountered.

2) Bears that come into contact with camps and development sites should not be allowed to become habituated and lose their fear of humans. When possible, they should be frightened and driven several miles away by use of a snow machine or helicopter. In addition, encounters should be discouraged by use of trip-wire alarm systems and other polar bear deterrents.

3) Seismic and exploratory surveys should be coordinated and limited to the number necessary. Repetitive surveys by independent companies should be avoided.

The final sentence in this section, which states that only Natives may kill polar bears, is not accurate. There is limited authority under the Marine Mammal Protection Act for the lethal taking of bears by government officials when necessary for the welfare of the animal or for public health and welfare. 16 U.S.C. §1379(h). In addition, bears may be taken for scientific research and public display purposes. 16 U.S.C. §1371(a)(3). This sentence should be revised to read: "Except for purposes of scientific research or other authorized takings under the Marine Mammal Protection Act, nuisance bears would have to be trapped and relocated, except in extreme situations where other methods of humane taking are necessary for either the welfare of the animal or the protection of the public health and welfare."

Page 118, column 2, Conclusion -- This paragraph states that the "exclusion of only one or two bears from areas consistently used for denning would be a moderate impact on that segment of the Beaufort Sea population . . . ." Lacking is a discussion of what the impact would be if more bears were excluded. In addition, due

to some of the information gaps and concerns identified elsewhere in this letter, the Commission regards the conclusion that "only one or two bears" would be excluded to be speculative.

On 25 April 1986, the Council on Environmental Quality published a revised regulation to govern the consideration of issues for which there is incomplete or unavailable information. 51 Fed. Reg. 15,618 - 15,626. That revision to 40 C.F.R. §1502.22 requires that impacts that have a low probability of occurrence but catastrophic consequences if they do occur should be evaluated if the analysis is supported by credible scientific evidence. 51 Fed. Reg. 15,625. The Commission believes that the exclusion of additional polar bears has a sufficient degree of probability and adverse environmental consequences to require analysis in the Assessment and recommends that appropriate steps be taken to address this possibility, through additional research (if necessary) and revisions to the document.

Page 119, column 2, Conclusion -- This paragraph states that the behavior of "dolphins, porpoises and seals in coastal marine habitats with high levels of industrial activity and marine traffic" suggests that behavioral changes by marine mammals using the Arctic coast would be minor as a result of development in the 1002 area. Although it is true that some dolphins, porpoises and seals are able to live in areas with relatively high levels of human activity, it does not necessarily follow that Arctic seals and whales, which have had relatively little exposure to such activities, also would be unaffected.

Page 127, column 1, Subsistence Use -- As noted above in our comment on Page 34, column 1, 4th complete paragraph, the Assessment should be revised to address the impacts on subsistence uses of marine mammals in villages outside of the Refuge. This would include, but is not necessarily limited to, Barrow and Nuiqsut.

I hope that these comments are useful. If you have any questions, please contact me. The Commission looks forward to working closely with the Service in addressing these concerns and other marine mammal issues associated with the 1002 program.

Sincerely,

Robert J. Hofman, Ph.D.
Scientific Program Director

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
WASHINGTON, DC 20240

FEB - 6 1987

Memorandum

To: Director, U.S. Fish and Wildlife Service
Attention: Noreen Clough, Division of Refuges

From: Director, Minerals Management Service

Subject: Arctic National Wildlife Refuge, Alaska; Coastal Plain Resource Assessment and Draft Legislative Environmental Impact Statement

The Minerals Management Service (MMS) has reviewed the above document, and our comments are attached.

The MMS fully supports the Department of the Interior's (DOI's) recommendation to Congress for pursuing energy resources development in the coastal plain of the Arctic National Wildlife Refuge (ANWR). This document has demonstrated that development of the ANWR's oil resources is vital to our national interest and that mitigation measures are available to ensure minimal adverse effects on the environment.

In the attached comments, we have identified several sections of the document that can be enhanced with additional discussions and/or clarifications. In particular, we have concerns on two major topics discussed in the document. First, the various sets of figures used for resource estimates and economic benefits, as discussed in Chapter III, should be more clearly explained to indicate how these figures, which appear confusing and occasionally are inconsistent, were developed. Second, the method for impacts assessment and discussions of potential environmental effects in Chapter VI should be clarified to show how the conclusions are related to development scenarios and assumptions. We have provided in the attached comments specific references to those chapters, pages, and paragraphs where we have questions, concerns, and suggestions.

As a result of our responsibilities for overseeing energy resources development on the Outer Continental Shelf, the MMS has considerable experience in oil and gas leasing and environmental effects monitoring offshore Alaska. To the extent that any of our program activities or expertise may be of assistance to you in the furtherance of the DOI's efforts for potential energy development in the ANWR, please feel free to call on us. If you have questions concerning our comments, please direct them to John Goll, Chief, Offshore Environmental Assessment Division (Room 2042, Main Interior, 343-2097).

Attachment

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COMMENTS BY THE MINERALS MANAGEMENT SERVICE ON
DRAFT COASTAL PLAIN RESOURCE ASSESSMENT,
ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

General Comments

We note that the draft document has been prepared to fulfill the requirements of section 1002(h) of the Alaska National Interest Lands Conservation Act (ANILCA) calling for a recommendation by the Secretary of the Interior to the Congress on whether the coastal plain of the Arctic National Wildlife Refuge (ANWR) in Alaska should be opened for oil and gas development. The geographical area addressed by the document is referred to as the "1002 area."

The Minerals Management Service (MMS) recently gained much relevant experience with the preparation of ANILCA section 810 subsistence analyses. Accordingly, we have focused our review on the suitability of the socioeconomic information needed for such analyses. The information in this document is comprehensive; it properly includes the required analyses of the abundance and availability of, and access to, subsistence resources. The document references much original literature regarding the North Slope Borough (NSB), but we note that it unfortunately references only one study from the MMS Social and Economic Studies Program.

In our specific comments that follow, we have noted, where appropriate, that additional information is available. To assist in making the information base for this document more comprehensive, we have attached a current MMS studies list for the Beaufort Sea Planning Area.

As implied in this document, an ANILCA section 810 analysis will be conducted prior to a lease sale. Although the applicability of ANILCA to Federal offshore oil and gas lease sales in Alaska is still to be clarified by a pending decision by the Supreme Court, the MMS has, under the advice of the Office of the Solicitor, prepared ANILCA section 810 analyses for several lease sales. Our most recent analysis is found in the Beaufort Sea Sale 97 draft environmental impact statement (EIS) published on November 7, 1986.

Chapter IV

A discussion of "Development and Transportation Infrastructure" should consider other oil development projects adjacent to the 1002 area that could affect caribou and other wildlife on the refuge. Federal and State offshore oil and gas activities as well as Canadian oil and gas activities should be considered.

Chapter VI

The analysis of environmental consequences, as a whole, contains one major methodological deficiency that should be corrected. The potential impacts of the proposed action are analyzed assuming mitigating measures are in effect. The proposed action should be analyzed two ways, first without any mitigating measures in place and then with mitigating measures because the inclusion of mitigating measures in a lease is a discretionary action of the leasing official.

If the 1002 area is opened to hydrocarbon exploration, development, and production at sometime in the future, it is very possible that the final leasing decision may not include all of the 32 potential stipulations noted on pages 145-147. If this happens, the subject resource assessment would not present a true analysis of the potential impacts of the proposed action since all the 32 potential stipulations are assumed to be in place for the purposes of the analysis.

Another reason for analyzing the proposal with and without mitigating measures is to facilitate evaluation of the effectiveness of each potential mitigating measure. At the present time, there is no analysis of effectiveness in the resource assessment. If a mitigating measure is not effective in reducing potential environmental impacts or facilitating lease administration, it is doubtful that it should be included in a lease.

The discussion of effects does not adequately address oil spills, nor is oil spillage estimated. Pipeline spillage could be estimated from the trans-Alaska pipeline system (TAPS) data held by the Bureau of Land Management.

There are major analytical problems throughout Chapter VI. The first is in the last paragraph of page 95 which outlines the assumptions that guide the analysis of environmental consequences. The paragraph states that the scenarios for development in Alternatives A and B are treated as if all three portions--western, eastern, and southern--of the 1002 area would be developed concurrently. The analysis then acknowledges that,

> . . . In fact, however, development would likely occur sequentially. [Emphasis added.] Therefore, the analysis and consequences may represent a higher level of development than may actually occur at any specific time if the area were opened to leasing. This factor was recognized, and because any prediction as to the various stages of development at any given time on the 1002 area would be highly speculative and perhaps misleading, the FWS chose to perform the analysis as if concurrent development were to take place.

We recognize the very real difficulty that the authors undoubtedly have in trying to second-guess the prospective development of the 1002 area, but we are concerned that the "concurrent development" assumption would simply overstate the extent of environmental consequences far beyond reason.

There is a nearly 20-year history of exploratory drilling and developmental operations in the nearby Prudhoe Bay oil fields. We believe that an examination of the Prudhoe Bay development history should provide some indications of how the 26 seismically mapped prospects in the 1002 area might be developed under a reasonable sequential development scenario. We acknowledge that the existence of the TAPS would likely help to speed sequential development of the 1002 area.

The analysis of environmental factors affecting the behavior patterns of the caribou and muskoxen herds in the 1002 area is well-documented, and the discussions of how prospective exploration and development operations might affect these herds are complete. Also, the discussions on page 111 of possible mitigating measures for reducing disturbance to caribou herds and for enhancing their migrations across roads and pipelines seem reasonable and well-supported by the analyses contained on pages 105 through 111. These discussions provide invaluable information on how to manage oil and gas development activities to minimize disturbance to the species under consideration.

We are concerned, however, that the conclusions about impacts to caribou and muskoxen contained on pages 112, 113, 132, and 144 do not seem to be substantiated by the analyses contained in the draft document. What are presented on these pages amount to "worst case" or catastrophic conclusions arrived at without the support of sufficient information. We suggest that the authors reexamine these conclusions in light of the revised Council on Environmental Quality and National Environmental Policy Act regulations on "Incomplete or Unavailable Information" (40 CFR 1502.22) that became effective on May 27, 1986 (51 FR 15618-15626).

Our specific concerns are as follows:

Page 112, left column, 3rd and 4th paragraphs--These paragraphs refer to the presence of up to 6,000 people, use of up to 25 percent of the Porcupine caribou herd (PCH) core calving area, and reduction or elimination of 29 percent of the coastal insect-relief habitat for the PCH. These factors are based on an assumed scenario of concurrent development throughout the area, a scenario that the FWS has stated is unlikely. The fourth paragraph concludes that these and other factors "could result in a major population decline and change in distribution of 20-40 percent, based on the amount of calving and insect-relief habitat to be adversely affected." There is no analysis in the report to support this conclusion, and it is, therefore, conjectural. We note that on page 106 the draft report cites a growth in the central Arctic caribou herd (CAH) population from 6,000 to between 12,000 to 14,000 individuals during the period 1978-1985--in spite of the range of CAH calving and insect-relief areas westward toward the vicinity of the TAPS and developed oil fields at Prudhoe Bay. We recognize the draft report assertion on page 106 (left column, 1st paragraph) that "Analogies comparing the effects of current oil development on the CAH and the PCH must be drawn with caution." However, no clear reasons were given on how the proposed development would result in seemingly dire consequences to the caribou in opposition to what is encouraging and objective evidence. Dire predictions also were made for the caribou prior to construction of the TAPS, but the population of these animals has increased rather than declined.

Page 113, right column, first paragraph--This paragraph again uses the concurrent development scenario to argue that "muskoxen would be displaced from approximately 53 percent" of their year-round habitat and up to 75 percent of their "high use habitats in which calving occurs." Again, the analysis contained in the report does not fully support such negative

conclusions. In fact, page 112 of the draft report indicates that from 1969 to 1985, the muskoxen population of the ANWR grew from 69 to 476 individuals--representing a nearly sevenfold increase--in spite of the development at Prudhoe Bay and construction of the TAPS.

These unsupported conclusions are evident as well in the executive summary of the draft report (page 6, right column, 4th paragraph) where it is stated:

> Long-term losses in fish and wildlife resources, subsistence uses, and wilderness values would be the inevitable consequences of long-term commitment to oil and gas development, production, and transportation.

We do not see any convincing analysis in the draft report to indicate the long-term losses in or consequences to these resources and uses would be "inevitable" as a result of oil and gas development in the 1002 area. We suggest that the experience of the past 20 years indicates otherwise.

Chapter VII

In view of the fall in oil prices in 1986 and the unpromising view for increases in the near future, the resource and economic benefit methodology and assumptions should be reviewed and perhaps redone to reflect more realistic numbers. Also, some of the tables need to be updated and care taken concerning the fact that Prudhoe Bay was a major discovery; other areas may not be, i.e., Mukluk.

This chapter should include a discussion of the enormous investments--billions of dollars in private investment and millions of dollars in Federal administrative costs--that truly make the TAPS a national resource of tremendous value. Although the report correctly notes that the productivity of Prudhoe Bay oil fields will begin to decline in a few years, it fails to consider the ramifications of this fact.

Letting the TAPS lie idle for even a few months would inevitably result in physical deterioration of the system under harsh Arctic conditions. Reconditioning the system to transport production from the 1002 area after only a short period could require expenditures of millions of dollars. Idling the TAPS during a year or more of public debate until a decision is made to produce the oil could result in scrapping sections of the TAPS and spending billions of dollars to build new sections. Congress should be made aware of this through an analysis in the final report that describes the ramifications of idling the TAPS prior to development of 1002 area oil fields. If a decision were made now to proceed with leasing and development of the 1002 area, the hydrocarbon resources from that area could begin to flow into the TAPS at a time when production activities at Prudhoe Bay would be down significantly.

We note that Table III-1 on page 50 compares the estimated mean economically recoverable oil resources of the 1002 area with planning areas of the Outer

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Continental Shelf. The estimate of 3.2 billion barrels of economically producible oil for the 1002 area is significantly larger than the 2.66 billion barrels estimated for the central Gulf of Mexico, where about 90 percent of all oil and gas production has occurred. This comparison provides strong encouragement to begin exploratory drilling in the 1002 area.

Specific Comments

Executive Summary

Page 1, 4th paragraph--This paragraph should be revised to indicate the marginal probability and amounts of both in-place and economically recoverable oil and gas. This paragraph could be misleading to the reader. There is not merely a 5-percent chance of finding 29.4 billion barrels of oil and 64.5 trillion cubic feet of gas. There is a 19-percent chance that hydrocarbons will be found. If hydrocarbons are found, there is a 5-percent chance that the estimated resources will be found.

The "3.2 BB of recoverable oil resources" in the 12th line should be "3.2 BB conditional mean of recoverable oil resources." The net national economic benefits resulting from development of these recoverable resources are estimated to be from $79.4 billion, based on an oil price of $33 per barrel. In light of the recent decline in per-barrel prices, the net national economic benefits would be about half of $79.4 billion.

Page 1, 6th paragraph--"Exploratory wells" should be "stratigraphic test wells".

Page 4, 2nd paragraph--" . . . . their cubs probably spend more time . . . ." How much more?

Page 4, 6th paragraph--" . . . . are of lesser importance . . . .", to the ecosystem or to humans?

Page 5, 6th paragraph--It is incorrect to say "Federal Lease Sale 71 in 1980 resulted in two discoveries." Sandpiper was the only discovery from this sale. The authors may be referring to the Seal Island discovery which is on Sale BF leases.

Page 8, last paragraph--The "$15 billion" in line 6 is different from that discussed on page 1. An explanation should be provided concerning the method of deriving these estimates.

Chapter II

Page 33, 2nd paragraph--Under "Marine Mammals," humpback whale, fin whale, and hooded seal should be deleted from the sentence that states they are only rarely seen. It is doubtful that they are seen at all in the region.

Page 34, 2nd paragraph--Stoker (1983, cited in Braund et al., 1984) shows seals comprising 11.5 percent of the Kaktovik subsistence diet. This conflicts with information stated in this paragraph.

Page 38--Decreases in NSB revenues, decreases in capital-improvement-projects employment, lack of diversification in community economics, and other factors will probably cause an outmigration as families leave to seek employment. The rate of outmigration will probably be higher than the rate of natural population growth. Many communities will experience net population losses. This analysis should be incorporated under the discussion on population.

Page 39--Under "Subsistence Use," it should be noted that the residents of Nuiqsut also harvest caribou of the central Arctic herd for subsistence uses.

There appear to be omissions in the sociocultural information. The Inupiat culture should be discussed to include such things as social organization, cultural values, and political systems. A discussion of the current sociocultural system is necessary in order to assess changes caused by oil- and gas-related activities within the 1002 area. Because subsistence is the central core of the Inupiat way of life, major effects on subsistence would cause effects on the sociocultural system.

Chapter III

Page 49, 1st paragraph--The marginal probability (MP_{hc}) for these estimates should be given in the text.

Page 49, 4th paragraph--The chance that economically recoverable oil is present is stated as 19 percent, on page 68, while the probability given on this page is 20 percent.

Page 50, Figure III-2--The caption should read "Conditional oil resources of the eight largest prospects in the 1002 area assuming commercial resources exist in each prospect . . . ." Also, the end of the caption has "M, mean." It appears that something is missing. This figure could be misleading to the reader. Marginal probabilities should be provided for individual prospects in the 1002 area.

Page 50, 3rd paragraph--Obviously, these comparsons are valid only if each prospect has commercial resources; therefore, some mention should be made of prospect risk. There is a remote chance of the 5-percent case occurring. The second sentence should read "If oil resources are present in the prospects, there is about a 5-percent chance . . . ." Also, according to Figure III-2, the largest prospect, if productive, has greater than a 5-percent chance of having more resources than Prudhoe Bay, and the second largest prospect has less than a 5-percent chance of having more resources than Prudhoe Bay.

Page 50, Table III-1--The first part of the caption should end with " . . . and elsewhere (unleased lands)." The last sentence in the second part of the caption should read "Data for Outer Continental Shelf resources from Cooke,

1985." Also, there should be a column for the corresponding MP_{hc}; otherwise, the table is somewhat misleading since the planning areas estimates do not compare directly.

Page 51, 2nd paragraph--Should state minimum accumulation size assessed.

Page 52, Figure III-3. Should plot location of the Japo River well drilled by Chevron on Native lands (KIC lands) east of Kaktovik and about 14 miles east of Barter Island. Chevron spudded the well in mid-February 1985 and drilled to below 11,000 feet before suspending operations due to spring ice breakup. Chevron has not released any drilling and testing results, because the well is a "tight hole."

Page 60, Figure III-9--Should plot location of the Jago River well.

Page 61, Table III-2--For prospect 3, it appears that the lowest closing contour should be 14,000 instead of 14.

Page 62, 8th paragraph--It would be extremely useful if the "information on the size, distribution, and numbers of petroleum accumulations" was provided. This information is critical and would be invaluable in making judgments concerning the in-place resource potential.

Page 68, 2nd paragraph--Should read "no current economic interest" instead of "not current economic interest".

Page 68, 3rd paragraph--The chance that economically recoverable oil is present is given as 19 percent while the same probability is shown as "about 20 percent" on page 49.

Page 69, Figures III-17 and III-18--Regarding the mean estimates and pie diagrams for plays 1-7, this is only justified for the risked estimates, but we assume $MP_{hc}=1$ has been used for each play in the calculations.

Page 70, 8th paragraph--Regarding the last two sentences, prospect risk, that is, the probability that the prospect does not contain hydrocarbons as modeled, should be assessed at the threshold. For additional discussion, see R.A. Baker, H.M. Gehman, W.R. James, and D.A. White, "Geologic Field Number and Size Assessments of Oil and Gas Plays," AAPG Bulletin, volume 68, no. 4, pp. 426-437.

Page 70, last paragraph--Area geologic risk should be based solely on the probability of at least one accumulation, as modeled, existing in the area under consideration. Economic risk is handled by the model based on tests of minimum economic field size and presented as a model output.

Page 72, Table III-4--We have compared the constant oil prices generated with those forecasted by the Department of Energy (DOE) for the Annual Energy Outlook 1986 and by Data Resources, Inc. (DRI), in the Autumn Energy Review (1986). All figures are in 1986 dollars. If they were in 1984 dollars, the numbers would be even smaller.

	Oil Prices (1986 dollars)	
	DRI	DOE
1990	17.61	17.84
1995	22.37	26.61
2000	32.73	32.87

Thus, $33 and $40 per barrel are much too high. Also, the inflation figures do not make sense. Generally, the higher the inflation, the higher the oil price; the lower the inflation, the lower the oil price. This document shows a higher inflation rate for the lower oil price and vice versa. As for the discount rate, somewhere in between 0 and 8 percent is more realistic than 10 percent. The use of 10 percent should be justified. Also, the marginal probability of 19 percent differs from 20 percent on page 49.

Chapter IV

Page 84, 2nd paragraph--The discussion under "Oil Spill Contingency, Including Leak Detection" should state the minimum daily leak rate that would not be detected under the automated system.

Chapter V

Page 91, 1st paragraph--The specific boundaries of Alternative B (Limited Leasing) are not adequately presented. Plate 2A is not specific enough. We recommend adding a half-page-size map showing the boundaries of Alternative B at the beginning of the discussion of Alternative B here and on page 132.

Page 91, 1st paragraph--How were these estimates derived? If they were developed by PRESTO, they should have a different MP_{hc} from those on page 49.

Chapter VI

Page 119, 2nd paragraph--Finley and Davis (1984) reports a strong avoidance by beluga whales to icebreaker noise at 35 to 50 kilometers. This is in conflict with the information reported in this paragraph.

Page 119, 3rd and 4th paragraphs--The reports by Fraker and others (1981, 1982) are somewhat outdated. Bowhead whale reaction to closely approaching vessels appears greater than their reaction to any other industrial activities except marine-seismic surveys. Based on sound measurements in the Alaskan Beaufort Sea, Miles et al. (1986) estimate that about 50 percent of bowheads exposed to tug noise would react to the noise at a distance of 2.5-13 kilometers (1.6-8.1 miles) from the source. In the Canadian Beaufort Sea, some bowheads observed in vessel-disturbance experiments began to orient away from an oncoming vessel at a range up to 4 kilometers (2.5 miles) and to move away at increased speeds when approached closer than 2 kilometers (1.2 miles). Closely approaching vessels temporarily disturbed activities and sometimes disrupted

social groups, as groups of whales sometimes scattered when a vessel approached. Generally, bowheads stopped swimming away from a vessel within minutes after the vessel had passed, but scattering persisted for a longer period. Based on these observations, bowheads appeared to be more sensitive to vessel traffic than some other whale species and could be displaced by repeated vessel disturbance (Richardson et al., 1985). Occasional vessel disturbance would not be expected to seriously disrupt or displace the bowhead-migration corridor or cause significant adverse effects on the bowhead population.

Page 125, 2nd paragraph--Arctic char should be analyzed more similarly to grayling, since new U.S. Fish and Wildlife Service research (funded by the MMS) indicates that individual river stocks occur. This finding suggests the separate stock is more vulnerable to local disturbance.

Page 125, 7th paragraph--Docks and causeways are mentioned as potential parts of the scenario at Camden Bay and Pokok port sites; however, only docks are mentioned in Chapter IV. Since the potential effects of causeways on anadromous fishes are not clear--and this is a major issue in the Beaufort Sea--the discussion should be clarified with supporting analysis regarding causeways that may be built. In the last sentence, location should be added to the dependent variables of time, amount, and type of material spilled.

Page 126, last paragraph--Decreases in NSB revenues, decreases in capital improvement-projects employment, lack of diversification in community economics, and other factors will probably cause an outmigration as families leave to seek employment. The rate of outmigration will probably be higher than the rate of natural population growth. Many communities will experience net population losses. This analysis should be incorporated under the discussion on population.

Page 127--There is no analysis of sociocultural effects under "Subsistence Use." If moderate to major effects are anticipated on the CAH, it is unclear how Nuiqsut (not mentioned) would be affected.

Page 129, 3rd paragraph--As stated in the first sentence, development activities could substantially increase employment and cash flow in Kaktovik. It would be useful if a description of these employment opportunities were included. This document states that effects (from employment and cash flow) would be unevenly distributed within the community. However, because of the cultural value of sharing (subsistence food, etc.), these effects would probably be experienced to some degree throughout the community.

Page 130--Reference is made to State and local economic benefits. Depending on what system is used for leasing (i.e., Mineral Leasing Act or separate legislation), the economic benefits would be quite different. Under the Mineral Leasing Act, the State of Alaska currently receives 90 percent of rents, bonuses, and royalties from Federal leases. Under a separate congressional act, leasing of the National Petroleum Reserve-Alaska provides 50 percent of rents, bonuses, or royalties to the State of Alaska.

Page 132, 2nd paragraph--This paragraph repeats the unsubstantiated conclusion of a 20-40 percent reduction in caribou population and distribution cited in our general comment for page 112.

Page 132, 4th and 5th paragraphs--These paragraphs basically repeat the unsubstantiated conclusions on impacts to muskoxen that are described in our general comment for page 113.

Page 138--This document would be strengthened in its analysis under "Effects on Socioeconomic Environment" if specific numbers for population increases and employment estimates were provided. A sociocultural analysis should be included in this section.

Page 142--Under "Biological Resources," effects (due to causeway construction) on planktonic and benthic organisms are discussed. Fish should also be discussed, and a sentence regarding the migration of anadromous fish (i.e., Arctic cisco) should be included.

Page 144, right column, 2nd paragraph--This paragraph basically repeats the erroneous conclusions concerning caribou and muskoxen described previously.

Page 145--There is a summary of recommended mitigation for the 1002 area that includes safety and environmental stipulations applicable to oil and gas exploration, development, production, and transportation on the 1002 area. A stipulation concerning oil spills should be added. On page 84 of this document, there is a discussion on the requirement that oil spill contingency plans include provisions for oil spill control. A stipulation to address concerns of oil spills would enhance a positive leasing program.

Chapter VII

Page 162, Table VII-2--The numbers should be updated.

Page 163, Table VII-3--The finding rates should be updated if available. Additional source information, if available, should be provided.

Page 164, last paragraph--The Federal deficit and import numbers should be updated.

Chapter VIII

Page 169, 6th paragraph.--How were the figures of economic benefits at $8.1 and $14.6 billion developed? There is no explanation of the methodology used for economic benefits. Also, it should be stated that 3.2 BBO are conditional mean estimates.

Beaufort Sea Environmental Studies List

Identification, Documentation and Delineation of Coastal Migratory Bird Habitats in Alaska, Alaska Department of Fish and Game, NOAA/OCSEAP Research Unit Nos. 3/4, September 1980.

Distribution, Abundance, Community Structure and Trophic Relationships of the Nearshore Benthos, University of Alaska, NOAA/OCSEAP Research Unit No. 5, December 1981.

Distribution, Composition, and Variability of Western Beaufort and Northern Chukchi Sea Benthos, Oregon State University, NOAA/OCSEAP Research Unit No. 6, June 1584.

Summarization of Existing Literature and Unpublished Data on Distribution, Abundance, and Life Histories of Benthic Organisms of the Beaufort Sea, Oregon State University, NOAA/OCSEAP Research Unit No. 7, January 1977.

Assessment of Potential Interactions of Micro-organisms and Pollutants Resulting from Petroleum Development on the OCS in the Beaufort Sea, University of Louisville, NOAA/OCSEAP Research Unit No. 29, December 1982.

Analysis of Marine Mammal Remote Sensing Data, Johns Hopkins University, NOAA/OCSEAP Research Unit No. 34, April 1977.

Trace Hydrocarbon Analysis in Previously Studied Matrices and Methods Development for (a) Trace HC Analysis in Sea Ice and at the Sea Ice/Water Interface and (b) Analysis of Individual High Molecular Weight Aromatic HC, National Bureau of Standards, NOAA/OCSEAP Research Unit No. 43, January 1980.

Environmental Assessment of Alaskan Waters - Trace Element Methodology - Inorganic Elements, National Bureau of Standards, NOAA/OCSEAP Research Unit No. 47, May 1977.

Coastal Morphology, Sedimentation, and Oil Spill Vulnerability, RPI, Inc., NOAA/OCSEAP Research Unit No. 59, April 1980.

Migration, Distribution, and Abundance of Bowhead and Beluga Whales in the Arctic Oceans, National Marine Fisheries Service, NOAA/OCSEAP Research Unit Nos. 69/70, October 1981.

Lethal and Sublethal Effects On Selected Alaskan Marine Species After Acute and Long-Term Exposure to Oil, National Marine Fisheries Service, NOAA/OCSEAP Research Unit No. 72, April 1983.

Sublethal Effects of Petroleum as Reflected By Morphological, Chemical, Physiological, Pathological and Behavioral Indices, National Marine Fisheries Service, NOAA/OCSEAP Research Unit No. 73, June 1982.

Identification of Major Processes in Biotransformations of Petroleum HC and Trace Metals, National Marine Fisheries Service, NOAA/OCSEAP Research Unit No. 74, June 1982.

Assessment of Available Literature: Oil Pollution Effects on Biota in Arctic and Subarctic Waters, National Marine Fisheries Service, NOAA/OCSEAP Research Unit No. 75, November 1976.

Beaufort Shelf Surface Currents, United States Coast Guard, NOAA/OCSEAP Research Unit No. 81, April 1977.

Interaction of Oil With Sea Ice in the Beaufort Sea, University of Washington, NOAA/OCSEAP Research Unit No. 87, May 1982.

Dynamics of Nearshore Ice, U.S. Army-CRREL, NOAA/OCSEAP Research Unit No. 88, Ongoing Study.

Current Measurements in Possible Dispersal Regions of the Beaufort Sea, University of Washington, NOAA/OCSEAP Research Unit Nos. 91/151, January 1981.

Dynamics of Nearshore Ice, Flow Research Co., NOAA/OCSEAP Research Unit No. 98, March 1979.

Delineation and Engineering Characteristics of Permafrost Beneath the Arctic Seas, U.S. Army-CRREL, NOAA/OCSEAP Research Unit No. 105, May 1982.

Seasonality and Variability of Streamflow Important to Alaskan Nearshore Coastal Areas, University of Alaska, NOAA/OCSEAP Research Unit No. 111, March 1977.

Natural Distribution of Trace Heavy Metals and Environmental Background in Three Alaskan Shelf Areas, University of Alaska, NOAA/OCSEAP Research Unit No. 162, May 1979.

Shorebird Dependence on Arctic Littoral Habitats, University of California, NOAA/OCSEAP Research Unit No. 172, September 1982.

Study of Microbial Activity and Crude Oil/Microbial Interactions in the Waters and Sediments of Cook Inlet and the Beaufort Sea, Oregon State University, NOAA/OCSEAP Research Unit No. 190, December 1980.

Morbidity and Mortality of Marine Mammals, University of Alaska, NOAA/OCSEAP Research Unit No. 194, December 1980.

Distribution, Abundance, and Feeding Ecology of Birds Associated with Sea Ice, College of the Atlantic, NOAA/OCSEAP Research Unit No. 196, January 1983.

Offshore Permafrost Studies, U.S. Geological Survey, NOAA/OCSEAP Research Unit Nos. 204/473, Ongoing Study.

Geologic Environment of the Chukchi and Beaufort Sea Shelf and Coastal Regions, U.S. Geological Survey, NOAA/OCSEAP Research Unit No. 205, Ongoing Study.

Avifaunal Utilization of the Offshore Islands Near Prudhoe Bay Alaska, University of Alaska, NOAA/OCSEAP Research Unit No. 215, March 1977.

The Natural History and Ecology of the Bearded Seal and the Ringed Seal, Alaska Department of Fish and Game, NOAA/OCSEAP Research Unit No. 230, May 1979.

Trophic Relationships Among Ice Inhabiting Phocid Seals and Functionally Related Marine Mammals in the Arctic, Alaska Department of Fish and Game, NOAA/OCSEAP Research Unit No. 232, February 1982.

Beaufort Sea Estuarine Fishery Study, Alaska Department of Fish and Game, NOAA/OCSEAP Research Unit No. 233, October 1977.

Study of Climatic Effects on Fast-Ice Extent and its Seasonal Decay Along the Beaufort Sea/Chukchi Sea Coasts, University of Colorado, NOAA/OCSEAP Research Unit No. 244, March 1979.

Relationships of Marine Mammal Distributions, Densities, and Activities to Sea Ice Conditions, Alaska Department of Fish and Game/University of Alaska, NOAA/OCSEAP Research Unit Nos. 248/249, June 1980.

Mechanics of Origin of Pressure, Shear Ridges, and Hummock Fields in Landfast Ice, University of Alaska, NOAA/OCSEAP Research Unit No. 250, Ongoing Study.

Subsea Permafrost, Probing, Thermal Regime and Data Analysis, University of Alaska, NOAA/OCSEAP Research Unit No. 253, Ongoing Study.

Morphology of Beaufort, Chukchi, and Bering Seas Nearshore Ice Conditions By Means of Satellite and Aerial Remote Sensing, University of Alaska, NOAA/OCSEAP Research Unit Nos. 257/258, September 1978.

Experimental Measurements of Sea-Ice Failure Stresses Near Grounded Structures, University of Alaska, NOAA/OCSEAP Research Unit No. 259, June 1978.

Baseline Study of Historic Ice Conditions in Bering Strait, Chukchi Sea, and Beaufort Sea, University of Alaska, NOAA/OCSEAP Research Unit No. 261, September 1977.

In Situ Measurements of the Mechanical Properties of Sea Ice, University of Alaska, NOAA/OCSEAP Research Unit No. 265, Ongoing Study.

Operation of an Alaskan Facility for Applications of Remote Sensing Data to OCS Studies, University of Alaska, NOAA/OCSEAP Research Unit No. 267, Ongoing Study.

Arctic Offshore Permafrost Studies, Michigan Technical University/University of Alaska, NOAA/OCSEAP Research Unit Nos. 271/610, September 1982.

Hydrocarbons: Natural Distribution and Dynamics on the Alaskan OCS, University of Alaska, NOAA/OCSEAP Research Unit No. 275, February 1981.

Preparation of Illustrated Keys to Skeletal Remains and Otoliths of Forage Fishes in the Beaufort Sea, University of Alaska, NOAA/OCSEAP Research Unit No. 318, March 1977.

Determine the Frequency and Pathology of Marine Fish Diseases in the Gulf of Alaska, Bering, and Beaufort Seas, National Marine Fisheries Service, NOAA/OCSEAP Research Unit No. 332, January 1980.

Transport of Pollutants in the Vicinity of Prudhoe Bay, Environmental Protection Agency, NOAA/OCSEAP Research Unit No. 335, March 1976.

Seasonal Distribution and Abundance of Marine Birds, U.S. Fish and Wildlife Service, NOAA/OCSEAP Research Unit No. 337, October 1978.

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January 20, 1987

N3615(475)

Memorandum

To: Division of Refuge Management, Fish and Wildlife Service

From: Chief, Air Quality Division

Subject: Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment and Legislative Environmental Impact Statement

The Air Quality Division has reviewed the draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment and Legislative Environmental Impact Statement (LEIS). We offer the following comments.

The discussion of air quality impacts of the proposal is inadequate. Air quality effects are dismissed as minor -- gaseous and particulate emissions which will "temporarily degrade local air quality". No data are included in the LEIS regarding emissions of specific pollutants such as sulfur dioxide, hydrogen sulfide, particulate matter, nitrogen oxides, and volatile organic compounds (the latter two being precursors of ozone). The proposal includes several sources of such pollutants -- either six or seven large central processing facilities, two small central processing facilities, between 30 and 60 permanent drilling pads, diesel engines, motor vehicles, and between 35 and 50 million cubic yards of gravel for construction, operation, and maintenance. There is also no discussion of any mitigating measures to be applied in order to reduce the air pollution from those sources.

The Arctic National Wildlife Refuge is a class II clean air area. The Clean Air Act has established increments for sulfur dioxide and particulate matter which cannot be exceeded once baselines have been established for those pollutants. Those baselines may have been established through monitoring data obtained from the energy related activities at Prudhoe Bay.

The final LEIS should be revised to include a more detailed air quality analysis. Monitoring and modeling data should be used to calculate existing background air pollutant concentrations and to determine the potential additional impacts of emissions resulting from the proposal and all alternatives. The analysis should also include a discussion of the possible impacts of the air pollution on the physical environment, including in particular, impacts on sensitive plant and animal species. In addition, the analysis should include a discussion of the mitigating measures to be applied to reduce or eliminate air pollution.

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We hope these comments will be helpful to you in preparing the final document. If you have any questions regarding our comments, or would like additional information, please contact me at FTS 776-8765.

John P. Christiano

United States Department of the Interior

NATIONAL PARK SERVICE
P.O. BOX 37127
WASHINGTON, D.C. 20013-7127

IN REPLY REFER TO:
L7617(762)

FEB 4 1987

Memorandum

To: Director, U. S. Fish and Wildlife Service
Attention: Noreen Clough

From: Associate Director, Planning and Development

Subject: Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment (DES 86/0045)

In response to your November 24, 1986, memorandum, we have reviewed the subject assessment and have the following comments.

We recommend the following changes and additions to subject assessment. Our recommended changes to the draft text are underlined.

F-81

1. Executive Summary, Vegetation and Terrain Types, p. 3; change second sentence of last paragraph to:

> located in the foothills in the southern part of the 1002 area, the spring and its surrounding area of approximately 640 acres have been identified as a potential National Natural Landmark.

2. Chapter II ("Existing Environment"), Biological Environment, Sadlerochit Spring Special Area, p. 25; change the first three sentences of the first paragraph to:

> Sadlerochit Spring and its surrounding area (approximately 640 acres), in the southern part of the 1002 area, west of the Sadlerochit River pl. 1A) have been identified as a potential National Natural Landmark (Detterman, 1974; see also Bliss and Gustafson, 1981). The National Natural Landmarks Program was established to encourage the preservation of natural areas illustrating the diverse geological and ecological character of the United States. Areas qualifying as National Natural Landmarks must constitute best examples of natural communities or geologic features characterizing one of the 33 physiographic provinces composing the Nation, and should be relatively free of human disturbance; designation of a site as a National Natural Landmark does not affect its ownership, management, or use, however.

3. Chapter II ("Existing Environment"), Biological Environment, Coastal and Marine Environment, p. 27; add the following new paragraph at the end of the Section:

> In the northeasternmost corner of the 1002 section, the 133,729-acre Kongakut River-Beaufort Lagoon area was identified as a potential National Natural Landmark, because it contains: (1) a unique offshore bar and lagoon ecosystem which supports a relatively diverse marine biota and terrestrial biota using the area for nesting and migration rests; and (2) an arctic river which flows from the mountain front and enters the lagoon ecosystem, perpetuating the unique marine conditions of freshwater throughout most of the summer, and the presence of spruce trees in the upper course of the river, accompanied by elements of the boreal flora (Koranda and Evans, 1975). In addition, nearby Angun Plains was identified as a potential National Natural Landmark, as a good example of glacial gravel outwash plains found near the areas of maximum Pleistocene glaciation (Detterman, 1974).

4. Chapter VI ("Environment Consequences"), References Cited for Biological Environment (Chapters II and VI), pp. 152 and 155; add:

> Detterman, R. L., 1974, The Arctic Lowland Region: Potential lifeform and lifeform natural landmarks: report prepared for the National Park Service by the U.S. Geological Survey, 418 p.
>
> Koranda, J. J., and Evans, C. D., 1975, A discussion of sites recommended as potential natural landmarks in the Arctic Lowland Natural Region, northern Alaska: report prepared for the National Park Service by the Tundra Biome Center, University of Alaska, Fairbanks, Alaska, 189 p.

In addition, we have attached a list of all potential National Natural Landmarks located in the entire Arctic National Wildlife Refuge. No sites have yet been designated within the refuge.

Attachment

Potential National Natural Landmarks in Arctic National Wildlife Refuge, Alaska

Site Name	Acres	USGS Quadrangle	Theme Study	Evaluation Rept.	Other Eval.
*Angun Plains	23,040	Demarcation Pt.	Detterman (3C)	Murray, 1979 (+)	HCRS, 1979 (-)
*Beaufort Lagoon - Clarence Fan	337,560	Demarcation Pt.	Composite	Murray, 1979 (+)	
*Beaufort Lagoon - Demarcation Bay	171,800	Demarcation Pt.	Composite		HCRS, 1979 (+)
Black Island	520	Canning River/ Mt. Michelson	Detterman (2B)		
Clarence Fan Plain	33,750 42,000	Demarcation Pt. Demarcation Pt.	Detterman (1B) Enlargement		HCRS, 1979 (+)
Demarcation Bay	18,140	Demarcation Pt.	Detterman (3B)		
Fire Creek	520 550	Mt. Michelson Mt. Michelson	Detterman (1C) Enlargement	Murray, 1979 (+)	
*Icy Reef - Beaufort L.	11,220	Demarcation Pt.	Detterman (1B)		
Ignek Creek	400	Mt. Michelson	Detterman (1C)	Murray, 1979 (-)	HCRS, 1979 (-)
Ignek Mesa	1,600	Mt. Michelson	Detterman (1C)	Murray, 1979 (+)	
Jago Valley	23,200	Demarcation Bay	Detterman (1C)	Murray, 1979 (+)	HCRS, 1979 (-)
Katakturuk Fold	6,820	Mt. Michelson	Detterman (4)		
Katakturuk Plateau Katakturuk Plateau and Canyon	32,000 41,000	Mt. Michelson Mt. Michelson	Detterman (2C) Enlargement	Murray, 1979 (+)	
*Kongakut River - Beaufort Lagoon	133,729	Demarcation Pt.	Koranda/Evans (1A)		

*Located in the Arctic Refuge coastal plain, as defined by Section 1002 of ANILCA.

Potential National Natural Landmarks located in the Arctic Refuge coastal plain of Arctic National Wildlife Refuge, as defined by Section 1002 of ANILCA.

Site Name	Acres	USGS Quadrangle	Theme Study	Evaluation Rept.	Other Eval.
Angun Plains	23,040	Demarcation Pt.	Detterman (3C)	Murray, 1979 (+)	HCRS, 1979 (-)
Beaufort Lagoon - Clarence Fan	337,560	Demarcation Pt.	Composite	Murray, 1979 (+)	
Beaufort Lagoon - Demarcation Bay	171,800	Demarcation Pt.	Composite		HCRS, 1979 (+)
?Icy Reef - Beaufort L.	11,220	Demarcation Pt.	Detterman (1B)		
Kongakut River - Beaufort Lagoon	133,729	Demarcation Pt.	Koranda/Evans (1A)		
Sadlerochit Mountains and Warm Springs	230,400	Mt. Michelson	Bliss/Gustaf. (1C)		
Sadlerochit Springs	640	Mt. Michelson	Detterman (2C)	Murray, 1979 (+)	HCRS, 1979 (+)

Key

Bliss/Gustaf. - Lawrence C. Bliss and Karen M. Gustafson, "Proposed Ecological Natural Landmarks in the Brooks Range, Alaska," National Park Service, March 1981.

Canning River - U. S. Geological Survey topographic quadrangle, 1:250,000 series.

Dean - Dr. Frederick C. Dean, University of Alaska

Demarcation Bay - U. S. Geological Survey topographic quadrangle, 1:250,000 series.

Demarcation Pt. - U. S. Geological Survey topographic quadrangle, 1:250,000 series.

Detterman - Robert L. Detterman , "The Arctic Lowland Region: Potential Landform and Lifeform Natural Landmarks," U. S. Geological Survey, November 1974.

HCRS, 1979 - Backlog review of potential natural landmarks by the Heritage Conservation and Recreation Service staff in the spring of 1979.

Koranda/Evans - John J. Koranda and Charles D. Evans, "A Discussion of Sites Recommended as Potential Natural Landmarks in the Arctic Lowland, Natural Region, Northern Alaska, Tundra Biome Center, University of Alaska, Fairbanks, Alaska, April 1975.

Lent - Dr. Peter C. Lent, Assistant Leader, Alaska Cooperative Wildlife Research Unit.

Mt. Michelson - U. S. Geological Survey topographic quadrangle, 1:250,000 series.

Murray - Dr. David F. Murray, Professor of Botany, Institute of Arctic Biology, University of Alaska, Fairbanks, Alaska.

(+) indicates positive recommendation
(-) indicates negative recommendation

The significance and protection status of theme study sites are rated according to the following scheme:

Priority 1 - High degree of national significance; recommended without reservation.
Priority 2 - Definitely eligible and recommended, but not quite as good as Priority 1.
Priority 3 - A good site, but not quite nationally significant.
Priority 4 - Not recommended.

Priority A - Site in serious impending danger.
Priority B - Site in some jeopardy.
Priority C - Site in no apparent danger.
Priority D - Relative jeopardy unknown.

Comments from State and Local Governments (S)

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February 6, 1987

Mr. Robert Gilmore
Regional Director
U.S. Department of the Interior
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, AK 99503

FEB 6 1987

Dear Mr. Gilmore:

The state has reviewed the Draft Arctic National Wildlife Refuge (ANWR), Alaska, Coastal Plain Resource Assessment 1002(h) Report. We appreciate the additional time granted the state to review this important report. Based on our review of the substantial amount of information contained in the draft 1002(h) report, we strongly support the conclusion that oil and gas exploration be allowed in ANWR consistent with the chief purpose of the refuge to preserve its unique wildlife values.

The State of Alaska recommends that Congress immediately open the 1002 area to oil and gas leasing, with the exception of the area described by U.S. Fish and Wildlife Service (USFWS) as the "core" caribou calving area. The state strongly recommends that leasing in the "core" calving area be deferred for a ten-year period. During this ten-year period, the Department of the Interior (DOI) should establish an ANWR Caribou Impact Assessment Study Group composed of federal, state, university, and private researchers to further study the potential impacts of oil and gas activities in the calving area on the Porcupine Caribou Herd. The study should be conducted over a seven-year period following commencement of the first exploratory well and result in a report to the Secretary of the Interior and Governor of Alaska. The report would seek to document the biological importance of the core calving area, the effects of oil and gas activities in the 1002 area on the Porcupine Caribou Herd, and the effectiveness of mitigation measures employed in the 1002 area to minimize adverse impacts to caribou. Based on the report findings, the Governor and Secretary would recommend to Congress to extend the deferral or open the core calving area to oil and gas leasing. If

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Congress failed to act on the recommendations within the ten-year period, the recommendation of the Secretary and Governor would be implemented.

It is imperative that the recommendations from the Governor of Alaska be included with those of the Secretary of the Interior given the significant interests of the state involved in both the leasing and protection of resources in the 1002 area. Not only is the state a sovereign steward of natural resources with regulatory responsibilities in the area, it is the principle owner of lands which any ANWR production transportation system must cross.

This recommendation is based on several salient facts. First, Congress has mandated that fish and wildlife populations in ANWR receive a very high level of protection. Because of this mandate, USFWS is required to take a conservative approach when making decisions regarding the impact of development activity on the refuge's fish and wildlife populations. Second, while a sizable amount of information has been collected on the impact of oil and gas activity on the Central Arctic Caribou Herd, questions remain regarding the potential impact of the oil and gas activity on the Porcupine Caribou Herd population because of its larger size, distribution and movement patterns, and population dynamics. Contrary to the statements made on page 112 of the draft 1002(h) report, at this point in time there is inadequate information to predict what population impacts would occur if oil and gas development were to take place in the core calving area. Third, protection of the herd and its habitat is of great concern to our Canadian neighbors, and the deferral and studies will respect those concerns.

Special Values of ANWR

We predicated our review on two fundamental facts inherent to ANWR. First, the fish and wildlife resources of ANWR are of significant state, national, and international importance. The Porcupine Caribou Herd, which numbers some 180,000 animals, annually migrates between Canada's Northwest Territories and Alaska's arctic coastal plain where it spends a portion of each summer. These animals are of great importance to both the people of Alaska and Canada. The Porcupine Caribou Herd and other fish and wildlife of the ANWR coastal plain are the foundation of the subsistence way of life to the residents of Kaktovik, Arctic Village, Venetie, and Fort Yukon in Alaska and Old Crow in the Yukon Territory of Canada. Furthermore, within the refuge, "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge." (Draft 1002(h) report, page 46.) The Alaska Department of Fish and Game has conducted an extensive review of ANWR fish and wildlife information which is available on request to USFWS

and other interested parties. The department's data on distribution and abundance of fish and wildlife and areas of special concern confirm the great importance of ANWR's renewable resource base.

The second intrinsic feature of ANWR is that it has high oil and gas potential. The state concurs with the draft 1002(h) report findings on page 1 that the 1002 area, ". . . is clearly the most outstanding oil and gas frontier remaining in the United States, and could contribute substantially to domestic energy supplies." As you know, the Alaska Department of Natural Resources has recently made public a preliminary appraisal it conducted of petroleum resource potential in ANWR's coastal plain. Alaska's report confirms DOI's conclusion that ANWR's coastal plain has the potential for an unusually large accumulation of oil.

Past Lessons Learned from Oil and Gas Activities in Alaska

As indicated in the draft 1002(h) report, development of ANWR's coastal plain will alter the existing environment and to some degree affect the Porcupine Caribou Herd. It is critical that appropriate and effective measures be taken to minimize the potential adverse effects of oil and gas activities on ANWR's coastal plain. Alaska has nearly two decades of experience in dealing with oil exploration, and lessons of the past will serve as a guideline for development in the future. In the event Congress permits exploration, the state would encourage that the best and latest technology be used.

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The state assumes the draft 1002(h) report was not intended to be all inclusive, and that more detailed performance standards would be developed in concert with the state prior to any lease sales or any transfer of subsurface rights. Clearly, additional time will be needed in order to develop an adequate set of terms and conditions designed to ensure protection of air and water quality and fish and wildlife resources. With this understanding, our general comments on the proposed mitigation measures summarized in the draft 1002(h) report are included in Enclosure A.

Federal/State Consultation and Resolution of Issues

The state is encouraged to read on page 97 of the 1002(h) report that "The FWS would emphasize early and continuous consultation and coordination with leaseholders, permittees, and state and federal agencies at the start of planning." Consistent with this federal intent, the state feels it is essential that DOI establish a formal consultation process with the state and other parties in order to clearly establish at what points in the process and what level of detail different issues and authorities will be addressed. This process would also allow the opportunity for the parties to clarify their respective authorities,

permitting, and field procedures to avoid duplication or conflicting efforts. These consultations should identify or acknowledge existing regulatory requirements and authorizations at federal, state, and local levels. At a minimum, it should address different agencies' review times and public notice requirements. Issues that should be addressed are the timing of the various phases of review for specific projects; the level of detail to be addressed at each; and the coordination of permitting, review of plans of operations, field surveillance, and field approvals. Experiences associated with the development of the Trans-Alaska Pipeline System (TAPS) and the proposed Alaska Natural Gas Transportation System (ANGTS) from Prudhoe Bay to the Canadian border could provide useful models for cooperative management programs.

A coordinated interagency process for planning, design review, permitting, field surveillance, compliance and enforcement, and reclamation would serve the state, DOI, and industry well. The state's existing coastal management consistency process as well as the jurisdiction of state agencies such as the Departments of Fish and Game, Environmental Conservation, Natural Resources and the Alaska Oil and Gas Conservation Commission need to be acknowledged and effectively implemented in the review and permitting of each stage of the overall project. Lack of sufficient and effective coordination could lead to each agency dealing independently with applicants and could result in permitting inefficiencies with duplicative and inconsistent compliance and enforcement actions.

Topics Needing Further Discussion in the Final 1002(h) Report

Overall, the State finds that USFWS did an excellent job in compiling and summarizing a large amount of biological and geological information in the draft 1002(h) report. Considerably more work needs to be directed to the following eight issues of major importance to the state.

1. Standards for Air and Water Quality Protection

The draft 1002(h) document focuses primarily on a discussion of habitat and wildlife issues and petroleum potential. The document is considerably weaker with respect to air, land, and water quality issues. DOI must acknowledge and accurately reflect in the final 1002(h) report state authority in this area and the body of regulations and requirements associated with sound environmental practices. A list of pertinent state authorities is included in Enclosure B for your reference.

a) Air Quality Management

Particular attention should be paid to emissions associated with start-up and upset flaring, emissions of nitrogen oxides, and the best available technology review process associated with "prevention of significant deterioration" review.

b) Drilling Wastes and Solid Waste Management

Major waste streams include garbage, drilling wastes, metal wastes, and oily wastes. Our experiences on the north slope verify that it is very important that proper management of all these wastes be addressed from the beginning.

Drilling wastes are of particular concern. Improper management of drilling wastes can result in the contamination of adjacent habitats with potential negative effects to the vegetation and fish and wildlife species. Management of drilling wastes should involve development of best practices to minimize waste generation and to ensure total containment or injection of all produced wastes. Best practices should be based in part on a thorough evaluation of the effectiveness of past practices of drilling waste disposal in Alaska. Recent efforts by the Alaska Department of Environmental Conservation to develop a workable set of regulations governing these activities are nearing completion and should be viewed as the framework for developing specific requirements. In addition, the U.S. Environmental Protection Agency is currently studying the issue of proper drilling waste disposal and should soon have a report available.

Provisions for pickup of windblown litter and other debris must be addressed by stipulation. Early planning for sound disposal of each waste stream will lead to the best environmental results.

c) Liquid Waste Management

Possible liquid waste discharges include domestic wastewater, reserve pit fluids, produced water discharges, hydrostatic test discharges, vessel rinsates and radiographic wastes. Each needs to be identified and provisions made for proper disposal. The existing local, state and federal regulatory structure, ranging from plan review to the use of the best practicable technology, needs to be addressed. Reinjection of produced waters and non Resource Conservation and Recovery Act (RCRA) regulated liquid wastes is routinely practiced on state lands on the north slope.

d) Hazardous Waste Management

No discussion of hazardous waste management is included in the draft 1002(h) report. Hazardous waste management is governed by stringent requirements under the federal RCRA. Transportation of hazardous materials is regulated by the federal Department of Transportation. Proper management must be addressed.

e) Oil Spill Prevention and Response

The draft 1002(h) report refers to the need to address oil spill control requirements at page 84. More detailed plans will be required under the cited state and federal statutes. Provision for a coordinated response capability should be provided by stipulation.

2. Provisions for Offshore Support Facilities

It is important that the final 1002(h) report and management alternatives address the siting in ANWR of oil and gas facilities needed to support offshore oil and gas development occurring adjacent to ANWR on state-owned submerged lands and on the federal Outer Continental Shelf. As written, none of the alternatives specifically state that support facilities, if needed, would be permitted.

3. Alternative Development and Transportation Scenarios

Statements in the draft 1002(h) report refer to a transportation corridor (road and pipeline) between ANWR and TAPS Pump Station 1 in Prudhoe Bay. The state recognizes that the scenario which was analyzed is only one of many potential alternatives. The actual alignment of transportation facilities if, in fact, discoveries are made and any facilities are required, will be dependent upon many factors including the location and size of any reserves discovered, the need to accommodate delivery of any additional nearby reserves, terrain constraints, habitat considerations, and project economics. We suggest that the final report reflect the interrelationship of these factors in determing the size and location of needed transportation facilities. In addition, we suggest that the report describe the level of any review that will proceed these decisions. Interagency and public reviews of TAPS and ANGTS projects provide a good model of the scope of analysis which accompanies the review and approval of a major transportation project.

4. Subsistence ANILCA 810 Analysis

The draft 1002(h) report does not address the process by which the impacts of oil and gas development on subsistence activities will be identified and mitigated. Such an analysis is required by Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA).

Impacts of oil and gas activity in the 1002 area on fish and wildlife resources can adversely affect human uses of these resources. This is true both in the 1002 area and in other Canadian and Alaskan communities that rely on wildlife which use the 1002 area, most notably the Porcupine Caribou Herd. The draft 1002(h) report does not present a complete picture of subsistence uses in the area. The discussion focuses principally on subsistence uses in the community of Kaktovik, and makes only passing reference to some but not all other communities that use the Porcupine Caribou Herd. A more comprehensive discussion of subsistence uses by communities that use Porcupine Caribou Herd is required in order to better assess the future impacts of development in the coastal plain. The potential impacts associated with oil and gas exploration and development in the 1002 area, like the siting and design of transportation facilities, cannot be addressed with certainty until exploration has confirmed the existence and location of potential oil and gas fields and some understanding of the scope of development is known. Enclosure C describes the basic requirements of ANILCA 810, and provides a recommended approach for meeting these requirements.

5. Water Availability and Use

The draft 1002(h) report correctly notes that water resources in the 1002 area are very limited and confined to the surface. Most of these water sources freeze solid by late winter. Given the paucity of fresh water for industrial use within the 1002 area, the draft report concludes that adjacent marine waters must be viewed as a water resource. Little attention is given to other alternatives used elsewhere on the north slope, such as snow melters and deep thaw lake reservoirs.

Fresh water for use in the Prudhoe Bay oilfield was taken from the Sagavanirktok River adjacent to the Deadhorse industrial area during the early years of that field's development. This removal of water from the Sagavanirktok River resulted in dewatering of fish overwintering habitats with documented mortality of large numbers of fish. As a consequence, the state no longer allows the use of water from this and similar sources. Currently, in order to provide fresh water for industrial uses in the Prudhoe Bay area, the state requires the use of several large surface

water reservoirs that have been developed. The majority of these reservoir sites are depleted deep gravel mine sites that have been flooded with surface water. Other sites are shallow tundra lakes that have been deepened to provide winter water supplies. These water reservoirs are filled either passively or actively from nearby drainages during the spring breakup period and are, in general, isolated from river and stream systems during the remainder of the year. DOI should initiate a more thorough analysis of similar alternatives for industrial water use in the 1002 area.

6. Gravel Use

Gravel sites in ANWR should be sited, developed, and reclaimed in such a manner that overall impacts to water quality and fish and wildlife resources are mitigated. Plans for gravel removal should include detailed plans for the reclamation of the site to be conducted in phases concurrent with the removal of gravel. Gravel sites may also be developed in such a manner that they can be used as water sources for both exploration and development.

7. Disputed Acreage

Although the draft report references the submerged lands ownership dispute between the state and federal government regarding the coastal lagoons between the mainland and offshore barrier islands, it does not address the ownership status of the beds of nontidal navigable waters. The state asserts ownership of the submerged lands underlying the Aichilik, Jago, Okpilak, Hulahula, Salerochit, Staines, and Canning rivers within the 1002 area.

8. Decision Rules and Mitigation Policy

The terms "avoidable adverse impacts" and "unnecessary adverse effects" are not defined and do not appear in USFWS Mitigation Policy (Federal Register, Vol. 46, No. 15). Adding further to the confusion is a list of "unavoidable effects" on page 101 that includes a mix of those that are truely unavoidable (e.g., loss of habitat by gravel overlay for roads and pads) with many that are avoidable with proper design (e.g., erosion and ponding along roads, water storage pits in streambeds).

There also appear to be discrepancies between the explanation regarding Resource Category 1 and 2 in the draft 1002(h) report and the explanation for both of these categories in the federal mitigation policy regulations. Further, the draft 1002(h) report makes no mention of the requirement for "no significant adverse affect" as provided

under Section 1002(h) of ANILCA. DOI should address these apparent inconsistencies with USFWS mitigation policy in the final 1002(h) report.

As discussed earlier in our comments, the Alaska Coastal Management Program standards and review procedures need to be addressed in the final 1002(h) report. In particular, reference should be made to the Habitat Standard (6 AAC 80.130) which requires habitats to be managed so as to maintain or enhance their characteristics and that uses and activities which will not conform to this standard may be allowed if there is a significant public need and there is no feasible and prudent alternative to meet the public need.

Conclusion

Recognizing the important renewable and nonrenewable resource values found in ANWR, the state fully supports the opening of the coastal plain to oil and gas leasing subject to appropriate and effective mitigation based on our firm belief that exploration, development, and production can occur in a manner consistent with the established purposes of ANWR. We look forward to reviewing the final 1002(h) report and actively pursuing a joint consultation process in the near future to resolve specific aspects of concern to the State of Alaska.

Sincerely,

Robert L. Grogan
Director

Enclosure

cc: Lieutenant Governor Steve McAlpine
Commissioner Don Collinsworth, DFG, Juneau
Commissioner Judy Brady, DNR, Juneau
Commissioner Dennis Kelso, DEC, Juneau
John Katz, Office of the Governor, Washington DC
Rod Swope, Office of the Governor, Juneau
Mayor George Ahmaogak, North Slope Borough, Barrow
Mayor Loren Ahlers, Kaktovik

bcc's continue:

Bob Arnold, DNR, Juneau
Tom Hawkins, DNR, Anchorage
Jim Eason, DNR, Anchorage
Bob Butts, DNR, Juneau
Gary Gustafson, DNR, Anchorage
Norman Cohen, DFG, Juneau
Bruce Baker, DFG, Juneau
Al Ott, DFG, Fairbanks
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Bob Martin, DEC, Juneau
Mike Wheeler, DEC, Anchorage

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ENCLOSURE A
State Comments on Summary of Recommended
Mitigation for the 1002 Area

The following comments are provided within the context of the federally proposed stipulation package summarized on pages 145-147 of the draft 1002(h) report. Our comments represent the state's position in response to the specific federal proposal and do not represent the state's total concern regarding mitigation requirements. The state reserves the right to comment further on stipulations not yet included or discussed with DOI. In addition to the following major comments on the specific stipulations, there are a number of terms and conditions which should be added.

First, there are mitigative measures for certain "non evaluation" species mentioned in the species discussions in the "Environmental Consequences" chapter of the draft 1002(h) report that are not contained in the summary section. These mitigative measures should be added to the summary section. Second, there are a number of factors which are either not addressed or not handled in sufficient detail in order to provide for an overall effective mitigation program. Examples include the following: coordinated state/federal process for design review, permitting, field surveillance, compliance, and enforcement; rehabilitation; maintenance of public fish and wildlife resource use; material exploration, extraction, and rehabilitation; solid waste management; timing restrictions on activities, and setbacks required for the use of explosives; liquid waste management; hazardous waste management; stream crossings and fish passage; water management; bonding and financial responsibility; right of access; erosion control; oil spill contingency planning; penalty provisions for non-compliance; definitions of key terms; identification of information needs; design criteria and compliance plans; quality assurance/quality control; air quality; and support service industries. These subjects need to be addressed in a comprehensive manner and appropriate mitigative measures described.

In addition, the DOI stipulations do not clearly differentiate between stipulations or restrictions applied to exploration versus development. The state suggests that the DOI reorganize the entire mitigation section into two distinct components: exploration, and development. Implementation of the stipulations should be tied to the type of activity proposed. Stipulations referring to area specific closures may be effective forms of mitigation during exploratory activities but may be ineffective or inappropriate during development. For example, the stipulation on no activity within 1/2 mile of a documented polar bear den could be useful and effective during exploration, but it is unclear how it would be implemented during development when facilities are fixed and certain activity levels are required. There are other stipulations that fall into a similar category

and clarification is needed in order to interpret how and when they will be used and implemented.

Stipulation 1 - Sensitive Habitats and Species:

As written it is unclear how this stipulation would be enforced. DOI should define what is included in the term "non essential facilities."

Stipulation 2 - Road and Drainage Designs:

Roads and other facilities should be designed, constructed, and maintained in such a manner that the following performance standards are achieved: natural drainage is maintained; free passage of fish is provided; gravel fills are stable; upslope ponding and downslope dewatering is prevented; the number of stream crossings is minimized; natural floodplains and flow patterns are maintained; spring areas are avoided; and road alignments are perpendicular to stream flows and sited in areas of minimal floodplain width. Design criteria and specifications to satisfy these performance standards should be developed by the industry and should be approved by the appropriate federal and state agencies.

Stipulation 3 - Exploration Pad Construction:

The state strongly supports the objective of this stipulation to minimize gravel requirements for exploration activities.

Stipulation 4 - Rehabilitation Plan:

The need for rehabilitation plans is clear, but the timing of their submittal and definition of measures necessary to ensure that they will be implemented needs further consideration. Separate rehabilitation plans for exploration and development, including abandonment should be required. Also, requirements for conducting necessary research to develop techniques and measures for the rehabilitation of specific sites (e.g., gravel pads, seismic lines, material sites, etc.) should be addressed.

Stipulation 5 - Off-Road vehicles:

Should be modified to prohibit off-road vehicle use, except for travel by snowmachines, unless otherwise specifically permitted.

Stipulation 6 - Limits on Oil Exploration:

While we agree in principle with this stipulation, as written it may be too restrictive. Exploration includes both surface disturbing and non surface disturbing activities. The stipulation should limit any surface disturbance activities to the winter months and allow only non surface disturbing activities during the summer, provided there are no area or timing restrictions that would dictate otherwise.

Stipulation 7 - Gravel and Water Removal:

The state recommends that DOI address gravel removal and water removal separately. In addition, DOI should prohibit winter water removal from fish-bearing waters, springs and tributaries. We also recommend that DOI modify summer/fall water removal language to read: "During summer and fall, water removal shall be restricted to those operations that will maintain instream flows at levels necessary to provide optimum fish passage and rearing habitat, and water quality. In addition, large surface water reservoirs should be created to provide an adequate supply of fresh water for oil and gas related industrial activity." Deep pit type excavations adjacent to active channels of the streams identified as lacking suitable fish overwintering habitat could provide a winter water source and provide overwintering fish habitat. These reservoir sites should incorporate features that will enhance their value as fish and wildlife habitat (e.g., areas of shallow water, varying shoreline, provide for free movement of fish in and out of sites).

With respect to gravel removal, prohibit removal in all fall spawning fish and overwintering areas. Additionally, prohibit gravel removal from all fish-bearing rivers/streams unless approved on site-specific basis. Plans for gravel removal should include detailed plans for the rehabilitation

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of the site and rehabilitation must be conducted in phases concurrent with the removal of gravel. The importance of rehabilitation cannot be overemphasized. At a minimum, any gravel site, whether upland and/or floodplain, should be sited and designed to conform to the guidelines as defined in the Gravel Removal Guidelines Manual for Arctic and Subarctic Floodplains (USFWS, Woodward-Clyde Consultants, 1980).

Stipulation 8 - Pipeline Elevation:

We recommend this stipulation be modified by adding a general statement of intent and then incorporate stipulations 8 thru 11 under that statement, and add an additional item regarding traffic control. Suggested language is as follows:

(a) Include language as proposed in stipulation No. 9.

(b) Include language as proposed in stipulation No. 10 except pipelines should be buried where "feasible and prudent" not just where "possible."

(c) Roads and pipelines should be separated. Offset distances shall be optimum for preventing the synergistic effect of roads and pipelines on caribou movement, based on most current relevant research.

(d) A surface traffic control plan should be prepared, approved by the Regional Director, and implemented. The plan should consider such measures as convoying, pulsed traffic, and seasonal or daily restrictions.

Stipulation 12 - Restrict Surface Occupancy within 3 Miles of Coastline:

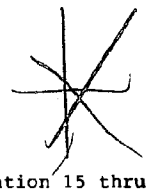
The blanket 3-mile buffer for facilities adjacent to the coast is too stringent as written. Provisions must be made to allow drill pads, flow stations, and other

essential support facilities for offshore development, in this buffer strip. In addition, measures must be taken to ensure free passage of caribou along the coast. Criteria must be established to determine which facilities will be allowed in the buffer area.

Stipulation 13 - Monitoring and Research Requirements:

Modify to make two separate terms. One that states: "The DOI should be responsible for ensuring appropriate monitoring of populations, productivity, movements, and general health of key species in relation to overall oil and gas activities in ANWR." Then add a separate requirement to read: Where there is a possibility that an activity could adversely affect fish and wildlife, "Lessees and permittees may be required to monitor the impacts of the activity on selected species, their habitats, and human uses; to evaluate impact hypotheses and the effectiveness of specific mitigation measures employed; and to develop corrective actions, including improved mitigative techniques, as necessary."

Stipulation 14 - Watercourse Setbacks:



The blanket 3/4-mile buffer for all permanent facilities is too stringent as written. Provisions must be made to allow drill pads, flow stations, and other essential facilities within this 3/4-mile buffer. Criteria must be established to determine which facilities will be allowed in the buffer area.

Stipulation 15 thru 18 - Peregrine Falcon and other Raptors Protection:

The state concurs with the need for special protection for the peregrine falcon, however, stipulations should be modified to incorporate language developed by the federal peregrine falcon recovery team. In addition, the same level of protection provided to the endangered peregrine falcon should not be provided to all raptors.

Stipulation 19 - Polar Bears:

This stipulation should be expanded to require an annual fall monitoring program to follow bears moving ashore and identify den site locations.

Stipulation 20 - Construction Near Coastal Bluffs:

Support language as proposed.

Stipulation 21 - Discharge of Firearms:

Restrictions on the discharge of firearms in the vicinity of structures is necessary to protect human safety and oil field operations, however, the five-mile prohibition may be excessive. Further discussion is needed on the subject and the potential effects on human use of resources in the 1002 area.

Stipulation 22 - Prohibit Surface Occupancy in Sadlerochit Spring Special Area:

In addition to the Sadlerochit Spring Special Area, surface occupancy should be prohibited in the area within 1/2 mile of the Fish Hole No. 1 spring outlet located in the Hulahula River, and extend for 1/4 mile on either side of mean high water for a distance of 3 miles downstream of the outlet.

Stipulation 23 - Protection of Thaspi arcticum:

It is not known how widespread this plant is, so it is impossible to determine how large an area will be placed off limits by this stipulation. Until the plant is placed on the endangered species list and more is known regarding its areal extent, it is premature to impose such a restriction.

Stipulation 24 - Causeways:

Based on the state's case-by-case review and experience in authorizing the Westdock, Endicott and Lisburne causeways, we recommend that the proposed stipulation be revised such that the construction of docks and causeways *minimize nearshore hydrographic changes* and avoid significant adverse effects on fish populations and movements.

Stipulation 25 - Time and Area Closures for Wildlife:

Although the state generally supports the language as proposed, it should be made clear that the stipulation applies only to exploratory activities, vehicle movements, and other activities that can reasonably be rescheduled for another period of time.

Stipulation 26 - Overflight Restrictions:

Expand to include aircraft overflight restriction above barrier islands, lagoons, river deltas, and wetlands within one mile of coast between May 15 and September 30 (excluding take-offs and landings). Also make clear that human safety takes precedence over the restrictions.

Stipulation 27 - Reduction of Human/Bear Conflicts:

Modify to read, "Measures must be taken to minimize human/bear interaction and conflict. These measures may include, but not be limited to, the use of bear-proof fencing around certain facilities, special solid waste management plans (such as incineration of putrescible wastes), and employee education programs."

Stipulation 28 - Limit Use of Infrastructure to Official Business:

Support language as proposed.

Stipulation 29 - Inventory Areas for Cultural Resources:

Support language as proposed.

Stipulation 30 and 31 - Air and Water Quality Provisions:

As discussed in our cover letter, the proposed stipulations represent a very small step toward defining what will be needed to provide an appropriate level of air and water quality protection as leasing moves forward. Further consultation between DOI and the state is needed on this subject to jointly develop a workable package of specific measures. Such a process would better acquaint DOI with the extensive body of environmental regulation and provide appropriate forums for decisions about stipulations, plans of operations, and permits. It is crucial to ensure that exploration and

development is conducted in accordance with environmental standards appropriate for the coastal plain of ANWR.

Stipulation 32 - Environmental Orientation Programs:

Support the language as proposed.

Enclosure A/kfi

	Type of Waste	Statutes	Definitions	Regulations	Definitions
4)	OIL and HAZARDOUS SUBSTANCES*	AS 46.03.740 758-760 780-790 822-826 AS 46.04		18 AAC 20 18 AAC 75	
	Oil		AS 46.03.758(6) AS 46.03.826(4) AS 46.04-120(9) AS 46.08.900(7)		
	Hazardous Substances	AS 46.03.826(3)	AS 46.08.900(6) AS 46.09.900(4)		
5)	WASTEWATER	AS 46.03.100-120		18 AAC 72	
	Domestic Wastewater		-- --		18 AAC 72.990(16)
	Graywater		-- --		18 AAC 72.990(24)
	Non-domestic Wastewater		-- --		18 AAC 72.990(29)
	Other Wastes		-- --		18 AAC 72.990(32)
	Septage		-- --		18 AAC 72.990(44)
	Sludge		-- --		18 AAC 72.990(50)
	Spoils		-- --		18 AAC 72.990(52)

* Note new legislation adding AS 46.08, AS 46.09, and amending AS 46.03.745, 758(k), 760(a), 765, 780(a), 790(a) (b) (d) and AS 46.04.010 and 090(b).

ENCLOSURE B

SUMMARY OF MAJOR STATE AUTHORITIES PERTINENT TO ANWR

The State of Alaska defines and regulates the following:

	Program	Statutes	Definitions	Regulations	Definitions
1)	SOLID WASTE	AS 46.03.100-120 800-810	AS 46.03.900(24)	18 AAC 60 (draft)	18 AAC 60.910(49)
	Construction Waste				(Not defined)
	Industrial Waste		AS 46.03.900(10)		-- --
	Other Wastes		AS 46.03.900(16)		-- --
	"Drilling Wastes"		AS 46.03.900(31-32)		18 AAC 60.910(16)
	Putrescrible Waste		-- --		18 AAC 60.910(40)
	Septage, Sewage Sludge Sludge		-- --		18 AAC 60.910(46) to (48)
	Sanitary Waste		-- --		-- --
2)	LITTER	AS 46.06	AS 46.06.150(4)		
3)	HAZARDOUS	AS 46.03.296-308 830-833	AS 46.03.299(a)-(b)	18 AAC 62	

	Type of Waste	Statutes	Definitions	Regulations	Definitions
13)	SURFACE LEASES			11 AAC 62	
	a. Near Shore	AS 38.05.070-075			
	b. Navigable Rivers	AS 38.05.070-075			
14)	LAND USE PERMITS				
	a. Near Shore	AS 38.05.850		11 AAC 62	
	b. Navigable Rivers	AS 38.05.850			
15)	CLASSIFICATION				
	a. Near Shore	AS 38.04.065-900		11 AAC 55	
	b. Navigable Rivers	AS 38.04.065-900			
16)	ACCESS ALONG HISTORIC TRAILS	RS 2477			

Enclosure B/kfi

	Type of Waste	Statutes	Definitions	Regulations	Definitions
6)	TOXIC MATERIALS and WASTES are a "special class regulated under the Federal Toxic Substances Control Act and National Emission Standards for Hazardous Air Pollutants.				
7)	HABITAT PROTECTION				
	Fish Habitat Permit	AS 16.05.840 AS 16.05.870	-- --		
8)	COASTAL MANAGEMENT	AS 46.40		6 AAC 50 6 AAC 80 6 AAC 85	6 AAC 50.190 6 AAC 80.900 6 AAC 85.900
9)	WATER USE	AS 46.15		11 AAC 93	
10)	GRAVEL SALES			11 AAC 76	
	a. Near Shore	AS 38.05.110-120			
	b. Navigable Rivers	AS 38.05.110-120			
11)	PIPELINE RIGHT OF WAY LEASES			11 AAC 80	
	a. Near Shore	AS 38.35			
	b. Navigable Rivers	AS 38.35			
12)	OIL AND GAS LEASES			11 AAC 83	
	a. Near Shore	AS 38.05.180			
	b. Navigable Rivers	AS 38.05.180			

ENCLOSURE C

A Recommended Approach to
Implementation of ANILCA §810

March 14, 1986

§810 of ANILCA requires federal agencies to consider the effects of proposed land actions upon people engaged in subsistence uses. Specifically, it requires agencies to:

1. Evaluate the effects of the proposed action on subsistence uses and needs;

2. Determine the availability of other lands for the purposes sought to be achieved and assess whether other alternatives are available which would reduce or eliminate the use, occupancy or disposition of public lands needed for subsistence purposes;

3. Determine whether the proposed action would "significantly restrict" subsistence uses;

4. If the proposed action would significantly restrict subsistence uses, to:

   a. Meet certain public notice and hearing requirements.

   b. Determine that such a restriction meets certain standards, including involving the minimum amount of public lands and minimizing adverse impacts upon subsistence uses and resources.

This paper describes the basic requirements of §810 and provides a systematic approach to meeting these requirements when making a decision on an OCS oil and gas lease sale.

Evaluating Effects on Subsistence Uses

ANILCA §810 provides, as a starting point, that "in determining whether to...lease...public lands...the head of the federal agency having primary jurisdiction over such lands...shall evaluate the effect of such use, occupancy, or disposition...on subsistence uses and needs...."

This section is clearly intended to require a specific assessment of impacts on subsistence uses. An adequate §810 evaluation must include complete and accurate information about the proposed action and about the subsistence uses of potentially affected wild resources.

Information about the wildlife populations, fish stocks, and geographic areas which could be affected by the proposed action

are needed to determine the scope of potential effects on subsistence. Information about the specific subsistence uses of, and needs related to, these resources and areas is required to identify and evaluate these effects. This includes data on:

1. Who uses the resources which could be affected;

2. Where, when, and how the resources are harvested;

3. How much they use; and,

4. The significance of the harvested resources for meeting socioeconomic and cultural needs.

Maps of community subsistence use areas can provide valuable data about which communities and groups of people use fish and wildlife that could be affected. Each §810 evaluation should include a map and list of communities that use the stocks and populations of resources potentially affected by a proposed action. The Alaska Department of Fish and Game routinely develops maps of subsistence use as it conducts community subsistence studies. The state welcomes opportunities to cooperate with federal agencies in improving the subsistence data base.

Once the area and communities which could be affected by an action are identified, an assessment must be made of the potential effects of the action on uses of fish and wildlife. The potential linkages between the proposed action, fish and wildlife resources, and subsistence uses need to be clearly described. This can be accomplished through developing hypothetical scenarios, and tracing their implications out through the biological system to the people who rely on subsistence uses.

The evaluation of effects should address potential positive, neutral, and negative effects, as well as direct and indirect impacts on subsistence uses resulting from a proposed lease sale. The guidelines for implementation of §810 developed by the Alaska Land Use Council are helpful in identifying several effects which would restrict subsistence uses:

1. A reduction in subsistence uses due to direct impacts on the resource, adverse impacts on habitat, increased competition for the resources, or other factors;

2. A reduction in the subsistence uses due to changes in availability of resources caused by an alteration in their distribution, migration, or location; and

3. A reduction in subsistence uses due to limitations

on the access to harvestable resources, such as by physical or legal barriers.

An adequate §810 assessment must consider the potential effects of the proposed action in each community which would be affected. In some circumstances, however, it may be necessary to examine effects on the subsistence uses of "typical" communities or groups of people within the affected zone.

Biological and socioeconomic data need to be at a level of detail which will allow a meaningful assessment of potential impacts on the people who use resources for subsistence. These effects can occur at the individual, household, community and regional level.

A working document has been developed by the Alaska Land Use Council which identifies minimum data standards for making an adequate §810 assessment. (Alaska Land Use Council, Working Group II; November 28, 1984, Draft Standards and Guidelines for the Collection, Analysis, and Presentation of Subsistence Use Information for ANILCA §810 Determination, pp. 5-6.) In some cases existing data on subsistence uses may not be adequate to conduct a §810 analysis. Agencies must anticipate these special data needs at the earliest stages in the EIS process. Public meetings may be useful in compiling additional data on subsistence uses and needs. Additional research may also be necessary to address particular data gaps. New studies should be closely coordinated with the State of Alaska as required by ANILCA §812.

The §810 evaluation must thoroughly describe and document data about subsistence resources and uses so that all concerned parties can ascertain which resources and subsistence uses could be affected by a proposed action.

Identifying Alternatives

§810(a) also requires federal agencies to evaluate "...the availability of other lands for the purposes to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes."

In ANILCA §802 Congress states its policy that the "...utilization of the public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources of such lands...." It is therefore important that §810 analyses fully identify and explore alternative areas and approaches which would minimize adverse impacts on rural residents.

Determining Whether Actions Would "Significantly Restrict" Subsistence Use

Once the potential effects of the lease sale upon subsistence uses have been described, the next step required by §810 is to determine whether these effects could "significantly restrict subsistence uses...."

The legislative history of ANILCA gives no clue to the intended meaning of "significantly restrict." The closest parallel to the "significantly restrict" standard appears to be the requirement of the National Environmental Policy Act (NEPA) to analyze actions which may "significantly affect" the environment. Regulations of the Council on Environmental Quality (CEQ) for implementing NEPA state that both the context and intensity of impacts must be considered in deciding significance.

The people who would be affected, and the roles that the particular resources play in their lives provide the obvious context for evaluating significance in relation to restrictions on subsistence uses. The "intensity" of effects also has to be evaluated in relation to use of specific resources by people.

In §810 Congress recognized that subsistence uses are essential to many rural Alaskans, and intended federal land actions to have the least adverse impact possible upon them.

When considered in relation to this mandate, a "significant" restriction to subsistence uses is an effect which imposes a meaningful burden or hardship on particular people.

A determination of "significance" therefore requires discussion of such factors as socioeconomic circumstances, the degree to which harvest of particular resources could be reduced by the proposed action, and the consequences of the frequency, timing, and location of restrictive effects. These need to be evaluated in the context of the people who actually harvest and use the potentially affected resources, and in the context of what would constitute a meaningful burden to those people.

A hypothetical example may be useful in demonstrating the approach suggested above:

During an EIS study a proposed lease sale is determined potentially to affect local salmon stocks. The studies suggest that the activity will not have a major impact on regional salmon populations or regional harvest levels, but depending on its timing and precise location, it could reduce a particular stock or run. It is impossible, given uncertainty about where or when the activity will occur, to predict exactly which salmon stock might be affected. However, the EIS has identified 20 communities and groups of people who make subsistence use of the

salmon runs which migrate through the general impact area and could be affected. The §810 evaluation therefore identifies these communities and the potential risks. It then examines what effect a reduction in a local salmon run could have for households within typical communities, perhaps dividing the communities into four or five categories, based on location, degree of reliance on subsistence resources, and so forth.

In the hypothetical example, the FEIS concludes that the proposed action could substantially reduce local stocks of king salmon for one or more seasons. As subsistence uses have been shown to occur on these stocks the §810 analysis would then identify this as a potential restriction and then go on to determine whether the action would "significantly restrict" the subsistence use of king salmon. In this analysis king salmon are one of the first fresh foods available to particular households in early summer, and the loss of king salmon for one or more seasons would be a meaningful burden on families in the communities. The §810 analysis, after weighing the risks to subsistence use of king salmon against the important role of king salmon to the people, might conclude that the action could "significantly restrict" subsistence use of king salmon in several of the communities.

Meeting Notice and Hearing Requirements

§810(a) requires the head of each federal agency to meet certain notice and hearing requirements before allowing an action which would significantly restrict subsistence uses. The appropriate state agency and appropriate local committees and regional councils established under §805 must be notified, and a hearing must be held in the vicinity of the area involved.

In ANILCA §801 Congress clearly stated its intent that rural residents, who have knowledge of local conditions and subsistence requirements, should have a meaningful role in decisions affecting subsistence uses and needs. The specific requirements of §810 are intended to ensure that federal agencies have the best available information about the potential effects of proposed actions on rural residents. They also seem, when taken in conjunction with §810(a)(3), to be intended to ensure that local knowledge and experience is brought to bear on the requirement that adverse impacts on subsistence be minimized.

Again, a community focus in evaluating effects would simplify the notice and hearing requirements. Each §810 evaluation should include a map and list of the communities potentially affected, and identify those where subsistence uses could be significantly restricted. In this way §810 assessment itself would indicate many of the groups which should be notified.

It is desirable for agencies to follow the §810 procedures for public involvement in instances where a determination of significance is not clear or where there may be significant restriction even though certain data may not yet be available to support the finding.

Public notification of hearings following a determination of significant restriction should follow several avenues, including:

1. Notice published in local and regional newspapers;
2. Notice mailed to local fish and game advisory committees, regional councils, local governments, and Native organizations;
3. Notice aired on local radio and/or television broadcasts;
4. Notice posted in community halls and other local meeting places; and
5. Personal communications with individuals or groups known by the land manager to have an interest in the action.

Minimizing unavoidable adverse impacts upon subsistence uses and resources

§810(a)(3) requires three findings before an action which would significantly restrict subsistence uses can procede.

1. That such a significant restriction of subsistence uses is necessary, consistent with sound management principles, for the utilization of public lands.

This finding of necessity should be specific to the proposed action, and should be based upon an analysis of the potential impacts upon subsistence uses and the relative value of the proposed action in meeting the goals for the use of public lands.

2. That the proposed activity will involve the minimal amount of public land necessary to accomplish its purposes.

The finding of necessity should exclude all public lands that are not necessary to achieving the proposed purpose.

3. That reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources.

Identification and consideration of possible mitigation measures are required to minimize the adverse impacts to subsistence uses that could result from the proposal to use, occupy, or dispose public lands. These can take many forms, and as noted above, public involvement can play a key role in developing suitable mitigation measures.

The following categories represent a broad range of types of mitigation measures:

1. Alternatives for deleting public lands from the proposed action to reduce the risk of potential subsistence resource restriction.

2. Alternatives for reducing impact to seasonal camps and other harvest and use locations;

3. Alternatives for reducing habitat changes that may reduce species abundance and decrease harvest opportunity;

4. Alternatives for reducing numbers of people living in, working in, or passing through area;

5. Alternatives for reducing numbers of people competing for resources;

6. Alternatives for reducing disturbance, roads, noise, water quality degradation, etc., that may affect distribution of species;

7. Alternatives for reducing land classification and ownership changes;

8. Alternatives for reducing changes in access routes to use areas; or

9. Alternatives for compensating people for losses.

Time and area restrictions on activity may frequently be useful in mitigating effects on subsistence uses.

Summary

Federal agencies can satisfy the requirements of ANILCA §810 by following the systematic approach outlined above. An adequate §810 evaluation for an OCS oil and gas lease sale would clearly meet the following standards:

1. Identify the people who make subsistence use of all wild resources which would be affected by the proposed action;

2. Identify the nature of their subsistence uses and needs for these resources;

3. Describe the potential effects of the proposed action on wild resources and upon community subsistence uses and needs, and identify which of these effects could be restrictions;

4. Make a determination of whether potential restrictions would be "significant" in the context of the meaning of the affected resources to the people who use them, and the role the resources play in their lives;

5. Identify alternatives that would minimize adverse impacts on rural residents;

6. If the proposed action could significantly restrict particular subsistence uses:

   a. meet notice and hearing requirements;

   b. make findings that;

      1. the necessity for the proposed action outweighs the risks to subsistence;

      2. the proposed action will involve the minimal amount of public lands needed to accomplish its purpose;

      3. reasonable steps will be taken to minimize adverse impacts upon subsistence uses and needs.

7. Thoroughly document all data and findings so that concerned parties have access to them.

REPRESENTATIVE
SAM COTTEN
DISTRICT 15

P.O. BOX 298, EAGLE RIVER, AK 99577
P.O. BOX , JUNEAU, AK 99811

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES

February 6, 1987

The Honorable Bill Horn
Assistant Secretary for
Fish, Wildlife and Parks
U. S. Interior Department
Washington, D. C. 20240

Dear Secretary Horn:

I am writing with regard to the draft 1002(h) study which presents alternatives for management of the coastal plain of the Arctic National Wildlife Refuge (ANWR).

The interest shared by Alaskans in the decisions about ANWR are fairly clear: we need to maintain a clean, healthy environment and provide jobs and revenue for Alaska's people. These are national interests as well.

Toward achieving these goals, the U. S. Congress should promptly open the coastal plain of the ANWR to oil and gas exploration, production, and transportation under conditions that are in the interest of the nation and the state; reserving the leasing of land in the core caribou calving grounds until a later date. Although, at this time, there is some controversy about the location of the calving ground, we are hopeful that the research data can be put to good use in the near term to define it. Protection of the Porcupine herd is in the interest of American and Canadian citizens. Other environmental issues such as air and water quality, waste management and disposal, and development coordination also need attention.

The Interior Department should desist from discussing land trades that would eliminate the State of Alaska's revenue share from oil and gas activity in the Refuge and that could reduce the ownership influence of the state and federal governments.

Unless the state concurs, the U. S. Congress should not allow measures or actions that reduce the state's entitlement to oil and gas revenue from the Refuge. The Congress should require the protection of the environmental and subsistence resources of the Refuge, including habitat, air, and water, in the event of oil and gas development on the coastal plain of the Refuge.

In recognition of Alaska's economic situation and the need for long-term economic development in the state, the Congress should require that exploration and development activity in the Refuge be conducted by Alaska work forces.

The Congress also should amend the Export Administration Act to reduce America's trade problem and energy costs by allowing the export of new production from Alaska's North Slope.

Thank you for considering these concerns. I hope that the Interior Department will work toward accomplishing these objectives during the Congressional debate on ANWR.

Sincerely,

Sam Cotten

Representative Sam Cotten
co-Chairman, House Resources Committee
(907) 465-3711/15/99

SC:smc

S-16

Arctic Village Council
Arctic Village, Alaska 99722

February 6, 1987

U.S. Fish and Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th and C Streets
N.W. Washington, D.C. 20240

Dear U.S. Fish & Wildlife Service:

Speaking for the majority of Arctic Village people, we're opposed to the opening up of the ANWR land. However, if the oil development will take place, we need to know what is going to happen to the Arctic Village and Venetie people, the ones that are going to be affected by the oil development more than anybody in the U.S. The Fish & Wildlife Reports should say something about what will happen to Arctic Village and Venetie people, so that the Congress will have all of the information to base their decision on for this important decision.

The Fish & Wildlife reported that on the ANWR or Coastal Plain lands, there are certain areas that will affect the herd, but from our standpoint all the areas in ANWR and coastal plains are important to the herd. They (caribou) don't go to just one place, they're everywhere.

Some reports say that the development can be compatible with the Porcupine herd; we don't think it is possible, due to encroachment without care to what the herd eats. The bulls won't mind, but the cows and calves will be affected by the impact of the development. After the caribou have their young, they migrate to the Arctic Village area and sometimes stay all winter. Since there's no trapping, the people of Arctic Village depend more than anything on Porcupine herds. We don't have trapping which brings monies for our survivability; we have caribou to survive.

To drill on the caribou's only calving ground would keep the cows from calving where the conditions are good for calving. It would also destroy our way of life and culture if we don't have the adequate amount of caribou around. We depend on the caribou for food and the skins to make our things--things like Caribou legskin boots, etc.

My Village leaders asked me to remind you that caribou is our only source of meat. Meats always consist of dry meat, meat stew, caribou head stew or soup, fry meat, caribou hamburger, roast and meat soup. In our coffee shop a hamburger costs $4.50. In the store it is $4.50/lb. and a checken fryer costs $9.00. Other store meat is very expensive due to distance from other places to our village.

Caribou has been our source of food for many generations before us. Skin is very valuable, too. Drilling would keep caribou away from their calving ground (How would you like it if you were in labor in a delivery room and someone was drilling in the same room?).

Skin is a source of income for some--making linings, (dog) whips, dogsleds, boots, strings, etc.

Don't do to the caribou what your ancestors did to the buffalo.

ANWR stands for Arctic National Wildlife Refuge, doesn't it? Doesn't the name speak for itself? What is a Wildlife Refuge if you destroy the Wildlife's main calving grounds?

Sincerely,

Joseph J. Tritt
for the Arctic Village Council

JJT/mb

S-17

STATE OF CALIFORNIA—THE RESOURCES AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
SACRAMENTO, CA 95814
(916) 445-3531

February 2, 1987

Mr. William P. Horn
Assistant Secretary for Fish
and Wildlife and Parks
U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Bldg.
18th and C Sts., N.W.
Washington, D.C. 20240

Dear Assistant Secretary Horn:

We have reviewed your decision to allow for full leasing of Section 1002 land of the coastal plains of the Arctic National Wildlife Refuge and would respectfully request a reconsideration of your position because of impacts on lesser snow geese. As a major staging area for the Banks Island lesser snow goose colony, the lands of Section 1002 contain critical habitat as documented in both the March 1985 and November 1986 "Arctic National Wildlife Refuge Coastal Plain Resource Assessments". We believe that full leasing activities in areas used by up to 350,000 geese during fall staging could have long term adverse effects on a large component of the Pacific Flyways total population of lesser snow geese.

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As a further gesture of our concern over migratory waterfowl, we would also request that any land exchange programs associated with the 1002 project, receive the benefit of full public review. Parcels available for exchange should be selected in such a manner as to provide maximum value for migratory birds.

I would appreciate your consideration in this matter.

Sincerely,

for Jack C. Parnell
Director

City of Kaktovik

P.O. Box 27
Kaktovik, Alaska 99747
(907) 640-6313

January 6, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Sts., N.W.
Washington, D.C. 20240

The City Council of Kaktovik has, after much deliberation, decided to support alternative B, limited leasing of the ANWR 1002 lands.

This support comes with the understanding that certain stipulations be met towards the protection of wildlife, it's habitat, subsistence lifestyles, and the social economic future of Kaktovik.

Option B was selected because it offers the most protection to wildlife but still allows private owners of land to develop and utilize their lands to meet their economic needs.

The protection of habitat needed by the porcupine caribou herd and protection of the herd itself is of great concern. This concern is felt not only by us but other communities that use the porcupine caribou herd to meet their nutritional needs. We realize negative impacts will occur. We feel conditions can be implemented to control these impacts and ask that in the development of these controls the protection of wildlife be the priority and economics of the developers be secondary.

Subsistence rights must be looked at in a manner that keeps areas open to hunting that are important to people's needs. We do not agree with the stipulation that no trapping or discharging of firearms within 5 miles of any development is necessary. We ask that for local subsistence uses, a waver would be considered from the 5 mile no hunting and trapping zone. On page 129, there is mention of section 810 of ANILCA and the requirement of the Secretary to determine the effects on subsistence. This was only mentioned under alternative A. It was also stated that Congress could exempt the Secretary from the requirements of Section 810 of ANILCA. We would strongly urge the Congress not to do this. To circumvent the requirements of ANILCA would not seem to be in the best interest of all subsistence users.

There was very little written about possible impacts to the Bowhead Whale. There are studies ongoing through the Minerals Management Service on the effects of noise and the

importance of offshore feeding in this area. The Alaska Eskimo Whaling Commission and the North Slope Borough may be doing whale studies that should be used to determine possible effects and in mitigating offshore activities. We would recommend using AEWC in formulating regulations to cover all offshore activities.

The social problems that will develop in Kaktovik were not covered very well by the report, and with good reason. It is probably the hardest and most emotional aspect of development of the area to mitigate. The social problems that will develop must be addressed now, prior to development. The North Slope Borough with its CIP Program is an example of what can happen. The North Slope Borough is trying to address and correct after the fact. We wish to do this prior to development and in a way that utilizes the unique lifestyle of the Kaktovik area. We ask that funds be made available for our use, as we believe necessary, to meet the needs of the community and develop programs to handle problems prior to any development or further exploration. Our primary objective would be to control alcohol and drug problems, and to enhance recreation and native arts. Kaktovik does not have the economic base nor the time to implement these programs without legislative action to create such a fund for our use. Again, prior to, instead of after, is essential.

The primary difference between alternative A and B, as we see it, is A allows the Secretary to open areas for leasing without further public comment. If the Secretary would recommend, at the minimum, involvement of all subsistence users of the Porcupine Caribou herd prior to leasing of the closed area, we would support Alternative A. If he cannot do this, we do not and will not support Alternative A. We ask Congress to consider this carefully, as we are sure they will.

If Congress so decides, we would support Alternative C or D but not E.

Sincerely,

Loren Ahlers, Mayor
City of Kaktovik

LA:ms

cc2

Commonwealth of Massachusetts

Department of Fisheries, Wildlife & Environmental Law Enforcement

Walter E. Bickford, Commissioner

January 21, 1987

William P. Horn
Assistant Secretary for Fish, Wildlife and Parks
United States Fish and Wildlife Service
2343 Main Interior Building
18th and C Street, N.W.
Washington, D.C. 20240

Re: Proposed Oil and Gas Development in the Arctic National Wildlife Refuge

S-20

Dear Assistant Secretary Horn:

The Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement has carefully studied your Draft Report and Recommendation to the Congress of the United States on the above subject. Because of the vital national importance of this issue, I am taking the liberty of submitting the Department's comments on your Recommendation to you directly as well as to the Division of Refuge Management.

Please be advised that the Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement vigorously opposes your Recommendation, as set forth on pages 169-70 of the Report, to open the entire 1.55 million-acre 1002 area of the Refuge to oil and gas leasing and development. In contrast to your Recommendation, this Department very strongly supports Alternative E, under which the United States Congress would designate the 1002 area as wilderness within the meaning of the 1964 Wilderness Act (Public Law 88-577).

The Department's opposition to your Recommendation is based on the following reasons.

100 Cambridge Street · Room 1901 · Boston, Massachusetts 02202 (617) 727-1614

An Agency of the Executive Office of Environmental Affairs

1. As you are well aware, the Arctic National Wildlife Refuge is incredibly rich in native arctic wildlife and is of immeasurable importance as breeding and nesting habitat for migratory birds from all over the Western Hemisphere. On these facts alone, the Department believes that the Refuge is eminently worthy of strict protection in its present pristine state. However, the Refuge is of far greater value than even this inherent inestimable worth suggests. North America was once overflowing with wildlife resources of tremendous abundance and diversity. However, our society has relentlessly plundered these resources in its ever more frantic search for energy and minerals to satiate its rapacious appetite for material goods. As a result, we have suffered devastating losses of wildlife habitat throughout the North American continent, and these losses continue. The Arctic National Wildlife Refuge represents, in this Department's opinion, the last truly great wildlife resource area on the North American continent. This incomparable area must be preserved undamaged by human action.

2. Your Recommendation is predicated almost entirely upon your assertion that this nation will continually need more and more oil and natural gas, and that as a result we must exploit every available domestic hydrocarbon resource. Your Report clearly reflects this attitude by focusing exclusively on projected increases in national demand for these energy resources and on how oil-and-gas development in the Refuge may help to partially satiate this ever increasing appetite for these energy fuels. However, this assertion misconstrues the real issue here.

This Department believes that the decision about whether to open the Arctic National Wildlife Refuge to oil-and-gas development is really a decision about what is wise use and proper stewardship of the great natural resources with which this nation has been blessed. The Department of Fisheries, Wildlife, and Environmental Law Enforcement agrees, as does practically everyone in the nation, that we need adequate reserves of oil and natural gas for economic well-being and national security purposes. However, our economic health and national security depend on the wise use of these reserves, not on the full-scale exploitation of them just to satisfy demand for these resources.

As I am certain that you are aware, vast quantities of energy are still being wasted in this country. Many studies have demonstrated that this nation's demand for energy can be substantially reduced through more efficient methods of production, heating, and transportation. In addition, alternative energy sources such as solar power, the conversion of coal into natural gas, and geothermal heating can replace a great deal of the oil and gas currently being consumed. Through the aggressive implementation of these approaches for eliminating energy waste and encouraging the development of alternative energy sources, the demand for oil and natural gas can be dramatically lowered from what it is today. As a result, not only would the alleged rationale for drilling in the refuge no longer be even remotely possible, but such a policy would in fact promote our economic

health and national security by reducing this nation's dependence on oil and natural gas as an energy source. I think that you will agree that it makes far more sense to more prudently use what oil and gas supplies we have that are readily available than to give our energy-addicted society yet another oil-and-gas fix for a couple of years. By being wise in our use of these fuels, we can strengthen our economic well-being and national security while at the same time preserving for future generations the irreplacable national treasure that is the Arctic National Wildlife Refuge.

However, your Report totally fails to address this issue. Moreover, the Report fails to mention the role that the United States government has played in the last few years in inflating demand for oil and gas in this country by encouraging wasteful energy use via actions such as a) delaying deadlines for meeting automobile fuel mileage standards, and b) slashing funding and incentives for energy conservation and alternative energy source development. The complete lack of any discussion of the impact on oil and gas demand from the implementation of already proven policies and methods for greatly reducing oil and gas use in this country vitiates the rationale underlying the Report and Recommendation.

3. Other national wildlife refuges and similar federal lands of special or unique value may also contain marginally commercial deposits of oil and/or natural gas. Although we believe that the rationale set forth in the Report and Recommendation is fatally flawed, the pressure to use it to force these other lands to be opened to oil and gas development will rise dramatically if drilling is allowed to proceed in the Arctic National Wildlife Refuge. The Department of Fisheries, Wildlife and Environmental Law Enforcement is adamantly opposed to any such activity in these protected areas, and recommends instead that these special lands be permanently protected from commercial development of any kind.

For the above reasons, the Department vigorously opposes the Recommendation contained in the Report and strongly supports Alternative E. We face a critical decision for this nation. Through the choice we make here, we can set the stage for a country that either (a) has a clean, fuel efficient economy and abundant wildlife resources, or (b) is wasteful of and addicted to oil-and-gas and essentially devoid of most of its once vast and splendid wildlife heritage. The choice is ours. The Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement votes for Option No. 1. We hope that you will join us by withdrawing the Recommendation and giving your full support to Alternative E. Thank you very much for this opportunity to comment on this vital national issue.

Sincerely yours,

Walter E. Bickford
Commissioner

cc: Division of Refuge Management
Honorable Senator Edward Kennedy
Senator John Kerry
All Congressional Representatives

NORTH SLOPE BOROUGH

OFFICE OF THE MAYOR

P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

George N. Ahmaogak, Sr., Mayor

January 20, 1987

Director
U.S. Fish and Wildlife Service
Division of Refuges
18th and "C" Streets, N.W.
Room 2343, Main Interior Building
Washington, D.C. 20240

Re: ANWR LEIS

S-22

Dear Sir:

These are the detailed comments of the North Slope Borough on your "Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment" and Legislative Environmental Impact Statement (LEIS). Incorporated herein by reference are the statements presented on my behalf by the Borough at the public hearings held in Kaktovik, Alaska and Washington, D.C. on January 6 and 9, 1987.

I believe that ANWR should be opened to oil and gas leasing, subject to stringent environmental, subsistence, local access, and public participation requirements. I also believe that if Congress adopts Alternative A in the LEIS, as recommended by Assistant Secretary Horn, the "core" calving area of the porcupine caribou herd--located in the south end of the Jago River area of ANWR--should be placed off limits to leasing for a period of time.

My views on the larger issues facing Congress, in deciding whether to open ANWR to leasing, were outlined in my statements at the hearings. I have attached comments on the specific strengths and weaknesses in the draft LEIS. I observe generally that the document is weak in the following general areas:

1) The effects on coastal resources (especially whales and fish) from development and shipping at port and waterflood sites;

2) The cumulative effects that ANWR and other developments will have on fish and wildlife, on demands for Borough services, and on lifestyles and subsistence opportunities;

3) There is no description of the specific procedures that you will recommend to Congress to guarantee that local governments and residents will be involved in federal decision-making concerning exploration and development, mitigation, subsistence, and transportation and utility systems;

4) You propose no mitigation measures to avoid your projected loss of subsistence areas to (a) development and (b) hunting restrictions; and

5) There is no indication of how you propose to coordinate your administrative procedures with decision-making under the Borough's zoning jurisdiction.

Thank you for this opportunity to comment on the ANWR LEIS. Under separate cover, we are providing certain of the maps, previously provided to your staff in Anchorage, that we feel are especially informative as to human uses of ANWR.

Sincerely,

George N. Ahmaogak Sr.
Mayor

cc: Senator Ted Stevens
Senator Frank Murkowski
Loren Ahlers, Mayor of Kaktovik
Kaktovik Inupiat Corporation
Jacob Adams, President, ASRC
Robert Grogan, State of Alaska
U.S. Fish & Wildlife Service, Anchorage
North Slope Borough Assembly
NSB Planning Commission
William Garner
Edward Itta, Director, NSB Planning Department
Harold Curran, NSB Attorney
Warren Matumeak, NSB Land Management Administrator
Ben Nageak, Director, NSB Wildlife Management

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COMMENTS OF THE
NORTH SLOPE BOROUGH
ON THE
DRAFT ANWR LEIS
JANUARY, 1987

Generally speaking, we think that the Draft LEIS is concise, well written, and predicts well the impacts of potential oil and gas development on terrestrial wildlife. However, it discusses in far less detail the existing fishing, hunting, and whaling locations, and the needs of the various Native groups that use ANWR and the Porcupine Caribou Herd (PCH). It does not present alternative development scenarios for coastal and riparian zones that might be dictated by the need to protect subsistence sites.

We also feel that since neither developments nor mitigation stipulations can be predicted with precision until concrete exploration or development plans are presented, the LEIS should have devoted more attention to the procedures that the Secretary will recommend to Congress for involving the public in your Department's process for making zoning and mitigation decisions for ANWR. Those procedures should incorporate ANILCA Title VIII and XI procedures. They should emphasize coordination with local and State decision-making respecting similar or integral development of Kaktovik Inupiat Corporation (KIC) lands, Native inholdings now being acquired, and State lands--both submerged lands within and offshore of ANWR, and those to the West of ANWR.

1. ACCESS

The LEIS addresses access on pages 127-129. The LEIS does state that subsistence hunting would be restricted in the vicinity of oil and gas facilities. Mitigation stipulation No. 21, Page 146, proposes a five- mile restricted access area adjacent to oil and gas facilities, producing major adverse effects by limiting access to resources and areas traditionally harvested. As noted at p. 132, if there were to be no hunting or trapping within five miles of development areas, full leasing (Alternative A) would result in the loss of over one half of the hunting area within the 1002 lands. This would be a major impact on subsistence activities (see p. 9).

The restrictions of this type imposed in various Units on the North Slope, are inconsistent. A restriction similar to No. 21 currently exists only in Prudhoe Bay, with no discharge of firearms allowed in the Prudhoe Bay Unit at all. There are no such restrictions at Kuparuk. A five-mile restriction currently exists on either side of the Trans-Alaska Pipeline System, but only for the discharge of firearms. However, enforcing this restriction is difficult at best due to lack of adequate personnel and vehicular means to enforce the prohibition. Uncertainty of local residents

at Nuiqsut over what restrictions apply has itself tended to discourage subsistence activities.

Stipulation No. 21 is grossly overbroad. Hunting restrictions for property protection should be deferred until specific developments are proposed. Before leasing, we must enter into agreements regarding such questions as rifle calibers and types of development, etc., that could be used in the vicinity of oil and gas facilities.

Moreover, with traditional subsistence areas rendered unavailable, due both to potential displacement of wildlife and to hunting restrictions, you should consider mitigation of subsistence effects, in the form of sport hunting restrictions. Subsistence use by local residents is a priority use over other consumptive uses in ANWR. 50 C.F.R. 36.11(c) (1985). The haul road experience suggests that "sport" hunting is highly concentrated along roadways, and is largely unpoliced. This could well occur along roadways in ANWR, to the detriment of subsistence opportunity.

As proposed, industrial development (port construction) is likely to have a major impact on subsistence whaling if sea traffic is not controlled. (See Part III, below). The noise and traffic associated with 1 or 2 ports near Kaktovik will be a far different matter from the occasional disturbance now produced by passing vessels.

There is little mention of the ANILCA Section 810 process. Section

810 (a)(3) of ANILCA requires that, prior to leasing federal land under any provision of law, the responsible federal agency must determine, at a minimum--

1) that any significant restriction of subsistence use is necessary,
2) that the proposed action uses the minimal amount of land necessary to accomplish such use, and
3) that reasonable steps will be taken to minimize adverse impacts upon subsistence use.

In addition to the foregoing recommendations regarding hunting restrictions, we suggest that at least the following be considered:

A) The LEIS should address and Congress should consider those factors outlined in ANILCA Section 810. This would require considerable further recitation of sociocultural research to satisfy Section 810 (a)(3). (See Attachment A)

B) Since Kaktovik residents have stated that the biological studies associated with the ANWR evaluation process have been somewhat disruptive, measures must be taken to coordinate programs (such as the LGL bowhead feeding study) so as to not disrupt subsistence activities.

C) There should be a full listing of the villages (U.S. & Canadian) that use the PCH.

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D) The LEIS must recommend to Secretary Hodel specific legislative language providing for full local government and resident participation in the federal processes for mitigating and approving (1) exploration or development plans, (2) transportation and utility systems, including roads, pipelines, docks and ports, (3) proposals to zone areas off-limits to development, (4) restrictions on subsistence and non-subsistence access. The subsistence users must be fully apprised well before development plans are decided. Such briefings should clearly explain the significance of the development for continued subsistence hunting, and for possible socioeconomic and cultural disruptions.

E) The document should state how subsistence-related mitigation stipulations will be enforced and how the public can be involved in their enforcement.

F) The government should be authorized to control seasonal sea traffic to and from the ANWR docking facility.

G) The port alternative east of Kaktovik would be far more likely to interfere with whale feeding and hunting than would the alternative site near Camden Bay.

H) The Borough provided your staff with maps, not used in the

LEIS, that describe stream reaches and the inland subsistence sites used for fishing. These should guide facility siting and water withdrawal decisions, just as caribou calving areas have, and more precise maps should be used in the Final LEIS.

II. COMPARING CENTRAL ARCTIC AND PORCUPINE CARIBOU HERDS

Any attempt to extrapolate to the PCH as it may be impacted by ANWR leasing, the apparent success of the Central Arctic Herd (CAH) near Prudhoe Bay should note the following points.

1) The CAH has not had a population decline, in part, because a) the CAH has only been displaced from a part of its calving ground, b) there seems to be plenty of habitat for the CAH, and c) the density of the CAH on their calving ground is low (p. 108).

2) The density of the PCH on the calving grounds is about 14 times the density of the CAH calving grounds. (p. 108). This means that the very large PCH is "packed into" its calving area, while the very small CAH has "plenty of room" on its calving grounds .

3) Full ANWR development could potentially displace the PCH from 32% of their most critical core calving area (p 108).

4) Because of the much greater density of PCH on their calving grounds, the PCH will interact much more extensively with oil development in ANWR than has the CAH near Prudhoe Bay (p 106).

III. IMPACTS ON WHALES AND FISH

Kaktovik whalers have voiced serious concerns regarding the adverse effects of marine traffic on their hunting success. The fundamental importance of subsistence activities to the proper functioning of the Inupiat family and community is not clearly stated or well referenced. See the Attachment A for a listing of pertinent sources.

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The brief description at p. 119 of the "Impacts" to bowhead whales is inadequate and does not mention that the marine waters off ANWR appear to be a major bowhead feeding area. (See attached Figure 1). This section must also be strengthened to recognize that noise disturbance from one or more port facilities is likely to be much more significant than reactions of individual whales to noise sources reported in other studies. The conclusion (p. 119) that there would only be minor behavioral changes is premature and not supported.

Any discussion of potential ANWR impacts to bowhead whales must take into consideration how ANWR activities are likely to influence further development at Point Thomson and in the offshore area adjacent to ANWR.

If a pipeline and roads extend into ANWR, such "infrastructure" will make development of nearby offshore prospects much more likely. This is especially important since the nearshore area from Camden Bay to the Canadian border is already of great interest to the industry and the same waters appear to be important feeding habitat for the bowhead.

Disturbance studies have not shown conclusively that bowheads will habituate to vessel traffic. The statement on p. 119 that "long-term behavioral effects from noise and vessel disturbance have not been demonstrated or measured" may be an overstatement. Studies in the Canadian Beaufort have shown a steady decrease since 1980 in the use of the "industrial zone" during exploratory activities (Richardson, et al. 1985). Additionally, the effects of short term disturbances are not conclusive, as the authors point out on p. 119. A port facility may have considerable effects on whale distribution (avoidance of marine traffic) and certainly on hunting success, particularly if a major sea lift was delayed into late August or September because of bad ice conditions.

The areas used in subsistence whaling activities extend beyond those outlined in the LEIS. The region used extends west to 144°, east to 143° 30', and 25 nautical miles seaward.

In addition to the effects of causeways, recited at p. 125, you should note that several studies have documented causeway-induced (solid fill) changes to the nearshore temperature and salinity regimes (Moulton et al. 1985:, Envirosphere 1985). Such changes reduce suitable feeding habitat

(Neil, et al. 1983). Numerous proposed or existing causeways used for docking facilities and accessing nearshore oil fields may have measurable effects on anadromous fish populations (Craig 1984). For instance, this may prevent the recruitment of young arctic cisco to the Colville River (Gallaway et al. 1983).

The effects of leasing the Coastal Plain must be considered cumulatively with the likely additional leasing of adjacent state, Native and federal lands. The Coastal Plain borders on three offshore State Lease Sales (50, 51, and 55), and Federal Lease Sale 97. If developed, these will effectively "seal off" the Village of Kaktovik and potentially industrialize the Eastern U.S. Beaufort coast. Also, marginal fields, (e.g., Point Thomson) may become economically viable once access is established into the Coastal Plain.

Accordingly, we recommend that the Final LEIS contain a more pointed analysis of the effects that docks, waterflood facilities, and related shipping traffic and industrial support facilities can have, in terms of obstruction and noise, on subsistence activities, fish, whales, the coastal environment, and Inupiat lifestyles and culture. There should be more specifics, at p. 125, on the design of causeways, docks and waterflood facilities to mitigate their cumulative effects.

Overwintering fish habitat deserves special attention. Water is very limited on 1002 lands and serious conflicts will most likely arise regarding

S-27

water usage for both exploration and development. As noted previously in the discussion, these areas of access should be better documented. The NSB provided your staff good maps for this purpose. Entire stream populations of arctic char or grayling could be destroyed by dewatering such areas, especially during winter months when many portions of a stream or river may be frozen completely to the stream bed.

There must be established a "Technical Review Committee", modeled after the Endicott T.R.C., to monitor local and cumulative impacts to fish, and to recommend mitigation when needed. Information from the most recent studies of the Endicott Environmental Monitoring Project, the West Dock Causeway, and the Lisburne Project should be incorporated continually into the design of mitigation measures outlined for this study.

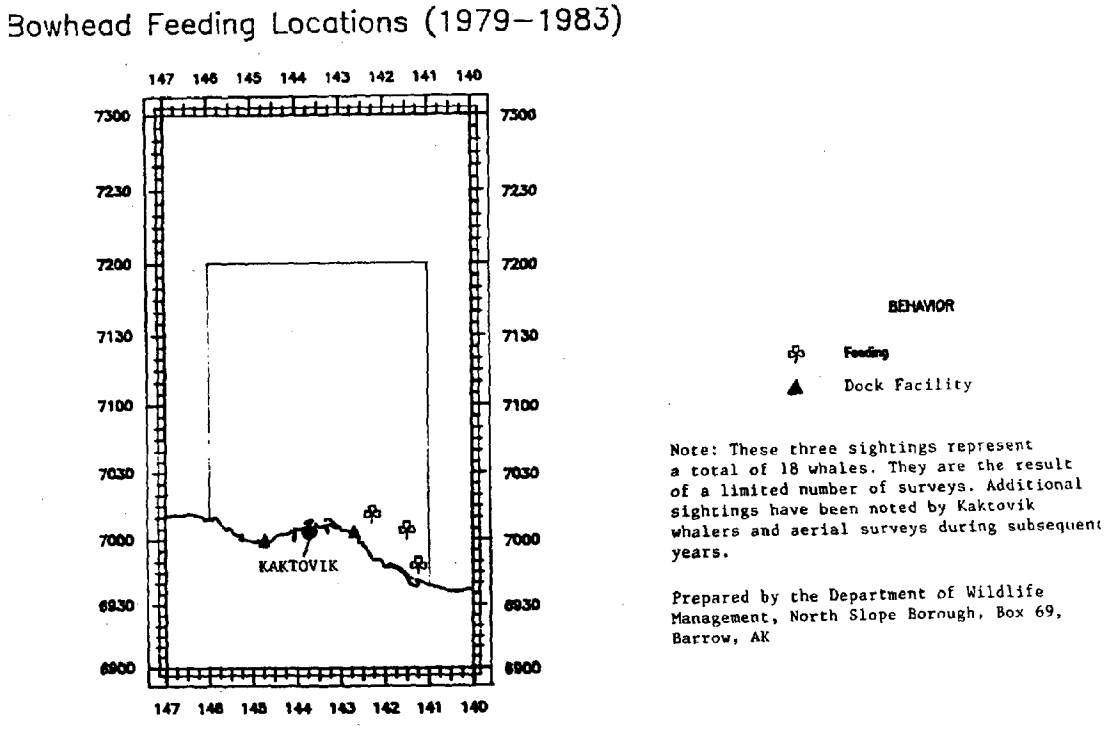
IV. MITIGATION OF CONSTRUCTION ACTIVITIES

Wetland Loss To Leachates - Enforcement of wetland loss due to reserve pit contents leaching through or spilling over the pit dikes onto wetlands should be addressed in the LEIS.

Based on our experiences in the Prudhoe Bay, Kuparuk River and Milne Point oil and gas units, use and maintenance of reserve pits can and has caused concerns with respect to pit contents spilling onto the tundra.

For example, drill muds and cuttings placed into the pits as an

FIGURE 1. Locations of bowhead whales feeding near ANWR. The sourse of these data are D. Ljungblad surveys[1] conducted for the Minerals Management Service.



1. See references (Ljungblad et al. 1984)

allowed practice provided that they are not contaminated with hydrocarbons. And yet not only hydrocarbons but crude oil has been discovered in the pits. And when they are allowed to overtop or are breached, the contents, including the hydrocarbons and crude oil escape onto the tundra.

Additionally, reserve pits are often used for the disposal of snow in the winter and if not managed so as to disperse the snow evenly in the pit, overtopping of the pit can occur in the spring when the snow melts and fills the pit. If flowlines and other pipelines are constructed around the pit such that pipeline construction prevents the maintenance of the pits with the use of machinery such as "cats", the walls of the pits can breach or be eroded out and spill their contents out onto the tundra. This is an issue that should be addressed in ANWR and proposed regulations.

ATTACHMENT A

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NORTH SLOPE BOROUGH

OFFICE OF THE MAYOR

P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

George N. Ahmaogak, Sr., Mayor

January 23, 1987

Director
U.S. Fish & Wildlife Services
Division of Refuge
18th and C Streets, N.W.
Room 2343 Main Interior Building
Washington, D.C. 20240

Dear Sir:

S-31

In addition to the comments we submitted on January 20, 1987, I would also like to submit the following comments regarding Native allotments of the Kaktovik residents.

The main concern of the Kaktovik residents is to preserve the subsistence resources and availability of those resources. Development of the 1002 area, as far as the residents of Kaktovik are concerned, is a secondary priority behind subsistence.

Native allotments are an important factor in a subsistence way of life. There are approximately 43 Native allotments for which Kaktovik residents have applied. Most of the applicants have not received title to these allotments from BLM and are still waiting approval. Most of these applicants use their pending or approved allotment areas for subsistence campsites to allow them to harvest food for their winter supply. We urge the Secretary of the Interior to resolve the pending Native allotment applications prior to the opening of ANWR for oil exploration and development. (Please see the attached Native allotment map).

There are also a few subsistence campsites that have not been applied for that are currently used for harvesting fish and other animals. These campsites are traditionally used by individual Kaktovik residents and should also be protected.

Sincerely,

Edward Itta for

George N. Ahmaogak, Sr.
Mayor

Attachment

cc: Senator Ted Stevens
Senator Frank Murkowski
Loren Ahlers, Mayor, Kaktovik
Kaktovik Inupiat Corporation
Jacob Adams, President, ASRC
Robert Grogan, State of Alaska
U.S. Fish & Wildlife Service, Anchorage
North Slope Borough Assembly
NSB Planning Commission
William Garner
Edward Itta, Director, NSB Planning Department
Harold Curran, NSB Attorney
Warren Matumeak, NSB Land Management Administrator
Ben Nageak, Director, NSB Wildlife Management

STATEMENT OF WARREN O. MATUMEAK

REPRESENTING THE NORTH SLOPE BOROUGH, ALASKA,

BEFORE THE DEPARTMENT OF THE INTERIOR

HEARINGS ON THE DRAFT ANWR LEIS

JANUARY 9, 1987

ON BEHALF OF OUR NORTH SLOPE BOROUGH MAYOR, GEORGE M. AHMAOGAK, SR., I WOULD LIKE TO THANK THE INTERIOR DEPARTMENT FOR GIVING US THE OPPORTUNITY TO TESTIFY HERE TODAY. I AM WARREN MATUMEAK, DEPUTY DIRECTOR OF PERMITTING AND LAND MANAGEMENT ADMINISTRATOR FOR THE NORTH SLOPE BOROUGH.

THE QUESTION OF OIL AND GAS EXPLORATION AND DEVELOPMENT IN THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE IS A MATTER OF CRITICAL IMPORTANCE TO THE CITIZENS OF THE NORTH SLOPE BOROUGH, ESPECIALLY TO THOSE IN THE VILLAGE OF KAKTOVIK, AND OTHER VILLAGES, THAT WOULD FEEL MOST IMMEDIATELY THE IMPACTS OF DEVELOPMENT.

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OIL AND GAS RESERVES THAT MAY BE FOUND IN THE COASTAL PLAIN WOULD PLAY A CRITICAL ROLE IN THE FUTURE ENERGY SECURITY OF OUR NATION, AND IN ITS BALANCE OF TRADE. THEY WILL PROVE EQUALLY VITAL TO THE ECONOMIC STABILITY OF THE STATE OF ALASKA. RESIDENTS OF THE NORTH SLOPE BOROUGH HAVE ONLY RECENTLY BECOME ACCUSTOMED TO HAVING FINE SCHOOLS, MODERN HOUSING, POLICE AND FIRE PROTECTION, AND OTHER SERVICES AND FACILITIES LONG TAKEN FOR GRANTED BY MOST AMERICANS. RESPONSIBLE DEVELOPMENT OF ANWR WOULD HELP ENABLE US TO CONTINUE PROVIDING THESE SERVICES FAR INTO THE FUTURE. WE MUST ALSO CAREFULLY CONSIDER SUBSISTENCE, AND THE WILDLIFE UPON WHICH OUR PEOPLE PRESENTLY DEPEND, AND WILL CONTINUE TO DEPEND IN THE FUTURE.

FOR OVER A DECADE NOW, NATIVE SHAREHOLDERS IN THE KAKTOVIK INUPIAT CORPORATION AND THE ARCTIC SLOPE REGIONAL CORPORATION HAVE WATCHED FROM THE SIDELINES AS BILLIONS OF DOLLARS WORTH OF OIL HAS BEEN EXTRACTED FROM THEIR ANCESTRAL LAND IN THE PRUDHOE BAY AREA. BOTH CORPORATIONS NOW HOLD TITLE TO LAND-HOLDINGS IN SOME OF THE MOST PROMISING OIL AND GAS STRUCTURES IDENTIFIED BY THE LEIS. A CONGRESSIONAL DECISION TO OPEN THE ANWR COASTAL PLAIN WOULD, AT LONG LAST, ALLOW THESE NATIVE SHAREHOLDERS TO BENEFIT DIRECTLY FROM OIL EXPLORATION AND DEVELOPMENT ON THEIR LANDS. THIS OPPORTUNITY FOR NATIVE CORPORATIONS MUST NOT BE DENIED.

BEING A WHALING CAPTAIN, AND THE HEAD OF A FAMILY WHICH CHERISHES THE SUBSISTENCE FOODS WHICH HAVE LONG NOURISHED THEIR HOUSEHOLD, MAYOR AHMAOGAK HOLDS STRONG FEELINGS ON THE QUESTION OF CONGRESS OPENING THE ANWR COASTAL PLAIN TO OIL AND GAS DEVELOPMENT. IN NOVEMBER OF LAST YEAR, HE STATED HIS OPINION THAT CONGRESS SHOULD OPEN THE ENTIRE COASTAL PLAIN OF ANWR TO OIL AND GAS EXPLORATION AND DEVELOPMENT, BUT THAT ALL DEVELOPMENTAL ACTIVITIES MUST BE SUBJECT TO STRICT ENVIRONMENTAL, SUBSISTENCE, CULTURAL AND LOCAL ACCESS REQUIREMENTS.

-- THE BOROUGH FAVORS ALTERNATIVE A IN THE LEIS. AS WE READ THE DESCRIPTION OF ALTERNATIVES AND THE SECRETARY'S RECOMMENDATION, PAGE 170, ALTERNATIVES A AND B DIFFER ONLY AS TO WHETHER CONGRESS OF THE DEPARTMENT OF THE INTERIOR WOULD PLACE CERTAIN AREAS OF ANWR OFF LIMITS TO LEASING.

WHILE WE AGREE WITH SECRETARY HORN THAT THE UPPER JAGO RIVER AREA SHOULD BE PLACED OFF LIMITS TO DEVELOPMENT WORK FOR A PERIOD OF TIME, WE THINK IT WOULD BE TOO INFLEXIBLE AN APPROACH FOR CONGRESS ITSELF TO DELINEATE ZONES IN ANWR THAT MUST BE KEPT FREE FROM ALL FORMS OF OIL AND GAS ACTIVITY. IT IS IMPORTANT TO RECOGNIZE THAT EXPLORATORY WORK, INCLUDING DRILLING, HAS BEEN AND CAN BE CONDUCTED DURING THE WINTER MONTHS ONLY, LEAVING NO APPRECIABLE EFFECT ON CARIBOU HABITAT. AND MITIGATION TECHNOLOGY IS IMPROVING.

WHEN KUPARUK AND PRUDHOE WERE INITIALLY PROPOSED, I PERSONALLY TOOK THE APPROACH THAT LARGE AREAS AROUND THESE FIELDS SHOULD BE ZONED OFF-LIMITS TO ANY DEVELOPMENT. BUT OUR CASE-BY-CASE REVIEW OF OIL COMPANY PLANS, AND THE STIPULATIONS THAT WE INSISTED UPON, HAVE SHOWN THAT WILDLIFE AND OIL DEVELOPMENT CAN CO-EXIST IN THE ARCTIC. PROPERLY STIPULATED ON THE BASIS OF EXTENSIVE EXPERIENCE, WE DON'T THINK THAT PIPELINES AND ROADS WILL RESTRICT CARIBOU MIGRATION ROUTES.

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THE POTENTIAL IMPACTS TO OUR COMMUNITIES ARE ENORMOUS. OUR RESIDENTS, ESPECIALLY THOSE IN THE VILLAGE OF KAKTOVIK, MUST BE TREATED FAIRLY. THE BOROUGH AND ITS VILLAGES MUST HAVE ALL THE FINANCIAL, TECHNICAL, AND HUMAN RESOURCES POSSIBLE TO DEAL WITH THE IMPACTS OF DEVELOPMENT IN THEIR COMMUNITIES. THE FEDERAL LAW OPENING ANWR SHOULD ENSURE THAT FEDERAL REVENUE RECEIPTS ARE SHARED EQUITABLY WITH LOCAL GOVERNMENTS.

GENERALLY SPEAKING, WE FOUND THE LEIS TO BE WELL WRITTEN AND DOCUMENTED, CONCISE, AND HONEST IN ITS APPRAISAL OF THE EFFECTS THAT ANWR DEVELOPMENT WOULD HAVE ON WILDLIFE AND PEOPLE. WE

BELIEVE IT MUST BE IMPROVED BY A DISCUSSION OF OTHER NORTH SLOPE DEVELOPMENTS, SUCH AS THE ENDICOTT CAUSEWAY AND OFFSHORE LEASING IN THE BEAUFORT SEA, THAT WILL OCCUR BEFORE ANWR WOULD BE LEASED AND THAT COULD HAVE CUMULATIVE EFFECTS ON FISH AND WILDLIFE, NORTH SLOPE RESIDENTS, AND THE BOROUGH'S FINANCIAL RESOURCES.

WE HAVE SEEN AT NUIQSUT TRADITIONAL HUNTING ACTIVITIES BEING GRADUALLY DISPLACED BY RESTRICTIONS IMPOSED AT THE PRUDHOE BAY AND KUPARUK UNITS. THIS TYPE OF PROBLEM SHOULD BE LOOKED AT MORE CAREFULLY IN THE LEIS FOR DEVELOPMENTS IN AND AROUND ANWR.

FINALLY, THE LEIS SHOULD CONTAIN A MORE DETAILED DISCUSSION OF REGULATORY ALTERNATIVES FOR CONTROLLING USE OF ANWR BY NATIVE AND FEDERAL LESSEES, FOR COORDINATING THE SAME WITH THE BOROUGH AND THE CITY OF KAKTOVIK, AND FOR INVOLVING LOCAL RESIDENTS IN REVIEW OF EXPLORATION AND DEVELOPMENT PLANS.

AGAIN, LET ME EXPRESS MY APPRECIATION FOR THIS OPPORTUNITY TO TESTIFY ON BEHALF OF OUR NORTH SLOPE BOROUGH MAYOR, GEORGE AHMAOGAK.

NORTH SLOPE BOROUGH

OFFICE OF THE MAYOR

P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

George N. Ahmaogak, Sr., Mayor

November 20, 1986

Mr. Jacob Adams, President
Arctic Slope Regional Corporation
P.O. Box 129
Barrow, Alaska 99723

Dear Mr. President:

Rest assured that as Mayor of the North Slope Borough, I fully share your concern for the future of oil and gas development in the Coastal Plain of the Arctic National Wildlife Refuge. I believe, as you do, that the proposed legislation would indeed work a grave injustice on the Inupiat people. We have long witnessed massive oil development in an extremely wealthy portion of the traditional Inupiat homeland, now held under state title. Any legislation which would prevent private corporations owned and controlled by Native shareholders from finally savoring the benefits of oil development on their own lands strikes me as terribly wrong.

I also feel a strong sense of pride over the improvements our Borough government has brought to our communities. When you and I were children, we had to travel far from our families and loved ones—and the life which we cherish--just to attend school. Now we have fine schools in every village on the North Slope. We have good roads where there were none. We have modern, state-of-the-art fire houses which have resulted in the saving of many lives; we have water and plumbing piped into modern homes, we boast a first-rate Public Safety Department, and many other services which our people did not have in the past.

I want to see these improvements maintained in the future. I want to see them broadened, to fully benefit every citizen on the North Slope! This, of course, will require a solid tax base, even after Prudhoe Bay production drops off. Responsible development in the ANWR Coastal Plain could prove vital in this regard.

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I too am concerned about our Nation's growing dependence on insecure sources of foreign oil. As you have stated, the Coastal Plain offers the best hope of alleviating this dependance of any region in the United States.

Therefore, as Mayor, I am throwing the full weight of my office into the effort to ensure that oil development becomes a reality on the Coastal Plain of the ANWR. I will be right at your side as a leader in this fight.

As a whaling captain, and a father who relies upon caribou, ducks, geese, seal, fish and other wildlife to feed his family, I also share your strong concern for the well being of the wild creatures who live upon the Coastal Plain. I am confident that with our Borough permitting powers, and the concern of corporate leaders such as yourself and Oliver Leavitt, we can ensure development that is ecologically sound, and which will protect our resources.

Perhaps most importantly, I am concerned for our Borough citizens who actually live in the ANWR Coastal Plain, namely the people of Kaktovik. They are the ones whose everyday lives will be most affected. They are the ones who will feel the direct impacts of development. You, of course, are well aware of the difficulties we have had trying to secure a fair share of the NPR-A impact funds for the North Slope villages hit hardest by exploration in the reserve. Even after a successful lawsuit, we still must fight to get what is rightfully ours.

With this in mind, I will be working to insure that an equitable method of revenue sharing from the federal mineral receipts for our local governments is enacted before any federal lease sales take place. This might involve a lobbying effort to convince Congress to make appropriations directly to our local governments. Any help you can give me here will be appreciated. The people of Kaktovik must be treated fairly, and beneficially! They must have all the financial, technical, and human resources possible to deal with the impacts of development in their community.

I note with satisfaction the leadership you have shown in the organization of the Coalition for American Energy Security. I am confident that this group will do much to educate Congress, and the public, of the importance development in the Coastal Plain of ANWR has for the entire nation.

After seeking the advice of, among many others, U.S. Senator Ted Stevens, Kaktovik Mayor Loren Ahlers, and our attorneys in Washington, I feel that it would not be appropriate for me to join this group. This will in no way diminish the effort I will give to make oil development on the ANWR Coastal Plain a reality. I would note that one of our Washington attorneys, Ronald G. Birch, will be attending the coalition meetings. He will keep us informed of coalition efforts, and he will inform the coalition

of what we are doing. This will insure that our efforts are mutua supportive.

If you have any questions, or more information to pass on, please not hesitate to contact me.

Sincerely,

George N. Ahmaogak, Sr.
Mayor

NORTH SLOPE BOROUGH

OFFICE OF THE MAYOR

P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

George N. Ahmaogak, Sr., Mayor

Policy Statement From the North Slope Borough Mayor's Office
On Oil Exploration and Development on the Coastal Plain
of the Arctic National Wildlife Refuge

Legislation currently in the U.S. Congress would designate the 1.5 million acre Coastal Plain of the Arctic National Wildlife Refuge as wilderness. All oil and gas exploration and development activities would be prohibited. The Mayor of the North Slope Borough, George N. Ahmaogak, Sr., recognizes the potential economic and social benefits development in this region could bring to the North Slope Borough and its residents.

Based primarily upon tax revenues on property in the Prudhoe Bay, Kuparuk River, and other oil fields, the Borough has in the past decade built a comprehensive network of schools, roads, housing and facilities and services of many kinds in all of its villages. A strong, secure tax base is necessary to support these facilities in the future, including during that time when production at Prudhoe Bay begins to wind down. Oil exploration and development within the ANWR Coastal Plain would provide a significant portion of that tax base.

Many residents of the North Slope Borough are shareholders in Native regional and village corporations owning surface and subsurface rights within the ANWR Coastal Plain. Oil development within the ANWR Coastal Plain would provide these corporations with their first opportunity to profit from oil development of their own lands. The corporations and their individual shareholders stand to reap substantial benefits from such development, which would be positive for the Borough as a whole. It is the feeling of the North Slope Borough Mayor that legislation preventing the Native shareholders from developing their own lands and resources would constitute a grave injustice.

The State of Alaska has built an economy largely dependent upon oil, and stands to suffer when Prudhoe Bay goes into decline. The Coastal Plain of ANWR holds the only real potential for another oil and gas discovery of reserves comparable to Prudhoe Bay. The State and all of its citizens stand to benefit greatly from the finding and development of such reserves, and to suffer if these reserves are locked up.

Oil production in the United States has been decling even as oil consumption has risen. The percentage of oil produced domestically drops smaller and smaller, worsening the balance of trade, and placing the energy security of the Nation ever more into the hands of other nations, such as the member-states of OPEC. The Coastal Plain of ANWR has greater potential than does any other on-shore region in the United States. In fact, estimates of potential reserves in ANWR indicate they could exceed one third of all current U.S. reserves, and are likely greater than were the reserves at Prudhoe Bay when first discovered. The development of oil and gas reserves in the Coastal Plain is vital to U.S. energy security.

In light of all of this, it is the policy of Mayor George N. Ahmaogak, Sr., and his office, to fully support the future exploration and development of the Coastal Plain of ANWR.

The Mayor is deeply concerned that North Slope residents who will feel the impacts of this development most strongly, namely the residents of the village of Kaktovik on Barter Island, be fairly included in revenue sharing to offset these impacts and to enhance the quality of village life. The Mayor and his office will strive to see that an equitable method of sharing the pre-determined percentages of federal mineral receipts with affected local governments, and of allocating these funds to them, is in place prior to any federal lease sales. This will require close work with both State and federal governments.

The Mayor is also deeply concerned with the wildlife and natural resources of the Coastal Plain. The Borough will undertake whatever steps are necessary to ensure that development takes place in an ecologically sound manner, resulting in minimal effects upon the wild resources of the ANWR Coastal Plain.

January 19, 1987

Division of Refuge Management
U. S. Fish & Wildlife Service
Department of the Interior
2343 Main Interior Building
18th and C Streets, NW
Washington, DC 20240

Re: Arctic National Wildlife Refuge

Dear Sir:

Poker Flat Research Range, Geophysical Institute, University of Alaska, submits the following comments with regard to the Department of Interior's recommendation that the Arctic National Wildlife Refuge (ANWR) be opened to oil and gas exploration.

Poker Flat is against opening the coastal plain of the ANWR to oil and gas exploration, as follows:

1. This area is an integral part of Flight Zone 3 Arctic Extension, one of the range's main flight zones for research sounding rockets (see map attached). This flight zone was established and is used under a Certificate of Waiver and Authorization as issued by the Federal Aviation Administration.

2. The lands lying beneath and immediately adjacent to this flight zone are used for the impact and recovery of research rocket motors and payloads under a U. S. Department of the Interior, Fish and Wildlife Service, Special Use Permit.

3. Safety is a prime concern of Poker Flat Research Range in the launching and the recovery of the rocket motors and payloads/instrumentation. Most of these research sounding rockets are for auroral research purposes and are launched at night during the winter months; however, launches are conducted during other times of the year for upper atmospheric research, such as ozone. The research sounding rockets launched from Poker Flat are unguided and do not carry destruct systems. Thus, the opening of the lands within or immediately adjacent to this flight zone to diverse groups for exploratory assessment, would effectively close the zone, which is vital to the continued research being conducted from Poker Flat.

Geophysical Institute, University of Alaska
Fairbanks, Alaska 99775-0800
PHONE: 907-474-7282 TELEX: 35414 GEOPH INST FBK

Established by Act of Congress, dedicated to the maintenance of geophysical research concerning the Arctic regions.

4. Poker Flat Research Range, while owned and operated by the Geophysical Institute, University of Alaska, is totally funded by and operates under the aegis of a federal government contract. It is considered a national asset as it is the only arctic/auroral zone research sounding rocket launch range on U. S. soil.

There is enclosed, besides the map referred to above, a document describing the range, its users and other data for your information.

Very truly yours,

Neal B. Brown, Director
Poker Flat Research Range

Enclosures

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POKER FLAT RESEARCH RANGE

Poker Flat Research Range, primarily a sounding rocket launch facility dedicated to auroral and middle to upper atmospheric research, is located north of Fairbanks, Alaska, at 30 Mile Steese Highway. Owned and operated by the Geophysical Institute, University of Alaska, it is the only university owned launch range in the world. It is also the only high latitude and auroral zone rocket launch facility located on United States soil.

Self-supporting, Poker Flat is funded through contracts with the National Aeronautics and Space Administration (NASA), the Defense Nuclear Agency (DNA), the U.S. Air Force Geophysics Laboratory (AFGL), the National Science Foundation (NSF) and the National Oceanic and Atmospheric Administration. Seven university employees work year-round at the facility maintaining the physical plant and the various waivers, approvals and agreements necessary to the operation.

Scientists and technicians from many federal agencies and from universities throughout the United States and abroad visit Poker Flat to conduct auroral, ozone, solar proton, electric and magnetic field, ultraviolet and other atmospheric research. Ten to fifteen major sounding rockets, plus a number of meteorological rockets, are launched from the site each year. Other ongoing research projects are: An automated Umkehr measurement station, one of six worldwide stations called the Automated Dobson Network (ADN), for ozone measuremets and observations; and an air sampling/monitoring station operated for the University of Alaska. The range also cooperates with and helps support the USDA Institute of Northern Forestry's Caribou-Poker Creeks watershed research project.

Support facilities include the Poker Optical Observatory which houses magnetometers, riometers, all-sky auroral cameras, scanning photometers and other observing instruments, and a low-light-level color television with video recorder for auroral research. The National Oceanic and Atmospheric Administration (NOAA) operates a Mesospheric-Stratospheric-Tropospheric (MST) radar at Poker Flat; this radar measures the direction and wind speeds at different atmospheric levels.

In addition to its importance to the scientific community, Poker Flat Research Range also contributes economically to Fairbanks and to Alaska: The annual budget for the operation and maintenance of Poker Flat is over $1,000,000, with physical facilities valued at approximately $15,000,000; the per diem paid annually to the user scientists and their support personnel amounts to approximately $1,000,000, most of which is spent in the Fairbanks area; and each mission spends $25,000 or more on air and truck freight.

Throughout its 17 year history, Poker Flat has enjoyed the support of a number of federal, state and military agencies. Permission to impact rockets and payloads on some nine million acres of land is given by the Bureau of Land Management, the U. S. Fish and Wildlife Service, the State of Alaska Division of Lands and Doyon, Ltd. The land on which the site itself is located is owned by the University of Alaska. The U.S. Air Force provides aircraft and crews for payload recovery, some logistical support and, with the use of L-band transponders, can furnish radar tracking support. The Federal Aviation Administration approves requested rocket flight zones and coordinates air space during rocket launches, and the Alaska Department of Transportation gives the range permission to stop road traffic on the Steese Highway during launches.

05/1986

PARTIAL LIST OF RANGE USERS
(1969 - 1986)

United States:
- Advanced Research Projects Agency
- Aerospace Corporation
- Air Force Geophysics Laboratory
- Cornell University
- Defense Nuclear Agnecy
- Florida Atlantic University
- Geophysical Corporation of America
- Geophysical Institute, Univ. of Alaska
- Lincoln Laboratory, MIT
- Los Alamos Scientific Laboratory
- National Aeronautics and Space Administration
- National Oceanic and Atmospheric Administration
- National Science Foundation
- Pennsylvania State University
- Sandia Corporation
- Science Applications, Inc.
- Space Data Corporation
- Rice University
- United States Air Force, Space Division
- United States Air Force, BMO
- United States Army, BMD
- University of California at Berkeley
- University of California at San Diego
- University of Colorado
- University of Denver
- University of Michigan
- University of Minnesota
- University of New Hampshire
- University of Rhode Island
- University of Texas at Houston
- University of Washington
- University of Wisconsin
- Utah State University

Foreign:
- Denmark
- Japan
- Sweden
- United Kingdom

POKER FLAT RESEARCH RANGE

PERFORMANCE 1969 - 1986

- 217 major high-altitude rocket experiments:

GEOPHYSICAL INSTITUTE	1
NASA:	
University	66
NASA Center	44
NATIONAL SCIENCE FOUNDATION	7
DEFENSE NUCLEAR AGENCY	66
AIR FORCE GEOPHYSICS LABORATORY	6
OTHER	27

- 1700 Meteorological rocket launchings

  (1971-1979 thrice-weekly data base to 65 km)

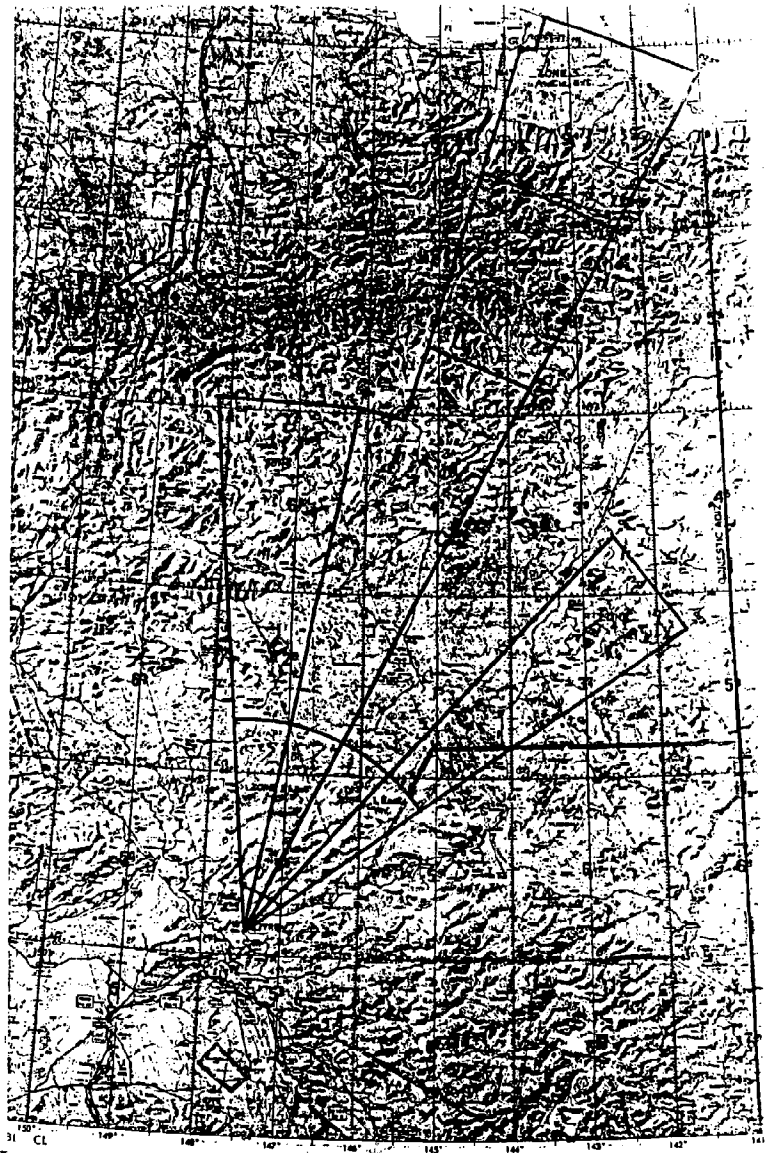
- Range Records:

  Altitude - 1400 km

  Loft - 5985 lbs. to 113 km

RESEARCH SOUNDING ROCKET VEHICLE SYSTEMS LAUNCHED FROM POKER FLAT RESEARCH RANGE, 1969 - 1985

Vehicle	Number of Launches
Astrobee D	8
Black Brant IVB	2
Black Brant VA	1
Black Brant VC	7
Black Brant IX	2
Black Brant X	7
Bullpup-Apache	4
Castor	1
Honest John-Hydac	3
Honest John-Javelin	1
Honest John-Nike-Hydac	2
Honest John-Nike-Javelin	3
Honest John-Tomahawk	5
Nike-Apache	3
Nike-Hydac	13
Nike-Javelin	4
Nike-Orion	8
Nike-Tomahawk	61
Orion	4
Paiute-Apache	1
Paiute-Tomahawk	8
Sandhawk-Tomahawk	5
Sergeant	11
Sergeant-Hydac	6
Strypi	2
Talos-Sergeant-Hydac	5
Talos-Castor	6
Taurus-Nike-Tomahawk	1
Taurus-Orion	9
Taurus-Tomahawk	5
Terrier-Malemute	10
Terrier-Sandhawk	4
Terrier-Tomahawk	1
Ute-Apache	1
Ute-Tomahawk	3



ONC C-9

SCALE 1:1,000,000

OPERATIONAL NAVIGATION CHART

Venetie Village Council
Venetie, Alaska 99781

February 6, 1987

U.S. Fish and Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th and C Streets
N.W. Washington, D.C. 20240

Dear U.S. Fish & Wildlife Service:

We are writing our comments on the Draft Report about whether to allow oil and gas development in the Arctic National Wildlife Refuge. The people of the Village of Venetie are opposed to allowing this development, because it will harm the Porcupine Caribou Herd.

The Draft Report does not discuss the importance of caribou to Venetie or to Arctic Village. Caribou are important here--to lose them would be to lose an important source of food and an important part of our culture. The Report should discuss these impacts on Venetie and Arctic Village to the same extent as it talks about effects on Kaktovik.

The Report talks about the "core" calving area, which makes it sound like only that region is critical to the caribou. We believe that the entire coastal plain is critical and sould be "category 1" habitat.

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We are opposed to any exploration and development. But if you are going to allow development, your standard of "unnecessary adverse effects" is wrong--development should be allowed only if it is compatible with the protection of subsistence and subsistence resources. And there should be no development until all Native allotments have been completely given to those who should have received them long ago.

You should have held hearings here and in Arctic Village. If you had come here, you would have heard people tell you about how vital caribou are to our people here. They would have asked you whether 20 days worth of oil is worth the destruction of our culture.

Thank you for your attention to the comments.

Sincerely,

Venetie Village Council
1st Chief - MacArthur Tritt
2nd Chief - Jim Christian
Council Members:
Eddie Frank
Neil Sam
Pete Peter
John Titus
Larry Williams

Comments from Organizations (O)

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JOHN ANTHONY (TONY) SMITH
CLARK S. GRUENING*
JULIUS J. BRECHT
CHARLES G. EVANS
ROBERT S. SPITZFADEN*
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JAMES R. SZENDER
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* JUNEAU OFFICE

February 6, 1987

U.S. Fish & Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th & C Streets, N.W.
Washington, D.C. 20240

Re: Comments of Akhiok-Kaguyak, Inc.
on ANILCA Section 1002(h) Report

Dear Sir or Madam:

On behalf of Akhiok-Kaguyak, Inc., I provide the comments set out below on the subject Arctic National Wildlife Refuge ANILCA Section 1002(h) Report. Generally, Akhiok-Kaguyak, Inc. wishes to congratulate your Department on the preparation of a thorough and well documented report and concurs in the Secretary's recommendation for full leasing of the ANILCA Section 1002(h) area. O-1

The report provides a thorough evaluation of prospective impacts from oil and gas exploration and development. However, in identifying these potential impacts, the Report fails to acknowledge the substantial mitigative effects of existing regulatory programs of the federal, state, and local governments with jurisdiction over the Report area. Federal agencies such as the United States Army Corps of Engineers, the Environmental Protection Agency, National Marine Fishery Service, United States Coast Guard, in addition to the United States Fish & Wildlife Service each have important roles to play in regulating the activities which would occur in development. The Report points out that, for all intents and purposes, the entire area is classified as wetlands. Wetlands are subject to the jurisdiction of the United States Army Corps of Engineers. The operation of the Section 404 program of the Corps, by itself, involving direct participation by federal, state, and local agencies, will do much to minimize surface impacts directly and indirectly related to the placement of gravel fill in the area. The Environmental Protection Agency's authority under Section 402 of the Clean

Water Act will serve to minimize water quality impacts from operations in the area. The State of Alaska's Coastal Zone Management Program insures the involvement of local communities affected by the operations as well as the input of interested state agencies such as the Department of Natural Resources, the Department of Fish & Game, and the Department of Environmental Conservation. The North Slope Borough's local zoning ordinance provides local authority for regulation of project activities. Added to this, the direct management authority of the Fish & Wildlife Service over the area constitutes one more layer of insurance that impacts will be avoided or mitigated to the extent possible.

Specific seasonal restrictions listed in the Summary of Recommended Mitigation for the 1002 Area should be only applied to the extent necessary to prevent significant impact from occurring. Some seasonal stipulations may be impracticable from the standpoint of allowing continued operations, especially if such restrictions were to apply during the development phase.

With regard to the disposal of drilling muds, cuttings, and other wastes, there is a decided bias reflected in the Report in favor of reinjection, without explanation as to why the use of reserve pits is not appropriate. Reserve pits have been used for many years without causing significant environmental impact at Prudhoe Bay, Kuparak, and other areas throughout the State of Alaska. Reinjection of drilling muds, cuttings, and other wastes should be economically feasible as well as geologically feasible.

With regard to site rehabilitation, Akhiok-Kaguyak, Inc. recommends that applicable requirements be practicable, timely, and non-redundant. Reporting requirements should be kept to reasonable minimums so as not to burden both reviewing agency staff and operators unnecessarily with unproductive responsibilities in preparation and analysis of reports, proposals and other documents.

Akhiok-Kaguyak, Inc. recognizes the strategic importance of finding significant oil reserves within the United States. By the year 2000, when any production from the 1002 area might be just beginning, the United States will be at least 50-60% dependent upon the import of foreign oil for its domestic use. The present glut of oil in the international marketplace, with concurrent low prices, should not be assumed to be a bellwether for the condition of the market 13 years hence. If large scale reserves are found in the 1002 area, this country simply must find ways to both develop it and minimize environmental harm while doing so. The alternatives are not pleasant to imagine.

It is important to consider that if gross domestic shortages occur in the next ten years and petroleum prices have skyrocketed, the pressures for development of a highly perspective geologic area might become so intense as to overshadow the attention which can now be given to avoiding or minimizing environmental harm.

Akhiok-Kaguyak, Inc. supports the recommendation of the Secretary of Interior and requests that the above considerations be addressed in the final report to be prepared by the Department.

Sincerely yours,

GRUENING, BRECHT, EVANS & SPITZFADEN

By: Patrick Rumley

PR:afg

cc: Ralph Eluska, Manager, Akhiok-Kaguyak, Inc.

O2

Alaska Center for the Environment
Suite 1A
411 West 4th Ave.
Anchorage, Alaska 99501 274-1671

January 15, 1987

U.S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Building
18 and C Streets NW
Washington, D.C. 20240

RE: Draft 1002 Report for the Arctic Coastal Plain

Dear Sirs/Madams:

The following comments of the Alaska Center for the Environment are intended to supplement, amplify and/or reiterate the oral testimony we provided at the January 5, 1987 hearing in Anchorage on the Draft 1002 Report for the Coastal Plain of the Arctic National Wildlife Refuge. Although the Center has a long history of involvement in Alaska Lands Act questions, including the Arctic Refuge, in recent years we have generally deferred to the several Alaskan conservation organizations whose primary concern is federal lands so that we can focus on important hazardous waste, state land use, and local wetlands preservation issues which might otherwise be largely ignored. The fact that the Center is nevertheless participating actively in the debate over the fate of the Coastal Plain is a strong indication of the tremendous interest in this issue on the part of the entire Alaskan conservation community, including our members.

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The exceptionally rich biological resources of the Coastal Plain are of regional, statewide, national and international significance. In a refuge blessed with biological treasures, the Coastal Plain is the refuge's most productive area. Lists of those valuable resources have been enumerated probably hundreds of times.

Contrary to what the oil industry so conclusively states, Prudhoe Bay has not demonstrated that oil exploration and development are compatible with the conservation purposes of the Arctic Refuge. Only minimal monitoring of the impact of those activities has occurred. We are just beginning to learn of possibly substantial air, water and toxics pollution at Prudhoe. The U.S.F.W.S. is only in the process of attempting to assess the impacts of oil and gas activities on wetlands and waterfowl. In spite of the fact that some bull caribou do not avoid the oil pipeline, we are not aware of any scientific reports by disinterested observers that conclude that impacts of Prudhoe Bay activities on caribou, especially on calving, are insignificant. In any case, for the reasons that we will give below, we do not believe that there is a need for any oil that might lie under the Coastal Plain sufficient to justify the impacts to wildlife that the draft 1002 Report says are likely to occur.

An issue that development interests have carefully sidestepped, however, is the impact of oil and gas exploration (alone, or with subsequent development) on the irreplaceable wilderness values of the Coastal Plain. We have not seen anyone from the development community willing to refute the assertion that leasing the Coastal Plain will destroy the wilderness values of the area. And to both Alaskan conservationists and millions of Americans in the lower 48, wilderness protection and wildlife conservation are co-equal goals in the drive to preserve the Coastal Plain for future generations.

The Arctic National Wildlife Range was established in 1960 in large part because of its wilderness values, unlike most national wildlife refuges where the primary goal is wildlife conservation. This is our last opportunity to preserve an arctic area that includes a full spectrum of ecosystems in their natural states, largely unaltered by man, and until now almost completely free from the destructive impacts of our most modern technologies. Wilderness designation for the entire Arctic National Wildlife Refuge is also the last great spiritual gift of its kind that we can leave to our descendants. It would be a reaffirmation of our hope and belief that we can learn from past mistakes, and that we are motivated by forces greater than greed.

It is not as if we need the Coastal Plain, where our chances of finding economically recoverable quantities of oil, even under the most optimistic--or unrealistic--assumptions, are less than 20%. Nowhere else has the Alaskan coastal plain been protected. Millions of acres of both onshore and offshore prospects are available or potentially available for oil exploration and development. In fact, the present administration has already flooded the nation with oil lease sales and driven the economic return to the nation to levels that are approximately half of what the previous administration received for the public's resources.

But more importantly perhaps, any reasonable national energy plan--should the federal government prepare one--could easily find ways of comfortably doing without any oil that might be found under the ANWR Coastal Plain. At the present time, however, the federal government has virtually no credibility in regard to energy planning after the president's recent veto of national appliance energy standards, which if enacted would have saved millions of barrels of oil, and its general policy of virtually ignoring even proven energy conservation measurers. The destruction of the nation's last great wilderness in these circumstances is unthinkable.

Nor have several technical or logistical questions been adequately addressed. The 1002 Report admits that we do not know where we will find the enormous amounts of water and gravel necessary for this project. Similarly, oil and gas exploration

and development would create a host of potentially very substantial hazardous waste and pollution problems which we are only beginning to recognize, identify and attempt to deal with. To date we have not shown that we can deal with them adequately.

We recommend that the Interior Department recommend to Congress that Alternative E, which is wilderness designation for the entire Coastal Plain, be adopted. We recommend also that the secret negotiations which could lead to substantial public losses on the Coastal Plain, and which are seriously compromising this reporting process and could preclude Congress' ability to choose from a full range of options for the area, be suspended immediately.

We are very happy to be able to provide comments to the Interior Department on this exceptionally important issue. We are deeply disturbed, however, that the department is grudgingly complying with the law and allowing public participation only after they were forced to by public interest groups who had to expend considerable amounts of time and money to secure this right. We are saddened by and ashamed of the Interior Department's actions in this regard.

Sincerely,

Cliff Eames
Issues Director

CE: dgh

Alaska Coalition for American Energy Security

P.O. Box 10-1515 Anchorage, Alaska 99510-1515 (907)561-8641

February 4, 1987

Director
U.S. Fish & Wildlife Service
Division of Refuges
2343 Main Interior Building
18th & C Streets, N.W.
Washington, D.C. 20240

Gentlemen:

The Alaska Coalition for American Energy Security is an umbrella organization formed for the single purpose to encourage the opening the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) to oil and gas exploration, development and production. Coalition members include the Alaska Oil and Gas Association, Alaska State Chamber of Commerce, Alaska Support Industry Alliance, Anchorage Chamber of Commerce, Arctic Slope Regional Corporation, Associated General Contractors, Common Sense for Alaska and Resource Development Council for Alaska. The Alaska Coalition appreciates this opportunity to provide written comments on the Draft Coastal Plain Resource Assessment.

The Alaska Coalition strongly supports the report's recommended Alternative A, full leasing of the Coastal Plain of ANWR. There are many compelling reasons why the Secretary of Interior must make that recommendation to the Congress of the United States.

NATIONAL INTEREST NEED

Exploration for and, hopefully, development of petroleum on the Coastal Plain of ANWR is clearly in the national interest because of the dramatic and sustained drop in oil prices and the cumulative effect that it has had on domestic production, along with a steady rise in domestic consumption of oil and gas products. The United States is moving toward an ever increasing dependence on energy imports. The present oil surplus is predicted to evaporate in three to five years. Given the start up or recovery time required to rebuild needed domestic production, it is imperative that the industry be allowed to explore on highly prospective areas such as the Coastal Plain without delay.

In a recent study requested by the Secretary of Energy on the future supply and demand for oil and gas, it was found that:

The positive trends of 1981-1985 towards reduced U.S. dependency on imported oil, particularly from the Middle East, are being reversed. Imports from the Middle East more than doubled during the first seven months of 1986.

The recent drop in oil prices has resulted in significant reductions in U.S. exploration, production, and drilling activity; these reductions cannot be quickly reversed.

Lower oil prices are encouraging growth in energy demand while reducing U.S. oil and gas production.

Finally, the Secretary concluded that, "Until oil prices increase appreciably, U.S. exploration will remain stagnant, our dependence on imports will continue to increase, and our vulnerability to oil price shocks and possible oil shortages or stoppages will rise to an excessively dangerous level. All of this could seriously affect our strategic and national security as well as our economic stability." With the long lead time required to bring an Arctic oil field from discovery to full production, typically 10 to 15 years, this study only reinforces the need to begin exploration activity in the Coastal Plain now.

From a national security perspective the Joint Chiefs of Staff and the National Security Agency has long pointed out that the most important corner stone of our nation's security is a stable and vital economy. Without considering the implications of energy shortages to our defense forces, which were dramatically illustrated in 1973 (the OPEC embargo), the exogenous shocks to our domestic economy will clearly be devastating.

It is essential that Congress and the President move quickly to encourage domestic exploration and production of our energy reserves. As the Secretary of Energy has pointed out, the down turn in domestic production as a result of depressed prices is not easily turned around.

As U.S. production continues to decline at an accelerating rate, our ability to supply our own energy needs will be increasingly impaired and our national dependence on imported oil will increase. Higher prices at best, and shortages at worst will be the inevitable outcome without the discovery and development of additional domestic reserves.

The single most important decision our Congress will make in the areas of domestic production and national energy security in the next eighteen months is the opening of the coastal plain of the Arctic National Wildlife Refuge to leasing for energy exploration and production. This relatively small area at the northeastern corner of Alaska holds the highest promise for significant domestic energy discoveries. Even with an affirmative

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decision to open this critical energy reserve it will take ten to fifteen years before a consumer product is available. Alaska has proven its capability in developing vital natural resources while being sensitive to fish, wildlife and habitat.

Currently, Alaskan oil and gas production represents about 20% of our total domestic production. That production will be in decline soon and will dramatically fall over the next ten years.. Without new discoveries and a dramatic change in domestic consumption there is little hope that we can avoid serious, national economic shocks. The nation is more dependent, than ever, on oil products and it cannot afford to ignore areas rich with potential oil resources.

ECONOMICS

By allowing for exploration, development and production on the Coastal Plain, the United States would receive a valuable resource which it would otherwise import from foreign producers at a tremendous cost to our national economy. The trade deficit for 1986 alone was $170 billion. It is estimated that about half of that imbalance is the direct result of foreign oil imports. It is interesting to note that Congress appears willing to take extraordinary measures to protect U.S. manufacturers from foreign trade competition, and yet the major problem is in the area of oil imports. The trade imbalance translates directly into lost jobs for U.S. workers. Assuming an average value of oil of $35 per barrel, the 3.2 billion barrels of oil which is estimated to be the most probable recoverable potential from the Coastal Plain, represents more than $100 billion in lost revenue to foreign producers. Not only would the loss of ANWR have an impact on U.S. workers, but it would impact the revenue deficit as well. More oil development by the domestic oil industry, means a greater return to the U.S. treasury from bonus payments, rentals, royalties, and taxes. This will help reduce the federal deficit.

RESOURCE POTENTIAL

As recognized in the draft report, the petroleum potential of the Coastal Plain is the most outstanding oil and gas frontier remaining in the United States. However, the reserve estimates for the 1002 area may be understated . The report indicates that only structural traps were considered in the reserve estimate, yet many of the plays expected to contain hydrocarbons are stratigraphic in nature. Were the potential stratigraphic traps considered, the reserve estimate for the Coastal Plain would be even higher than what is quoted in the report.

The report estimates the chance for a commercially developable field at approximately 19 percent. A 19 percent chance of commercial success indicates a considerable improvement over the historical chance of success in Alaska petroleum exploration which is typically a 2 percent chance of commercial success.

A reserve potential of this magnitude cannot and must not be ignored, and the Secretary is correct in recommending that the entire Coastal Plain be opened for leasing.

It is estimated that the oil potential of the Coastal Plain could be as high as that of the Prudhoe Bay fields. Prudhoe Bay and adjacent fields are presently providing approximately 20 percent of the United State's domestic oil production. A conservative estimate of the oil that will have been supplied by the known North Slope fields upon their exhaustion is roughly 13 billion barrels. This represents hundreds of billions of dollars for the cost of oil that would otherwise have been imported from foreign producers if those fields were not produced. Without this development, the U.S. economy would have been even more vulnerable to the inflationary effects that were generated by the high oil prices from foreign suppliers. North Slope fields have helped strengthen the U.S. economy and have contributed billions of dollars to the U.S. Treasury. ANWR has the potential of being an equal contributor to the U.S. economy.

ENVIRONMENTAL CONSIDERATION

While the overall area of the Arctic National Wildlife Refuge is quite large, that portion proposed for exploration and development represents only eight percent of the entire area. The actual surface impact to the resources of the Refuge in this small area would be minimal. The report's analysis and discussion of environmental impacts and effects on wildlife resulting from exploration and production do not adequately reflect the experience of exploration and ongoing production in areas of the Coastal Plain adjacent to ANWR. We see this as the most serious deficiency of the report, which may draw unwarranted opposition to the Department's proposal of full leasing.

The "worst case" speculation of potential impacts on the Porcupine Caribou Herd ignores much of what industry and the regulatory agencies have learned to date about the interaction between arctic oil development and caribou. The report should take an approach which looks at impacts that are "most likely to occur," based on North Slope experience. Such an approach would significantly alter the results of the analysis and yield realistic conclusions of negligible impacts to caribou populations.

The over-emphasis of the importance of a so-called "core calving area" in the 1002 area leads the report to dismiss past experience and studies which show that caribou populations thrive in the midst of oil field activity on the North Slope. Historical data on the Porcupine Herd presented in the report clearly show that the coastal plain from the Babbage River in Canada across the 1002 area to the Canning River has been successfully used for caribou calving. The Porcupine Herd has been observed in some years not to use the so-called core area at all. In some years, the herd has been observed to calve entirely outside the 1002 area. Thus, rather than a specific core area, calving habitat is a continuum across the Arctic coast from the Canning River to the Babbage River in Canada. Recognizing the wide year-to-year variation in calving distributions, it becomes increasingly clear that activities such as oil exploration and production which use only small portions of abundant habitat will not affect the calving success of caribou in ANWR. Caribou continue to use the area in and around the Kuparuk River oilfield for calving and that herd continues to increase at rates similar to other North Slope herds. The Department should re-evaluate the core calving area concept and de-emphasize the importance it plays in the conclusions in the report related to potential impacts from petroleum development.

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SUBSISTENCE

Preservation of the subsistence resource is one of the most difficult and important issues relating to opening ANWR to oil and gas development. In evaluating this issue, it is important to keep in mind the following points:

First, the oil and gas industry has a strong commitment to preserving subsistence resources, and an excellent track record in having done so. The oil and gas industry has worked on the North Slope and in western Alaska in close contact with Native communities and regulatory agencies seeking to preserve the subsistence resources which otherwise might be affected by oil and gas exploration and development. As a result, no significant impact upon any subsistence resource has ever been substantiated as a result of oil exploration and development in Alaska -- and it is our strong belief that this excellent track record will continue in ANWR. The industry is strongly committed to this concern and will closely cooperate with Native subsistence users.

Second, it is also important to take note that subsistence impacts can only occur if there are significant impacts upon the wildlife resources of the area. The primary subsistence resource in this area is the Porcupine Caribou Herd, along with waterfowl. The industry's excellent record in protecting

caribou and other subsistence resources from impact at Prudhoe Bay and Kuparuk is a further reason why subsistence resources will not be impacted in this area.

Third, the subsistence lifestyle requires access to cash, for purposes of obtaining three-wheelers, guns, ammunition, and related supplies. The villagers in the local area will be able to utilize job opportunities offered by oil development to enhance their subsistence activities.

Fourth, natives in the area, who are well experienced with the interactions between oil and gas development and subsistence, favor oil and gas development in ANWR. In fact, Jacob Adams, President of the Arctic Slope Regional Corporation, himself a whaling captain, has stated as follows:

> " We are convinced that experience gained by the exploration and development of energy sources within the last 20 years will lead to the development of new energy production facilities that can be operated very compatibly with the caribou and other living resources of the Coastal Plain. We know that it will require careful regulation and will increase project costs, but we believe a productive balance can be achieved."
>
> "Our own local governments and companies have brought their experience and knowledge to bear on the energy development process, resulting in sensitive and effective decisions. The lands we own within ANWR were cooperatively placed under a regulatory scheme and set of stipulations that has demonstrated the compatibility of living resources and energy development."
>
> "As a people reliant on our land its resources, we are sensitive to the long-term significance that development of the ANWR Coastal Plain may represent. We think that sound environmental studies and mitigation measures have been and will be successful in limiting the adverse effects of development. We are also confident that the existing and improving technologies can ensure the integrity of the environment during oil and gas operations."

WATER AND GRAVEL RESOURCES

The 1002(h) report indicates that water and gravel resources could be problematic with respect to their availability to support petroleum exploration and development in the Coastal

Plain. The Alaska Coalition offers the following comments and observations.

Water

There are many means to provide water for oil and gas operations. Snow melt by using snow collected by use of snow fences, temporary roads to deep lakes, desalinization can furnish water for early exploration. Water supply wells could and would be established fairly early if surface supplies are insufficient. Water from these wells would be in the form of treated formation water from deeper horizons below the permafrost. These methods are routinely used in the Prudhoe Bay development area to insure adequate water supplies.

Although as much as 15 million gallons of water may indeed be necessary for initial exploratory wells, the bulk of this water volume is needed not for the direct drilling of the well, but for the associated ice pad, ice road, and/or ice airstrip. Hence, much of the required water volume will decrease as permanent infrastructure replaces temporary annual ice structures.

For development and production, water supplies can be supplemented by artificial water reservoirs at gravel barrow sites.

Gravel

The report contains conflicting discussions on the availability of gravel resources within the 1002 area. The Executive Summary (page 6, column 1, paragraph 5) states that "...the water and gravel necessary for construction and development are in very limited supply on the 1002 area." Further, page 75 (column 2, paragraph 1) states that "Specific locations and sources of water and gravel for exploration and development activities have not been identified, and it is understood that these resources, especially water, are not readily available on the 1002 area." Page 84 (column 1, paragraph 1) states that "the availability of adequate gravel supplies on the 1002 areas is uncertain.

However, the description of the physical environment on page 20 (column 2, paragraph 4) states that "The valleys of larger streams are underlain by large quantities of course sand and gravel." Figure II-2 on page 16 indicates abundant surficial deposits of sand and gravel. Although Figure II-2 indicates surface materials only, it is unlikely that these gravel deposits are strictly surficial in nature, particularly since similar deposits are widespread and abundant across the entire North Slope Coastal Plain. Abundant gravel beneath the Coastal Plain was observed and reported by the seismic crews when

drilling thousands of shot-holes to depths of 75' the 1984 and 1985 seismic programs.

In fact, not only do abundant sources of gravel seem to be available in the 1002 area along the major stream valleys, but pages 99-100 indicate that the taking of gravel from areas such as river bars, river terraces, and cutbanks can be done with minimal adverse impacts. Furthermore, water reservoirs would be created, thus supplementing other water supplies.

One last point to be made with respect to both water and gravel resources pertains to the ability of the petroleum industry to overcome technical problems. The opening of the Coastal Plain should not be precluded solely on the basis of the potential technical obstacles. Historically, these kinds of problems have been overcome.

LEASING METHODS

The most basic action contemplated by Congress with respect to ANWR is leasing. However, a full discussion of the merits of this basic action is obscured by the debate about the environmental consequences of oil development. There are significant aspects with respect to the leasing program which should be developed with care.

The draft Environmental Impact Statement states, with respect to leasing systems, as follows as page 89, in its discussion of "Alternative A":

> Under the alternative of full leasing, it is assumed that Congressional action would allow all Federal subsurface ownerships of the § 1002 area to be available for development through a leasing program administered by the Department of the Interior. This action would also open to oil and gas development in production the private lands within the refuge. The exact terms of the leasing program would be developed in response to specific legislation passed by the Congress. If the Congress chooses to authorize leasing in the entire § 1002 area, the legislation would probably contain the important elements of the Minerals Leasing Act and the NPRA legislations, with special provisions to meet the unique needs of the Arctic Refuge.

It is crucial that no element of the NPRA legislation be used. The NPRA leasing program did not, for instance, contain normal provisions regarding unitization, for the maintenance of the

lease and the extention of the primary period by shut-in production, etc.

The Secretary should recommend to Congress that it adopt, with respect to ANWR, the ANILCA §§ 1008 (16 U.S.C. §3148) and 1009 (16 U.S.C. § 3149) onshore leasing program. The §§ 1008 and 1009 program is the competitive onshore leasing program utilizing the statutory authority and well developed procedures of the Mineral Leasing Act, as applied by ANILCA to the unique circumstances in Alaska. The important features of this program include procedures to provide significant environmental protection, and are intended to apply to game refuges in Alaska.

The procedures provided in § 1008 are similar to those contained in the Outer Continental Shelf Leasing Act (OCSLA, 43 U.S.C. § 1401 et seq.) including the preparation, pursuant to § 1008(f) of an exploration plan, and, pursuant to § 1008(g) preparation of a development and production plan. The Secretary retains the authority to monitor and modify the terms of such plans pursuant to § 1008(h), and if the Secretary determines that "immediate and irreparable damage will result from a continuation enforce of a lease," then the lease may be suspended or cancelled pursuant to § 1008(i).

Congress need not attempt to "reinvent the wheel." The preparation of an environmentally sensitive leasing program which applies to game refuges in Alaska has already been accomplished by Congress and all Congress need do is to implement it. In other words, the simplest action for Congress to take in this instance would simply be to revoke §§ 1002(i) (16 U.S.C. § 3142(i)) and 1003 (16 U.S.C. § 3143), and the §§ 1008 and 1009 program will automatically apply

INDUSTRY TRACK RECORD

The petroleum industry has a long and well demonstrated history on the North Slope of working closely in consonance with the physical and biological environment. A tremendous amount of funding and effort has gone into studying the environment and seeking ways to minimize adverse impacts. The lack of significant impact serves as a testimony to the ability of industry to operate in an environmentally safe and sound manner. Meanwhile, Arctic technology continues to be developed, assuring that future projects and developments are "state of the art."

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We are confident that the oil industry can operate in an environmentally safe manner and we urge the Secretary to recommend to the Congress that the 1002 study area be opened to leasing, development and production.

Sincerely,

BOYD BROWNFIELD, Chairman
Alaska Coalition for American
Energy Security

BB:tp:NS4:467

Alaska Friends of the Earth
Box 3847 Anchorage, AK 99510

Testimony on the Draft
Arctic National Wildlife Refuge, Alaska
Coastal Plain Resource Assessment
- - - - - - - - - - - - - - -
Kaktovik Public Hearing
January 6, 1987

My name is Mike Holloway and I represent Alaska Friends of the Earth. Friends of the Earth is a international citizen-based environmental group. We believe continuation of traditional subsistence cultures is as vital to the diversity and richness of the earth as is the protection of plants and animals. We believe oil exploration and development of the coastal plain of the Arctic Refuge is a threat not only to international wildlife resources, but also to the subsistence way of life.

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Every spring for thousands of years caribou have collected at the foot of the Richardson Mountains and traveled north to the coastal plain of Canada and Alaska to give birth to their young. The 1002 Report does not show the entire calving grounds of the Porcupine caribou herd, which includes the whole 1002 area. However, the select portion of the calving areas shown in the report emphasizes the high use of the area between the Hulahula and Aichilik rivers, in direct conflict with proposed oil actvities.

After the long migration, giving birth, and nursing a calf, caribou cows are at their weakest. At a time when they can poorly tolerate more stress, mosquitoes hatch out to agitate and drive herds of animals into a frenzy. When the insects are at their worst, caribou are almost continually on the move. They are easily stampeded. Insect season contributes to the high death rate for calves. Access to forage and insect relief habitat is crucial at this time. Any oil exploration and development activities would likely add to already high levels of stress and likely increase calf mortality. This could have a drastic effect on the continued health of the Porcupine caribou herd and should therefore be opposed by any agency concerned about the protection of wildlife.

According to the 1002 Report, oil development in the Arctic Refuge would include the construction of ports, roads, pipelines, and airfields, as well as thousands of people moving in. Elevated pipelines would discourage caribou access to coastal insect relief areas. All of this development and the associated air and road traffic would add unacceptable stresses and losses to the Porcupine caribou herd.

In village meetings in Alaska and Canada in the spring of 1978 elders agreed that development of oil within the coastal plain of the Arctic Refuge would be very harmful to the continued health of the Porcupine caribou herd, and thus bring hard times to those people who have lived in close relation to the caribou for tens of thousands of years.

Unlike Prudhoe Bay, water is scarce in the 1002 area. Here the coastal plain is narrow and sloped, not flat with lakes like Prudhoe. A lot of disturbance of the ground and river beds would be done to provide enough water and gravel for oil field development. Oil activities will certainly have an impact on water quality, especially considering the added problems of unavoidable oil spills and the storing of toxic drilling muds in reserve pits.

Of course, there are efforts to develop oil offshore of this area also. Water traffic and activity from all this development would effect marine mammals, especially noise-sensitive bowhead whales.

There are also the noted effects of loss of polar bear denning, musk ox habitat, and restrictions on subsistence hunting with the 1002 area. Page 129 of the report reads as follows: "Most important will be the likely decline or change in distribution of the PCH and the CAH and the harvest prohibitions near developed areas. These effects, in combination with adverse effects on other subsistence use species, disruption of traditional use sites, and likely psychological effects on a people accustomed to isolation, will result in a major adverse effect on subsistence uses within the 1002 area. Competition for resources and the potential for increasing restrictive hunting regulations may add to the severity of impacts on subsistence uses."

The 1002 report and the oil industry would have us all believe that we need to get the oil and gas out of the coastal plain as soon as possible, that pumping this area dry of oil and gas reserves is in the best interests of national economy and security. But at current rates of U.S. use, there would only be enough oil for several months. Energy conservation efforts could

easily save this amount.

The Arctic National Wildlife Refuge was established in 1960 to, in part, "conserve fish and wildlife populations and habitats in their natural diversity, to provide for continued subsistence uses by local residents and to ensure, to the maximum extent practicable, water quality and necessary water quantity within the refuge." In 1978 and 1980 the U.S. House of Representatives voted twice to make the coastal plain of the Arctic Refuge Wilderness, but the Senate necessitated this 1002 study and report.

The coastal plain is the most biologically productive part of the Arctic National Wildlife Refuge. It is the center of the cycle of life for caribou, birds, fish, and other animals. It must not be disturbed for the possibility of a few months oil supply.

To develop this area now for short term gain will destroy forever the wilderness characteristics of one of the most important biological areas in the entire Arctic. This is the only area of our Arctic slope now protected. Let it remain protected. We recommend the 1002 area be put into Wilderness with continued subsistence uses as protected in the Alaska National Interest Lands Conservation Act.

Thank you.

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Alaska Oil and Gas Association

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February 4, 1987

Director
U.S. Fish and Wildlife Service
Division of Refuges
United States Department of Interior
Room 2343, Main Interior Building
18th and C Streets
Washington, D.C. 20240

Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment

Dear Sir:

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The Alaska Oil and Gas Association (AOGA) is a trade association whose member companies account for the majority of oil and gas exploration, production and transportation activities in Alaska. AOGA appreciates this opportunity to comment on the draft Coastal Plain Resource Assessment.

AOGA commends the Department of Interior on the overall completeness and adequacy of the report in the assessment of the resources of the ANWR Coastal Plain. AOGA strongly supports the Department of the Interior's proposed recommendation that the entire "1002" study area be authorized for oil and gas exploration, development and production.

As demonstrated since 1973, the United States is vulnerable to serious supply disruptions and price escalation because of its dependence on foreign sources of oil. The Free World's sources of petroleum are heavily concentrated in the Middle East where two-thirds of the proven reserves are located. Saudi Arabia alone possesses one-fourth of the world's reserves. Increased future dependency on politically unstable Middle East nations is highly undesirable from a national interest standpoint.

Domestic crude oil production from existing fields is forecast to decline from the 8.9 million barrels per day average of 1985 to 6.2 million barrels per day by 1991, if oil prices prevail at about $15 per barrel. Current domestic crude oil production has already fallen to about 8.5 million barrels per day as marginal fields are being abandoned. Domestic production may decline as low as 4 million barrels per day by the year 2000 unless significant new domestic reserves are found and developed. Without

significant new discoveries, our nation could be dependent upon foreign sources for 60-75% of its demand, almost double the present level of dependency, within the next 10-15 years. Because it takes 10-15 years to explore, develop, and bring Arctic oil and gas resources into production, the opening of the ANWR 1002 area for development is now of timely and critical importance.

All the geologic factors favorable for significant oil and gas discoveries exist in the 1002 area, including source rocks that generate oil and gas, thick sequences of reservoir rocks, large structures to trap petroleum and a favorable geologic history. The 1002 area is one of the most promising areas for major discoveries of oil and gas of all untested onshore areas of the United States.

Exploration, development, and production can proceed on the coastal plain with minimal environmental effects through reasonably applied mitigation measures. Clearly, the 18 years of exploration and development of Prudhoe Bay and other North Slope oilfields and construction of the Trans-Alaska Pipeline System (TAPS) has shown that proven and current industry practices can ensure that development can proceed in a manner compatible with wildlife resources and ensure that no unnecessary adverse environmental impacts occur.

AOGA strongly endorses Alternative A, full leasing of the "1002" study area, as the most acceptable alternative consistent with the national interest. Alternative B, partial leasing, is based on a speculative premise that a traditional core calving area exists and is necessary for the maintenance of a healthy caribou herd. This has not been demonstrated in the scientific literature and there is a large body of data which indicates otherwise. Alternative C makes no positive contribution. Surface and regional geologic information already confirm that the area has oil potential. The amount can only be verified by on-structure drilling. Stratigraphic type drilling is an unnecessary duplication and its surface impact would be in addition to that eventually required for on-structure wells. Also, Alternative C will only delay any eventual production from the area. Neither Alternatives D, no action, nor E, wilderness designation, would determine whether or not substantial petroleum reserves exist in the "1002" study area. Alternatives D and E preclude reasoned planning and would deny the nation the positive benefits that could come from oil and gas production on the coastal plain.

Our more detailed written comments on the draft Coastal Plain Resource Assessment report are attached for your consideration (Attachment A). We have also attached copies of independent analyses on the report's biological portions, prepared by R. J. Jakimchuk (Attachment B), J. Curatolo (Attachment C) and A. T. Bergerud (Attachment D) at the request of AOGA. Also, attached is

AOGA's testimony presented at hearings held in Anchorage and Washington, D.C. (Attachment E). We submit our written comments as constructive input and urge the Service to consider them in preparing the final report for submittal to the Congress. Thank you for this opportunity to comment.

Sincerely,

WILLIAM W. HOPKINS
Executive Director

WWH:tp:NS4:477

Attachments (5)

ATTACHMENT A

COMMENTS OF THE
ALASKA OIL AND GAS ASSOCIATION ON THE
U.S. DEPARTMENT OF INTERIOR (DOI) - 1002(h) REPORT

EXECUTIVE SUMMARY

Page 2, paragraph 1: The point from this paragraph is the bottom line conclusion of the entire 1002 study. We would like to re-emphasize our support for this position. We concur that adverse effects resulting from development can be minimized or entirely eliminated through proven mitigation measures, lessons learned and technology acquired from the Prudhoe Bay development and from construction of the Trans-Alaska Pipeline System (TAPS).

Page 6, paragraph 2: "The Department did not include gas in its recoverable calculations as it was determined that the gas resources were unlikely to be economic at any point in the 30-year period considered."

Given the quantities of gas estimated to exist in the area, we question the statement that the gas resources are unlikely to be economic during the next 30 years.

Page 6, column 2, paragraph 4: "Oil and gas discovery will lead to industrial development..."

There may indeed be development pressure, but adverse effects can be controlled or mitigated.

Page 6, column 2, paragraph 5: This paragraph states that "changes in wildlife habitat and wilderness environment could include displacement and reduction in the size of the Porcupine Caribou Herd (PCH). The amount of reduction and its long-term significance for herd viability is highly speculative." (Emphasis added)

We strongly agree that many of the subsequent environmental consequences are overstated and highly speculative. As currently written, many of the conclusions of severe impacts and concerns for caribou populations are stated as fact, when in actuality, they are speculations not supportable by the experience at Prudhoe Bay or elsewhere in the Alaska arctic.

Thus, we ask that the authors of the report reconsider these speculative, "worst-case" statements. At a minimum, we ask that the authors emphasize the highly speculative nature of the conclusions in the environmental consequences section by including appropriate caveats and cautionary statements to avoid further proliferation of these consequences as statements of fact.

CHAPTER II - Existing Environment and
CHAPTER VI - Environmental Consequences

Comment 1 - Often the NEPA-mandated EIS process is forced to predict environmental consequences of new developments with little or no previous field experience to guide the predictions. Clearly, for the ANWR coastal plain, the test case has already been run at Prudhoe Bay. Collectively, the experience of the regulatory agencies and industry is captured in the DEIS on page 2: "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the coastal plain and generate similar minimal effects." Jointly, the industry and regulatory agencies have expended literally millions of dollars and hundreds of man-years effort to characterize the interaction of fish and wildlife with the oil field development in and around the Prudhoe Bay area. Undoubtedly this is one of the most-studied ecosystems in North America. This effort has led to the development of tried and proven mitigation techniques to ensure the compatibility of wildlife and oil field interests.

Furthermore, we support the statement, also on page 2 of the DEIS, that "Most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at Prudhoe Bay and from construction of the Trans-Alaska Pipeline System (TAPS)."

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Indeed, we would like to point out that all of the environmental activists' unwarranted predictions of 15 years ago, prior to the construction of TAPS, have subsequently been proven false. The demise of major caribou herds, alterations in water quality and major losses of habitat simply have not occurred. Conversely, the development of Prudhoe Bay and TAPS have allowed Alaskans to enjoy a period of economic prosperity in harmony with a high quality environment and thriving wildlife populations.

Comment 2 - Numerous sections of Chapter II and VI are devoted to discussions of research on the behavior and movements of caribou in and around oil field development. The main problem this discussion and the conclusions drawn is that habitat is not a limiting factor for any of the stages of the caribou life cycle. Therefore, conclusions regarding displacement of maternal cows or bulls carry little if any significance for the continued growth and survival of the herd. Since habitat is not limiting, loss of access to small portions of available habitat due to oil field development is not biologically significant.

We readily agree that some degree of modified behavior and displacement has occurred in response to habitat alterations in the Prudhoe field. However, habitat is not limiting caribou population growth for any Alaskan herds at the present time. Therefore, a degree of habitat loss as a result of development on the

coastal plain will be inconsequential to growth and productivity of the herd.

In the management of wildlife populations, the concept of habitat carrying capacity is the key to defining management goals for a herd. It is an established fact that neither the Central Arctic Herd (CAH) nor the Porcupine herd approach the carrying capacity of their ranges. Indeed, Skoog (1968) stated the "It seems likely that the Alaskan caribou population has remained far below range carrying capacity and that the total habitat has never been fully occupied. In reality caribou populations seem to have maintained densities much lower than the maximum dictated by food alone, and hence the reduction in total range becomes less meaningful." Thus, we agree with Skoog's conclusion that habitat is not currently limiting the growth of the (PCH) and that the loss of habitat represented by likely development in the 1002 area will not impact growth or productivity of resident caribou.

Comment 3 - The "core calving area" is assumed to be critical to (PCH) herd demographics and therefore any displacement from this area would necessarily impact productivity.

The report places undue emphasis on a core-calving concept when, in fact, the historical data for calving use do not support fidelity to a "core calving area." Historical data for calving distribution clearly show that the coastal plain from the Babbage River in Canada, across the 1002 area to the Canning River has been used for calving. Thus, calving habitat is more correctly referred to as a continuum across the coastal plain rather than a specific core area.

Chapter II, page 28 correctly points out that wide year-to-year variations in calving distribution can occur due to weather influences and the arrival of spring snow-melt. This acknowledged effect of weather further erodes the core-calving area concept and points out the wide annual variability and adaptability of caribou. During 1983, 1984, and 1985, calving estimates were 74% to 35% and 82% respectively in the 1002 area. These data clearly show the adaptability of the PCH to yearly variations in weather conditions and point out that calving distributions do vary widely.

The "core calving area" for the PCH has been arbitrarily defined as an area where high density (50 caribou sq. mi.) calving has occurred for at least 5 of the last 14 years. For much of this area, high density calving has occurred in 9 of the 14 years, which still leads to the obvious conclusion that calving has occurred outside the "core calving area" during 5 to 9 years. An important aspect of the "core calving area" to consider is what percentage of the overall calving habitat it represents. From Table VI-5, the total "core calving area" is 311,000 acres, while total concentrated calving occurs over 2,117,000 acres. Thus, core calving represents 15% of all concentrated calving areas, and would represent an even lower percentage if peripheral calving

areas were considered. The conclusion is that the PCH has successfully calved over a very large area in the past and while the core area is obviously important to the herd, it is not necessarily critical.

The assumption is made that areas outside the "core calving area" have less important habitat values or higher exposure to predators. If this were so then reduced productivity should be apparent from the years that the herd used these alternative areas. This has not been demonstrated and it is known that the herd has grown steadily since the early 70's.

In considering the effects of displacement from traditional calving grounds, examples can be drawn from the literature. Davis et al., (1983) report that "in 1982, the Delta Caribou Herd was apparently precluded from calving in its traditional core areas because of persistent snow cover and instead used an alternate calving area roughly within the area burned in 1979, even though snow conditions were as favorable in unburned areas northeast, northwest, and west of the 1979 burn, where some calving occurs in most years. Calving in 1982 was quite successful, which suggests that caribou may have considerable flexibility in their habitat requirements." The CAH and Taimyr Herd in Russia also provide examples where industrial activity has had no measurable effect on herd productivity.

Skoog (1968) and Bergerud et al. (1984) believe that caribou are not limited by available habitat . Shank (1979) states that:

> "Stating that animals have no adequate habitat into which they can disperse is tantamount to saying that the population is being density controlled. In fact, northern large mammals (excepting sheep) are most likely not often resource limited suggesting that at least some degree of distributional alteration could be accommodated without drastic demographic consequences."

Therefore, conclusions regarding the relative importance of the Jago highlands as a core-calving should be de-emphasized throughout the report.

Comment 4 - In assessing the environmental consequences of possible oil and gas development in the 1002 area, the USFWS has chosen to apply its USFWS policy (46 Federal Register, p. 7644 - 7663, January 23, 1981) (1002 Report, p. 12). In so choosing, USFWS has focused their impact analyses on losses of habitat value and has quantified their impact conclusions in terms of acres lost. Then, assuming a direct correlation between acres of habitat available and the population sizes of resident species, USFWS has translated their projections of acres lost to population reductions.

This approach to resource management is justified primarily on the basis of the USFWS Mitigation Policy and has never been examined

by USFWS for its scientific validity in the arctic. The foundation of the USFWS Mitigation Policy is the management of habitat as a means of managing the productivity of fish and wildlife populations. It is inappropriate, however, to use a habitat-based system to manage a population when habitat availability has not been shown to be a mechanism by which that population is regulated. The policy is particularly inappropriate in the arctic where habitat has not been shown to be a limiting factor for most species, and is particularly meaningless with respect to caribou. The published literature on caribou clearly supports the finding that herd productivity (and therefore size) is regulated by direct mortality due to predation and hunting. Continental caribou herds have not been shown to be limited by habitat availability.

Since habitat is not a limiting factor for many of the Arctic species, it is more biologically meaningful to focus on impact mitigation. The most biologically effective approach to assessing and mitigating effects of development on wildlife is first to determine systematically how project activities and structures will adversely affect a population and then to apply mitigative measures that will avoid or minimize the mechanism by which those activities and structures disturb the population.

The USFWS Mitigation Policy should not be the basis for either impact analysis or mitigation requirements in the arctic.

Comment 5 - The 1002 Report states on page 98 that "the mitigation policy recommends that legally designated or set-aside areas, such as National Wildlife Refuges, be given special consideration as either Resource Category 1 or 2."

The designation of USFWS Resource Category 1 for a portion of the caribou calving habitat is inappropriate. The habitat in question is not "unique or irreplaceable". It has not even been established that the PCH has a specific "core" calving area. The Porcupine herd's calving concentrations vary annually in number and location, in some years falling within the same general area, in other years separated by hundreds of miles. Calving occurs primarily in the uplands along the northern sides of the Sadlerochit, British, and Richardson mountains, a region extending approximately from the western boundary of ANWR at the Canning river to the western Mackenzie Bay area in Yukon Territory. This principal calving range encompasses an east-west distance of over 200 miles and an area exceeding 6,500 square miles, larger than Connecticut. In 1982, for example, the majority of the Porcupine herd calved east of the United States - Canada border in Yukon Territory, completely outside ANWR. Also, 1986, the herd calved almost entirely outside the 1002 area. In any given spring, there are usually several areas where densities of calving caribou cows are higher than elsewhere in the calving range. These concentrations may be several hundred miles apart, some in Alaska, some in Yukon Territory, and may vary greatly in location and number from one year to the next, while remaining inside the herd's principal calving range. The idea of a "core" calving area consisting of a specific tract of land with fixed boundaries, used consistently and predictably from year to year, is a misconception. Calving habitat

is more appropriately represented as a true continuum across the coastal plain. Thus, the "unique and irreplaceable" nature required for designation as Resource Category 1 does not pertain.

Comment 6 - The report confuses behavioral responses with demographic responses. That is, the report proposes that if a behavioral response is observed or predicted in an individual or group, then the species productivity has been or will be negatively impacted.

Shank (1979) discusses this confusion directly. He defines a behavioral disturbance "as any behavioral response to human-caused stimulus which results in actually or potentially reduced reproductive fitness. If human action results in an animal acting in a manner in which it would not otherwise have acted and if this alteration is thought to cause a reduction in that individual's capacity to produce a viable offspring, then behavioral disturbance has occurred. The issue is confused by the occasional unavoidable use of the term 'disturbance' to describe the human-caused stimulus itself."

Shanks further states "Behavioral disturbance becomes manifested in animals in three distinct analyzable modes: overt behavioral response, physiological response, and demographic responses."

There is a consistently blurred distinction in the 1002 report regarding what is a behavioral response and what is a demographic response. The discussion of effects on caribou and muskox are excellent examples of this confusion. In both cases observed behavioral responses (flight reactions or displacement) are used to estimate areas of affected habitat. Although habitat is not a limiting factor for either species, these avoidance behaviors are then equated to demographic responses. As Shank (1979) states:

> "What is commonly forgotten or ignored...is that disruption of normal behavior is not necessarily bad in itself. For behavioral disturbance to be of practical concern, it must be demonstrated that it does or does not, have demographic consequences. Failure to provide this link is, without question, the major failing of current research."

Comment 7 - Declines in all major predators are assumed to occur due to the hypothesized decline in caribou population.

The discussions of wolves, brown bears, wolverines and golden eagles all predict a "moderate" impact, largely due to a hypothesized 20-40% decline in the PCH. This reasoning is flawed for several reasons:

1. No alternative prey species are considered.

2. The 6-8 weeks of PCH availability to predators on the coastal plain would have to be a critical period for all species where the predators relied almost entirely on caribou.

3. No consideration is given to the fact that the high numbers of the PCH relative to the low numbers indicates that the predator - prey system is not in a stage of dynamic equilibrium where a small change in one population leads immediately to a change in the other.

As an example of the problems with the assumption that PCH numbers are now limiting the 4 predators discussed, wolves will be examined in detail below because wolf-caribou systems have been studied more extensively. The logic behind the argument applies to the other predators as well.

Population estimates for the PCH ranged from 100,000-106,000 for most of the 70's, which represents a decline slightly greater than the maximum 40% predicted by the 1002 report. Yet wolf numbers in the 1002 area are not estimated to have been significantly lower than the report's estimate of 5-10 wolves, and in fact may have been higher. "Wolf predation on caribou in the ANWR study area during calving and post-calving is probably low." (USFWS 1982) It is fairly safe to assume that wolf populations on the 1002 area have been held artificially low through rabies and legal and illegal hunting and that PCH population size is not a dominant factor.

Keith (1981) shows a direct relation between wolf population density and ungulate population biomass. However, the theory behind this relation cannot be applied to the 1002 area because:

1. Wolf densities are quite low relative to the available biomass of the PCH, such that Keith's relation does not hold. This suggests other factors control wolf populations in the 1002 area.

2. The PCH are only seasonally available to resident wolves, and then at a time when wolves are tied to denning sites to the south of the 1002 area.

3. The availability of the PCH occurs in summer, not during the more critical winter period, when resources are more scarce and wolves have fewer prey alternatives.

For the reasons discussed above it is not reasonable to assume that declines of 20-40% of the PCH population will have any effect on wolf numbers. Negligible to minor impact on other predator species would also be expected from the hypothetical worse case of a 20-40% decline.

Comment 8 - The standard for judging environmental effects is not discussed. Based on numerous examples documented in the specific comments section, it is apparent that the standard used in the 1002 report is "worst case". NEPA as now amended currently requires that a "reasonably foreseeable" standard be used.

Although the current 1002 report is a legislative EIS and not one occurring directly as a result of NEPA, most CEQ guidelines apply

to a LEIS as well. As stated above, the requirement to prepare a "worst case analysis" when faced with incomplete or unavailable information was rescinded in April, 1986. Since most of the environmental consequences result from worst case analysis, this approach requires modification. The large amount of study and experience on the North Slope allows for an analysis of "reasonably foreseeable" effects.

Page 23, column 2, last paragraph (also page 104): We feel that undue emphasis is placed on the plant, Thlaspi arcticum. Although the plant is known to occur in the 1002 area, its status and distributional ecology are not well understood. Currently, the plant has no status either as threatened or endangered, and yet it is treated as endangered status throughout the report. More information must be developed on the occurrence and distribution of this species before stipulations and set-back requirements can be promulgated.

Page 28, paragraph 1: "The long-term maximum and minimum population of the PCH and the carrying capacity of the PCH are unknown."

This is a key point not mentioned again in the entire report. We agree that the habitat and range carrying capacity for the PCH are indeed unknown. However, it is an accepted fact that the PCH and most circum-polar caribou herds do not approach the carrying capacity of their ranges based on food, calving habitat, insect relief or any other habitat basis.

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Since habitat is not limiting growth, ample room exists to accommodate development interests in the 1002 area without potential for impacts on the size or growth of the PCH. This is a fundamental tenet of caribou biology and we would like this relationship to be much more strongly emphasized in the net conclusions of the 1002 report.

Page 28, paragraph 3: "The core calving area is a location to which pregnant cows have shown a strong fidelity as traditionally favored calving habitat. Those concentrated calving areas used in at least 5 years during the 14-year study were identified as the core calving area."

We disagree that use in 5 of 14 years illustrates "strong fidelity". Instead, we believe that a minimum of 1/2 of the historical record is necessary to suggest any fidelity at all.

Page 28, column 2, paragraphs 2 and 3: We are concerned that the report places undue emphasis on a core-calving concept when, in fact, the historical data for calving use do not support fidelity to a "core calving area." Historical data for calving distribution clearly show that the coastal plain from the Babbage River in Canada, across the 1002 area to the Canning River has been used for calving. Thus, calving habitat is more correctly referred to as a continuum across the coastal plain rather than a specific core area.

low use for calving represents an historical distribution rather than a displacement of calving to other areas.

I do not disagree that cows with neonates are sensitive to disturbance. There is ample evidence to support this sensitivity not only for caribou but for other cervids and bovids as well. This sensitivity appears to be strongly associated with a behavioral repertoire in response to predation. I do not disagree, either, that developments such as roads with traffic and human activity, are disturbing to cows with calves, or that some types of barriers can physically exclude caribou from their ranges. I do, however, distinguish between the sensory disturbances associated with the Dalton Highway which have been documented, and the notion of avoidance or displacement along the TAPS corridor which implies a permanency that is not justified by the evidence. I feel that the pipeline itself is not a source of disturbance - most of it is buried in the Sag. River floodplain. Most of the existing disturbance comes from the traffic and hunting along the Dalton Highway. But even here, except for hunting mortality, I feel that the disturbances are temporary and are not instrumental in altering either the behavior or distribution of caribou along that corridor in any fundamental or permanent way. In short, I think that caribou are frequently disturbed by activity within the corridor but they do not avoid it for this reason.

Evidence suggesting that disturbances to date are temporary and sensory in nature is available from a broader review of the growth, distribution and movements of the Central Arctic herd (previous papers). There is no indication that there has been any change in distribution, life cycle patterns or the fundamental ecology of caribou resulting from the interaction with existing oil development. On the contrary, the herd has grown in size and has continued to use and occupy habitats in the region in a manner consistent with pre-development use. The best evidence for this is where pre-development baseline data exist, such as the Kuparuk and Milne Point developments. There are no overall effects on seasonal distribution, habitat use or numbers which can currently be attributed to petroleum development. The seasonal cycles of caribou in the Central Arctic region continue despite the development which only recently includes their major pre-development calving ranges.

As development continues and expands, it is important to monitor and document interactions with caribou and to assess their significance. If decisions are taken that any habitat alteration is deleterious and this forms the basis for permitting, it will be difficult to justify management oriented research because of the a priori conclusion that all changes are equally deletrious. The most important requirement for future research, in my view, is to identify where compatibility

exists between a viable caribou population and development, to document where development activities are incompatible, to identify the nature of the problem, and to develop means of effective mitigation.

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ATTACHMENT C

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Mr. William Hopkins
Alaska Oil and Gas Association
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17 January 1987

Dear Mr. Hopkins:

Enclosed is a copy of my review of the ANWR report. I apologize for it being late; the Post Office lost my Express Mail package. Please feel free to contact me if you have any questions or comments. You can contact me at the above address if I can be of further assistance.

Sincerely,

James Curatolo
President

Enclosure

A REVIEW OF THE DRAFT REPORT

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,

COASTAL PLAIN RESOURCE ASSESSMENT

WITH RESPECT TO CARIBOU

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O-21

I have reviewed the Draft Report Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment, solely for its content as it refers to the effects of oil development on caribou. All of my comments reflect my own opinion on this subject.

Overall, I thought the report provided a thorough examination of the various aspects of caribou biology as it related to oil development in the Arctic National Wildlife Refuge (ANWR). The report's final conclusion that a substantial decline in caribou populations would occur under a full leasing program, however, do appear to be extreme. In general, I believe oil development in the 1002 area would result in localized displacement of the PCH caribou during calving and localized changes in movement patterns during insect season. These changes would have a negligible effect on caribou productivity, however, because caribou would still have adequate habitat for calving and would still be able to access most of the insect relief habitat. The "core" calving area concept in the report probably overemphasizes the importance of a portion of the Porcupine Caribou Herd's (PCH) calving ground. It should be noted that the PCH's calving ground extends from the Canning River in Alaska to the Babbage River in the Yukon Territory. The PCH has calved successfully throughout this region.

Oil development in ANWR would be on the periphery of the Cetral Arctic Herd's (CAH) range. Effects of development in ANWR on the CAH should be minimal because the herd will rarely contact it. The CAH has shown a high degree of resiliance to the effects of oil development considering that two oilfields are presently within its home range, and the herd continues to increase.

The Secretary of Interior's recommendation to allow full leasing in the 1002 area of ANWR appears to be justified as far as its effects on caribou are concerned. The mitigative measures that were suggested would help minimize the intensity of potential disturbances, resulting in an increased rate of habituation and greater use of habitat near oil development. A phased leasing system will distribute disturbances over time and space, thus minimizing the extent of potential disruption to the herd. Once oil development is completed, a policy that maintains human occupancy of the oilfield to a minimum will allow, over time, a re-occupation of areas where caribou use may have declined during construction.

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Specific Comments:

1. P. 28, ¶ 3: Almost the entire basis for determining the magnitude of oil development impacts on the PCH lies in the identification of a core calving area. No rationalization is given for selecting greater than 36% (5 of 14 years used) as the cutoff point. Indeed, if a more logical criterion, such as 50% (7 of 14 years used), was chosen, then the core calving area is halved in size. No attempt is made to enumerate how many caribou were contained in the core calving area beyond the 50 animals/square mile minimum.

2. P. 28, ¶ 6: To put the calving ground in better perspective, the entire 14 years of data should have been summarized rather than only 1983 and 1984. There have been years when the entire herd calved in Canada.

3. P. 28, ¶ 7: Caribou cows are very sensitive to disturbance during the calving period. The disturbances caused by oilfield operation are mostly confined to the roadway system. Caribou can easily avoid the roadway system, resulting in localized displacement. Cows will then calve at a point where human activity is no longer preceived as a disturbing factor (1-2 miles). This is the case in the Kuparuk Oilfield.

4. P. 29, ¶ 3: This paragraph suggests that the major insect relief habitat for the PCH is the coast. However, in most years the majority of the herd travels inland (southeast into Canada) and uses the mountains for relief habitat.

5. P. 29, ¶ 9: Most caribou of the CAH that calve in the vicinity of the Canning River usually do so west of the Staines River. During an aerial survey conducted in the 1984 calving season few cows were found between the Canning River and the Tamayariak River.

6. P. 29, ¶ 9: The statement that "little or no calving has been observed since 1973" is misleading because no one looked before 1973. I was in the Prudhoe Bay area in the summer of 1972, before oilfield development, and did not see any calves. There is no evidence to suggest that a significant number of cows ever calved in the Prudhoe Bay area. A more appropriate comparison concerning oil development and calving caribou is found in the Kuparuk Oilfield where there are localized changes in distribution, but continued use of the area by calving caribou.

7. P. 98, ¶ 2: The concept that a specific area in a calving ground has a unique value is not supported by scientific data. The only known unique aspect of a calving ground is that caribou calve there. Caribou behavior has

evolved to minimize predation during calving by cows synchronizing parturition, aggregating during calving, and selecting relatively predator-free habitats in which to calve. The aggregation and synchronization results in a high density of calves over a relatively small time and area, which "overwhelms" the predators (the chance of any individual calf being caught is lower than that of other strategies). Caribou cows accomplish this strategy by returning to the same area, thus forming a " tradition". However, caribou are "dynamically traditional" because the exact location of a concentration in a calving ground varies from year to year. If, for example, a certain portion of the calving ground is made unavailable to caribou due to heavy snowfall, then calving will occur in another portion of the calving ground. The corollary to this is that if intense oilfield construction causes part of the calving ground to be "unavailable" to caribou, the cows may be displaced, but there should be no effect on calving as long as there is a sufficient portion of the calving ground remaining. The only universal attributes of a calving ground is that it is a relatively predator-free and has open space where concealing habitat is minimal.

8. P. 101, ¶ 4: The suggestion that the routes of the pipeline and road should be independent, allowing for a separation between the pipeline and road, is probably one of the most important mitigative measures that could be undertaken.

9. P. 105, ¶ 9: The 3000 to 4000 caribou from the CAH that use the 1002 area , do so infrequenlty. Large numbers of CAH caribou would probably use the 1002 area only during an extended movement due to mosquito harassment, which would last for several days or less. In most years, few CAH caribou calve in the 1002 area.

10. P. 106, ¶ 1: Comparison of the CAH in the Kuparuk Oilfield to the PCH in the 1002 area is reasonable. There is a calving concentration area within the Kuparuk Oilfield and nearly half of the herd repeatedly comes in contact with oil development during the summer. CAH caribou in the Kuparuk Oilfield probably encounter oil development more often the PCH caribou will.

11. P.107, ¶ 5: Displacement of the CAH from an historic calving ground has not been documented. It has been hypothesized that this occurred, although no data exists to show that caribou ever calved in the Prudhoe Bay area in any number.

12. P. 108, ¶ 2,5: The expectation that PCH productivity would decline if calving was displaced from the core calving area is not supported by data. Productivity was good in all years studied including those years when the entire herd calved in Canada or entirely outside of the core calving area.

13. P. 108, ¶ 7,8: This report states that caribou would be displaced two miles from oil development. However, this displacement would not be total, but would result in fewer caribou near the road system. The habitat values of the area would be diminished, not completely lost.

14. P. 109, ¶ 2: Barriers to caribou movements would not decrease calving success as long as sufficient calving habitat remained accessible and available. If the proposed mitigative measures were implemented, few barriers would occur.

15. P. 109, ¶ 3: There is little or no difference in the caribou reactions to a buried pipeline and a road without traffic. Large, mosquito-harassed caribou groups will cross elevated pipelines. It is only pipelines next to roads with traffic that can cause a significant decrease in crossing success.

16. P. 109, ¶ 6: It is highly unlikely that the PCH will refuse to cross oilfield development during insect season if mitigative measures are are followed (especially pipeline and major road separation). Suggesting that caribou avoid areas near oilfield activity (the two mile sphere of influence) during insect season is incorrect. The two mile sphere of influence refers to a partial displacement of caribou during calving and does not occur when caribou are harassed by insects. Failure of caribou to reach insect relief habitat is unlikely with proper mitigation (pipeline and road separation). Furthermore, the PCH has been exposed to overhead stimuli, as they usually winter in forested regions of Alaska and Canada. PCH caribou may react less severely to pipelines than CAH caribou, who live entirely on the tundra.

17. P. 110, ¶ 7: The total kill for the CAH in the winter of 1985-86 is probably substantially greater than the estimate of 800 given in the report. Actual postcard returns tallied 875 animals. Considering almost all of the kill was illegal it is not inconceiveable that many people would not report their take. The number of caribou killed in 1985-86 may be more than 10% of the herd and could be a significant factor in the CAH's population dynamics.

18. P. 111, ¶ 3: It does appear possible to mitigate the loss of caribou habitat in Resource Category I by decreasing potential disturbing factors so that fewer acres of that habitat type would be affected.

19. P. 111, ¶ 5: Mitigation Measure #1 suggests that ramps and elevated pipelines are the alternative to pipeline burial. If pipeline burial is not practical, the best alternative is elevated pipelines that are separated from roads (Mitigation Measure #5). Ramps are not an effective measure due to the extremely small size of a ramp with respect to an oilfield, and the relatively high cost of construction. Separation of pipelines from roads can be widespread in the area of coverage, and is potentially very cost effective (pipelines run straight, roads follow dry topography). In theory, placing mitigative measures in areas such as "natural crossings" sounds logical, but in practice it is nearly impossible for two reasons. First, caribou movements are variable, depending on insect levels, weather conditions, and the area selected for use during any particular time period. Second, and more importantly, the development of an oilfield will result in a localized change in caribou movement patterns, which cannot be predicted with any great degree of accuracy beforehand. The most reliable mitigation method is a generalized scheme where pipelines and roads are separated whenever practical. Over time, this would allow caribou to develop movement patterns through the oilfield and minimize loss of habitat due to inaccessibility. Separation of roads and pipelines will also decrease the intensity of disturbances that are present, which will increase the rate of habituation to the entire project.

20. P. 111, ¶ 7: Mitigation Measure #2 can be an important technique. Caribou will habituate to a disturbance much more readily if the disturbance is kept at low levels. Regulating unnecessary traffic in areas of high use by caribou can be very effective. A limited access road such as the Oliktok Road in the Kuparuk Oilfield is a good example. This discussion is also applicable to Mitigation Measures #4, 6, 7, and 10.

21. P. 111, ¶ 8: Mitigation Measure #3 is important and should be followed. The only major loss to the CAH population resulted from hunting along the TAPS haul road.

22. P. 111, ¶13,14: Monitoring the dynamics of the caribou herds during oil development will provide additional information for focusing on real problems rather than hypothetical ones.

23. P. 112, ¶ 2: The CAH and PCH will probably not reach the "carrying capacity" of the habitat contained in their home ranges . Caribou herds do not reach the carrying capacity of their range, except in certain island populations, because natural and human-caused mortality factors restrict herd growth before habitat limitations come into play. No free-ranging caribou herd has ever reached the carrying capacity of their habitat.

Mitigation only begins at 400 feet and the wider the separation, the better, depending on the specific circumstances involved.

(c) Ramps should not be used as a general mitigative measure. Their only effective use is in a "corral" situation where pipelines near a facility might completely encircle an area. Ramps are too site specific and do not work well near traffic, making them ineffective in most circumstances.

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ATTACHMENT D

AN ASSESSMENT OF PETROLEUM DEVELOPMENT ON THE STATUS OF THE PORCUPINE HERD

by

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O-25

Prepared for the

Alaska Oil and Gas Association

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The U.S. Federal government has proposed that the 1002 lands of the Arctic Coastal Plain and in the Arctic National Wildlife Refuge, Alaska, be opened for exploration and full leasing for petroleum supplies. Included within the 1002 proposed lease area are 242,000 acres of 311,000 acres (78%) of the core calving area of the Porcupine Herd (core defined as areas used in $\geq$ 5 of 14 years) and 934,000 acres of 2,117,000 acres (45%) of concentrated calving area of the herd (areas with $\geq$ 50 animals/mi^2). Also included in the 1002 area is the habitat where nearly the entire herd, now estimated at 180,000 animals, masses in early July to seek relief from mosquitoes. The herd leaves the 1002 area in mid to late July and does not return until the following May. I have been asked as a caribou biologist, by AOGA, to evaluate the impact of full leasing and development on the viability of the herd and specifically to critique the environmental impact statement prepared by the Fish and Wildlife Service on the proposed full leasing and development.

Background Theoretical Considerations

The environment of the caribou (Rangifer tarandus) can be segregated into: other animals, a place in which to live, food and weather (Fig. 1, Andrewartha and Birch 1954). The interactions of caribou with insects, open habitats, food and weather represent variable contingencies that result in facultative responses by caribou that can be modified relative to disturbance factors (Fig. 1). The interactions of caribou with other caribou and with wolves in open environments are consistent contingencies affecting reproductive fitness - these are obligatory responses that will respond to change very slowly, if at all, when habitats are modified.

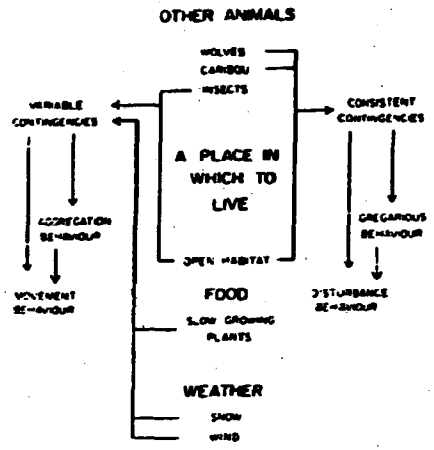

Figure 1. Diagram of the proposed manner in which the four components of the environment interact as variable and consistent contingencies in the development of movement, aggregation, gregarious and disturbance behaviour of caribou (Bergerud 1974b).

I feel that the major behavioral responses of caribou in the 1002 area are the insect x weather facultative responses and the predator x habitat obligatory responses. Unlike many biologists, I do not feel that food is a major factor in the calving and massing of caribou in June and July in the 1002 area.

Are Caribou Wilderness Animals?

Much of the concern for the well-being of caribou arises from the view that caribou are wilderness animals that cannot adapt to coinhabiting ranges with man. This concept has arisen, in part, because caribou are found on ranges far removed from major developments. Also, caribou herds have declined on the southern edge of their range as settlement proceeded (Cringan 1956). Thirdly, caribou are unwary and easily over-exploited. And lastly, caribou utilize slow-growing lichens that are many years in recovering following forest fires.

However, a closer examination of these facts suggests that they are not sufficient to define caribou as wilderness animals nor to imply that loss of wilderness per se will bring about the demise of herds. Obviously, mule deer (Odocoileus hemionus) and antelope (Antilocapra americana) were once far removed from European man in the 1700's, but they are not called wilderness animals today; they have adapted. The decline of caribou along their southern boundary was due to increased predation from man and natural predators, as well as from disease contracted from white-tailed deer (Odocoileus virginianus) (Bergerud 1974a) and not from outright habitat alteration. There is no evidence that herds abandonned their annual ranges because of an intrinsic aversion to man or man-made

structures. The nomadic life style of caribou and its propensity for shifting habitats makes it as adaptable to short term habitat alterations as it is to the slow succession of lichen following natural fires and regeneration cycles. The unwary nature of caribou means that they can coinhabit range with man if not overhunted. In fact, reindeer (Rangifer tarandus) are an important domestic animal in Eurasia. Several caribou researchers have noted that caribou are both highly adapted and adaptable (Skoog 1968, Bergerud 1974b, Roby 1978, Skogland, pers. comm.).

Resource-Limited by Food?

Another basic philosophy that influences how some caribou biologists view the impacts of development on caribou is the closely held belief that the carrying capacity of the habitat for caribou is determined by food resources, the slow growing lichens in winter, and green plants in the summer. It follows from this belief that if caribou are displaced by development and lose part of their range, then the potential carrying capacity is reduced. Another concern is that, if the animals are at a carrying capacity limited by food, then additional disturbance may stress the animals, thereby reducing reproductive rates and increasing mortality rates. A further refinement is that caribou select their calving grounds to maximize the quantity and quality of the diet - to optimally forage (Kuropat and Bryant 1980). Hence displacement from the calving areas should adversely affect the herd.

As an example of this type of thinking, Whitten and Cameron (Arctic (1984:293) said, speaking of developmental impacts, "For example, a series of mild winters might compensate for the negative effects of harassment or habitat loss." Bergerud, Jakimchuk and Carruthers replied (Arctic 1984:295) "The supposition advanced by Whitten and Cameron...assumes:

(1) that winter conditions limit caribou numbers (this has never been substantiated in mainland North America);

(2) that harassment results in caribou mortality - never substantiated and the extreme case (Pot Hill data) given in our paper represents the best available contrary evidence pertaining to this assumption;

(3) that habitat loss (unspecified) has governed caribou numbers (greater evidence for the opposite case is available in the literature);

(4) that ranges are at carrying capacity - which is not the case for any of the herds we discussed;

(5) finally, that the supposition has some basis in fact. However, this supposition has never been researched."

Such a seemingly innocuous statement, as made by Whitten and Cameron, reveals a basic philosopy of food limitation, and is the cornerstone of many dire predictions of caribou demise with development.

But in fact, the carrying capacity of this herd is not limited by winter food supplies. The dynamics of the Porcupine Herd were modelled in a workshop at the University of British Columbia in 1978. The herd then numbered 110,000. The simulation model indicated that the herd was not limited by winter food supplies. Food would not be limiting until the herd reached about one million animals. The simulation even indicated that if no animals crossed the Dempster Highway and the entire range east of the road in the Ogilvie Mts was lost, the herd could still prosper if food resources were the only consideration. The same simulation, however,

indicated that the herd would be limited by wolf predation at densities far below those imposed by food resources (Walters et al. 1979).

Both reproductive and natural mortality rates of caribou are little affected by winter food supplies. Fecundity is relatively fixed at 1 calf/female/year for females $\geq$ 3 years-of-age regardless of densities (Bergerud 1971, Skogland 1986). Skogland provided an equation for recruitment for females $\geq$ 1 year in Norway, where there are few predators, where $R = 0.65 - 0.012\ Dw - 0.00013\ Dw^2$ where Dw = caribou/km^2. Even at a density of 10 caribou/km^2 of winter range, recruitment would equal 52 yearlings/100 females. At a density of 10 animals/km^2 the Porcupine Herd would number 1,800,000 animals; and even this density would not hold since this many caribou would have greatly expanded their range.

In North America, in herds coexisting with wolves, recruitment is commonly less than 25 yearlings/100 females and yet densities seldom exceed 2 caribou/km^2 (Bergerud 1980). This disparity in densities and recruitment between Norway and North America is due to predation in North America. Predation limits populations far below that provided by food supplies (Bergerud et al. 1983).

Carrying capacity has been defined as that point where recruitment = natural mortality (Caughley 1977). For caribou on mainland North America the carrying capacity is determined by the abundance of predators (Bergerud and Elliot 1986). Recruitment equalled natural mortality for 22 herds at 6.5 wolves/1000 km^2 (Bergerud and Elliot 1986) regardless of the density of caribou on the winter range.

Long Term vs. Short Term, Individual vs. Herd

Bergerud, Jakimchuk and Carruthers (1984) reviewed the demography of 8 herds relative to disturbance by human activities. They concluded that the major impacts were (1) the building of transportation corridors that permitted increased human harvests of caribou and (2) the improvement in calf survival when wolves were reduced. Caribou herds continued to cross roads, and herds such as those in Newfoundland, still prospered when habitats were altered by logging and flooding. The Central Arctic Herd in Alaska increased from about 5,000 to 13,000 (early 1970's to 1984) despite the Prudhoe Bay oil field.

The conclusions of Bergerud et al. (1984) were debated in letters to the editor by Whitten and Cameron (Arctic 1984:293), Klein and White (Arctic 1984:293-294) and Miller and Gunn (Arctic 1985:154-155). Rebuttals to all letters were provided by Bergerud and Jakimchuk (Arctic 1984:294-295, Arctic 1985:155-156). Klein and White agreed that the herds were increasing but thought that disturbance must be viewed on a long term basis. But this is a nonsequitur - if there are no effects of disturbance for a short term, how are they significant on a long term? The long term is the addition of short term intervals. Miller and Gunn agreed that the herds were increasing but stated that disturbance must be viewed on the basis of the individual, not the herd. Again, this is a nonsequitur - since individuals comprise herds, if the herds are prospering, then the individuals are also faring well.

Now, there are new arguments that the prosperity of the Central Arctic Herd in the face of development cannot be used to gauge the success of the Porcupine Herd when faced with similar development and the question

is, why not? The Central Arctic Herd spends its entire annual cycle quite close to the development zone - the Porcupine Herd spends only two months. All the animals now alive in the Central Arctic Herd have been born since development commenced; they have adapted. The basic reason that some biologists cannot accept that caribou can cope with development is their ingrained views that caribou are "wilderness animals" and that food supplies are limiting. The new research work planned for the Porcupine by the Alaska Fish and Game is proceeding on this basis. Now caribou will be radio-tracked by satellites and energy budgets calculated daily, perhaps hourly. It all flows from the unsupported belief that nutrients and energy will ultimately limit total numbers of caribou in this herd.

Biology of Calving and Aggregating Behavior

Before we can evaluate the potential impacts of development on the Porcupine Herd we must determine why the animals use the Coastal Plain in the 1002 area for calving and grouping after calving. Basically, what are the environmental factors that determine where caribou locate their calving grounds?

The calving grounds of the migratory herds in the Holarctic are usually located on the northern distribution of the herd's range in tundra habitats (Appendix I:Fig. 1). The cows leave the bulls and commence migration towards these areas generally in April before green plants appear. Some herds migrate northeast, others northwest, and two herds south of Hudson Bay even migrate east. The consistent factor in all these migrations is that cows cross the tree-line at right angles

(Appendix I:Fig. 1) Wolves in North America generally den near tree line (Appendix II). By migrating at right angles to the tree line the cows can maximize their distance from wolves, with the least effort. Caribou cows migrate and calve on the bleak inhospitable arctic tundra to reduce contact with wolves (Appendix II) and there are very few wolves on the calving grounds of the Porcupine Herd.

An alternative hypothesis is that caribou seek their northern tundra calving grounds to optimally forage, primarily on Eriophorum angustifolium (Kuropat and Bryant 1980). I was able to disprove this hypothesis in 1984 by comparing the nitrogen in fecal droppings and plants at the time of calving between cows on calving grounds and bulls still south of calving grounds. The bulls were feeding in more nutritious plant communities than the cows (Appendix I:Table 1). If the calving grounds were really unique in the quality of forage then the bulls should have been with the cows. If the cows were primarily "interested" in the quality of their forage, they should have stayed back with the bulls. The fact that cows commonly calve on Eriophorum tussock associations may be due to the particular microtopography of these habitats which results in little accumulation of snow and early snow melt (Benson 1969). That is not to say that caribou do not optimally forage within the constraints of selecting the best overall habitat to avoid predators. However, over all, the diet of the cows in late May and early June is not highly nutritious (Appendix I:Table 1) and this has resulted because of their own migratory behaviour.

The location of the calving grounds varies between years because of annual variations in snow cover. The caribou arrived on the calving

grounds of the Porcupine Herd on 5 May 1974 and 12 May 1975 when snow cover was light; they arrived 20 May 1976 and 24 May 1973 with medium snow cover and even later on 26 May and 30 May when winter snows had been heavy (Curatolo and Rosenaau 1977). The calving ground of the Porcupine Herd is on the areas of reduced snow cover generally sandwiched between the foothills and the slightly colder coastal strip (Fig. 2). In an early spring, as in 1974, the animals will be farther west and north than in late years such as 1972 and 1973. In an early year, more caribou will calve in the 1002 area than in a late year. In 1982, the season was so retarded that the herd calved in the Yukon (ANWR Progress Rept FY 83-6). We can think of the annual variations as caused by snow induced limitations to the basic spacing antipredator tactic. But within this tactic, to maximize the distance from tree line, the animals also need to find brown substrates so that calves can be cryptic, especially to avoid predation from golden eagles (Aquila chrysaetos). Thus snow cover affects the distribution within the coastal plain but not the overall regional distribution.

We know less about the extrinsic and socialization factors in the massing of caribou in late June and July than we know about calving. In some years, such as 1976 and 1981, no large aggregations formed. But in all years, the animals concentrate on the 1002 lands. This occurred even in 1982 when the herd calved in the Yukon (ANWR Progress Rept. FY 83-6). We also know that the Porcupine Herd is unique that in some years the entire herd comes together for a few days in July. This represents the most spectacular aggregation of ungulates in North America and compares favorably with the aggregating of the wildebeeste (Connochaetes taurinus)

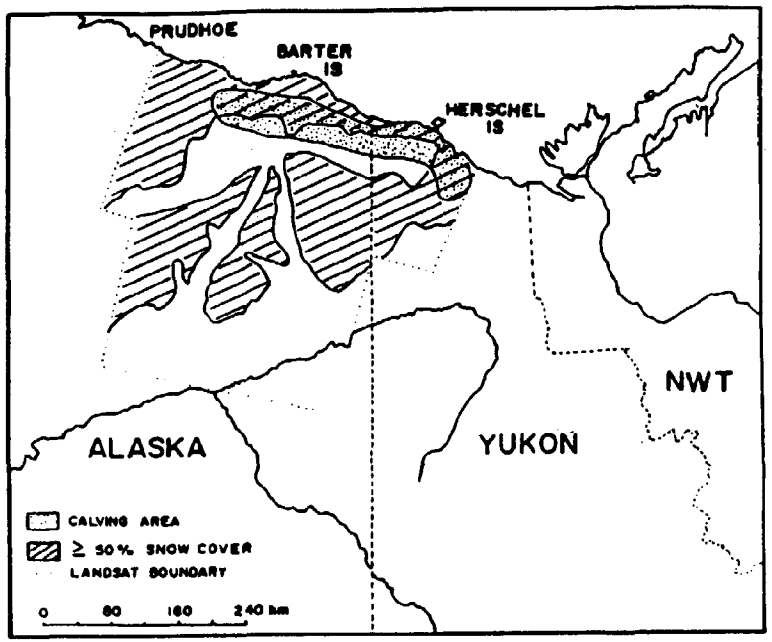

Figure 2. The snow profile of northeastern Alaska in late May 1978 (from Lent 1980).

on the Serengeti.

Initially, after calving, cows with their calves group together in the vicinity of where the calves were born (Lent 1966, Bergerud 1974b). This aggregating represents another antipredator tactic. A caribou calf will benefit if there is another animal between itself and a predator (the selfish herd concept) (Appendix II). Later, with the onset of the mosquitoes, the caribou in the Porcupine Herd move to the coast where cooler temperatures and fog provide some relief. The animals are usually concentrated in July south of Barter Island in the 1002 lands.

Why is this particular strip of coast selected? The animals may select the coast adjacent to Barter Island simply because the core calving area is near the Jago River, hence a direct route to the coast leads to Barter Island. In support of this view, in 1974, when the concentrated calving was along the Katakturuk River, the post calving grouping was at nearby Camden Bay. But to the contrary of this sequence, when the animals calved near Herschel Island in 1982, they still travelled up the coast after calving to the area adjacent to Barter Island (ANWR Progress Rept. FY 83-6). This fidelity to the coast opposite Barter Island could be due primarily to (1) tradition and socialization, or it might result because (2) the animals may, between the end of calving and the emergence of insects, follow the green phenology west, or, (3) the concentration at Barter Island may relate to some additional relief factor from mosquitoes. For example, a small herd of 2000 animals on the Hudson Bay Coast in Ontario aggregates in July on the tidal benches where there are large mud flats. In the absence of vegetation to hold insects, these caribou probably gain added relief from mosquitoes. This same situation

may hold for the tidal flats near Barter Island. Thus we don't know if the uniqueness of the gathering near Barter Island is because of its juxtaposition to calving locations or if the area, per se, has its own special attraction.

Critique of the Arctic National Wildlife Refuge-Alaska Coastal Plain Resource Assessment

My comments are limited here to the full leasing option and are restricted to caribou. This is the worst case scenario and many of my comments will reflect my view that caribou can adapt to full leasing and developing if the proper mitigating actions are taken. I will only discuss my major criticisms, which does not mean that I necessarily agree with sections not discussed.

2 mile limit: On several pages it is suggested that maternal cows will avoid a strip 2-miles out from major roads and development. This implies a 4-mile displacement when both sides of the road are considered. The reference for this avoidance strip is Dau and Cameron (1986). Based on this 2-mile rule, the report calculates the acreage lost to caribou from development. Firstly, the concern should not be the lost acreage as it relates to carrying capacity. The cows have not selected the coastal plain for it forage resources but to avoid predators. If wolves travel the haul road, as they did the TAPS highway (Roby 1978) it will be advantageous for caribou to avoid the habitat adjacent to the road. Secondly, Dau and Cameron (1986) did not show caribou avoidance of a 2-mile strip on both sides of travel routes. Dau and Cameron documented

a 50% avoidance of adjacent habitats at 2 kilometers from the road and no avoidance at 3 kilometers (p. 100:Fig. 4). Thus there should be 50% avoidance at 1.2 miles and no avoidance at 1.9 miles. Actually, Murphy and Curatolo (in press) show that caribou, including cows and calves, resume normal foraging and daily activities when 600 meters from active roads in the Prudhoe oil field. Therefore, a maximum statement is that maternal cows avoid about a 1½ mile strip on each side of the road; thus the displacement statements in the report should be reduced substantially.

If development proceeds in area 3 as shown on page 7 of the assessment statement, there would be 47 miles of road in the core calving area. We could expect maternal cows to be displaced from an area of 141 mi^2 or about 90,000 acres. However, the area between the two parallel roads in the hypothetical development would also probably be lost. Parallel roads to reach different objectives should be avoided. However, parallel roads to reach the same objective might be a way to re-direct traffic to minimize disturbance, depending upon which route has the most caribou nearby.

P. 28, Para. 1. "The lower levels of earlier estimates may reflect a truly smaller population, less accurate or less complete survey techniques,...". Because the Porcupine herd gathers in one or a few major aggregations, the census results of the herd by aerial photography is highly accurate. The herd has definitely been increasing. This increase has resulted from greater calf survival (Fig. 3). The increased calf survival occurred because wolves were reduced by rabies in the late 1970's and early 1980's. Jakimchuk and associates saw considerably more wolves in 1971 and 1972 than have been seen in recent years.

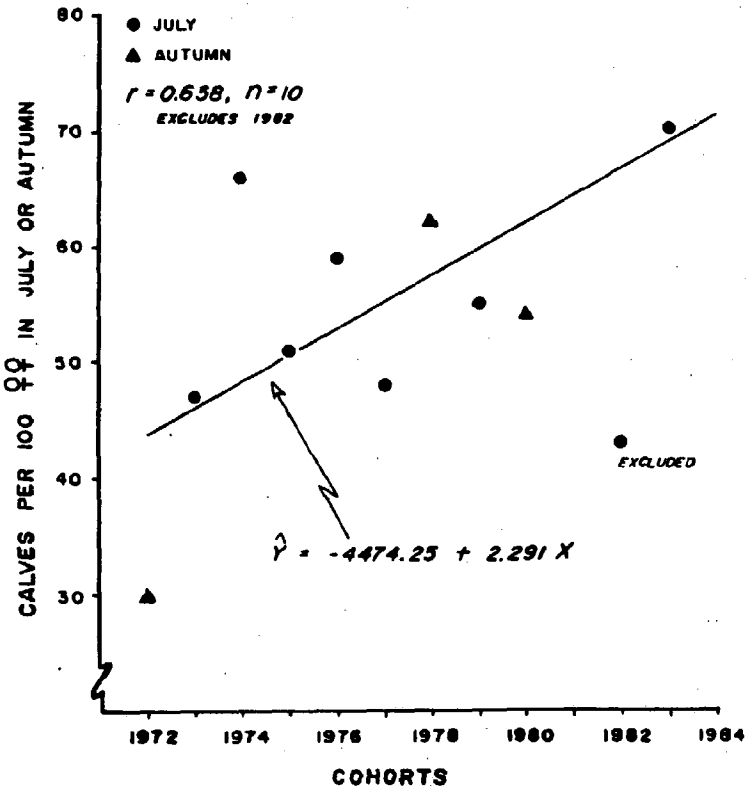

Figure 3. The regression of calf survival (calves/100 ♀♀) on year.

P. 29, Para. 4. "Access to insect-relief habitat and forage resources during this period may be critical to herd productivity." No one has documented that fecundity or calf survival have been affected by failure to reach mosquito relief habitat. There are no other large herds in North America that have access to a foggy coastal strip. Even if the animals could not use the coastal strip this would only put them on par with other herds. Note that there were an excellent 59 calves/100 cows in July 1976; in that year the animals did not mass on the shores of the coast. However, if caribou did seek the foothills for insect relief, reduced calf survival would be expected because of increased predation.

In this paragraph and throughout the report, the word "productivity" is used as a synonym for "recruitment". This is an unfortunate usage. To many ecologists, productivity brings to mind "to produce", the elements of reproduction, and for others it implies biomass as in the terms primary and secondary productivity. The use of the word "productivity" comes with the philosophy of a food carrying capacity. For many ungulates in the lower 48 states (where there are no wolves) the number of young born per 100 adult females does vary with nutritional conditions. In these southern ungulates, the final recruitment may indeed reflect the initial variations in pregnancy percentages. For caribou, we should use the terms "fecundity", "parous percentage", or "pregnancy rate" to describe the initial number of calves/100 cows at birth, prior to mortality. The emphasis thereafter should be on documenting the survival or mortality statistics; the final yearlings/100 females parameter at 12 months should be called "recruitment". "Productivity" is a catch-all and reveals a basic indoctrination that the resources of the land result

in cows being productive or not productive. Since fecundity is fixed in mature caribou the emphasis should always be on survival after the calves are born.

P. 29, Para. 10. "Riparian areas are used for travel corridors...". This does not sound feasible since wolves also use riparian areas for travel. Caribou in Spatsizi, B.C. avoid ambush cover in tall willows (Bergerud, Butler and Miller 1984). Also the streams are in flood in late May and early June and are not suitable for small calves. In Svalbard, T. Skogland (pers. comm.) indicated that bull caribou use the riparian communities and flood plains but cows avoid these dangerous areas. Curatolo (1985) also indicated that bulls used the riparian community but cows generally avoid them (see also Roby 1978).

P. 108, Para. 1. "Caribou select calving areas because of favorable... advanced new vegetation...proximity to insect relief habitat...". Caribou only select calving grounds to avoid predators (Appendix I,II). The report is too general in using the word "insect-relief". Generally, insect relief is meant to include both mosquitoes and oestrid flies, whereas the coastal habitats that the caribou seek are to escape only mosquitoes. Oestrids do not emerge until late in July, when the animals have left the 1002 lands.

P. 108, Para. 2. "Displacement of the PCH from a core calving area to a less desirable area would be expected to reduce productivity". Again, the word should not be productivity. If the development results in a

displacement of caribou farther south towards tree line it will result in increased predation (Fig. 4) and reduced survival. "Loss of important habitat has been shown to directly impact ungulate populations (Wolfe, 1978; Skovlin, 1982)". This is a general motherhood statement and these references are for ungulates living without wolves and are not appropriate for the Porcupine Herd. When caribou herds increase they expand their range and when they decline the range shrinks (Bergerud 1980). Calf survival drives numbers and hence range occupancy. "...Whitten and Cameron (1985) contend that the CAH has not experienced a reduction in productivity ... because (1) the CAH has been displaced from only a part of its calving grounds;...". The herd could be displaced from all of its calving area and still not decline if predator numbers were managed. The CAH herd increased 1972 to 1985 because of high calf survival since wolf numbers had declined with development. As their second point, Whitten and Cameron argued that the CAH did not decline with development because "...(2) suitable alternative high-quality habitat appears available...". The habitat at Prudhoe Bay is so poor that White et al. (1975) calculated some negative energy budgets and thought that the herd was energy-limited when it numbered a few thousand animals in the early 1970's. Again, the habitat was thought to be so poor from a forage standpoint that Skogland (1980) listed it as the area with the least plant biomass of 6 herds in the Holarctic. Yet today the CAH has grown to >15,000 animals. Point 2 of Whitten and Cameron (1985), referenced in the assessment statement, is an ad hoc hypothesis to explain away the herd's prosperity in the face of development. As their last point, Whitten and Cameron felt that the CAH

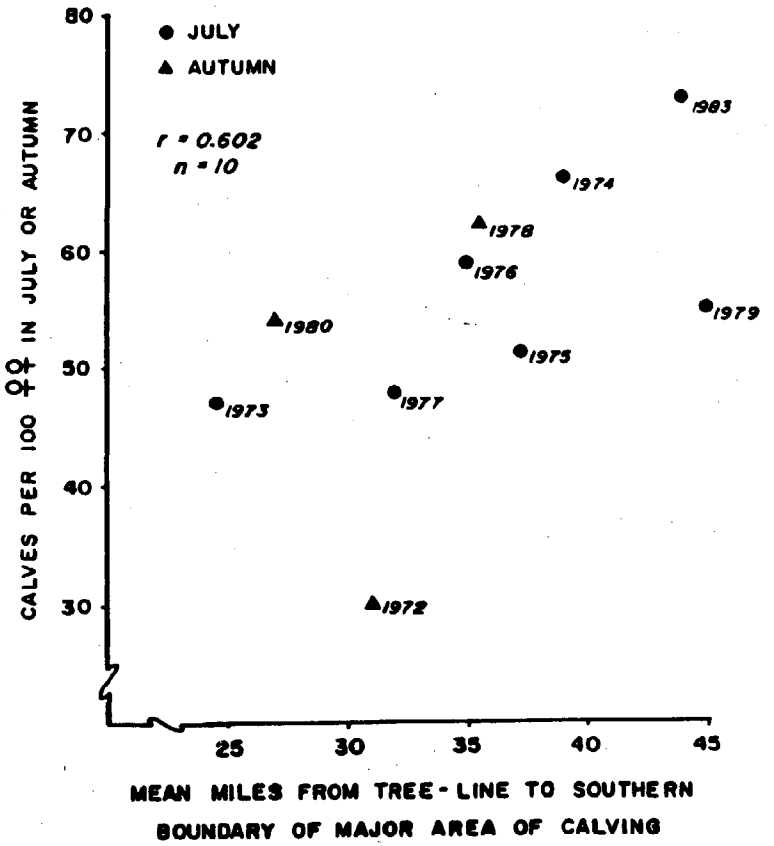

Figure 4. The regression of calf survival (calves/100 ♀♀) on distance of calving ground from tree line.

has not declined with development because the "...(3) overall density of CAH caribou on their calving grounds is much lower than that of arctic herds in Alaska". Again, this reflects Whitten and Cmeron's dogmatic opinion that forage determines numbers. The CAH calving ground is about 125 miles from tree line and the PCH, only 30-40 miles. Given the much larger "safe" space, the cows in the CAH are also able to disperse which is another antipredator tactic (Appendix II). The animals in the PCH herd, faced with less space, are more aggregated. Again this is expected, if the animals were dispersed, many would be nearer tree line and at greater predation risk. Since food supplies are not limiting for either herd, the greater densities for the PCH are not a problem. In fact the aggregating is a tactic to avoid predators; when animals face food problems such as in the high arctic or on Svalbard, the groups disperse and densities are low (T. Skogland and F. Miller, pers. comm.).

P. 108, Para. 3. "Both absolute..." This paragraph is irrelevant. One cannot use density figures (see above) to argue that the PCH will face greater consequences than the CAH from development. The CAH lives year round with development and has prospered; the PCH will only be near the development for 2-3 months. Densities are functions of aggregating behaviour and the lower densities for the CAH than the PCH mean greater forage as well as less space for the PCH, and in no way signify the density-dependent problems that Whitten and Cameron imply.

P. 108, Para. 4. "With the CAH calving density remaining low compared to other herds.... overcrowding and consequent habitat stress that might

result in reduced productivity have not yet occurred, ..." This statement is not correct; there is no habitat stress. The CAH cows have selected their calving range, with its low plant biomass, to avoid predators. Cows in other herds in North America are also prepared to sacrifice optimal foraging to avoid predators (Ferguson 1982, Bergerud et al. 1984).

P. 108, Para. 5. "The PCH is much more crowded..." They are not crowded - they aggregate to maintain maximum distance from tree line.

P. 109, Para. 2. This paragraph continues to discuss insect disturbance. But what is involved is primarily mosquitoes. Oestrid flies are not on the wing until the animals leave the 1002 lands. Helle in his publications was primarily concerned with oestrids and other flies and not mosquitoes. To quote their work in this context of causing mortality is stretching the argument.

P. 109, Para. 6. "Failure to obtain relief from insect harassment from either factor (barrier or displacement) could shorten foraging time, leading to poorer physical condition and subsequently to increased susceptibility to predation and reduced overwinter survival."
The 1976 and 1981 cohorts did not apparently use the coast line for insect relief and these cohorts did quite well. These animals are not on a fine edge in physical condition. No one has documented winter starvation in North America as a result of high insect years. When the insects abate in late August and September, the animals are able to recoop their losses

and fatten for winter. Remember that the Porcupine herd has a unique fog belt for insect relief that other herds do not have and even they (PCH) desert the mosquito relief habitat by mid-July. Murphy and Curatolo (in press) showed that caribou at Prudhoe Bay, away from the road, feed 53% of the day prior to mosquito emergence, 41% with mosquito harassment and 29% with oestrids on the wing. Oestrid flies harass caribou more than do mosquitoes and yet PCH animals contend with oestrid flies well inland in August.

P. 112, Para. 4. (and p. 132 as well) "These changes ... could result in a major population decline and change in distribution of 20-40 percent..." They have provided no data to show a 20-40% population decline. Neither was a concensus reached on the magnitude of any negative effects on the PCH population size or distribution by the 14 specialists at the Caribou Impact Analysis Workshop (ANWR) in November, 1985. I believe that the caribou will continue to use the 1002 lands with development, except near active roads. Even if there was some displacement, there is no need for the herd to decline if wolf populations are managed to provide positive recruitment or calf survival sufficient to balance natural and hunting mortality.

P. 112, Para. 5. "The population decline or distribution change would be 5 - 10 percent for the CAH throughout its range." There is no evidence to support such a decline. A change in distribution cannot cause a decline unless it changes the reproductive or mortality rates. Caribou, even in undisturbed populations, frequently exhibit range shifts,

including areas used for calving. Why can't the authors be objective? The empirical evidence is there for all to see; the CAH increased coincident with development because predator numbers were reduced. How can the field findings be twisted to fit preconceived ideas?

Impacts and Mitigation

The one guarenteed impact of the development of the 1002 lands will be that cows with young calves will avoid active roads for a distance of >1.2 miles. This is based both on theoretical considerations (Bergerud et al. 1984) and empirical observations (Dau and Cameron 1986). The loss of this habitat will not cause additional stress on the animals since they are not nutritionally limited. Nor will activity budgets be seriously altered by development activities (Murphy and Curatolo in press). It might be more serious if the animals remained near the road where predators may travel. We do not want these cows to habituate to traffic because this would suggest that they might become less wary to their natural predators.

An impact that might affect calf survival would be if the females in May failed to cross the east-west haul road because of the traffic and shifted their calving distribution closer to the foothills where there are greater numbers of wolves and bears. Such a barrier affect has not resulted from the TAPS corridor and haul road. The CAH animals have crossed the road and shifted their distributions between years, making use of habitats both east and west of the corridor. Presumably, these shifts relate to snow cover (Jakimchuk pers. comm.). The PCH herd, since it is both more migratory and larger than the CAH, should

cross a pipeline-road corridor more readily than the CAH. Also, the PCH caribou should cross rather than be funneled by the corridor because caribou should not be easily deflected when undertaking directional shifts to antipredator and mosquito-relief habitat.

Certainly, every effort must be made to allow the animals to continue to use all their potential space to avoid predators. Initially, until the impact of the corridor is understood, traffic will have to be prohibited in the period May 15-June 10 within several miles of cows moving west or north towards the road. Another effort to mitigate the effect of the corridor should be to reduce its visual impact as seen by animals entering the area (moving north and west). Once in the area, the animals will find their way out. If ramps are built they are more important on the south side of the road than on the north side. Murphy and Curatolo (in press) have shown that disturbance is greater when there is an active road combined with a pipeline. Theoretically, the vehicle appears as a predator - and the pipeline as the ambush cover. The pipeline and haul road should be separated by at least 1 km with the pipeline north of the road. Pipelines should be cryptic (painted green and brown), be motionless and scentless.

Another potential impact is that the road facilities will increase predator access to the herd. Wolves can be expected to move north down river valleys and then move laterally, using the road to cross rivers east and west. The cows, by calving between north-south river valleys, have in the past taken advantage of the rivers as potential barriers to east-west movements of predators, especially since the rivers are in flood in late May and early June. We do not want to increase the ease of

access to calving areas for predators by development (Bergerud 1985).

Even if the calving animals are displaced southwards by the corridor, the PCH can remain a viable herd if predator populations are managed. It is an incredible omission in this impact statement that predator management was not mentioned. The reduction of wolves is our major tool to improve calf survival. Wolves would not necessarily have to be reduced on the Coastal Plain. Control operations could take place on the winter range. The goal would be to have recruitment equal natural mortality + hunting mortality, which means, for the Porcupine herd, that about 12% of the herd should be yearlings in April-May (Bergerud and Elliot 1986). This oil development may provide advantages for predators. Once we disturb the status-quo, we must be prepared to manage the predators. This management is the fail-safe position.

I believe that the PCH will cross the haul road in seeking mosquito relief along the coast. The cow and calf that Curatolo (1986) radio-tracked in the CAH herd crossed the road 8 times in one mosquito season. Once a large herd starts across it will continue even if a vehicle approaches. Certainly large herds moving west and north will have to be monitored hourly as they approach the corridor and all traffic halted or rerouted. However, even if the animals did not cross and gain the coastal strip, I believe that the herd wuould be little affected in its vitality.

The one fact that we cannot escape is that the wilderness character of the coastal plain will be lost for decades. The post calving aggregation of the Porcupine Herd is the most spectacular large mammal display on the North American continent. We must do all that we can to

see that this massing does not become a memory as did the thundering buffalo herds of the plains. The animals should continue to mass in the undisturbed KIC lands, adjacent to the coast, in a wilderness setting.

Because I believe caribou can coexist in close proximity to an ethical man, I look forward to the day when I can go on a guided tour down the Haul road and view this massing of the mighty legions in July. The day will surely come when the old rigs will have been dismantled, the pipes disassembled, the scars left to heel, and the wind again sweeps unrestricted across the cotton grass plains. The caribou will still be there in uncounted numbers, coming as always down their ancestral tracks, and, we too will be there to see and marvel at the majestics of our fellow species.

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Migration and antipredator spacing in caribou/reindeer

by

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Advances in understanding the reproductive fitness of polygynous mammals have been rapid since Trivers[1] emphasized the different reproductive roles of the sexes. The fitness of females is enhanced by endeavors that increase the survival of young; while male effort is directed at activities that maximize advantages in intrasexual competition[2]. These different sexual strategies can help us evaluate the relative importance of antipredator tactics vs optimal foraging predictions in the divergent behaviour of the sexes. The data presented here suggest female reindeer/caribou (Rangifer tarandus) of both tundra and forest races seek environments away from predators at calving time. These environments commonly have low phytomass and late plant phenology. Males, to the contrary, in the spring seek environments of high phytomass and early plant phenology where they maximize growth and condition; such locations are generally nearer to predator travel routes than the locations the females select for calving. These two divergent strategies provide an explanation for spring migration and the segregation of the sexes in caribou and may have application to other ungulate species.

The females of the tundra races in North America and the USSR migrate 200-600 km in April and May to traditional calving grounds, generally on the north end of each herd's annual range (Fig. 1). The movements are directional and most important, perpendicular to the tree-line (Fig. 1). If the cows arrive early, they halt and remain until parturition. In the Northwest Territories, Canada, the growing season advances northeast in isoclines parallel to the tree-line. The bulls lag behind[3,4] following the green phenology north[5]. At the time the calves are born, the bulls are still >150 km southwest of the cows. For the cows farther north, the growing season doesn't commence until about June 24, or 2-3 weeks after

parturition.

A similar north-south progression in phenology is evident in Alaska, as well as strong altitudinal effects. I compared the diet quality of segregated males and females at calving time for three of these migratory herds in Alaska by means of fecal nitrogen analysis. Fecal nitrogen has been used as a gauge for dietary digestibility and dietary protein for several species[6-9]. Caribou select plants high in nitrogen in the spring[10-11]. The females on the calving grounds had a lower quality diet than the males who in all three herds were located at lower elevations or farther south (Table 1). Males and females did not differ in fecal nitrogen where they shared the same range in a non-migratory herd on the Slate Islands, Canada (Table 1). These results are consistent with the measurements of weight-gain and fat deposits that show males resume positive energy balance in the spring prior to preparturient females[12,13].

Calving grounds of tundra caribou are <u>not</u> optimum for females in regard to food resources or favorable weather for neonates[4,14-16]. The grounds are generally elevated uplands with reduced phytomass, exposed to storms and with colder temperatures and later phenology than surrounding locales. However, the calving locations generally have reduced snow cover because of topographic gradients[16,17]. These bare substrates provide a cryptic back-ground for newborn calves.

These calving grounds are only optimum, I believe, relative to predation risk. The migratory wolves (<u>Canis lupus</u>) that depend on caribou commonly den near tree-line or south of the calving grounds [16,18,19]. Dens are rare on calving grounds[16,20], which have a reduced diversity of alternative prey. Wolves whelp about the same time caribou calve. When caring for young, wolves have a reduced cruising radius and generally cannot reach calving grounds. Thus I believe cows should maximize their distance north of tree-line, where wolves and alternative prey including bulls, are more numerous. Yet females should go no farther north than the locations that still have snow-free substrates providing crypsis for neonates and foraging for females. Since these selected sites, the calving grounds, represent a small proportion of the total range, females aggregated there can reach densities >16 animals/km^2 [15,16]. Tactics of the selfish herd may be a factor in this aggregating[21] but wolves can surplus kill young calves when caribou are abundant[22]. The chief advantage of such remote locations is a reduced encounter rate with their major predators, wolves.

Since about 1976, radio transmitters have been placed on adults in 2+ herds of forest caribou in North America (Fig. 1) and new information has been secured for these less known populations on movements and distribution in the spring. Like tundra animals, woodland females leave winter ranges up to 6 weeks before parturition and travel directionally 2 to 150 km at speeds of 2-9 km/day to calving sites to which they subsequently return in later springs[23-25]. Unlike tundra caribou, these females are generally solitary and dispersed at calving.

Three patterns of calving females have been described. (1) In mountainous areas, woodland females move upslope and disperse. They often calve above the alpine tree-line on brown substrates where the brown calf is cryptic[10,24]. These habitats, like tundra calving grounds, have increased exposure to weather, reduced food resources and a later growing season than habitats at low elevations[19]. (2) In non-mountainous regions with large lakes and archipelagoes, females seek small, scattered islands for

parturition, if the surrounding waters are free of ice[26,27]. These females remain on the islands throughout the summer and some islands can consequently become overgrazed[28]. (3) If neither mountains nor island refuges are available, woodland females scatter widely, densities of <.05/km^2 in homogeneous forest-bog complexes have been recorded[23,25].

Behaviour patterns common to all three dispersed patterns are (1) females are least aggregated during calving than during any other period of their annual cycle (Table 2), (2) females remain stationary (hiding) during and after calving, with small home ranges (Fig. 2), and (3) the calving locations are widely scattered[23-28](Fig.2). Woodland bulls, like tundra bulls, remain in early greening plant communities (lower elevations) with greater phytomass than calving habitats[10,24].

The forest/mountain females by moving upslope maximize the distance between themselves and wolves traveling in the valleys[10,24]. Further, moose (Alces alces) calve below tree-line and are encountered first by predators moving upslope searching. Cows on islands are extremely safe since they are widely spaced across barriers and have water for escape if discovered. Females in the more southern woodland populations do not have sufficient space above tree-line to migrate completely away from wolves and alternative prey (spacing-away), but they space-out to more remote habitats less travelled by predators. By being rare, they should reduce searching effort by predators.

Thus, I propose that the evolutionary or ultimate reason for the migration of females is not to reach a specific area (the calving ground) but rather to leave their predators behind. The proximate response is philopatry to a traditional calving location, solitary and dispersed in

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forest animals (spacing-out) and aggregated and clumped in tundra animals (spacing-away). The environmental factors of available space and the distribution of their chief predator, wolves, have paced the divergence of these two tactics of a common anti-predator strategy. Lastly, I note that saiga (Saiga tatarica) females also make long migrations in the USSR to common parturition sites where predators are rare[29,30] and that the sexes of many other species of ungulates are segregated in the spring at parturition time. In these instances, the optimal foraging and predation risk hypotheses should be tested as possible explanations. I thank Jim Davis, Patrick Valkenburg and Heather Butler for their assistance.

Table 2 The mean aggregation size of spacing-away caribou in Canada during four seasons*

Area in Canada	North latitude	West longitude	Sample size	Mean Aggregation Size			
				Winter	Calving	Summer	Fall
Labrador	54°	62°	148	16.1	1.2	-	15.5
Central Ontario	48°	86°	176	2.9	←1.3→		-
Northern Ontario	53°	90°	326	11.5	1.3	1.3	9.8
Central Manitoba	55°	101°	239	4.6	2.6	1.7	3.2
Eastern Alberta	57°	113°	690	3.4	1.2	1.7	5.3
Western Alberta	54°	120°	82	6.5	1.6	1.9	3.6
Eastern Brit. Col.	53°	120°	284	6.5	2.6	5.2	5.6
Southern Brit. Col.	52°	120°	229	9.1	3.0	6.7	6.4
Eastern Brit. Col.	55°	121°	203	7.7	2.8	3.0	8.2
Western Brit. Col.	54°	126°	239	10.7	2.0	7.5	10.0
Western Brit. Col.	55°	128°	106	7.8	4.8	6.4	9.8
Central Yukon	65°	135°	?	10.8	3.2	36.9	large
Mean ± S.E.				8.3 ± 1.07	2.4 ± 0.29	6.7 ± 2.83	8.3 ± 1.20

*Table is compiled from a variety of sources, references will be provided by the author upon request.

Table 1 Percent nitrogen in feces and green plants (Mean ± S.E.) of caribou compared at calving between females and males on the Slate Islands, Ontario (females and males not segregated) and three migratory herds in Alaska where females were segregated on calving grounds and males were at lower elevations seeking green plants.

Herd and Collection date	Herd Location latitude, longitude & elevation		km between ♀♀ & ♂♂	Percent fecal Nitrogen control		t-test of difference & P
	♀♀	♂♂		♀♀	♂♂	
Slate Islands early June	49°, 87° 183-312 m	49°, 87°	0	3.69 ± 0.074 (28)*	3.74 ± 0.73 (17)	t = 0.671 not sign
Delta Herd, Ak May 17-26	64°, 145° 1200 m	64°, 146° 600 m	30	1.78 ± 0.041 (12)	2.32 ± 0.137 (16)	t = 4.369 P < 0.0005
Fortymile, Ak May 27 - June 2	65°, 144° 1050 m	64°, 143° 725 m	75	1.93 ± 0.032 (14)	2.18 ± 0.079 (10)	t = 3.238 P < 0.0025
Western Arctic, Ak June 6-12	69°30', 160° 250 m	68°, 159° 300 m	130	1.98 ± 0.037** (15)	2.18 ± 0.028 (20)	t = 4.2644 P < 0.0005
% Nitrogen in Green Plants*** same eaten that day in Alaska				2.20 ± 0.244 (7)	3.50 ± 0.378 (7)	t = 2.132 P < 0.05

*Sample size

**Fecal nitrogen for 3 sequences pearsings on the calving ground was 1.96 ± 0.074

***Species included for males: Betula nanifolia, Salix spp., Armoald leaves, and Ericaceae angustifolium leaves and flowerheads for females, Ericaceae flowerheads and leaves, Salix and Dryas integrifolia. Highest values for females were Ericaceae flowers, 2.35 (May 28, Delta), 2.84 (June 7, Western Arctic), and Dryas, 2.40 (June 2, Fortymile). Highest value for males were Salix, 4.44 (May 28, Delta), 3.03 (May 27, Fortymile). Ericaceae flowers, 2.38 (June 6, Western Arctic). Many males of the Western Arctic herd were eating rich Salix but leaves could not be collected.

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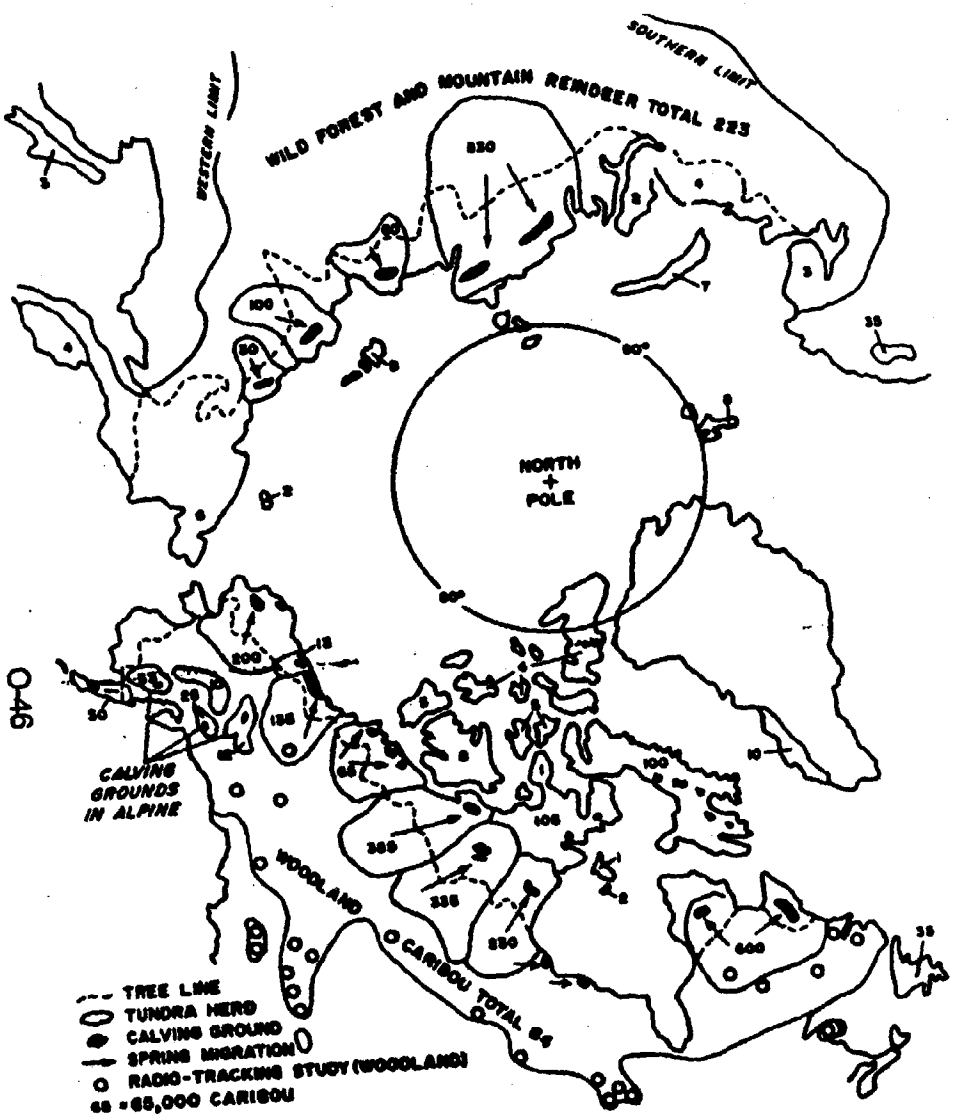
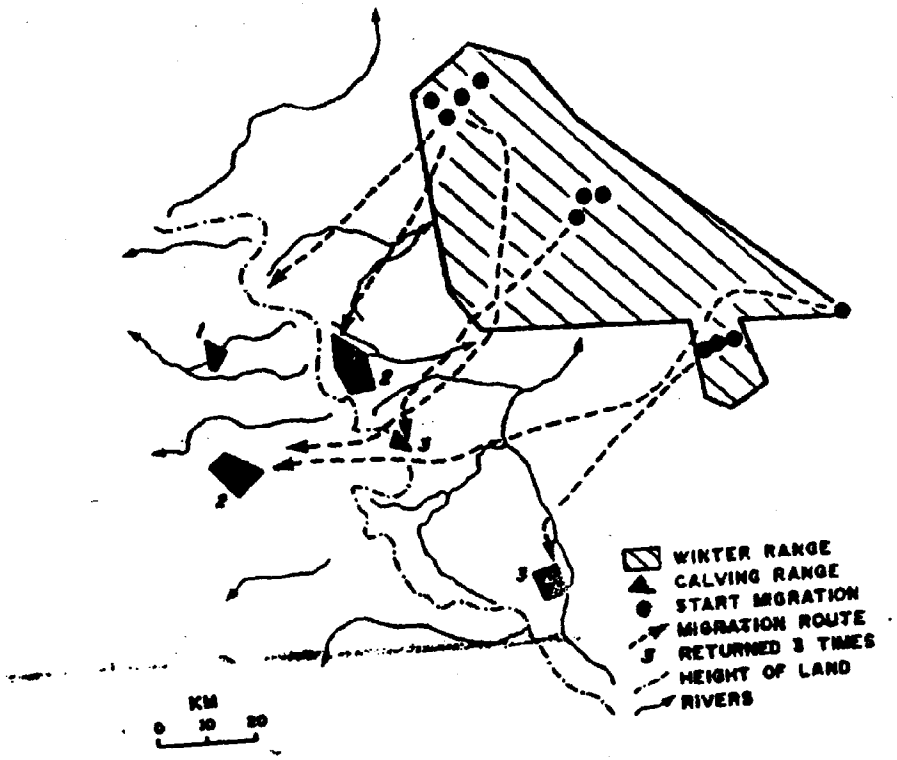
Figure 1. The migration of females in tundra herds in the spring is at right angles to the tree-line. Cows return to calving grounds on the northern edge of the population's distribution and generally beyond the range of wolves that den at or near tree-line (spacing away). Bulls remain farther south feeding on early greening plant growth.

Figure 1. Five woodland caribou females returned in spring migration to individual calving locations at high elevation. The cows were spaced-out from each other and had restricted home ranges. The bulls were at lower elevations feeding on new plant growth. The cows calved at maximum distances from alternate prey, moose, and wolves and bears hunting at lower elevations. Data are adapted from studies by Edmonds and Bloomfield[24] in Alberta.


WILD FOREST AND MOUNTAIN REINDEER TOTAL 223
SOUTHERN LIMIT
WESTERN LIMIT
NORTH POLE
CALVING GROUNDS IN ALPINE
WOODLAND CARIBOU TOTAL 64
TREE LINE
TUNDRA HERD
CALVING GROUND
SPRING MIGRATION
RADIO-TRACKING STUDY (WOODLAND)
65 = 65,000 CARIBOU


WINTER RANGE
CALVING RANGE
START MIGRATION
MIGRATION ROUTE
3 RETURNED 3 TIMES
HEIGHT OF LAND
RIVERS
KM
0 10 20

ABSTRACT

Survival of caribou (Rangifer tarandus) calves until 4 months of age was monitored for 8 years in 4 herds in northern British Columbia, Canada. The chief cause of mortality was predation by wolves (Canis lupus) and grizzly bears (Ursus arctos) and this mortality was correlated within years between all herds. More calves died in years with late springs when extensive snow patches remained during calving in June than in early springs when larger snow free areas existed. Cow caribou prior to calving and after birth sought to space-out on snow-free areas in small aggregations at high elevations above treeline. By being high, the females increased the distance between themselves and wolves and bears travelling valley bottoms as well as the main alternate prey moose (Alces alces) that calved only in forest cover at lower elevations. Also with early springs the reduced snow meant more space for dispersion. The variation in calf survival for 3 herds was negatively correlated with the heterogeneity of the calving area. Snow cover disappeared in smaller patches in more rugged mountains regardless of spring phenology therein providing a more constant search area for predators between years. More uniform mountains had either extensive areas of snow cover (late years) or brown substrates (early years), thus greatly varying the space predators had to search between years. As stochastic variation in snow cover at calving time alters the searching ability of predators, the aggregation responses of prey and the spatial overlap between predators and prey, it promotes short-term stability of the prey and lessens the probability of extinction.

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Displacement and Dispersion of Parturient Caribou at Calving as Antipredator Tactics

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INTRODUCTION

A central problem in predator-prey ecology is the behavioural responses of prey to the distribution of predators. Prey attempt to avoid areas where predators search (reviews by Stein 1979, Morse 1980, Sih 1982) whereas predators concentrate in areas of high prey densities (reviews by Hassell 1978, Cowie and Krebs 1979). If the predators are relatively mobile, the predator response should dominate. But what response should dominate if both predators and prey are mobile such as caribou (Rangifer tarandus) and wolves (Canis lupus)? With both prey and predators mobile the responses could cancel each other (Sih 1984). Yet another possibility could be that the extrinsic environment would intervene, at one time favoring the movement of the prey yet later the predator.

The paradox of why predators rarely cause the extinction of their prey in the real world as they do in the laboratory also remains of theoretical interest. Murdock and Oaten (1975) point out that laboratory experimental and mathematical modelling have outstripped empirical field studies. Field studies in turn have emphasized invertebrate systems where the predator is generally more mobile than the prey. Further, Murdock and Oaten in their review state (p. 13) "...we have no explanation for the stability of most systems...". This study should contribute to predation-stability theory as it pertains to a highly mobile, mammal predator-prey system.

We studied a wolf-bear (Ursus arctos) caribou-moose (Alces alces) system in northern British Columbia from 1976 to 1983. Pregnant caribou, in this system, leave valley bottoms which are travelled by wolves and bears just prior to calving and disperse into mountains as an antipredator tactic while nonproductive caribou remain at low elevations (Bergerud and Butler 1978, Hatler 1982, Bergerud et al. 1984, Page 1985). The calves of cows that moved to valley bottoms in June suffered greater mortality from wolf and bear predation than those that stayed high (Bergerud et al. 1984). We hypothesize that the success of the predator avoidance strategy depends, in order of importance, upon (1) the distance that the females can space from the travel routes of predators and alternative prey (displacement), (2) the dispersion of the cows, and (3) the extent of cryptic brown space (snow free areas) available for dispersion and crypsis. The main alternative prey, moose, scatter into forest cover at lower elevations at calving. The behavioural response of predators looking for caribou in turn should vary with the space they must search as it affects the relative profitability of hunting moose or caribou.

METHODS

Caribou in northern British Columbia traditionally gather on the plateaus above timber-line in the fall prior to breeding, allowing a near-complete aerial census. Four herds discussed in greatest detail are (1) Spatsizi - these animals congregate on Caribou Mountain and nearby Tomias Mountain (approx. 57°30'N, 128°W, see Boonstra and Sinclair 1984); (2) Level Mountain - 58°30'N, 131°W, (3) Kawdy - 59°N, 131°W - these animals also aggregate near Badman Point 59°N, 130°W and (4) Horseranch - 59°15'N, 128°30'W. All the herds calve high in the mountains. The distance between calving locations is approximately 80

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km between Level and Kawdy, 240 km between Kawdy and Spatsizi, 200 km between Level and Spatsizi, and 15 km between Kawdy and Horseranch. Horserance was an experimental population where wolves were reduced for 3 years (1978, 1979 and 1980) (Bergerud and Elliot 1986).

We monitored the summer survival of calves in these four herds from 1976 to 1983 to investigate factors limiting population increase. Our basic technique was to measure recruitment when the new generation was ≥4 months-of-age in the last week of September and the first week of October. If a helicopter was available the animals were classified as to calves, cows, and bulls and recruitment was based on calves/100 ♀♀. If only a fixed-wing aircraft was available caribou were classified only as to calves, large bulls, and others, and recruitment was based on the percentage of calves of total animals. Radio-tracking investigations by Hatler (1985) have shown that males and females are least segregated at this time in the annual cycle.

To determine the causes of early mortality calves <3 days old were captured and radio-equipped with collars that sent a mortality signal if the calf was motionless for >4 hours. Ten calves were monitored at Spatsizi in 1979, a late spring, and 23 calves were monitored at Level Mt. in 1980, an early spring. The calves were weighed and notes taken on the birth site and the reunion sequence with the dam.

At Spatsizi in 1977 and 1979, we classified the reproductive status of females (≥ 2 years) from the ground in June by presence or absence of a distended udder and whether a calf was at heel. Females were similarly segregated from a helicopter at Level Mtn. in 4 years, from 1978 to 1981 at the end of calving about June 10.

A meterological statistic was needed as an index to the percentage of mountain slopes covered with snow during calving in early June. We wished to quantify the extent of cryptic backgrounds (brown substrates) available for the dispersion of expectant females spacing-out from predators. Landsat satellite photographs were available only in 1977 and 1978. Cloud cover obscured the ground in late May and early June in the other years. Our primary index was the April 1 water equivalent of snow pack measured at Dease Lake, B.C. (58° 26' N, 130° 01' W). We had to use the April 1 statistics since Dease Lake, at only 820 m elevation, never had snow remaining by June 1. Dease Lake is within 100 km of the mountains used by all but the Horseranch females. In 1980, a new snow station was established in the Eaglenest Mountains (57° 37' N, 129° 01' W) at an elevation of 1540 m. Some females that aggregate in the fall at Caribou Mountain calve in the Eaglenest Range at elevations of 1400 m and above (Hatler 1982). We compared these June 1 water equivalent readings from the Eaglenest with calves/100 females from 1980-83.

A seasonal snow statistic that we used to gauge the overall severity of the winter was the average snow depth remaining at the end of each month. We combined the readings from stations at Dease Lake, Iskut and Cassiar.

The wolf population near Level Mountain was censused in 4 winters from 1977-81 by D. Hatler (Bergerud and Elliot 1986). At Spatsizi wolves were counted in the winter of 1977-78 (Bergerud and Butler 1978) and again in 1979-80 (Page 1985).

RESULTS

Annual variation in calf survival

We found that there were large annual variations between years in the percentage of calves in the three control herds and these variations were correlated (Fig. 1). These variations held whether recruitment was expressed as either the percentage of calves of total animals or as calves per 100 females (Fig. 1). These variations were not artifacts of sampling since we generally segregated calves and adults in 50% or more of the entire estimated population so that percentages differing by >3% were statistically different based on finite statistics.

The large annual variations in recruitment were not explained by changes in reproductive rates. The mean percentages of females (> 2-year-of-age) giving birth to calves in 5 years was 84 ± 2.6% (CV = only 8%) for 2 of the study herds (Fig. 2).

However by 2 weeks after the first calf was born in these 2 herds there were only 38 ±8.5 calves per 100 females (CV = 54%) or a mortality rate of 55% by 1-2 weeks of age. We could not find the bodies of the missing calves and feel that the calves were completely eaten by bears and wolves. An analysis of the scats of bears and wolves showed that they contained hoof and skull fragments of calves suggesting 100% utilization of calf carcasses (Page 1985, Bergerud and Elliot 1986).

The major cause of death of calves in their first summer in British Columbia was predation by bears and wolves. We documented this by observing predator chases (Bergerud et al. 1984), scat analysis (Page 1985) and an experiment in which wolves were removed at Horseranch (Bergerud and Elliot 1986). When we visited the sites where the radio collared calves died we generally found only the bitten collars, calf hair, and small pieces of skin (Page 1985). Page (1985) estimated that probably 12 of the 17 deaths of calves with radios were due to predation.

One hypothesis we considered was that the viability of calves hence their susceptibility to predation, could vary depending on the previous winter's severity and maternal nutrition. To the contrary, the 34 young calves we captured struggled vigorously and generally weighed 8-9 kg which is approximately 3 kg greater than calves in the Arctic (pers. files). There was no significant difference in the weight of <1 day old calves between 1979, a hard winter and late spring, and 1980, a mild winter and early spring (8.0 ± 0.75 vs. 9.3 ± 0.55 kg, $t = 1.45$, $n = 16$).

An analysis of variance of the mean winter snow depths and the percentage of calves in the herds in the fall for all populations (the three control populations and Horseranch where wolves had been removed) was significant ($F = 4.26$, 24 df, $P = 0.0168$). However, the influence of the experimental removal was also significant ($F = 3.10$, 1 df, $P = 0.097$). That is, Horseranch, in contrast to the control herds, had practically the same proportions of calves regardless of snow depths in 3 winters when wolves were removed (16.7, 17.2, 16.1%) vs. greatly reduced percentages when wolves were present (6.3, 10.9, 4.2 and 6.0%). The significance of snow cover on calf percentages was improved with the removal of the variance from these three experimental cohorts ($F = 8.09$, $P = 0.0097$). The interaction of control and experimental populations was not significant ($F = 0.2193$). Thus, we rejected the hypothesis

that variations in snow cover acting through maternal condition and neonate viability were the explanation of variation in calf survival on the three control areas. In the absence of wolves there was little effect of weather on summer calf survival.

We could not explain the annual variations nor the correlations in the annual survival of calves between populations on the basis of changes in the abundance of predators or alternative prey. We saw grizzlies hunting calves in all years we were in the field. There was no obvious change in bear abundance. The number of wolves censused in the winter adjacent to Level Mountain were: 1977-78, 49-54; 1978-79, 43-44+; 1979-80, 44-46 and 1980-81, 46-50+ (Bergerud and Elliot 1986). We counted 72 wolves in Spatsizi 1977-78 and 43 wolves in 1979-80. The estimated moose density near Level Mountain was: January 1979, 0.34/km^{-2}, March 1980, 0.24/km^{-2} and February 1981, 0.18/km^{-2}. None of the values were statistically different (Elliot et al. 1984). The moose population near the Horseranch Range, also showed no statistical difference in two winter counts: 1979, 0.30/km^{-2}, and 1980, 0.48/km^{-2} (Elliot et al. 1984). Even if there were changes in numbers of predators and/or alternative prey, they could not explain the sequence of runs in calf recruitment we generally noted from 1977 to 1983 (Fig. 1). Moose, wolves and bears, do not have life history parameters that would alter their numbers quickly enough to be reflected in the annual perturbations in the survival of caribou calves.

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Snow cover and survival

The annual changes in calf survival were correlated with the extent

of the snow pack of Dease Lake on April 1 (Fig. 3) and in the Eaglenest Mountains on June 1 (Fig. 4). Calf survival was higher following springs (1978, 1980 and 1983) with reduced snow cover than in years with more snow cover in the spring (1976, 1977, 1979, 1981 and 1982).

We tried to correct the water equivalent readings at Dease Lake for subsequent melt from April 1 to June 1 using the mean daily temperature. However these corrections did not improve the correlation between the April snowpack and calf survival shown in Fig. 3. In fact, the mean April-May temperatures were negatively correlated with the April 1 water equivalent readings, $r = -0.729$, $n = 8$.

In an early spring the extent of melted areas is considerably greater than in a late spring (Fig. 5). Hence parturient cows can displace and disperse themselves farther into the mountains away from the travel routes of wolves and bears (Figs. 4, 5, Table 1). The mean group size of cows with calves was less than that of animals without calves (Fig. 6) as expected from a dispersal to scattered snow-free areas at high elevations.

The annual variations in calf percentages within each of the 3 control herds was correlated with topography. When the mountains were uplifted as in Spatsizi (heterogenous) the variations in annual recruitment were less than when the mountains were volcanic (more homogeneous) as at Level Mountain (Fig. 7). The topography at Horseranch was also uplifted and the coefficient of variation in recruitment for the 4 years without control was 41%.

The topography should affect snow accumulation and residual snow cover at calving. The undulating topography at Level Mountain would

provide more wind swept surfaces and even accumulations of snow than would the more sheltered landscapes at Spatsizi. Thus in an early year the patches of brown substrate would be larger at Level Mountain than Spatsizi (Fig. 8) which would require that predators search larger areas to locate caribou (Fig. 9).

DISCUSSION

The maximum killing rate of a searching predator should depend on the product of three functions: the rate at which the predator encounters groups of prey, the rate of detection of groups of various size, and the probability of a successful capture of a calf from a group once detected (Taylor 1981). Maternal cows should take actions to reduce the success rates of wolves and bears in encountering, detecting, and capturing calves.

Tactics to reduce encounters (Displacement)

Regardless of group size, cows in mountains appear to space themselves maximally from predator travel routes along water courses (Bergerud et al. 1984, Edmonds and Bloomfield 1984, Hatler 1985). This spacing should also remove them from moose that are calving in forest cover at lower elevations and male caribou feeding at lower elevations. These strategies should increase searching time and decrease encounters with predators primarily hunting moose and nonproductive caribou (Fig. 9).

The movements of cows to alpine habitats to avoid predators resulted in these caribou grazing in habitats where the vegetational

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phenology was several weeks delayed compared to that along watercourses at low elevations (cf. Edwards 1983). This selection of antipredator habitats that are suboptimal for foraging is well illustrated by satellite photography (Fig. 5). At the time of the photograph, on 3 June 1978, the cows had dispersed away from the forest habitats and were located on the highest bare spots immediately below the snowline. The cross hatched areas (originally red on the Landsat photograph) represent new, green, flushing vegetation, mostly willow (Salix spp.) along water courses at elevations below 600 m that the caribou have just left. This new, green growth is highly nutritious and a preferred food of caribou in the spring (White et al. 1975, Skogland 1980, Boertje 1981, Bergerud et al. 1984).

This altitudinal shift is contrary to Klein's (1970) view that caribou follow altitudinal gradients coincident with plant phenology to optimally forage. Cow caribou in British Columbia do move higher in the spring but this takes them away from the most nutritious food, to habitats where predation risk is reduced (Bergerud et al. 1984).

Tactics to reduce detection (Dispersion and Crypsis)

Caribou that calve in forest cover are widely dispersed in small groups with cows frequently alone (Shoesmith 1972, Fuller and Keith 1981). These small groups should reduce conspicuousness. In this study, the mean group size of groups with calves present was 2.4 (n = 52) at Level Mountain (calves excluded).

The group size of cows with calves did not change between 2 years in this study despite variation in the space for dispersion (Table 1).

This constant group size suggests an overriding need to remain inconspicuous. If groups size increased there would be a multiplicative loss of crypsis because of the need for cows and calves to communicate for identification. We noted that when barren-ground caribou move in large aggregations calling is continuous. Bears in the Arctic appear to orient to these vocalizations (pers. obs).

Cows were generally on the south side of mountains with larger areas of brown backgrounds than north slopes (Figs. 5, 9). Additionally, the prevailing southerly winds carried the scent of caribou to higher topography and away from the lower elevation where wolves were more common (Bergerud et al. 1984).

Cows with calves in the mountains were also sedentary. Five cows on Umbach Mountain at Spatsizi remained there an average of 6 ± 2.1 days, whereas 8 females in the valley bottom frequented by wolves stayed there only 2.9 ± 0.8 days (Bergerud et al. 1984). Reduced movement should reduce encounter rates with mobile predators, if an appropriate initial location has been chosen that minimizes encounters with those predators.

Enhancement between multiple predators, rather than interference, should occur in this system. Any hiding cow-calf pairs flushed by a predator would become more conspicuous to other predators, since the flushed caribou would leave scent trails and cross snow covered areas. Both bears and wolves hunt by searching large areas and can run faster than a young calf in rough terrain, hence, the hiding tactic would be partially abrogated by a functional predator response.

Tactics to reduce capture success

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The chance of being captured when discovered should decline with an increase of group size because of shared-risk, mutual vigilance, and improved lead time for escape (Bergerud 1974b). The idea that an animal is safer when it can keep another animal between itself and its predator (the selfish herd concept) is now well recognized (Williams 1964, Hamilton 1971, Wittenberger 1981). However, cows with young calves in British Columbia never form large herds as is common for migratory caribou. This suggests that in the absence of complete displacement there is a need to remain inconspicuous and escape detection rather than to depend on eluding capture after discovery. Maternal cows were especially alert. We noted on several occasions that in an adult group where there was only one calf, it was the mother of the calf that remained standing when the herd bedded. These maternal cows also engaged in the most frequent "look-ups" when the groups fed.

If cows aggregated, it might increase the success of capture by predators. One behaviour of bears and wolves is to charge herds, cows and calves, in the confusion, have little time to reform maternal-filial pairs (pers. obs., F. Miller, pers. comm.) and calves can be left behind either sleeping or disoriented from their dams. In the small groups in British Columbia females did not take flight until they had their calf at heel. The cows generally knew where the calf was bedded and were able to reunite quickly when rushed by a predator.

General

We compare the primary tactics of moose and caribou to counter the success of mobile predators, such as bears and wolves in Table 2. Some

frequent areas where the major alternative prey of moose are relatively scarce (Fuller and Keith 1981, Bergerud et al. 1984, M. Cummings, pers. comm.). If predators hunt based on profitability theory (Royama 1970) then the spaced-out animals can reduce encounter rates if they are scarce enough to be unprofitable to search for. Again, the basic strategy is to reduce encounter rates.

A large animal such as caribou, even if fairly cryptic (Fig. 8), will have a difficult time avoiding detection if it is within the sensory range of predators in the open. However, vigilance can provide a long lead time and a reasonable probability of escape if detected. The animal can then make a rapid move to a new hiding area where there are few predators and possibly again escape encountering predators for some time before being rediscovered.

Moose, contrary to caribou, appear to rely more on avoiding detection than on spacing to avoid encounters; cows hide their calves in forest cover (Lent 1974) and defend their calves (Table 3). Moose should also benefit from reductions in kill rates when caribou are common, since caribou calves are much easier to kill than moose calves (Haber 1977). Wolves may switch from moose to caribou when caribou are common (Hoilemann and Stephenson 1981, James 1983). Predators would not search for both prey simultaneously because of their different habitats. Thus, this 2 species prey system should have greater stability than a caribou only system, consistent with theory (Southwood 1975, Murdock and Oaten 1975, Hassell 1978).

The study extends the principle, that habitat heterogeneity promotes stability in predator-prey systems (Huffacker 1958, Murdock and Oaten

caribou populations aggregate at calving and others, such as those in northern British Columbia, space-out. The aggregating caribou are migratory, usually moving several hundred kilometers north of tree line prior to parturition. Wolves generally den near tree line (Kuyt 1972, Jacobson 1979, Fleck and Gunn 1982), thus, aggregations on calving grounds take place in an area of low wolf numbers (Kelsall 1968, Miller and Broughton 1974). We term this displacement response, spacing-away. For migratory cows, the tactics of sharing-risk, increased vigilance and swarming would not suffice if the majority of the wolves followed the caribou to the calving grounds. The few wolves that are present on calving grounds are able to kill calves at surplus levels (Miller et al. 1985). Miller et al. (1985) have seen one wolf kill three calves in 6 minutes of hunting on a calving ground. Handling time is not a restraint in the functional response. The primary antipredator tactic of these migratory cows is displacement to reduce the encounter rates with predators, many of which remain farther south with alternative prey, including bull and yearling caribou.

If these large herds also displayed dispersion they would be scattered nearer to tree line and abrogate the value of displacement. Spacing-away is most effective by being aggregated. It is the large space of the Arctic above tree line that permits the spacing-away option.

The caribou that space-out rather than space-away are the more sedentary woodland caribou. They do not have sufficient space above tree line for complete displacement; this incomplete displacement has lead to dispersion. Some herds even scatter in tree cover but the caribou in this study spaced-out in the open. Both groups that space-out

1975), to mobile vertebrates. Caribou populations commonly show little population change when calf recruitment equals 10-12% of the herd (Bergerud 1974a, Bergerud and Elliot 1986). The mean percentage of calves for all three of our control study areas was 10-11% and the herds changed little from 1980 to 1983 (Bergerud and Elliot 1986). However, the mean annual deviations from 10% were only 3% at Spatsizi vs. 6% at Level and Kawdy. The more topographically diverse Spatsizi with enhanced patchiness had the most stable recruitment of the three study areas (> topography, > patchiness, > stability).

Density independent stochastic variations such as snow cover intuitively should not be stabilizing (Hassell 1978). However, stochastic variation may be less destabilizing than time lags (Bartlett 1957, May 1973). There have been long predator-prey oscillations in our system (Bergerud and Elliot 1986) and in other northern caribou-wolf systems (Skoog 1968, Haber 1977). These oscillations appear to result more from a numerical predator response than from changes in functional responses (Skoog 1968, Haber 1977). Snow cover, as it affects relative prey densities (hence searching time and efficiency), appears to cause considerable annual variations in calf survival about long-term density trends. Thus the stochastic variation adds noise to the system. But also, snow cover varies the distance between the subhabitats of moose and caribou, therein varying travel time and hunting profitability (promotes switching) for predators. In the sense that this stochastic variation alters the aggregating response of prey and the spatial overlap of predator and prey, it promotes short-term stability and lessens the possibility of extinction (Hassell and May 1973, Murdock and Oaten 1975, Southwood 1975, Beddington et al. 1978).

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Table 1. Comparison of the locations of *females* at calving time on Level Mountain between a June with below normal snow and a year with average snow conditions.

Displacement and Dispersion, groups with & without calves	Extent of Snow: Below Normal 10 June 80 mean ± SE	Extent of Snow: Average 9 June 81 mean ± SE	Differences 1980-81
Mean elevation (m):			
With calves	1703 ± 44.7 (16)	1533 ± 47.3 (13)	170[1]
No calves	1596 ± 31.7 (14)	1488 ± 29.3 (11)	108
Average distance from wolf routes (km):			
With calves	17.4 ± 1.19 (16)	13.2 ± 1.22 (13)	4.2[2]
No calves	13.5 ± 2.25 (10)	12.6 ± 1.26 (16)	0.9
Mean number adults/group:			
With calves	1.9 ± 0.37 (18)	2.0 ± 0.49 (12)	0.1
No calves	3.8 ± 0.95 (13)	2.7 ± 0.39 (18)	1.1

[1] $t = 2.399$, $P < 0.05$

[2] $t = 2.456$, $P < 0.05$

Table 2. Tactics to reduce the rate of predation.

Species and grouping	Tactics to Reduce: Encounter Rate	Detection Rate	Capture Rate
Moose dispersed	Space-out, use islands	Use forest cover & hide calf	Defend calf, use cover and obstacles
Caribou aggregated (spaced-away)	Migrate away from predators & alternative prey, including noncalving caribou, remain mobile	Calve on brown substrates, spaced-out briefly at parturition	Share-risk & vigilance plus swarming, long flushes
Caribou dispersed in open (spaced-out)	Space away from travel routes of wolves & alternative prey, remain sedentary	Calve on brown substrates, spaced-out, remain upwind	Remain vigilant for long lead time, flee uphill
Caribou dispersed in forest (spaced-out)	Shift to habitats with low numbers of predators & ± alternative prey, remain sedentary	Give birth spaced-out in forest cover	Use cover & predator obstacles, water barriers

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LIST OF FIGURES

Figure 1. Annual variations in the percentage of calves of total animals surveyed in the fall.

Figure 2. Decline in calves per 100 females (≥ 2 years) 2 weeks after birth.

Figure 3. A comparison of the percentage of calves in the fall and the snow pack (as mm of water equivalent) in the previous April at Dease Lake.

Figure 4. A comparison of the elevation of cows with calves in June and calves/100 females in the fall for caribou at Caribou Mountain (Spatsizi herd) with the water equivalent of the snow pack on June 1 in the Eaglenest Mountains where these caribou gave birth. (Elevation of cows from Hatler 1985).

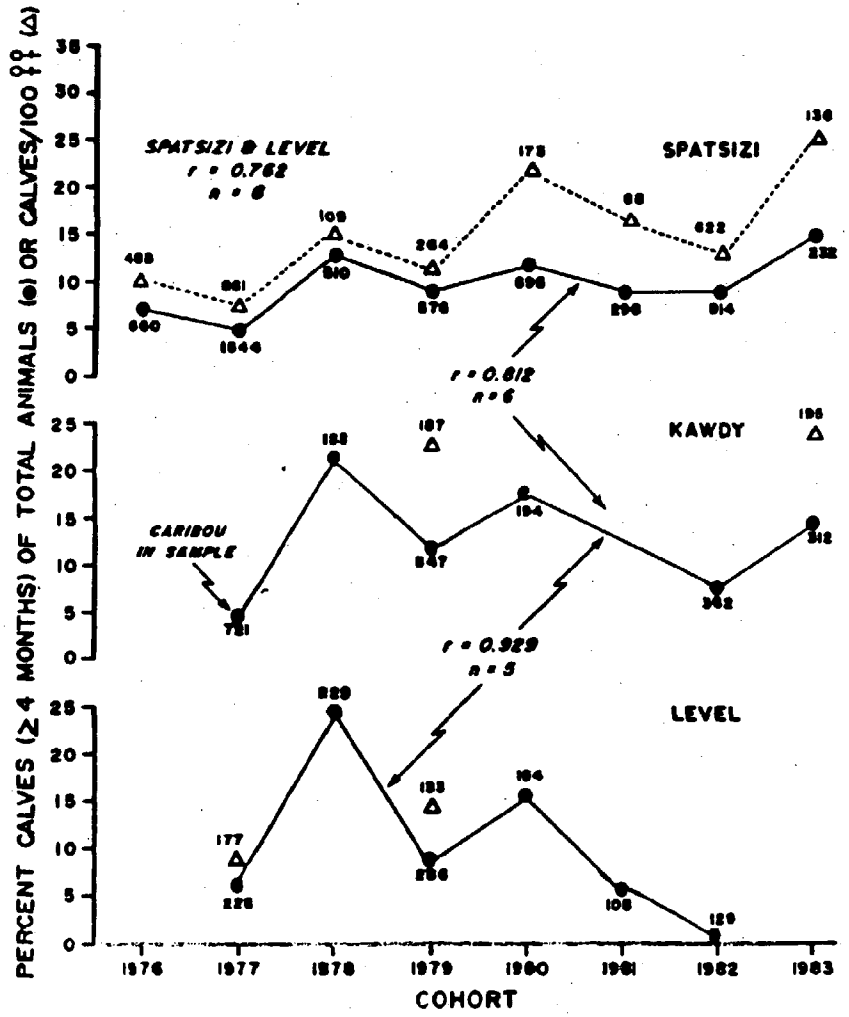
Figure 5. A satellite photograph (1:500,000) showing snow cover at Level Mountain on June 3, 1977, a relatively late year, compared to June 3, 1978, an early year (30% less snow). The hatched area indicates new green vegetation, mostly willow. Cow locations were not available for 1977.

Figure 6. The group size of caribou at Level Mountain in 3 years on June 7-9.

Figure 7. The topographical profile of the three study areas. The graphs in the upper right corner are the chronology of calf percentages. Percentages greater than 10% are listed as plus and those below are negative. Calf survival varied more with moderate relief at Level than at Spatsizi, where the topography was more rugged.

Figure 8. The volcanic mountains at Level Mountain (above) were more undulating, with reduced snow cover, compared to the uplifted mountains at Spatsizi (below). These mountain caribou are quite brown, blending with brown substrates but contrasting with white backgrounds.

Figure 9. Spacing model. (above) When caribou are spaced-out and total numbers are low it is not profitable for a predator to search for caribou. When caribou are aggregated and total numbers are high predators know where the animals are and an increase in density does not result in an increase in searching effort. (below) Snow cover can alter the space for dispersion and can change relative densities and the searching effort of predators. In an early spring caribou can disperse higher into the mountains and away from alternate prey and the travel route of predators in valleys than in a year with greater amounts of snow in June. In late springs wolves denned on Level Mountain but probably not in early springs (1978 and 1980).



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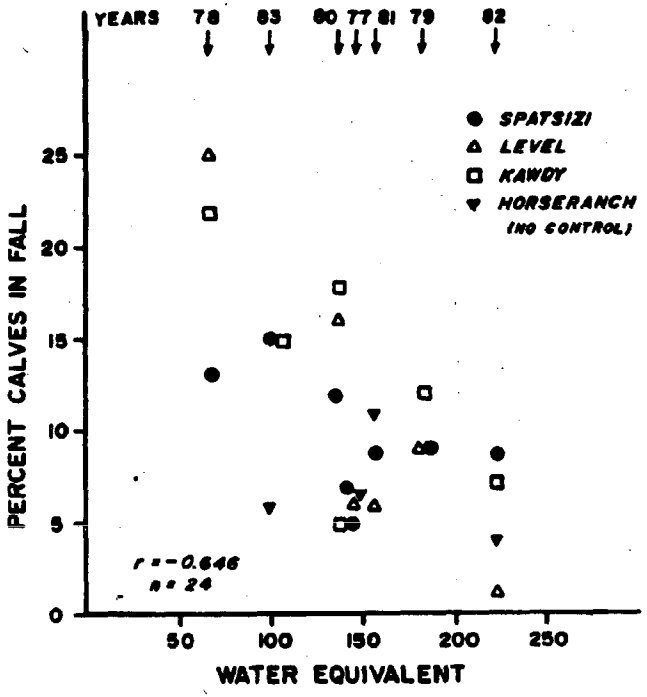

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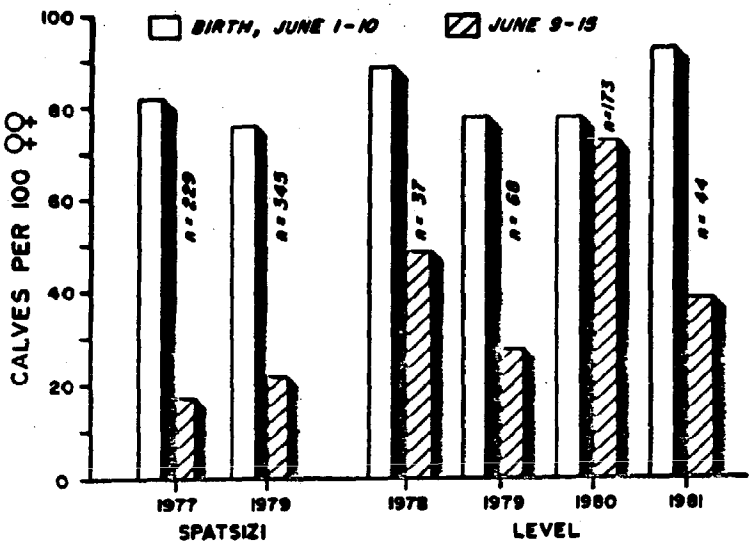

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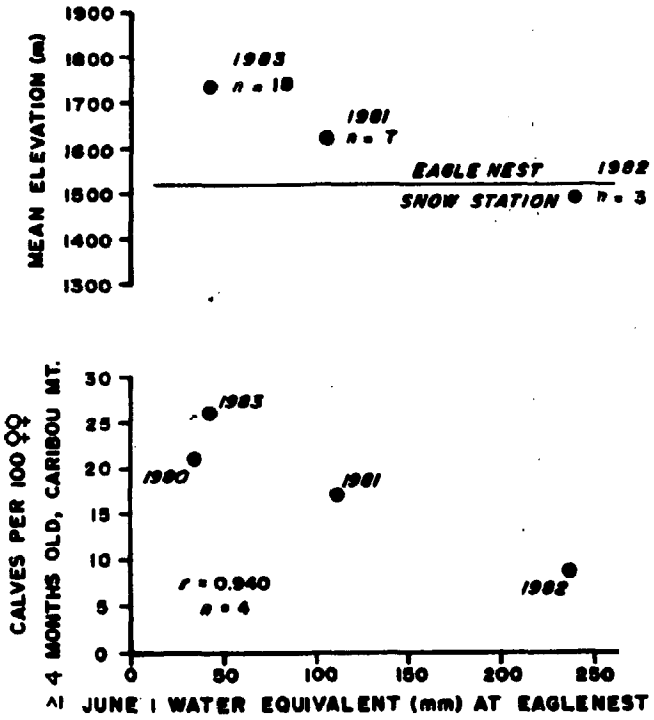

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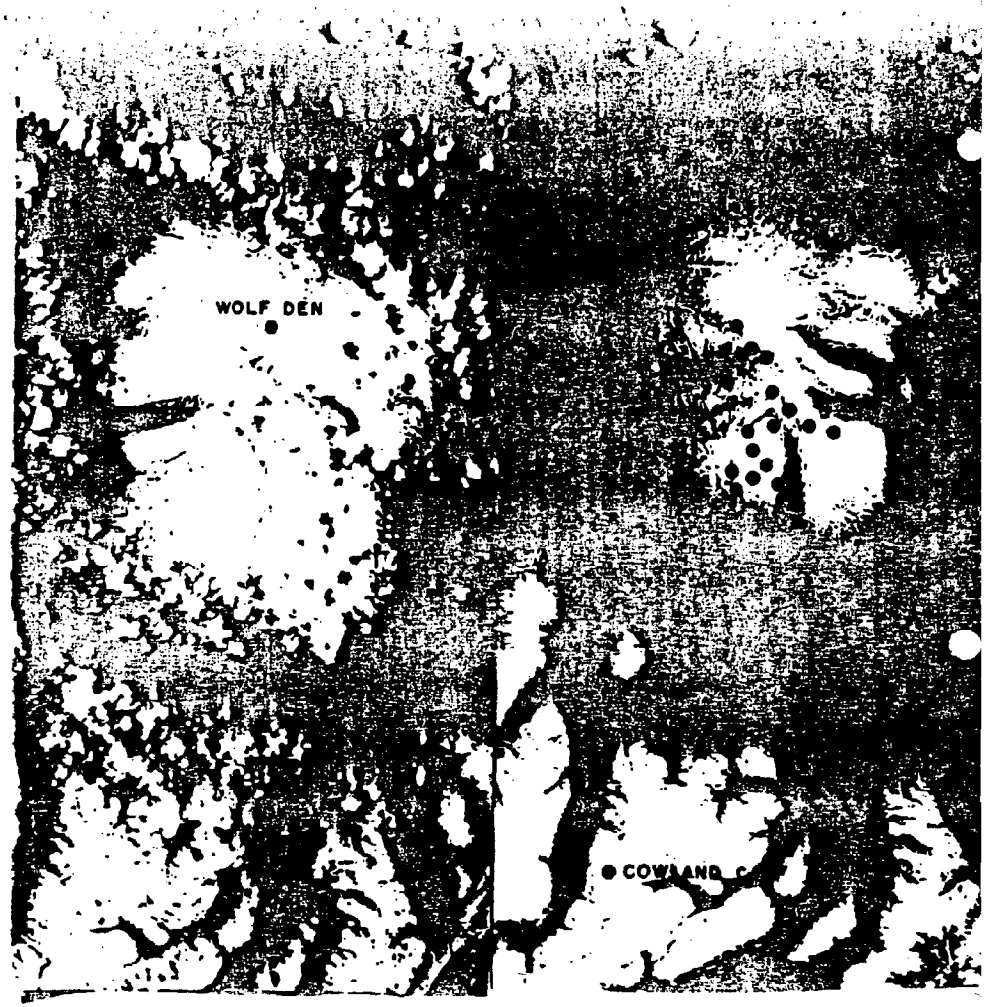

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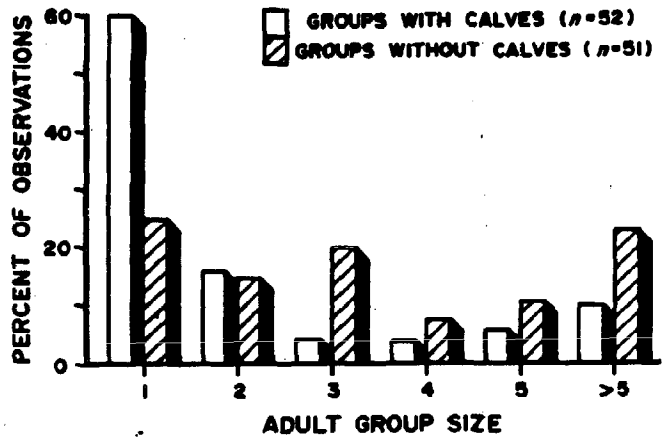
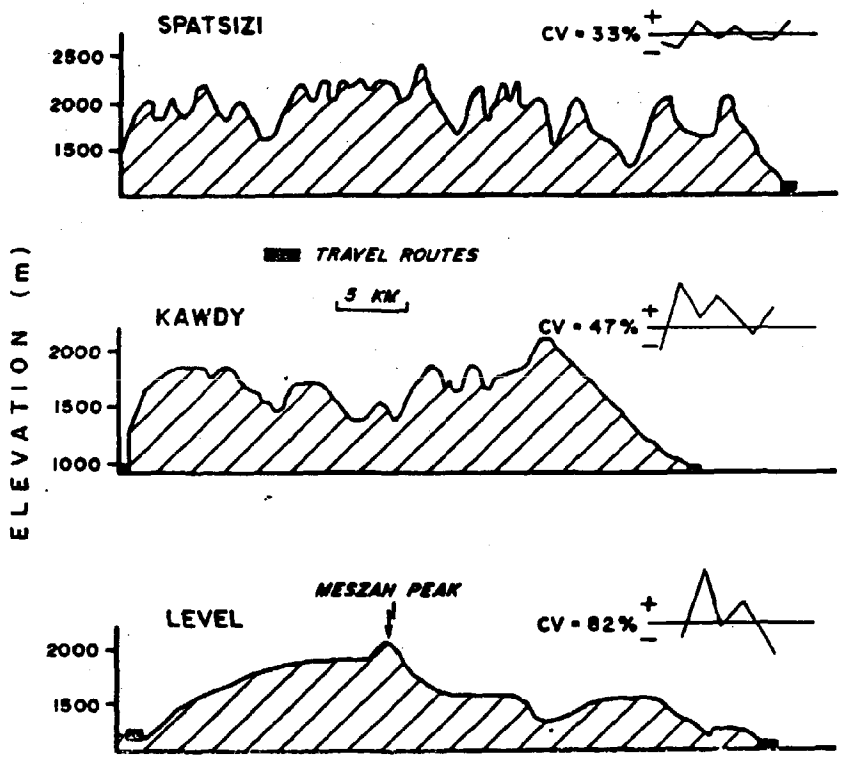


FIGURE 6



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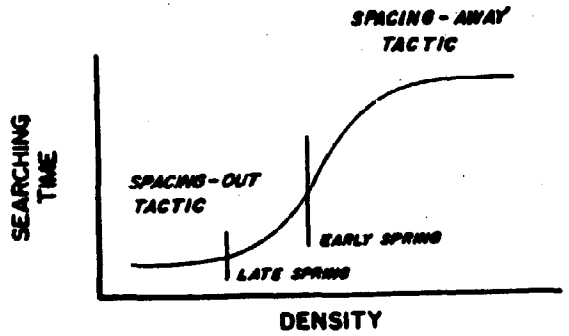

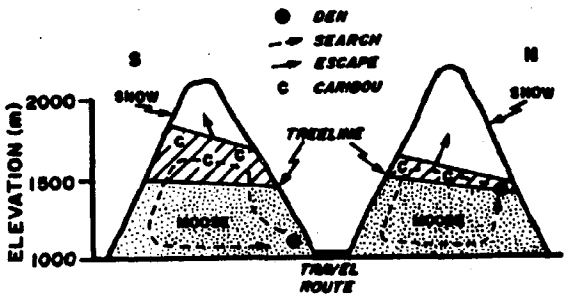

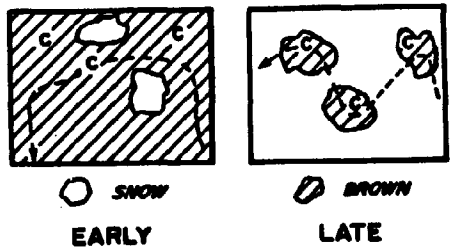

FIGURE 9

FIGURE 9

ATTACHMENT E

TESTIMONY ON THE
DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT
"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"
Anchorage, Alaska
Presented by the Alaska Oil and Gas Association (AOGA)
January 5, 1987

I am Tom Cook, Alaska Exploration Representative for Chevron U.S.A. Inc. Today I am appearing before you on behalf of the Alaska Oil and Gas Association. AOGA is a trade association whose member companies account for the majority of oil and gas exploration, production and transportation activities in Alaska. Let me say at the outset that AOGA strongly supports the Department of Interior's proposed recommendation that the entire "1002" area, also known as the Coastal Plain, be authorized for oil and gas exploration and production. We have restricted our comments today to three aspects of the "1002(h) report", but will submit detailed written comments on the entire report before the January 23, 1987 deadline specified in the Federal Register Notice.

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Mr. Mike Bradshaw of Conoco will first address the national interest in developing the petroleum resources discussed in Chapter VII, then Mr. Mark McDermott of ARCO will comment on the biological content of Chapters II and VI. I will conclude our statement with comments on the recommended stipulations applicable to the area, together with an endorsement of the proposed full leasing Alternative A selected for recommendation by the Assistant Secretary for Fish and Wildlife and Parks, William P. Horn.

Comments on National Need for Oil and Gas (Chapter VII)

Thank you. For the record, I am Mike Bradshaw, Operations Director-Alaska for Conoco Inc. There are many factors that are relevant in determining why opening the ANWR Coastal Plain to oil and gas leasing, exploration and production is in the national interest.

- The U.S. is rapidly depleting its domestic reserves of oil and gas.
- Domestic crude oil production from existing fields is forecast to decline from the 8.9 million barrels per day average in 1985 to 6.2 million barrels per day by 1991, if prices remain at $15 per barrel. Current domestic production has already fallen to about 8.5 million barrels per day. Domestic production is forecast to fall as low as 4 million barrels per day by the year 2000.
- Currently Alaska supplies our nation with approximately 20% of the total U.S. production.

- Barring new domestic discoveries to replace depleted reserves, and assuming the demand for petroleum does not increase, the U.S. may need to import 12 million barrels per day by the year 2000. Thus, without significant new discoveries, our nation could be dependent upon foreign sources for 60-75% of its demand, within the next 10-15 years, almost double the present level of dependency.

Currently the U.S. consumes more than 25 percent of worldwide petroleum production even though it has less than 4 percent of proven worldwide reserves. Policy decisions which slow or prohibit replenishment of domestic reserves only exacerbate this problem. Opportunities to explore for and develop new reserves must be forthcoming.

As we have seen in recent years, the U.S. is vulnerable to serious supply disruptions because of its dependence on foreign oil. Foreign sources of petroleum are concentrated largely in the Middle East where two-thirds of the proven reserves of the non-communist world exist. Saudi Arabia alone possesses over one-fourth of the free world's reserves. Increased future dependency on these politically unstable Middle Eastern areas is highly undesirable from a national interest viewpoint.

As domestic production continues to decline, and imports continue to rise, U.S. vulnerability to supply disruption will increase. A reliable domestic energy supply is a key factor in maintaining a viable foreign policy.

It is in the national security and economic interest to encourage exploration for new domestic reserves wherever the potential exists, on the Coastal Plain of ANWR and other promising areas. Any decision to delay that search is a step toward increased dependency on foreign supply. Lead times to develop frontier Alaska oilfields are very long, typically 10 to 15 years from discovery to first production. If a major discovery were made on the Coastal Plain today, first production would not be likely before the year 2000.

Increasing consumption, decreasing domestic production, and rising imports, coupled with delay in opening promising new areas to exploration and development are all factors which collectively will contribute to the likelihood of a future energy crisis. 1986 was a year of drastic change throughout the oil and gas industry. Exploration is currently at a near standstill, marginal and uneconomic fields are being shut-in, and research and development have been drastically reduced. Continuity of exploration and development are necessary to replace depleted reserves. Delays in the exploration process today will cause greatly reduced future production.

Those who oppose oil resource development argue that the reserve potential of the Coastal Plain may represent only a few months supply of oil to the nation. This statement, though misleading,

illustrates very well the significance of such a reserve if it is discovered and produced from the Coastal Plain. A few months is indeed significant when compared on the same terms with the 18 month supply in the largest oilfield ever discovered in North America - Prudhoe Bay. But, the statement is misleading for two very important reasons. First, no oil field can be fully produced in a few months. Prudhoe Bay, for example, may produce oil and gas for at least 30 years. Second, the statement assumes a reserve estimate which would offset total daily consumption rather than an offset to imports during the life of the field. From a national security perspective, offsetting imports is a more important comparison. Prudhoe Bay, on average, could offset approximately 13% of foreign oil imports for 30 years (assuming 10 billion barrels recoverable reserves and 7 million barrels per day imports).

The report estimates a 19% chance of finding economically recoverable oil on the Coastal Plain. This promising outlook for success helps explain industry's high interest in exploring the Coastal Plain because it is a ten-fold increase over the statistical industry success rate in Alaska. Historically only one out of fifty, or 2%, of the exploratory wells drilled in Alaska has ever resulted in a commercial discovery

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Economic benefits of further North Slope development to the nation are extremely significant. In addition to the direct benefits to the State and Federal governments from bonus payments, rentals, royalties, and taxes, the discovery of large new reserves would significantly reduce oil imports and the associated national trade deficit. Nearly half of the U.S. trade deficit today results from imported oil.

Oil development on the North Slope of Alaska has provided hundreds of billions of dollars to the U.S. economy, representing a benefit to all of the 50 states. Therefore, petroleum development from the Coastal Plain, especially on the order of magnitude of Kuparuk or Prudhoe Bay, would promote economic development not only within Alaska, but also throughout the United States. Jobs would be created as the demand for goods and services increase and the positive impacts would be felt well beyond the petroleum industry.

If highly prospective areas such as the Coastal Plain are placed off limits to petroleum exploration, the nation may experience a future energy crisis which will make the 1973 embargo and the 1979-1980 price escalation seem mild by comparison.

In summary, we believe it is clearly in the national interest to open the Coastal Plain of ANWR to leasing and development.

I will now turn the microphone to Mark McDermott with ARCO who will comment on the biological aspects of the draft report.

Biological Review Comments

My name is Mark McDermott and I am a Senior Environmental Coordinator for ARCO Alaska, Inc. Following a detailed review of the LEIS Chapter II - Existing Environment and Chapter VI - Environmental Consequences, the Alaska Oil and Gas Association strongly endorses the DOI recommendation to lease the entire "1002" Coastal Plain area for oil and gas exploration, development and production based on the following points and conclusions:

Prudhoe Bay Region/TAPS

Often the National Environmental Policy Act (NEPA)-mandated EIS process tries to predict environmental consequences of new developments with little or no previous field experience to guide the predictions. Clearly, for the ANWR Coastal Plain, test cases have already been run at Prudhoe Bay, Kuparuk, Milne Point, Lisburne, and Endicott, and with the Trans Alaska Pipeline. Collectively, the experience of the regulatory agencies and industry is summarized in the LEIS on page 2: "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the Coastal Plain and generate similar minimal effects."

Furthermore, we support the statement, also on page 2 of the LEIS, that "Most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at other North Slope oilfields and from the construction and operation of the Trans-Alaska Pipeline System (TAPS)".

Indeed, we would like to point out that all of the dire predictions of environmental degradation made 15 years ago, prior to the construction of TAPS, have subsequently been proven to be unfounded. The predicted demise of major caribou herds, deterioration in water quality and major losses of habitat simply have not occurred. Instead, the development of Prudhoe Bay and the TAPS have allowed Alaskans to enjoy economic prosperity in harmony with a high quality environment and thriving wildlife populations.

National Environmental Policy Act

We understand that the draft document is a legislative EIS largely following the requirements of the National Environmental Policy Act. We would like to point out that many of the environmental consequences predicted to occur for the 5 alternatives appear to be based on "worst case" evaluations. In April 1986 the NEPA-EIS guidelines were changed from requiring a "worst case" assessment to one of "most likely to occur." We feel that many of the major conclusions of significant effects carry the earlier "worst case" assessment to an extreme and thus we ask that the authors reconsider many of their conclusions in light of the "most likely to

occur" assessment of impacts. The standard for the "most likely to occur" case exists in the experience from other North Slope oilfields. Many of these specific points will be detailed in our written comments.

Caribou

We agree that caribou, both from a standpoint of numbers and distribution, is the specie most likely to encounter developmental activities in the "1002" area. The LEIS quote from page 6 states that "Changes could include displacement and reduction in the size of the Porcupine Caribou Herd. The amount of reduction and its long-term significance for herd viability is highly speculative" (emphasis added). We ask that these acknowledged qualifications be presented throughout the environmental consequences section to ensure that all readers of the document are fully aware of the highly speculative nature of some of the hypothesized impacts.

Carrying Capacity

In the management of wildlife populations, the concept of habitat carrying capacity is key to defining management goals. It is an established fact that the Porcupine Herd does not approach the carrying capacity of its range. Indeed, former Alaska Fish & Game Commissioner, R. Skoog, in his Doctoral dissertation (1968) stated that "It seems likely that the Alaskan caribou population has remained far below range carrying capacity and that the total habitat has never been fully occupied. In reality, caribou populations seem to have maintained densities much lower than the maximum dictated by food alone, and hence the reduction in total range becomes less meaningful." Thus, we agree with the conclusions that habitat is not currently limiting the growth of the Porcupine Herd and that the small loss of habitat represented by likely development in the "1002" area will not impact growth or productivity of caribou. Consequently, we disagree with the speculation that a reduction of caribou population is likely to occur as a result of small reductions in habitat availability and value.

"Core Calving Area" Concept

Significant year-to-year variability in calving distribution has been recorded for the Porcupine Herd all across the Arctic coast from east into Canada and west to the Canning River. Concentrated calving has been observed across the entire so-called core calving area during only 5 of the past 14 years. Therefore, calving habitat is more appropriately represented as a true continuum across the Coastal Plain including portions of the Arctic coast outside the "1002" study area. The Porcupine Caribou Herd has demonstrated numerous times in the past, including this past year, that it can and will successfully calve miles from the (quote) "core calving area" (unquote). Thus, the "unique and irreplaceable" nature required for designation as Resource Category 1 does not apply.

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While AOGA embraces the responsible use of mitigation procedures in the Arctic, it is inappropriate to emphasize habitat loss alone without consideration of actual effects or lack of effects on wildlife populations from development.

Muskox

We feel that the conclusions regarding potential impacts of development on muskox are unnecessarily severe and unfounded. While it is true that very few data characterizing muskox responses to oil field development are available, it is also true that the muskox have shown ready adaptability to human presence and have even been semi-domesticated in several areas. This adaptability to human presence will significantly reduce the "worst-case" conclusions stated in the LEIS.

Mammalian Species

We feel that it is important to point out that the remaining mammalian species including moose, dall sheep, wolves, arctic fox, wolverines and brown bears are present on the Coastal Plain in relatively low population densities or for relatively short periods during the year. Thus, we support the conclusions of minimal or negligible impacts on these species.

Fishery Populations

We support the conclusion that only minor to negligible effects on coastal fishery resources or fishery habitat will occur. Experience at Prudhoe Bay and Endicott has provided a significant volume of data to support this judgment.

Threatened and Endangered Species

We also support the conclusions of minor to negligible impacts on endangered and threatened animal species such as bowhead and grey whales and the peregrine falcon. We feel that the transient nature of their presence on the Coastal Plain and the history of developmental interaction in the Prudhoe Bay field clearly demonstrate the lack of meaningful impacts on these species. Regarding the plant, Thlaspi arcticum, we feel that conclusions and set-back stipulations based on the presence of this specie are overly restrictive because the plant has not been determined to be threatened or endangered.

Recreation

We would like to underscore the extraordinarily low use of the Coastal Plain as a recreational area. History indicates that only a small number of individuals have actually utilized the Coastal Plain for recreation in the form of hunting, fishing, camping or hiking. It is extremely expensive to reach the area; a trip from

the contiguous states costs thousands of dollars and requires an air charter flight to reach the Coastal Plain. Wet and moist ground conditions make hiking difficult during the 8-10 week "summer." Extreme cold and darkness during most of the year further reduce recreational use of the Coastal Plain. For most of the year this is an extremely harsh and hostile environment.

While there is no reason to believe that leasing and development would lead to a permanent loss of aesthetic values, over 30 miles of Coastal Plain from the "1002" area east to the Canadian border are already classified as wilderness, thus preserving the complete spectrum of arctic ecosystems represented in the Arctic Refuge.

Summary

Before I ask Mr. Cook to conclude our statement, I would like to acknowledge the 5 years of extensive field investigations, data collections and analyses by over 50 trained professional scientists, including wildlife and fishery biologists, botanists, zoologists, chemists, geologists and resource specialists who contributed to this draft report. We consider the factual basis for the scientific analysis to be adequate and the conclusions to be reasoned. However, we cannot support some of the speculation on environmental consequences found in the report which result in an over estimation of potential impacts.

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Concluding Remarks

As previously stated AOGA supports the full leasing of the ANWR Coastal Plain under reasonable measures for environmental protection. Except for a few provisions, the proposed stipulations found in the report and the land use stipulations found in the Agreement Between the Arctic Slope Regional Corporation and the United States of America (incorporated into the report by reference), appear reasonable. The proposed mitigation measures are generally consistent with current and proven industry practices for the protection of wildlife and the environment. The application of reasonable mitigation can ensure that development is conducted in a manner compatible with the purposes of the Refuge and ensure that no unnecessary adverse environmental impacts occur. Our written comments will address in detail, those measures that we believe are unduly restrictive.

AOGA strongly endorses Alternative A, full leasing of the "1002" study area, as the most acceptable alternative consistent with the national interest. Alternative B, partial leasing, is based on a speculative premise that a traditional core calving area exists and is necessary for the maintenance of a healthy caribou herd. This has not been demonstrated in the scientific literature and there is a large body of data which indicates otherwise. Alternative C makes no positive contribution. Surface and regional geologic information already confirm that the area has oil potential. The amount can only be verified by on-structure drilling.

Stratigraphic type drilling is an unnecessary duplication and its surface impact would be in addition to that eventually required for on-structure wells. Also, Alternative C would just be another delay in the eventual production from the area. Neither Alternatives D, no action, nor E, wilderness designation, would determine whether or not substantial petroleum reserves exist in the "1002" study area. Alternatives D and E preclude reasoned planning and would deny the nation the positive benefits that could come from oil and gas production on the Coastal Plain.

We fully support the proposed recommendation on page 169 which contains the following statement: "even though the billions of barrels of oil reserves have been brought on line and the infrastructure developed to bring that oil to U.S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy. The Central Arctic Caribou Herd has increased substantially during the period that development has occurred within the heart of its range. Estimated at about 3,000 animals in 1972, the herd now numbers more than 13,000. Similarly, important waterfowl species continue to successfully nest and rear their brood within the developed area. Although circumstances within the "1002" area may be somewhat different, the evidence derived from the Prudhoe Bay experience leads one to be quite optimistic about the ability to explore for and develop the hydrocarbon potential of the "1002" area without significant deleterious effects on the unit's wildlife resources."

Thank you for this opportunity to comment.

TESTIMONY ON THE
DRAFT LEGISLATION ENVIRONMENTAL IMPACT STATEMENT
"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"
Washington, D.C.
Presented by the Alaska Oil and Gas Association (AOGA)
January 9, 1987

I am Wayne Smith, District Manager of Amoco Production Company and President of the Alaska Oil and Gas Association (AOGA). I am appearing before you today on behalf of AOGA which is a trade association whose member companies account for the majority of oil and gas exploration, production and transportation activities in Alaska. AOGA strongly supports the Department of the Interior's proposed recommendation that the entire "1002" area, also known as the Coastal Plain of the Arctic National Wildlife Refuge (ANWR), be authorized for oil and gas leasing, exploration and production.

Currently, Alaska supplies our nation with approximately 20% of its total domestic production. Lead times are long in frontier Alaska regions--at least 10 years from discovery to first production, but more likely to extend as long as 15 years in the case of the ANWR Coastal Plain. Without significant new discoveries, our nation could be dependent upon foreign sources for 60-75% of its petroleum needs within the next 10-15 years, almost double the present level of dependency.

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Production from existing Arctic Alaska oil fields which are presently being produced at about 1.8 million barrels per day will begin a precipitous decline by 1988. It is a matter of technical certainty that the present level of production from Alaska's North Slope will decline to about 500,000 barrels per day by the year 2000, earliest date by which new production from the ANWR Coastal Plain would likely be available.

If highly prospective areas such as the Coastal Plain are placed off limits to petroleum exploration, the nation may experience a future energy crisis which will make the 1973 embargo and the 1979-1980 price escalation seem mild by comparison.

Increasing consumption and rising imports along with decreasing domestic reserves and production, coupled with delay in opening promising new areas to exploration and development, are all factors which collectively will contribute to the likelihood of a future energy crisis.

The resource assessment contained in the draft LEIS for the Coastal Plain supports our view that the area may contain significant reserves. The Coastal Plain has great potential for making a substantial contribution to our domestic energy supply.

Even the most optimistic production scenario will physically utilize only a very small area of the Coastal Plain. The very small area which would be affected by discovery and development of

1 or 2 giant oil fields should be balanced against the very strong contribution to the national interest that such discoveries could represent.

Our industry has demonstrated its compatibility to explore for, develop, and produce oil in the Alaska Arctic without significant adverse impact on wildlife and the environment. The dire predictions of environmental degradation and harm to wildlife made 15 years ago, prior to the development of the giant Prudhoe Bay field and the construction of the Trans-Alaska Pipeline have proven to be unfounded. The predicted demise of major caribou herds, deterioration in water quality and major losses of habitat simply have not occurred.

Instead, the development of Prudhoe Bay and the Trans-Alaska Pipeline have permitted the production of 5 billion barrels of much needed oil with minimal environmental impact. During the 15 year period of development wildlife have thrived in the midst of oil field development and evidenced by the fact that the Central Arctic Caribou Herd has grown from about 3,000 to a population now estimated at over 13,000 animals.

With regard to the issue of protecting the Porcupine Caribou Herd which uses the Coastal Plain on a seasonal basis, there has been a development since the issuance of the draft report which I would like to mention. On December 3, 1986, the United States and Canada have devised an agreement for the management and conservation of the Porcupine Caribou Herd. This agreement which also involved the native subsistence users of both the Canadian and American Arctic assures that appropriate steps will be taken to guarantee the well-being and preservation of the Porcupine Caribou Herd. In view of this development, the final report to be submitted to the Congress should be revised to reflect this new measure of protection afforded the Porcupine Caribou Herd.

I would like to acknowledge the 5 years of extensive field investigations, data collections and analyses by over 50 trained professional scientists, including wildlife and fishery biologists, botanists, zoologists, chemists, geologists and resource specialists who contributed to this draft report. We consider the factual basis for the scientific analysis to be adequate and the conclusions to be reasoned. However, we cannot support some of the speculation on environmental consequences found in the report which result in an over estimation of potential impacts.

Except for a few provisions, the proposed stipulations found in the report and the land use stipulations found in the Agreement Between the Arctic Slope Regional Corporation and the United States of America (incorporated into the report by reference), appear reasonable. The proposed mitigation measures are generally consistent with current and proven industry practices for the protection of wildlife and the environment. The application of reasonable mitigation can ensure that development is conducted in a manner compatible with the purposes of the Refuge and ensure

that no unnecessary adverse environmental impacts occur. Our written comments will address in detail, those measures that we believe are unduly restrictive.

AOGA strongly endorses Alternative A, full leasing of the "1002" study area, as the most acceptable alternative consistent with the national interest. Alternative B, partial leasing, is based on a speculative premise that a traditional core calving area exists and is necessary for the maintenance of a healthy caribou herd. This has not been demonstrated in the scientific literature and there is a large body of data which indicates otherwise. Alternative C makes no positive contribution. Surface and regional geologic information already confirm that the area has oil potential. The amount can only be verified by on-structure drilling. Stratigraphic type drilling is an unnecessary duplication and its surface impact would be in addition to that eventually required for on-structure wells. Also, Alternative C would just be another delay in the eventual production from the area. Neither Alternatives D, no action, nor E, wilderness designation, would determine whether or not substantial petroleum reserves exist in the "1002" study area. Alternatives D and E preclude reasoned planning and would deny the nation the positive benefits that could come from oil and gas production on the Coastal Plain.

O-70

AOGA's expresses its full support of the Department of the Interior's proposed recommendation to Congress which states "...even though the millions of barrels of oil resources have been brought on line and the infrastructure developed to bring that oil to U.S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy. The Central Arctic Caribou Herd has increased substantially during the period that development has occurred within the heart of its range. Estimated at about 3,000 animals in 1972, the herd now numbers more than 13,000. Similarly, important waterfowl species continue to successfully nest and rear their brood within the developed area. Although circumstances within the "1002" area may be somewhat different, the evidence derived from the Prudhoe Bay experience leads one to be quite optimistic about the ability to explore for and develop the hydrocarbon potential of the "1002" area without significant deleterious effects on the unit's wildlife resources".

Thank you for the opportunity to present this statement.

Paragraph 2 correctly points out that wide year-to-year variations in calving distribution can occur due to weather influences and the arrival of spring snow-melt. This acknowledged effect of weather further erodes the core-calving area concept and points out the wide annual variability and adaptability of caribou.

Paragraph 3 clearly shows this annual variability. During 1983, 1984, and 1985, calving estimates varied from 74% to 35% and 82% respectively in the 1002 area. These data clearly show the adaptability of the PCH to yearly variations in weather conditions and point out that calving distributions do vary widely.

Therefore, we ask that conclusions regarding the relative importance of the Jago highlands as a core-calving area be de-emphasized throughout the report.

Page 29, paragraph 3: Similar to calving distribution, caribou demonstrate wide variation in their selection and use of insect relief habitat. Although many groups move towards the coast, the report correctly points out that many also move to higher foothill and mountain areas for relief. We feel the report does not sufficiently recognize the wide variation in acceptable insect relief habitat, and thus places undue emphasis on the coastal areas. We also point out that the Prudhoe Bay development pads and roads have actually created insect relief habitat and have not prohibited CAH access to coastal areas for insect relief. We ask that this section clearly point out the favorable experience at Prudhoe Bay.

Page 27-33, Other mammalian species: Population size and distribution data for other mammalian species in the 1002 area are summarized as follows:

Species	Population Density in 1002 Area*
Muskox	Approx. 476 individuals
Moose	Does not exceed 25
Dall Sheep	Very rare
Wolves	Does not exceed 5-10 animals
Arctic Foxes	Common with annual fluctuations
Wolverines	Few-accurate figures are unavailable
Brown Bear	Approx. 108 bears

* Population density statements taken from 1002 report, pages 29-33.

As can be clearly seen from these data, very few individuals of these species are found in the 1002 area. We ask that the report conclusions be strengthened to point out the extremely low density of use for these species, and thus the low potential for any impacts on these species due to development.

Page 34, paragraphs 3 and 4: The report does not consider the results from the highly successful 1986 whaling season. During

this season, Kaktovik took 3 whales and Nuiqsut took 1 whale. These successful hunts took place while offshore drilling and drillship activity were allowed to occur during a portion of the fall bowhead migration. We feel this experience clearly documents the compatibility of offshore drilling activity with subsistence whaling.

We ask that these data be added to this section of the report.

Page 43, column 1, paragraph 3: "The 1002 area has received no industrial use other than oil and gas exploration under the 1002 program."

Reindeer herding and commercial whaling were practiced in the early part of the century.

Page 45, column 2: Statistics on recreational use of the 1002 area seem unduly inflated. Permit data on file with the USFWS indicate that 1983, 1984 and 1985 had only 6, 33 and 33 permitted users respectively for the 1002 area. Additionally, it is not clear whether the "less than 3000" recreational visits per year include the "Kaktovik residents also engage in snowmobiling" or not. If so, the number is deceptively large.

We ask that these figures be included in the report to emphasize the low frequency of recreational use for the area.

O-71

Page 45, column 2, paragraph 5: "The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America."

There is ample evidence in the report referring to recreational and subsistence use of the area to show that the area is not undisturbed.

Page 46, column 1, paragraph 2: "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge."

This statement is contrary to the wildlife population data cited in the preceding parts of this chapter which point out the relatively low abundance of wildlife species and the relatively short period of use of the 1002 area. We suggest deletion or at least clarification and quantitative justification for this statement.

Page 46, paragraph 3: This paragraph acknowledges the esthetics of the coastal plain area but fails to recognize that the easternmost portion of the ANWR coastal plain has similar aesthetics and is currently designated as wilderness.

Even with full leasing under Alternative A, this 30 miles of coastal plain from the 1002 area east to the Canadian border and further into Canada will remain as wilderness, thus preserving the complete spectrum of arctic ecosystems represented in the Arctic Refuge. Furthermore, we believe that leasing and development will not lead to a permanent loss of esthetics.

Page 49, column 2, paragraph 2: "These 26 prospects were subjected to technological and economic conditions to determine the degree to which their resources could be recovered, resulting in estimates of conditional economically recoverable resources."

It should be recognized that these technological and economic criteria could be different for different lessees, resulting in variable reserve estimates, high and low.

Page 49, column 2, paragraph 2: "It is estimated, if there is economically recoverable oil present (the chance of which is estimated to be about 20 percent),..."

This estimate is misleading to those who are not familiar with typical industry risk and success ratios. While a 20% chance might be considered unfavorable to others outside the petroleum industry, it is an excellent chance from an industry standpoint. The record in Alaska shows only 1 out of 10 exploratory wells drilled encounters any hydrocarbons at all, and of those that do, only 1 out of 5 finds a commercial field. Hence, out of 100 exploratory wells drilled, only 10 would encounter oil. Of those 10, only 2 would have discovered economically developable fields. This represents a 2 percent chance of success compared to the 20 percent mentioned above. In other words, 20 percent represents a considerable increase over past industry success in Alaska.

Page 51, column 1, paragraph 4: "However, the estimation of recoverable resources was limited to those prospects (all structural) which can be identified and delineated with reasonable degree of certainty, and which are physically large enough that they could reasonably be expected to contain commercial quantities of oil."

A reserve estimate based on these criteria should represent a minimum. Recoverable resources from stratigraphic traps could be considerable since many of the plays identified on p. 63-67 are stratigraphic in nature. Further, the minimum economic field size would be expected to decrease as infrastructure from larger fields is developed. Prospects that were deemed too small to be economically viable on their own may come into play later on in the development cycle. Additionally, all of this discussion precludes the uncertainty of oil prices and the effect of price fluctuations on the economic viability of any prospect.

Page 54, column 2, paragraph 1: "If most of the Ellesmerian rocks are missing in most of the 1002 area, the assessment number would be reduced considerably. Drilling of one or two wells in critical areas would resolve this question."

Although the drilling of one or two stratigraphic wells would provide additional geologic detail, it only prolongs the process of determining and evaluating the resource potential of the Coastal Plain. The level of geological information currently in hand is sufficient to begin an exploratory phase of drilling on the Coastal

Plain. As exploratory wells are drilled to evaluate oil and gas prospects, stratigraphic information will be obtained to update resource and reserve estimates.

Page 58, column 2, paragraph 6: "No prospects were adequately resolved within the detached and highly deformed Mesozoic and Tertiary rocks."..."Structural analogs in Canada - the Alberta disturbed belt - and in the Montana-Wyoming thrust belt suggest that the probability of traps occurring in the subsurface in this structural setting is high, although determining their location on the basis of existing seismic data is difficult."

These statements indicate that the resource estimate might actually be higher than what is stated in the report.

Page 61, Table III-2: Data on Petroleum Prospects in the 1002 Area.

The data presented in the Table indicate that many of the prospects have been identified by only one seismic line. It is difficult, if not impossible, to identify the areal extent of a prospect from only one seismic line. Hence, the reserve estimates for these prospects could be understated.

Page 68, column 2, paragraph 4: "The PRESTO model also allows for input of a minimum economic field size. Any field smaller than this economic field size is not counted in the prospect or area conditional resource estimates."

The economical viability of small fields should improve as the infrastructure is developed for larger fields. To exclude the reserve potential of smaller fields strictly by size does not seem reasonable.

O-72

CHAPTER IV - Development and Transportation Infrastructure

The scenarios for exploration, development, production and transportation set forth in Chapter IV are realistic and reasonable descriptions of how petroleum development and operations may be conducted on the Coastal Plain. We believe that Chapter IV is responsive to Section 1002(h)(3), which requires an evaluation of the effects of further oil and gas exploration, development, and Section 1002(h)(4), which requires a description of transportation facilities. We offer the following comments and suggestions on the content of Chapter IV:

Page 75, column 1, paragraph 3: "Without exploratory drilling as a confirmation and delineation tool, all estimates must be considered uncertain."

We fully support this important caveat. Drilling an adequate number of exploratory wells is the only means of reducing the inherent uncertainty of the estimates which form the basis for the scenarios described in Chapter IV.

Page 75, near top of column 2: "Specific locations and sources of water and gravel for exploration and development activities have not been identified; and it is understood that these resources, especially water, are not readily available on the 1002 area."

Throughout the "1002" draft there are numerous references to gravel and water shortages with the implication that there are no known ways in which these resources can be obtained in quantities sufficient to support development and operations. We believe the report overstates potential problems in obtaining needed water and gravel.

With regard to the availability of gravel, it is acknowledged on page 20 of the report that "The valleys of larger streams are underlain by large quantities of coarse sand and gravel". Further, data available from the drilling of thousands of shallow shot-holes throughout the 1002 area substantiate that much of the area is underlain in the very near surface with gravel. These data from the group seismic surveys are available to the Department of the Interior and should be used to substantiate the availability of gravel for construction.

We also believe that the report overstates the problems attributed to the scarcity of water from the 1002 area. While we acknowledge that fresh water may not be readily available in much of the 1002 area (as is the case generally in the Arctic), there are ways of providing for water as demonstrated in the Prudhoe Bay area. Water availability varies by location, and solutions to provide water must be considered on a site-specific basis. Specific solutions are addressed in later comments.

Page 75, column 2, last paragraph: "On the North Slope, exploratory wells to a depth of approximately 12,000 feet can usually be drilled in a single season. It is possible that many wells would require two seasons."

The presumption that a 12,000 foot exploratory well can usually be drilled in a single season is not necessarily correct. Further, the presumption that wells which cannot be drilled in a single winter season will require a multi-season effort should be examined on a case-by-case basis. While we agree that operations should be scheduled to avoid significant disturbance to wildlife and the environment, conducting exploratory operations into or through the summer may be warranted if adverse impacts can be avoided.

Page 76, column 1, paragraph 2: "Heavy construction equipment is used to prepare the wellsite for the drilling operation and to prepare an airstrip large enough for Hercules C-130 aircraft."

The assumption that all exploratory drilling operations would be mobilized and supported by C-130 aircraft results in overestimating water and gravel requirements, vegetation disturbance, wildlife displacement and loss of habitat. Exploratory wells can also be mobilized and supported by Rolligons and other surface vehicles as has been demonstrated by past experience on the North Slope.

Page 76, column 2, paragraph 1: "On the 1002 area, obtaining the water needed for drilling, and more particularly for ancillary needs such as ice roads and airstrip construction, poses the major engineering problem."

Here again, the problem of water availability is overstated, particularly for an exploratory well. The roads and ice airstrips can be constructed from snow. Snow fences have been successfully used for the collection of snow for such construction. Snow/ice melters can be used to obtain water for drilling and camp use. As a last resort, water can be hauled or even air-lifted to an exploratory operation. Also, there are lakes (depending upon locality) which do not freeze to the bottom. The three scenarios for obtaining water described on page 76 are also feasible alternatives for obtaining water or reducing the requirements for water.

Page 77, column 2, paragraph 1: "Following is a discovery of oil from exploration drilling, a confirmation or delineation well is drilled during the next drilling season. ... further delineation drilling occurs during subsequent drilling seasons."

Delineation drilling may not require a sequential season-by-season time frame. Delineation wells often can be drilled in a significantly shorter drilling time than a rank exploratory well depending on (among other factors) the depth of the production horizon. Also, one or more delineation wells can be drilled from the same location by directional drilling which in itself would reduce

expenses and impacts by limiting the number of surface locations required.

Page 78, column 1, full paragraph 3: "...about 10 years will elapse before production starts from a new lease."

This may be an overly optimistic time frame, if seasonal restrictions are indiscriminately placed on operations and construction. Permit acquisition may contribute to a more lengthy time frame. Twelve to fifteen years could be required from lease acquisition to first production.

Production Infrastructure

Page 80, column 2, paragraph 5: "The drilling pad--- covers 20-35 acres... 160,000 - 285,000 cubic yards of gravel."

This is not typical at present but relates to the 40-50 wells/pad suggested on page 81 (paragraph 2). Typical latest technology on Kuparuk River Field (D.S. 3G) is 24 wells on an 11.5 acre site (including reserve pit area) with only 46,000 cubic yards of gravel (for wellheads at 25 feet spacing). With reduction in wellhead spacing (which is already achievable) a 40-50 well pad could be little bigger than the Kuparuk River Field example given above. Well spacing for the Endicott field, now under development, is about 10 feet from wellhead to wellhead.

Page 81, column 2, paragraph 1: "These roads would have a crown width of approximately 35 feet...."

Kuparuk River field standard is 32 feet for main roads and only 24 feet for other roads.

Page 81, column 2, paragraph 1: "Construction of a marine facility to service development... would be necessary because long hauls... from Prudhoe Bay are impractical."

A marine facility would be required for major equipment sealifts in summer open water seasons. However, year-round transportation services to drillsite facilities would be via Prudhoe Bay.

Page 82, column 1, full paragraph 2: "...construct a second pipeline parallel to TAPS..."

Given the certain and precipitous decline from existing North Slope production, which will have occurred long before any new production will be available form the 1002 area, it is very unlikely that a new trunkline from the Prudhoe Bay to Valdez would be required.

Page 82, column 2, full paragraph 2: "A concept used in the Kuparuk River field pipeline, but not incorporated in TAPS, was construction of only one road for use as both a main transportation artery and a pipeline maintenance road."

If the main road is not adjacent to the pipeline, adequate access on a year-round basis will be needed to the pipeline.

Page 83, column 1, paragraph 1: "Access to valves, which require frequent maintenance..."

This is not the case, although on the rare occasion when a valve is automatically closed it may need to be reopened manually.

Page 83, column 1, paragraph 2: "A pump station is required every 50-100 miles... 2 or 3 pump stations probably would be required... The first would be located near the oil field."

For 150 miles no intermediate pump station would be necessary. The first and only pump station would be located at the oil field. A pipeline of this length would certainly not be designed with 2 or 3 pump stations, but with one and a pipeline diameter sufficient for a the anticipated maximum flow.

Page 83, column 2, paragraph 4: "Maintaining continuous control of the pipeline... would require a complex communication system".

Although complex, such communication systems are standard technology.

Page 84, column 1, paragraph 2: "Airfields may be required at pipeline construction camps and pump stations or airfields may be shared with oil development facilities."

Permanent airstrips (5,000-6,000 feet long and 150 feet wide and five feet thick) are not likely to be required to support the pipeline during construction or operation. To consolidate facilities, only one or two permanent airstrips are likely to be needed to support all operations in the 1002 area. Temporary ice airstrips may be required to support exploratory drilling and pipeline construction.

Page 85, column 2, full paragraph 4: "the actual availability of gravel is unknown..."

Here again, we offer the comment that data from thousands of shot-holes drilled as part of the 1002 area group seismic surveys provide evidence of widespread gravel availability in the near surface of the 1002 area.

O-74

The five alternatives ranging from full leasing (Alternative A) to wilderness designation (alternative E) describe a full spectrum of possible alternatives for the future management of the 1002 area. The options as listed occur in the order of industry preference. That is: full leasing, followed by limited leasing, further exploration, no action. The least preferred would be a wilderness designation for the Coastal Plain. No action would be far better than wilderness status. The area is currently managed as a wilderness. If no action is taken, then the Coastal Plain will continue to be managed as wilderness, but options will still be open for the future.

We strongly endorse Alternative A, full leasing of the "1002" study area, as the most acceptable alternative consistent with the national interest.

Alternative B, partial leasing, is based on a speculative premise that a traditional core calving area exists and is necessary for the maintenance of a healthy caribou herd. This has not been demonstrated in the scientific literature and there is a large body of data which indicates otherwise.

Alternative C makes no positive contribution. Surface and regional geologic information already confirm that the area has oil potential. The amount can only be verified by on-structure drilling. Stratigraphic type drilling is an unnecessary duplication and its surface impact would be in addition to that eventually required for on-structure wells. Also, Alternative C would just be another delay in the eventual production from the area.

Neither Alternatives D, no action, nor E, wilderness designation, would determine whether or not substantial petroleum reserves exist in the "1002" study area. Alternatives D and E preclude reasoned planning and would deny the nation the positive benefits that could come from oil and gas production on the Coastal Plain.

Page 89, column 1, paragraph 1: "If the Congress chooses to authorize leasing in the entire 1002 area, the legislation would probably contain the important elements of the Mineral Leasing Act and the NPRA legislation, with special provisions to meet the unique needs of the Arctic Refuge."

Without offering specific suggestions as to lease terms and the provisions for leasing, which may be applied to the 1002 area, we would like to point out a few problems with the NPRA leasing program. First, the NPRA program did not provide for unitization which (among other things) is the basis for the consolidation of facilities. Provisions for unitization are necessary if redundant operations and facilities are to be minimized. Second, given the long lead times for development in the 1002 area, there should be provisions for holding a lease (or unit) beyond the primary term of

the lease by virtue of "shut-in" production. Third, the overall suite of stipulations and regulations applied to exploration, development, and production in the 1002 area must not be unduly burdensome. Collectively, the stipulations and regulatory framework imposed on the NPRA were burdensome to the point of precluding industry interest in evaluating the NPRA.

Page 89, column 1, item 3: "Development will be unitized within the 1002 area and on privately owned subsurface resources in the vicinity of Kaktovik."

Exploration as well as development should be allowed to occur under unitized operations. Further, given the proximity of state submerged lands, private lands, and federal lands (1002 area onshore and the OCS), unitization policy should be coordinated between all lessors and their managing entities.

Page 89, column 2, item 5: "Development, production and, transportation of oil from the 1002 area are considered to be independent of any offshore production; however, infrastructure could be shared."

Please see previous comment on item 3 regarding unitization. Given the proximity of state, federal, and private lands it is possible that common reservoirs may extend under all categories of land ownership. If this proves to be the case, the management of onshore land should not be considered independently of offshore lands.

Page 91, Table 5-1: Some of the estimates in this Table seem to be overstated. There does not appear to be a great deal of difference between the full leasing option and the limited leasing option. The number of facilities, amounts of gravel, and acres indicated in the table seem excessive, such as: processing facilities, permanent airfields, and drilling pads. Table 5-1, as well as Figure 5-1 are very hypothetical cases. Development might be something like this or it might be one large field or a combination of closely located fields.

Page 92, column 1, paragraph 4: "A program to drill off-structure test wells would provide subsurface geological information."

The drilling of additional wells/stratigraphic tests would not necessarily determine the presence or absence of oil or the absolute presence or absence of the Ellesmerian section. Industry feels that it has sufficient data to lease and explore for oil and gas. Alternative C represents an unnecessary delay in exploration and, ultimately, production.

O-75

The general comments pertaining to Chapter II apply also to Chapter VI. The following are specific comments on Chapter VI:

Page 95, paragraph 8: "In Alternative A, three portions of the 1002 area.....are all predicted as being developed, and the assessment considers all three areas as developed concurrently... Therefore, the analysis and consequences may represent a higher level of development than may actually occur at any specific time if the area were opened to leasing."

We would agree that the analysis represents a worst case scenario and therefore most subsequent environmental effects outlined in Chapter VI are overstated from what is likely to occur.

Page 98, paragraph 2: For additional comments, see our Comment #5 on page 10 of this document. We feel that the designation of USFWS Resource Category 1 for a portion of the calving habitat available to the PCH is inappropriate. Significant year-to-year variability in calving distribution has been recorded for the Porcupine herd all across the coastal plain from well into Canada and west to the Canning River. Therefore, calving habitat is more appropriately represented as a true continuum across the coastal plain. Thus, the "unique and irreplaceable" nature required for designation as Resource Category 1 does not pertain.

Page 98, section on Effect on Physical Geography and Processes: There are no mitigation sections in the subheadings:

"Consequences of Geological and Geophysical Exploration"
"Consequences of Exploratory Drilling"
"Consequences of Development Drilling"
"Consequences Resulting from Construction of Roads, Pipelines, and Marine and Production Facilities"

Mitigation sections are found in the remaining two main subheadings in this chapter: "Effects on Biological Environment" and "Effects on Socioeconomic Environment", thus it would seem appropriate to include mitigation sections in the "Effects on Physical Geography and Processes." This is particularly true in light of the very large body of knowledge that has been developed over the past two decades on this subject. There are literally hundreds of proven mitigative techniques commonly applied on North Slope oilfields by virtue of the fact that arctic environmental engineering is in a mature stage of development.

Page 100, paragraph 1 and 2: "Preliminary results of those investigations show gradients of increase in pH, salinity, alkalinity, turbidity, and sediment loads from control ponds to ponds adjacent to reserve pits (R.L. West and E. Snyder-Conn, unpublished data). Trends of increase in the vicinity of reserve pits were also shown for heavy metals such as aluminum, barium, chromium, zinc and arsenic, as well as for certain hydrocarbons...."

We feel that the conclusions regarding relative impacts from potential discharges of reserve pit waters are overly severe and not substantiated by actual field monitoring data or current practice information from Prudhoe Bay areas. It is not appropriate for DOI to cite unavailable and unpublished data in support of these allegations. To the contrary, available data indicate that any impacts are extremely localized and limited to the immediate vicinity surrounding the pit. No effects have been observed in fish or wildlife species from active reserve pits and we feel adequate technology exists to close pits in an environmentally safe manner.

West and Snyder-Conn report basic conclusions, cited in the draft 1002(h) report, that were derived from the misapplication of statistical analyses. Based on the ANOVA analysis performed in West and Snyder-Conn's draft report, they would not have concluded that ponds adjacent to reserve pits were significantly different from control ponds because they did not apply the statistics to answer that question. What they did conclude by their analyses, based on the comparison they carried out, was that reserve pits differed from control ponds. The difference was that USFWS compared reserve pits to control ponds, and ARCO compared ponds near reserve pits to control ponds. There is no question that reserve pit water quality differs from natural ponds. The appropriate question is how natural ponds near reserve pits differ from control ponds. USFWS has not adequately analyzed the data to answer this question.

O-76

We recommend deleting any references to West and Snyder-Conn's report or their conclusions.

Page 100, paragraph 3: "There are two approaches to abandoning an exploratory well reserve pit: 1. Leave it as is."....

Recent studies in the Canadian Arctic (French, 1985) and in the NPRA, Alaska (Nuera Reclamation, 1986) document the minor environmental effects of abandoning a drilling reserve pit without closure. However, it is current industry practice to "button up" the reserve pit adjacent to exploratory wells. All recent state and federal lease sale stipulations require complete closure and containment of reserve pits. Therefore, the purposes of discussing future options for reserve pit closeout on the Coastal Plain, option #1 is not relevant and should be deleted.

Page 100, paragraph 4: ....."Therefore, this method requires remobilizing construction equipment, opening a gravel pit elsewhere, and hauling in material to fill in and "mound up" over the reserve pit area."....

Recent experience from exploration wells on the North Slope do not support this statement. Reserve pits can be excavated into the permafrost and then closed out by filling with the original mineral soil and capped by the tundra mat material. This allows the pit contents and capping soil to freeze back and form a stable mound over the pit and to accommodate revegetation. Experience indicates that a) this method is a very effective mitigation technique, b)

remobilizing equipment is not necessary, c) opening other gravel borrow pits is not necessary, and d) the material will revegetate naturally and rapidly.

Page 100, paragraph 8: "The almost unavoidable minor oil leaks and spill.....which would contaminate the tundra and, possibly, the aquatic environment....."

Spills of oil are easily noticed on ice and snow and rarely escape detection, even in quantities of less than a gallon. Further, these spills are easily and routinely cleaned up and disposed of properly. All that is required is that the snow/oil mixture be scooped up by shovel or front end loader. Thus, the actual amount of spilled oil that lasts until spring is exceedingly minor.

Page 101, paragraph 17: "Construction of a solid-core causeway....would require breaching to permit fish passage...."

The breaching of gravel causeways for fish passage is not a necessary requirement. Although fish do pass through large breaches (Endicott Environmental Studies 1985) they also go around causeways with and without large breaches (Endicott Studies 1985; Prudhoe Bay Waterflood Studies 1981, 1982, 1983 and 1984). The Waterflood studies demonstrated that the West Dock Causeway was not an impediment to the migration of large fish. The 1985 Endicott and Colville River Fish Studies showed that even the smallest migratory anadromous fish, young-of-the-year Arctic cisco, were able to get by both the West Dock and Endicott causeways to reach the Colville River.

Page 103, paragraph 5: Meehan (1986) is a draft report that contains a significant number of errors including many erroneous conclusions on (1) gravel spray and (2) dust. We also have significant additional concerns over the methods used and data interpretations. We request that all calculations, extrapolations and conclusions based on Meehan (1986) be omitted.

Page 103, paragraph 7: "Since 1972 some 23,000, mostly small, spills have been reported to the Alaska Department of Environmental Conservation. The largest spill of 658,000 gallons was the result of sabotage in 1978. A spill of over 200,000 gallons near Atigun Pass in 1979...."

It should be pointed out that neither of these incidents occurred on the North Slope, although they are an indirect outgrowth of North Slope development.

Page 104, paragraph 1: "to date, the cumulative effect of spills has not been significant".

We would concur with this assessment. However, the main reason for the lack of significant impact is completely absent from the discussion. Of the 82,216 gallons spilled in 1985, very little actually reached the environment because it was properly cleaned up. The discussion leaves the reader to conclude that all 82,216

gallons went into the tundra or wetlands. Spill prevention and cleanup is aggressively pursued on the North Slope and to date has been effective. Most spills occur on gravel production pads while snow is on the ground and are therefore easy to spot and cleanup. Those that do escape detection or occur in the summer off gravel pads are treated with sorbent pads and rehabilitation and revegetation procedures.

Page 104, paragraphs 4 and 6, Mitigation Section

The preceding discussion of impacts to vegetation, wetlands, and terrain types covers in detail the possible impacts from:

1. seismic surveys
2. ice pads and roads
3. gravel pads and roads
4. reserve pits
5. oil and fuel spills
6. gravel mining
7. secondary effects of roads, such as dust, thermokarst, gravel spray and impoundments.
8. seawater spills

The following Mitigation Section for these impacts discusses only a portion of these impacts and does so in the briefest possible manner. It is not for lack of subject matter or data, however, since 18 years of Arctic experience and many millions of dollars have been spent on effective mitigation techniques. The following commonly employed mitigation techniques should be discussed to properly balance the discussion:

O-77

1. Snow depth, routing and USFWS oversight procedures followed during seismic surveys.

2. Current accepted design parameters for ice pads and roads, (i.e. Brontosaurus well, NPRA, ARCO) that requires sufficient thickness, siting considerations.

3. Site selection criteria for roads and pads that avoid critical habitats.

4. The trend towards smaller gravel pads and reserve pits, decreasing the wellsite "footprint".

5. Aggressive fluid management of reserve pits to prevent overtopping and leaking.

6. Chemical screening of all reserve pit fluids prior to surface disposal to insure water quality standards are met.

7. Comprehensive oil spill contingency planning.

8. Spill clean up procedures, including proper disposal of contaminated snow in winter and sorbent pads in summer.

9. Rehabilitation and revegetation of disturbed sites, including gravel spray removal, reseeding, replacing damaged vegetation mat.

10. Road watering to minimize dust generation.

11. Improved culvert design and placement to avoid impoundments.

Page 104, paragraph 7: "The expected modification of approximately 12,650 acres (0.8 percent of the 1002 area) would be a moderate effect (Table VI-1) on area vegetation and wetlands."

The estimate of 5,650 acres for direct impacts of gravel appears to be reasonable based on the proposed scenario. Further, the classification of moderate impact for this area is appropriate. However, classifying 7,000 acres of secondary impacts as moderate is either a) too large an area to be placed in the moderate category, as defined, or b) too severe a category for that broad an area.

The moderate category requires either a "local modification of considerable severity" or a "widespread modification of lesser severity". Since 12,650 acres is 0.8 percent of the Coastal Plain, it does not fit the category of "widespread". Therefore, the 7,000 acres of secondary effects are defined as local modification having "considerable severity". It is difficult to defend the hypothesis that 7,000 acres of road dust, gravel spray and thermokarst would reach this degree of impact.

Page 106, paragraph 2: "Later studies (Cameron and Whitten, 1979, 1980; Cameron and others, 1981; Whitten and Cameron, 1985) indicate an absence of calving near the Coast at Prudhoe Bay during 1976-85, possibly due to avoidance of the activity area by calving caribou".

This is a widely quoted, through erroneous, conclusion of the low numbers of cows with calves found in the Prudhoe Bay area. ADF&G, for the period 1978-85, reports average caribou densities of 0.06 caribou/km^2 while Gavin (1979) reports densities of 0.01-0.05/km^2 for the predevelopment period of 1970-79. Thus, the conclusion is that total caribou densities have always been low. In regards to calving, inspection of Table 1 shows the same consistent low historical numbers with little change through development.

At a recent caribou workshop at Alyeska (Demography and Behavior of the Central Arctic and Porcupine Caribou Herds in Relation to Oil Field Development, Oct. 1986) all ADF&G and USFWS participants including Messrs Cameron and Whitten, reached the consensus that "the Central Arctic Herd (CAH) has never calved in the Prudhoe Bay area in large numbers."

We suggest this paragraph and Table VI-4 be amended to show this area as a historically low density calving area (see Table 1). Regardless of the pre-development data the fact remains that this herd has continued to proliferate during the period of maximum development at Prudhoe Bay.

TABLE 1 - TOTAL NUMBERS OF COWS AND CALVES WITHIN THE PRUDHOE BAY AREA (1165 km^2), 1970-1979. From Gavin, 1980.

Year	Cows	Calves	Calves per 100 Cows	Yearlings	Bulls	Total	Density Caribou/km^2
1970	24	17	71	8		49	0.04
1971	16	7	44	7		30	0.03
1972	8	5	63	4		17	0.01
1973	24	9	38	9		42	0.04
1974	34	9	27	8		51	0.04
1975	27	13	48	4		44	0.04
1976	19	4	21	5		28	0.03
1977	14	11	79	3		28	0.03
1978	29	15	50	7	6	57	0.05
1979	13	7	50	8	4	32	0.03

O-78

Page 106, paragraph 4: "The 242,000 acres of calving habitat are proposed for designation as Resource Category 1 in accord with FWS mitigation policy."

We feel strongly that this is an inappropriate designation and over-extension of the FWS mitigation policy. We recommend that this designation be eliminated. See comment for page 98, paragraph 2, above.

Page 107, paragraph 2: Calculations of secondary modifications should be changed to exclude any data extracted from Meehan (1986).

Page 107, 108 and 109: These three pages of literature citations discuss the Prudhoe Bay caribou behavior studies in detail. Data are reported which discuss disturbance and displacement of caribou movement patterns throughout the field as a result of developmental activities.

We readily agree that some degree of modified behavior and displacement has occurred in response to habitat alterations in the Prudhoe field. However as discussed in comments for page 28, paragraph 1, above, habitat is not limiting caribou population growth for any Alaskan herds at the present time. Therefore, a degree of habitat loss as a result of development on the coastal plain will be inconsequential to growth and productivity of the herd.

In the management of wildlife populations, the concept of habitat carrying capacity is the key to defining management goals for a herd. It is an established fact that neither the CAH nor the Porcupine Herd approach the carrying capacity of their ranges. Indeed, Skoog (1968) stated the "It seems likely that the Alaskan caribou population has remained far below range carrying capacity and that the total habitat has never been fully occupied. In reality, caribou populations seem to have maintained densities much lower than the maximum dictated by food alone, and hence the reduction in total range becomes less meaningful." Thus, we agree with Skoog's conclusion that habitat is not currently limiting the growth of the Porcupine Herd and that the loss of habitat represented by likely development in the 1002 area will not impact growth or productivity of resident caribou.

Page 107, paragraph 5: "Whitten and Cameron (1985) found consistently low numbers of caribou and generally low percentages of calves in the Prudhoe Bay oilfield from their annual surveys of the CAH calving grounds, 1972-82, with caribou being displaced to adjacent areas already used for calving."

Based on Gavin (1980) which demonstrated consistently low numbers of caribou and low percentages of calves throughout the period 1970-1979, the conclusion is reached that numbers have always been low in the Prudhoe Bay Region. White et al. (1975) suggests that the high percentage of wet and moist areas near Prudhoe Bay makes this area less attractive to caribou. This was the conclusion of

the Alyeska Caribou Workshop in October 1986 (see comments for page 105, paragraph 2).

Page 107, paragraph 5: "Dau and Cameron (1985), in what may be the most systematic study of caribou displacement by oil development, reported that maternal caribou groups showed measurable declines in habitat use within approximately two miles on either side of the Milne Point Road in the Central Alaskan Arctic."

The "two mile" reference is a typographical error. The actual distance is "two km".

Page 108, paragraph 2: "Displacement of the PCH from a core calving area to a less desirable area would be excepted to reduce caribou productivity."

It is implied that any displacement of the PCH would necessarily be into a less desirable area. As the report points out, there is over two million acres of known concentrated calving area, not counting peripheral areas. Since the PCH has calved throughout this area successfully in the past, and there is no known effect of decreased productivity in the years that the herd used those areas exclusively, there is no reason to conclude that the areas outside the core calving area area less desirable. Therefore, the expectation that the herd's productivity will suffer is not supportable.

Page 108, paragraph 3: Although the absolute density for the PCH is almost 14 times, and the Western Arctic almost 15 times greater than the CAH, none of these herds approach the carrying capacity of their respective ranges. Therefore, any arguments against extrapolation of CAH data to the PCH based on relative densities on the fact that the PCH may occupy coastal plain habitat in higher densities than the CAH are not valid. (See comment to page 107-109, above).

We ask that the above point be clearly made in the conclusions of environmental impacts for alternative A.

Page 108, paragraph 5: "The lack of observable adverse effects from displacement exhibited by the CAH would be unlikely for the PCH. The PCH is much more crowded in its calving habitats, and a substantially greater proportion of important calving habitats would be involved with development that included their core calving area."

The fact that the PCH has higher calving densities than the CAH is not sufficient to argue that displacement would be likely to cause adverse effects. Two other conditions would have to be met: 1) alternative high quality calving habitat is not available in sufficient quantities. The large area used by the PCH for calving, and their historical use and success in that habitat, would indicate that this is not the case. 2) The densities achieved by the PCH during calving are near some threshold limit above which range destruction or negative intraspecific interactions would occur. This has not been demonstrated.

C79

Page 108, paragraph 7: "Based upon the work of Dau and Cameron (1985), caribou are displaced approximately 2 miles out from development...within this 2 mile area of influence are about 357,000 acres of the total core calving grounds in the 1002 area."

This statement is a misrepresentation of the study conclusions. In fact the relationship between calves and distance from the road (Milne Point) is statistically insignificant. Dau and Cameron did find fewer maternal groups near the road than away from it, but the partial displacement was for 2 kilometers, not 2 miles.

Additionally, their data show a high degree of year-to-year variability -- so much so that they had to resort to a mathematical transformation of their data in order to show stabilized variances so a test of significance could be run. Their data also show that non-maternal caribou were not displaced by the road corridor and that "partial displacement" was shown within a zone of 0-3 km.

The USFWS uses these data to imply that a complete displacement of all caribou groups occurred out to 2 miles. This is a gross over-extrapolation of the data and we ask that this section be rewritten to more properly reflect the study results.

Regardless of the conclusions regarding partial displacement, a comparison of the study data from 1978 to 1985 clearly documents an increased density of animals through the period of maximum development in the area. We feel this increased density clearly demonstrates that the CAH has continued to grow and thrive concurrently with the development of the oil field. This conclusion must be noted in any discussion of the Dau and Cameron data.

Page 109, paragraph 6: "If caribou refuse to cross through any development areas, then 194,000 acres would be unavailable as habitat. That area encompasses 52 percent of total insect-relief and over 80 percent of Coastal insect-relief habitats. This would mean that all coastal insect-relief habitats within the 1002 area, except for a small area in the eastern portion, would become unavailable under full development.

The hypothesis that the PCH would be eliminated from virtually all it's coastal insect-relief is predicated by the supposition that the PCH would "refuse to cross through any development areas". There are no studies in the literature to support the hypothesis that a properly designed pipeline and road would present a total physical barrier to caribou movements. Yet there are abundant examples of herds throughout the world regularly crossing roads, roads with pipelines, hunter's firing lines, and even improperly designed pipelines such as the Norilsk gasline in Russia (Shideler, 1986). The supposition is unsupportable.

Page 109, paragraph 6: "The second factor is to assume the approximately 2-mile sphere of influence for oil development used previously. Under that assumption, caribou crossing through the development area would avoid using approximately 72,000 acres or 29 percent of identified coastal insect-relief habitat withing the 1002 area...."

The 2-mile sphere of influence is based on the Dau and Cameron (1985) study that was conducted during the calving season, not mosquito harassment season. Conclusions regarding movement of mosquito harassed groups seeking coastal areas cannot be drawn from studies of the distribution of caribou during calving. Dau and Cameron (1986) found that "during June, the relative number of caribou within 1km of the (Milne Point) road was positively correlated with distance from the road; there was no relationship between number of caribou and distance from the road for either May or July/Aug." It is well recognized that measurable behaviors that can occur during calving, such as avoidance, are often absent at other times of the year, such as during insect harassment.

Page 110, paragraph 3 and 4: Available literature clearly shows that caribou can and do readily acclimate to aircraft overlight noise. CAH animals throughout the Prudhoe Bay area characteristically show little disturbance to typical overflights. Any perceived negative effects can be readily mitigated by maintaining a minimum aircraft altitude of 500 feet (AGL) during overflights. Also the experience with the Delta herd, where calving grounds are located next to overflight, bombing, and strafing areas, further documents the acclamation of these animals to aircraft noise.

Thus, we ask that this section be rewritten to more properly reflect the acclamation of caribou to aircraft.

O-80

Page 111, item #10: Reduction of surface occupancy in the insect relief habitat to 3 miles from the coast.

In the Kuparuk River oilfield, experience has shown that 3/4 mile of reduced occupancy from the coast is sufficient to ensure adequate insect relief habitat. This distance appears sufficient since actual insect relief habitat is the coast line proper, shallow coastal water, offshore islands and coastal bluffs - a relatively narrow band. Once this narrow band is provided, the second requirement is to provide for relatively free movement along the coastline. Elevated pipelines and other normal mitigation measures similar to those applied in the Kuparuk Oilfield have proven effective in allowing passage. Thus, we ask this stipulation for a 3 mile reduced surface occupancy zone be changed to reflect the currently proven experience of 3/4 mile.

Page 112, paragraph 2: Neither the CAH nor PCH are at carrying capacity for their respective ranges and therefore incremental habitat loss due to development of the coastal plain can be expected to result in only minimal displacement of the herd. See comment page 107-109 above.

Page 112, paragraph 3: "A major change in distribution. . . could occur if the 1002 area were fully developed . . . nearly 80% of coastal insect relief habitat could be affected if development proves to be a barrier to caribou movements."

Although the conclusions of this paragraph are preceded with "could" and "if", the statements are still gross over-generalizations with no basis in fact. The extensive Prudhoe Bay experience indicates that these statements are false. The Kuparuk River oilfield experience clearly shows that caribou can and do readily move across developmental structures. Proven mitigation measures such as elevated pipelines and crossings ensure that access to insect relief habitat will remain. Thus, projections such as 80% loss of available relief habitat are unfounded.

We ask these gross generalizations be removed from the report.

Page 112, paragraph 4: ". . . could result in major population decline and change in distribution of 20-40 percent . . . this estimate is uncertain."

Although this projection is followed by the uncertainty statement, we feel strongly that this statement is completely unfounded and unsupportable. No data are provided to support this estimate and we are given no basis for its determination. We conclude that the estimate is highly speculative and ask that the entire paragraph be deleted from the final report.

Page 112, paragraph 5: "For the CAH, a moderate change in distribution or decline in that portion of the CAH using the 1002 area could occur. The effect on the entire CAH population throughout its range may also be moderate. Those effects on the segment of the CAH within the 1002 area would be similar to those on the PCH that occur from disturbance, displacement and barriers to free movement. The population decline or distribution change would be 5-10 percent for the CAH throughout its range."

The basis for concluding that a moderate change in the CAH distribution or numbers has not been presented. In fact, all the data presented would lead one to the opposite conclusion. There is abundant discussion in the report regarding why the CAH is different and can be expected to respond differently to development than the PCH. The facts of lower overall densities, lower calving densities, more distributed rather than concentrated calving, incomplete range utilization, greater habituation and the overwhelming fact that the CAH has already demonstrated its accommodation to development are all discussed in the report. All of these argue towards a minimal impact of the proposed scenario on the CAH. Further, the proposed development scenario borders the extreme eastern extension of the CAH's calving areas, while it overlaps substantially with the PCH. Given all these differences discussed in detail in the report, it appears to be inconsistent with the conclusion that the "effects....would be similar." The qualification of "on the segment of the CAH within the 1002 area" is specious because there is no distinct subpopulation of the CAH that uses the 1002 area. That a "population decline or distribution change would be 5-10 percent" is not supportable. Based on Table VI-1, the environmental effect on the CAH should be negligible.

Predicted population declines, particularly in the CAH cannot be supported by any scientific or logical hypotheses. In fact, the CAH has continued to grow at a 13% year rate while continuing to calve in areas of oil development. A prediction of population decline for the CAH, based on oil development in the fringe areas of their calving habitat, directly contradicts the results of 10 years of detailed scientific study of the CAH.

Page 113, paragraph 3: "Displacement from calving areas would have a negative effect on muskoxen production."

Displacement from calving areas may have a negative effect on muskoxen production if they are near or at their upper limit of utilizing all high quality calving habitat throughout their range. The high productivity reported for the ANWR muskox population has been attributed to the availability of preferred forage during summer (Robus 1981) and to the tendency for herds to remain in relatively restricted home ranges, thereby capitalizing on the abundant forage (Jingfors 1980). As the 1002 report points out, "carrying capacity has apparently not been reached." Thus due to the fact that the herd is still expanding its range, and that high productivity rates have been tied to abundant forage, it does not follow that displacement would have a negative effect on productivity.

Page 113, paragraph 4: "From the reports of Russell (1977) and Reynolds and La Plant (1985), a 2 mile sphere of influence was assumed in calculating the range which could be affected by full leasing."

O-481

The term "affected" is defined in the next sentence as "lost or greatly reduced." Thus the 2-mile area is being defined as an area where muskoxen are removed by 100% (lost) or decreased by an amount in the range of 60-90% (greatly reduced). The data of Reynolds and LaPlant (1985) show that a flight response occurred in only 7 of 31 groups (23%) encountered in the Tamayariak area (Table 1) or the Okerokovik area (Table 3). This flight response occurred at distances from 200 m to 3.2 km, or an average of 1.5 km. Based on these data, one would have to significantly increase the stimulus, or shorten the 2-mile sphere of influence, or both, to reasonably expect a 50 to 100% displacement in muskoxen. Four of the 9 groups (44%) displayed no response at distances less than a km. It is not sound scientific judgement to pick the farthest distance reported for a flight reaction (3.2 km) and then conclude that most or all of the animals will behave in a similar manner, when the Reynolds and LaPlant data show that only 23% actually did. This is particularly true since habituation is known to occur in muskoxen, as the report states.

Thus, the assumption that a 2-mile sphere of influence is appropriate for a complete displacement of muskoxen is not supportable by the data.

Page 113, paragraph 4: "Table VI-6 shows that habitat values could be lost or greatly reduced throughout about one-third (256,000 acres) of the muskox range within the 1002 area."

These figures should be decreased by at least half based on the previous discussion.

Page 114, paragraph 1 and 2: We feel that the conclusions regarding potential developmental effects on muskox are unnecessarily severe and unfounded. While it is true that very little data characterizing muskox responses to oil field development are available, it is also true that the muskox has shown ready adaptability to human presence and has even been semi-domesticated in several areas. This adaptability to human presence will significantly reduce the worst-case conclusions implicated in the DEIS.

Several experimental farming programs have been successfully initiated in Alaska and Canada to domestically raise muskox for their high quality quivit, or underwool, to be used in the knitting industry. Obviously their adaptability to constant human presence in these situations significantly reduces concerns over occasional and distant disturbances from developmental interests. Limited observations of muskox response to oil exploration activities in Greenland indicate that muskox respond by a gradual and temporary avoidance to seismic activities.

We ask that this section of the report be re-written to properly reflect the adaptability of muskox to human presence and thus reduce the severity of the projected effects.

Page 114, paragraph 9: "Effects on the regional moose population from habitat loss and mortality due to oil development in the 1002 area would be minor."

Due to the very low population of moose on the Coastal Plain, the extremely low loss of habitat expected, the ability of moose to habituate to disturbance and the ability of ADF&G to regulate moose harvest, it is reasonable to expect a negligible, rather than a minor, effect.

Page 115, paragraph 6: "A moderate decline of the wolf population using the 1002 and surrounding area could result from the cumulative effects of direct mortality and reduced production or survival of ground, caused by reduced prey availability."

As pointed out in the state references, there is indeed a relationship between the abundance of wolves and the biomass of ungulate prey. However, even if one hypothesizes a 40% decline in the PCH from 180,000 to 100,000 animals, it is difficult to demonstrate that 5 to 10 wolves would be in any way limited by a herd of such magnitude. The cited references all deal with wolf/caribou densities that are orders of magnitude higher than 0.00002 to 0.0001. Further, no consideration is given to alternate prey species.

The environmental effect on wolves from the proposed development should be changed to negligible.

Page 119, column 2, paragraph 1: This paragraph discusses behavioral effects on marine mammals.

The last sentence should be modified to add "however, a large body of data indicates that there are none."

Page 120, paragraph 11: All references to the West and Snyder-Conn Report should be deleted for the reasons provided earlier in the comments on page 100, paragraph 1 and 2.

Page 121, paragraph 7: "Table VI-7 shows the amount of habitat that could be affected by development resulting from full leasing, assuming snow geese are displaced 1.5 and 3 miles as observed by Gallop and Davis (1974)."

The reactions of fall-staging snow geese to noise were studied by Gollop and Davis (1974) and Wisely (1974). In those studies, gas compressor noise simulators were placed in fall-staging areas and the reactions of flying and feeding flocks were observed with and without noise production. Some general conclusions, which cannot be evaluated quantitatively, included:

1. noise may decrease the number of flocks that land at a particular site:

2. noise may cause a temporary alteration in the flight path of geese flocks;

3. geese may avoid feeding sites where high noise levels are present;

4. feeding flocks may react to the sudden occurrence of gas-compressor type noise up to 3 miles away (Gollop and Davis 1974); and

5. feeding flocks may approach to within 300 meters of continuously-operating gas-compressor noise simulators, but most flocks appear to avoid the area within 800 meters in front of such noise simulators (Wisely 1974).

Gollop and Davis (1974) did observe some snow geese disturbance up to 3 miles, but, as with other studies cited in the 1002 report, this should not be given as an adequate indication that geese would be totally displaced out to 3 miles. In fact, Gollop and Gavis report in their Table 8 that the mean distance that snow geese flared under simulator tests was 365 yards, or 0.2 miles. Thus, the 1.5 and 3 mile limits suggested by the report are gross overestimates and are not supported by the cited literature.

Page 121, paragraph 8: "Reduced time spent feeding and lost habitat in which to feed would result from petroleum development, adversely affecting accumulation of the energy reserves essential for migration. Davis and Wisely (1974) estimated that staging juvenile snow geese unable to adjust to aircraft disturbance accumulated 20.4 percent less energy reserves due to lost feeding time."

O-82

Davis and Wisely's discussion of the energetic effects of disturbance is questionable because the authors assumed that disturbance reaction time would subtract in equal proportions from all other activities. A more conservative approach would be to assume that the geese were capable of at least some compensatory increase in feeding rate. The estimates of 20.4% reduction and 9.5% reduction in energy reserves acquired by juvenile geese subjected to 2-hour interval fixed-wing and helicopter overflights, respectively, are probably overestimates of the bioenergetic impact of these disturbances.

Page 122, paragraph 2: "The average number of snow geese annually staging on the 1002 area could be reduced by almost 50 percent."

The affected habitat has been grossly overstated based on a misapplication of Gollop and Davis's results and the assumption that geese could not compensate for lost feeding time or habituate to disturbance. This has led to an equally gross overstatement of the potential effects on snow geese.

Page 122, paragraph 2: Recently conducted extensive monitoring in the Lisburne field provides data to reduce concerns over geese and brant displacement. Avian monitoring has shown that a brant colony has successfully nested in this area since the 1970's with no decrease in productivity. The density of geese and swans using this area has not changed from pre-construction (1983-84) to post-construction (1985). Geese broods actually cross roads and pipelines into the Lisburne area. Brant continuously utilize a marsh at the mouth of the Putuligayuk River within 400 meters of one of the busiest roads on the North Slope. Snow geese occasionally move into the Lisburne area to feed and rear young, often immediately next to busy roads. Also, white-fronted geese often nest close to roads.

We ask that this section be modified to include these important new data from Murphy et al. 1986. "Lisburne terrestrial monitoring program - 1985. The effects of the Lisburne development project on geese and swans."

Page 123, paragraph 4: "Recent work near Prudhoe Bay has shown that reduced numbers of shore-birds occur near roads in the oil field (Troy and other, 1983; Troy, 1984)."

Troy's work also shows increased habitat use near roads for several species, including Northern Pintails, Red-Necked and Red Phalaropes in impoundments, and Semi-palmated Sandpipers in dust induced early melt zones.

Page 126, paragraph 1: We support the conclusion that only minor to negligible effects on coastal fishery resources or fishery habitat will occur. Experience at Prudhoe Bay has provided a significant volume of data to support this viewpoint.

Page 126, column 2, paragraph 5: We also support the conclusions of minor to negligible impacts on endangered and threatened animal species such as bowhead and grey whales and the peregrine falcon. We feel that the transient nature of their presence on the coastal plain and the history of developmental interaction in the Prudhoe Bay field clearly demonstrate the lack of meaningful impacts on these species.

Page 129, column 2, paragraph 4: Based on the preceding conclusions of negligible to minimal effects on wildlife populations as a result of development, there remains no reason to assume that major effects on subsistence uses will occur. Therefore, we ask that this paragraph be deleted.

Page 131, column 2, paragraph 4: We would like to underscore the relatively low value of the coastal plain as recreational habitat. History of use indicates that only a handful of individuals have actually utilized the coastal plain for recreation, either hunting, fishing or camping. It is extremely expensive to reach the area; a trip from the contiguous states costs thousands of dollars and requires air charter flights. Wet and moist ground conditions make hiking difficult during the 8-10 week "summer". Extreme cold and darkness during a large part of the year further reduce recreational use.

We ask that these perspectives be added to this section of the report.

O-83

Page 134, paragraph 6 and 7: See comment above for page 112, paragraph 4.

Page 140, next to last paragraph: Seismic Trails:

This paragraph should be modified to add "although, seismic trails can only be detected from the air after two or three years."

Page 143, paragraph 6: See comment above for page 6, column 2, paragraph 5.

Pages 145-147, Summary of Recommended Mitigation

Stipulation 2: Design all bridges and culverts to handle at least 50-year flood events.

Comment: Insert "permanent" before the word bridges.

Stipulation 3: Use ice or gravel-foam-timber pads, where feasible, for exploration wells.

Comment: There may be limited use for ice pads; however, the use of pad material must ensure a safe and successful completion of the operations plan.

Stipulations 5: Prohibit off-road vehicle use within 5 miles of all pipelines, pads, roads, and other facilities, except by local residents engaged in traditional uses or if otherwise specifically permitted.

Comment: Prohibiting all activities in all seasons is too restrictive. This stipulation should be limited to summer season only and not be applied to research, surveying, seismic work, etc. approved by USFWS.

Stipulation 6: Limit oil exploration, except surface geology studies, to November 1-May 1 (exact dates to be determined by Refuge Manager). Cease exploration activities and remove or store equipment at an approved site by May 15. Local exceptions may be made.

Comment: Seasonal restriction might be appropriate for intensive human activity such as construction but should allow activities less likely to interfere with animal behavior to continue. Activities in this category would be those largely confined to the drill pad and required support and would include drilling and testing of wells. When recognizing that such prohibition cannot reasonably be applied during any subsequent development activities, USFWS should allow those activities while being conducted as part of an approved research program to determine actual effects on wildlife and to develop better mitigation techniques if needed for development. Restriction on drilling and testing could cause exploratory wells to take two or more years to complete, which extends environmental exposure, may compromise well safety and control, and significantly increases the cost of the well.

Stipulations 8 9 & 10: Elevate pipelines to allow free passage of caribou in areas without ramps or buried sections.

Place ramps over pipelines at natural crossings or where development tends to funnel animals.

Bury pipelines where possible.

Comment: Stipulations 8, 9, and 10 appear to prefer buried pipelines. Burial of pipelines is unnecessary where elevation and ramping are used to accommodate movements of animals. Buried pipelines are not environmentally

preferred on the North Slope due to permafrost. Moreover, burying causes more environmental impact initially and during abandonment. Suggest adopting the current State of Alaska policy: To minimize impacts on caribou, pipelines must be consolidated to the extent feasible and must be designed, sited and constructed to allow safe passage of caribou. Adequate elevation, ramping or burial of pipelines will be required in areas identified by [Department of Fish and Game] USFWS as important caribou movement zones.

Stipulation 11: Separate roads and pipelines 400-800 feet, depending on terrain, in areas used for caribou crossing.

Comment: The combination of roads near pipelines is considered a deterrent to caribou crossing, primarily when there is high human use (traffic) of the road, therefore, it is unnecessary to have all roads separate from pipelines. This policy conflicts with the basic desire to consolidate facilities. A preferable wording of this stipulation may be "separate high use trunk roads and pipelines 400-800 feet,..."

Stipulation 12: Restrict surface occupancy in the zone from the coastline inland 3 miles to marine facilities and infrastructure necessary to support activities outside the restricted zone.

Comment: This restriction could preclude access to and development of significant reserves. Temporary exploration facilities and essential production facilities should be allowed on a site-specific basis.

Stipulation 14: Close areas within 3/4 mile of high-water mark of specified water courses to permanent facilities and limit transportation crossings. Gravel removal may occur on a site-specific basis.

Comment: A 3/4 mile buffer is an excessive restriction. Maximum effort to protect critical riparian habitat should be required; however, essential production facilities should be allowed on a site-specific basis.

Stipulation 21: Close area within 5 miles of development and associated infrastructure to hunting, trapping and discharge of firearms.

Comment: Subsistence trapping without firearms should be allowed.

Stipulation 23: Define range of the candidate plant Thlaspi arcticum. Minimize surface occupancy in immediate vicinity of areas identified as supporting the plant. Position pads, collecting lines, and associated roads at least 1/2 mile from candidate plant locations.

Comment: It appears that a feasible and prudent effort to avoid adverse impacts to the plant would be reasonable: 1/2 mile buffer appears excessive and unnecessary.

Stipulation 24: Construct docks and causeways so that fish movements are not impeded and lagoon water chemistry is basically unchanged.

Comment: Policy needs to focus on potential impacts: suggest wording "...and lagoon water chemistry not be altered to a degree which causes significant adverse effects on marine populations."

Stipulation 25: Establish time and area closures or restrictions on surface activity in areas of wildlife concentration during muskox calving, April 15-June 5; caribou calving, May 15-June 20; caribou insect harassment, June 20-August 15; snow goose staging, August 20-September 27 and overwintering and spawning.

Comment: This stipulation should specifically exclude restrictions on activities confined to an exploratory drill pad such as drilling and testing being conducted in conjunction with a USFWS approved research program to determine effects on evaluation (key) species.

Stipulation 26: Acquire authority to establish time and area closures and minimum aircraft altitude of 2,000 feet above ground level (AGL) during muskox and caribou calving and caribou insect harrassment, April 15-August 15; and snow goose staging, August 20-September 25. At other times the minimum altitude generally will be 1,000 feet AGL over areas of animal concentrations.

Comment: It is unnecessary to have time and area closures in addition to minimum altitude restrictions.

Stipulations Found in the USFWS/ASRC Agreement Stipulations (Appendix 2)

Stipulation: Exploration activities will be supported only by ice roads, winter trails, existing road systems, and air service.

Comment: This stipulation should recognize the need for barges and boats for marine support.

Stipulation: The operator shall not significantly alter the banks of streams, rivers, or lakes while conducting exploration activities. Crossings of stream, river, or lake banks shall utilize a low angle approach or, if appropriate, snow bridges. If snow bridges are utilized for bank protection, they shall be free of dirt and debris and shall be removed after use or prior to breakup each year, whichever occurs first.

Comment: The need for the removal of ice bridges after use or before breakup is not readily apparent. If the intent is to prevent flooding, the stipulation should so state, and allow alternatives such as selective or partial removal of ice bridges.

Stipulation: Reserve pits shall be rendered impermeable by a design of the operator's choice, other than reliance upon permafrost.

Comment: For below-grade (excavated) designed pits, permafrost provides an impermeable barrier. Suggest deleting the words "other than reliance upon permafrost." This stipulation should defer to existing reserve pit regulation in this matter.

Stipulation: All hydrocarbons discharged into flare and relief pits shall be removed and properly disposed of as soon as practicable during the winter but prior to spring breakup, except that during periods of thaw such removal shall occur within 72 hours of discovery.

Comment: This language from the COE AAP Special condition C is under revision by the COE to read: "Hydrocarbons discharged into relief pits, flare pits, or reserve pits shall be contained and properly disposed of as soon as practicable. Removal shall minimize waste generation and all hydrocarbons which are removed shall be disposed of in a manner consistent with all pertinent regulations."

Stipulation: When an exploratory well bottom hole depth will not exceed 10,000 feet true vertical depth, the well shall be drilled from an ice pad with piling support for the drill rig.

Comment: Stipulations should allow the use of pad material which will ensure a safe and successful completion of the overall exploratory operations plan. Bottom hole depth may not be the most important criteria in determining a proper pad. This stipulation should be reworded to read: "When an exploratory well program can be safely accomplished from an ice pad, it is preferred that the well be drilled from an ice pad with piling support for the drill rig..."

Stipulation: The Regional Director is authorized to designate within ASRC Lands special caribou calving and post-calving special areas that will be closed to all exploration activities for such periods from May 1 through August 31 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect caribou calving and post-calving activities, including but not limited to, relief from insects. The Regional Director may shorten the period of closure or reduce the area closed if it is determined that caribou are not using the area.

Comment: Special area stipulations should be modified to allow continued exploration drilling and testing while conducting research programs to determine the effects on these species (see our comments on Stipulation #6 of the 1002h report).

Stipulation: The Regional Director is authorized to designate within ASRC Lands specific snow goose staging special areas that will be closed to all exploration activities for such periods from August 20 through September 10 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect snow goose staging. The Regional Director may shorten the period of closure or reduce the area closed if it is determined that snow geese are not using the area.

Comment: Special area stipulations should be modified to allow continued exploration drilling and testing while conducting research programs to determine the effects on these species (see our comments on Stipulation #6 of the 1002h report).

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Stipulation: The Regional Director is authorized to designate within ASRC Lands specific waterfowl nesting habitat special areas that will be closed to all exploration activities for such periods from May 25 through August 1 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect waterfowl nesting habitat. The Regional Director may shorten the period of closure or reduce the area closed if it is determined that waterfowl nesting is not occurring within the area.

Comment: Special area stipulations should be modified to allow continued exploration drilling and testing while conducting research programs to determine the effects on these species (see our comments on Stipulation #6 of the 1002h report).

Stipulation: Sand and gravel extraction, processing or storage sites shall not be located within the active floodplains of water courses as defined in the Gravel Removal Guidelines Manual for Arctic and subArctic Floodplains (USFWS 1980), unless there are no feasible and prudent alternatives. In the event that there is no feasible and prudent alternative to sand and gravel extraction, processing or storage within the active floodplain of water courses, and in the event that such sand and gravel extraction, processing or storage otherwise satisfies the environmental protection safeguards of these stipulations, sand and gravel extraction, processing or storage in active floodplains shall be undertaken in accordance with the provisions of the above-referenced Guidelines, to the extent practicable.

Comment: Suggest language consistent with 1002 Report Stipulation 7 which limits the application of the prohibition to major fish-bearing rivers.

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CHAPTER VII - Oil and Gas --
National Need for Domestic Sources and the 1002 Area's Potential Contribution

Comment 1 - The 1002 Area's Potential Contribution to U.S. Needs

We agree that the 1002 area has very significant potential. All of the geologic factors favorable for significant oil and gas discoveries exist in the 1002 area, including source rocks that generate oil and gas, thick sequences of reservoir rocks, large structures to trap petroleum and a favorable geologic history. The location of the 1002 area between major petroleum provinces, i.e., Prudhoe Bay and MacKenzie Delta, and the basin's extension of known productive trends make the area especially prospective. Of all untested onshore areas of the United States, the 1002 area is the most promising area for discoveries of major oil and gas fields.

Comment 2 - Contribution to Domestic Oil Demand and Supply

There is a rapidly growing gap between domestic consumption and production capability of U.S. energy supplies. As stated on page 163, paragraph 1, "Oil reserves decreased over 27 percent, about 11 billion barrels from 1970 to 1985 and declined annually during 14 of these 15 years despite extensive exploration and active field exploitation programs." The trend of declining domestic reserves and production is accelerating. In 1985 domestic crude-oil production was 8.9 million barrels per day average. The drastic drop in oil prices in 1986, to approximately one-half 1985 levels, resulted in a dramatic reduction in exploration and production activity and a concomitant increase in U.S. consumption. In 1986 the shutting-in of striper wells and marginal fields has resulted in a decrease in domestic crude-oil production to a current rate of approximately 8.5 million barrels per day. If prices prevail at about $15 per barrel, domestic production could average 6.2 million barrels per day by 1991. Unless significant new reserves are found and developed by the year 2000, domestic production may decline as low as 4 million barrels per day and our nation could be dependent on foreign resources for 60-75% of its demand, almost double the present level of dependency, within 10-15 years.

Future level of oil prices ultimately affects how well the U.S. replaces its production. However, the most important factor in the future decline of domestic production is due to the steep, natural production drop from North America's two largest producing fields, Prudhoe Bay and Kuparuk River. Alaska North Slope production currently contributes 20 percent of U.S. oil production. This production is expected to peak at about 1.9 million barrels per day in 1987, then decline to about 500,000 barrels per day by 2000. The United States must turn to those areas with highest potential for undiscovered oil and gas to reverse the trend towards increasing U.S. reliance on oil imports. Because it takes 10-15 years to explore, develop, and bring Arctic oil and gas

resources into production, the opening of the ANWR 1002 area for exploration and development is now of timely and critical importance.

Comment 3 - Contribution to National Objectives

We agree that production of oil from the 1002 area can help achieve this nation's national economic and security objectives. As demonstrated since 1973, the United States is vulnerable to serious supply disruptions and price escalation because of its dependence on foreign sources of oil. The Free World's sources of petroleum are heavily concentrated in the Middle East where two-thirds of the proven reserves are located. Saudi Arabia alone possesses one-fourth of the world's reserves. Increased future dependency on politically unstable Middle East nations is highly undesirable from a national interest standpoint.

As domestic production continues to deline, and imports continue to rise, U.S. vulnerability to supply disruption will increase. A reliable domestic energy supply is a key factor in maintaining a viable and flexible foreign policy, and reducing potential security threats.

Economic benefits of further North Slope development to the nation are very significant. In addition to the direct benefits to state and federal governments from bonus payments, rentals, royalties, and taxes, the discovery of large new reserves and reduction of oil imports would significantly reduce the national trade deficit by bringing a more favorable trade balance. Nearly half of the U.S. trade deficit today results from imported oil.

Oil development on the North Slope of Alaska has provided hundreds of billions of dollars to the U.S. economy, representing a benefit to all of the 50 states. Development of petroleum resources in the 1002 area would have a positive impact on the gross national produce and thousands of direct and indirect jobs would be created as demand for goods and services increase. The positive impacts would be felt well beyond the petroleum industry.

It is clearly in the national interest to open the 1002 area of ANWR to leasing and development.

ATTACHMENT B

Renewable Resources Inc.

ENVIRONMENTAL CONSULTANTS #211A - 1503 WEST 33RD AVE., ANCHORAGE, ALASKA 99503

13 January 1987

Mr. William W. Hopkins
Executive Director
Alaska Oil and Gas Association
121 W. Fireweed Lane, Suite 207
ANCHORAGE, Alaska 99503-2035
U.S.A.

Dear Mr. Hopkins:

Re: Review of Draft EIS - ANWR

I am pleased to enclose two copies of a review and comments of the Draft EIS, with particular attention to Chapters II and VI. This review was carried out by myself and Lennart Sopuck.

The review consists of a narrative discussing major issues pertaining to ANWR and how these have been addressed in the EIS, followed by an Appendix of specific comments keyed to the EIS. Appendix II is our review of a key paper by Lau and Cameron (1986), referenced by the EIS, which provides a rationale for differences between the EIS and our own interpretations of potential impacts on caribou. Reference numbers for Appendix I are shown on a copy of Chapters II and VI of the EIs that I have enclosed.

I have also enclosed a copy of a draft paper I prepared for the Caribou workshop at Alyeska Resort in October 1986. That paper which was prepared with the financial support of Alyeska Pipeline Service Company provides the most detailed examination of and rebuttal to the conclusions of Whitten and Cameron (1985) pertaining to the issue of displacement of calving in the Prudhoe Bay area. The evidence and arguments I presented in that paper form the basis for criticizing the reliance of the EIS on the conclusions reached by Whitten and Cameron (1985).

ANWR has an unusually detailed baseline data base available which was derived over a long period. Those data cover a wide range of wildlife species and ecological relationships. For example, systematic surveys of caribou and other wildlife species in ANWR have been conducted since 1972. In addition, the data base available for wildlife/petroleum interactions in the Prudhoe Bay area and along the Trans-Alaska Pipeline, also covers the long term (over 15 years). The foregoing studies provide detailed analyses of topics which

Cont'd./...

Mr. William W. hopkins
Alaska Oil and Gas Association
ANCHORAGE, Ak. January 1987 U.S.A.

range from population dynamics, seasonal distribution, behavior and responses to mitigation. The combination and scope of studies and experience available is unprecedented as a sound basis for an environmental impact analysis, assessment and prediction. Our review finds that selective use of those data and studies and omission of relevant references has resulted in over-emphasis of potential negative effects of proposed development on wildlife populations and under-emphasized areas of compatibility or effective mitigation. In particular, the predictions of caribou population declines are not supported by all available evidence.

The prediction of impacts is always a complex task, usually made more difficult by major data deficiencies. The latter, however, does not apply in the present case. Since our review has identified those areas where omissions of relevant information or selectivity of literature have created a significant bias in impact interpretations, we have concluded that the projected impacts on mammalian wildlife populations in the EIS are more severe than would be the case under an actual development which included appropriate mitigative measures.

I would be pleased to provide any clarification of the enclosed material that you may require, and hope that you find our comments to be useful.

Sincerely yours,

for/ R.D. Jakimchuk
President.

RDJ/mt
Enc:

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A REVIEW OF THE REPORT ON THE ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN RESOURCES ASSESSMENT

Prepared by

R.D. Jakimchuk and L.G. Sopuck

of

Renewable Resources, Inc.

For the

Alaska Oil and Gas Association

January 1987

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1.0 INTRODUCTION

The purpose of this report is to review the terrestrial wildlife portions of the U.S. Secretary of the Interior's 1002(h) report concerning oil development in the Arctic National Wildlife Refuge (ANWR) in northeastern Alaska. Our approach was to assess the adequacy of the data base used to describe resource values and to predict impacts. We then determined whether the data base was used in an objective and scientifically-sound manner to predict impacts and recommend appropriate mitigative measures. Following sections provide periodic reference to Appendix I which is a list of specific comments keyed to Chapters II and VI of the 1002 report. Appendix I should be consulted for additional and more specific comments.

2.0 ADEQUACY OF THE DATA BASE

The wildlife resource and impact assessment sections of the 1002 report often contain unreliable statistics and poorly referenced and unqualified statements. Conclusions are often based on uncritical acceptance of one or two studies or on unreliable data bases. In some cases, speculative statements are not distinguished from those which are well-documented and hence are misleading.

There are several examples in the report of where the reliability of population data are not addressed. For example, the estimate of 180,000 animals for the Porcupine caribou herd (PCH) in 1986 is crude because the herd has not been properly censused since 1983 when an estimate of 135,000 animals was obtained (Whitten, 1986). However, the uncertainty of the 1986 estimate was not addressed in the report. The report also states that there is a major concentration of Central Arctic herd (CAH) caribou calving on the Canning River Delta. This was based on very limited survey information. In contrast, more extensive calving ground surveys conducted by Renewable Resources Consulting Services Ltd. (RRCS) from 1981-86 show that the Canning River Delta is not a major calving area, but that there tends to be a continuum of calving along the coast with concentrations between major river valleys (Carruthers et al., 1984; Carruthers and Jakimchuk, 1985; Sopuck and Jakimchuk, 1986). These studies were not referenced in the text.

The available data base on the distribution and movements of the PCH and CAH is vastly under-utilized in the report. The calving distribution of the PCH was studied by RRCS from 1972 to 1977 but these studies are not cited directly in the report (Jakimchuk et al., 1974; Roseneau et al., 1974; Roseneau and Curatolo, 1975, 1976; Curatolo and Roseneau, 1977; Bente 1977). However, these reports contain important

site-specific movement and distribution data for the PCH. The report states that caribou use riparian areas during spring and summer but does not cite a recent study by Carruthers et al. (1984a) that shows that females with calves usually avoid riparian habitats. In addition, the movements and distribution of CAH caribou within the 1002 area are described in detail in the report, yet the movements have been very poorly documented to date. If recent unpublished data were used they should have been referenced in the report.

The definition of the "core calving area" for the PCH was derived using information obtained from 1972-85. This report refers to this period as the "14-year study". In fact, the data were obtained from several individual studies and surveys. During some years (e.g., 1973, 1974, 1980) very limited information was obtained on the calving distribution of the PCH, and even more limited estimates of density. Yet it appears in the report that the "core calving area" was defined based on a solid, 14-year data base.

In the impact section of the report, the indirect loss of habitat as a result of behavioral avoidance is quantified using a worst-case scenario. However, based on the studies conducted to date, it is extremely speculative to predict a "zone of total displacement" around a particular development. These speculations are based primarily on one quantitative

study, Dau and Cameron (1986). This study shows short-term partial displacement by maternal groups around an active road system, but also shows that caribou responses can be highly variable. In addition, no quantitative information on how caribou may habituate to these disturbances is available. Habituation over the long term may significantly reduce this "zone of displacement".

The report presents several statements as fact rather than speculation. For example, it is assumed that increased energy demands on individual caribou during the insect relief period will lead to reduced survival and productivity of the herd. However, there are no studies on North American populations of caribou that have established this link. Also, the report makes the implicit assumption that caribou are a "food-limited" species. However, there are no studies that show that mainland populations of caribou in North America are food-limited. European references are not appropriate because reindeer herds are maintained at artificially high stocking levels in largely predator free systems.

The report states that the PCH may have difficulty accommodating to developments such as pipelines because they will interact with them for short periods during the year. However, the report fails to discuss RRCS studies of the Nelchina herd (Carruthers et al., 1984b) which shows that this

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herd is exposed to TAPS only twice each year, but crosses it successfully. In the assessment of the impacts of aircraft overflights on caribou, the report ignores the work by Davis et al. (1985). The 1002 report appears to cite references selectively rather than presenting a more balanced viewpoint. Davis et al. show that caribou populations can continue to grow despite sometimes severe harassment from aircraft and other military activities including bombing and strafing within traditional calving ranges.

In summary, the 1002 report does not adequately qualify or reference its conclusions and hence presents an unbalanced assessment of impacts. In many cases, the worst case scenario for impacts is unjustified.

3.0 MAJOR ISSUES FOR THE PORCUPINE AND CENTRAL ARCTIC HERDS

Although a worst case scenario is a valid approach to environmental analysis, for significant resources such as the PCH it should incorporate the following:

1. Assumptions should be realistic and properly qualified.
2. The factual basis for analysis should be supported and well documented.
3. Impact criteria should be well defined and supported.

4. Use of the scientific literature should be objective rather than selective.

3.1 The Displacement Issue

The impact assessment on the PCH is largely based on two studies: Whitten and Cameron (1985) who concluded that calving of the CAH has been displaced from the Prudhoe Bay area since the onset of petroleum development, and Dau and Cameron (1986) who reported local displacement of maternal caribou along the Milne Point Road. Whitten and Cameron (1985) present conclusions based on anecdotal data which are largely correlations after the fact. Jakimchuk (1986) presents a detailed rebuttal to the principal conclusion that calving of the CAH has been displaced from Prudhoe Bay. Their own paper recognizes the possibility of other factors such as flooding which may account for the lower calving density in the Prudhoe Bay Complex (PBC). Jakimchuk (1986) reviews evidence that indicates that the PBC was not an important calving area even before development and that the correlations made by Whitten and Cameron reflect a calving distribution in response to natural influences. However, neither viewpoint can be termed conclusive because of the post facto correlations which are made and the limitations of pre-development data and possible comparisons. Jakimchuk (1986) does, however, present a

critical appraisal of those data and the conclusions of Whitten and Cameron. The evidence supports the notion that the Prudhoe area is similar to other deltas in having a low calving density which existed pre-development and that conclusions that calving has been displaced from the PBC are unsupportable.

Because of the contentious and inconclusive nature of the Prudhoe Bay scenario, the report of Whitten and Cameron (1985) is not a sufficiently strong basis to rely on for the PCH scenario analysis.

Dau and Cameron (1986) present a far better study design and basis for assessing the implications of sensory disturbance to the distribution of calving caribou. Because of its importance as the basis for the impact analysis we have reviewed that study (Appendix II) for its relevance and validity. Several points have emerged from that review which are important to the analysis for the PCH.

1. The Dau and Cameron study, although a better design than previous studies, is not definitive. It documents a partial avoidance by maternal cows over a period of high disturbance. However its limitations include lack of a control, and no discussion of conflicting results with West Sak Road studies which show no avoidance by calving groups along the West Sak Road. Their comments on lack of habituation by caribou to disturbance are unsupportable.

Although Dau and Cameron document reduced habitat use (i.e., lower densities) by maternal groups near the road, they did not in fact document displacement which may be defined as an active process of dislocation of caribou from a previously used area in response to a stimulus. Further, they do not comment on the significance of the fact that numbers of calving caribou in their study area almost doubled between the pre- and post-development study periods.

The most significant error of the scenario analysis for the PCH is the assumption that what is termed "behavioural displacement" would be total for a 2-mile zone adjacent to roads using Dau and Cameron (1986) as a basis for that analysis. A total displacement was not found by Dau and Cameron and there is no basis for the assumption of a zone of habitat loss of that magnitude. Moreover, the analysis unjustifiably fails to discuss the potential for habituation and is highly selective in use of relevant references. It specifically ignores those references which may temper conclusions pertaining to the adverse effects of disturbance and displacement on caribou demography.

For example, Davis et al. (1985) report no short term demographic effects on the Delta herd from displacement from their core calving area and no adverse demographic effects on the herd from severe disturbances on the calving grounds. This

reference is not even cited in the EIS. The analysis of aircraft disturbance ignores at least a dozen aircraft disturbance studies, many of which are more quantitative or relevant than those cited. The gratuitous editorial comment on Bergerud et al. (1984) (ref. 41, p. 110, App. I) as a paper that is "widely disputed" indicates a biased approach to dissenting viewpoints. We consider that such an arbitrary dismissal of a major, refereed, published paper is unethical.

Previous sections of this review and Appendix I identify omissions of specific papers relevant to an objective analysis of impacts. Another example is omission of Carruthers et al. (1984b) on crossing success of TAPS by the Nelchina herd, which has a direct relevance to the question of effects on caribou which only periodically contact a pipeline (ref. 36, p. 109, App. I). This report is not listed in the bibliography of the EIS.

The assumption that displacement from the PCH core calving area would be complete is not justified on the basis of known examples. The further link to population decline is even more speculative. There is inadequate treatment of alternative habitat use and the potential mitigating effects of habituation. The net result of the foregoing omissions is to greatly exaggerate the worst case beyond what can be supported on scientific evidence.

Although the qualifiers "could be", and "maybe" are, frequently used in the impact predictions they are not defined. The assessment would be enhanced considerably by an objective risk or probability analysis in order to place predictions in context with their likelihood of occurrence.

The analysis of comparative calving densities for various herds has been linked to the vulnerability of the PCH to population decline if displacement occurs because of its higher calving densities. That analysis, however, depends entirely on undocumented assumptions that:

a) There is a relationship between calving density and herd productivity.
b) That alternative calving areas are incapable of sustaining the PCH at current levels.
c) That displacement would be complete.
d) That the growth of the CAH is partially a result of its low calving density.

The arguments presented in the EIS regarding assumed relationships between calving density and herd productivity are both speculative and hypothetical. There is no supporting data to warrant the conclusions made. Therefore, the severity of the impacts predicted are overstated and subject to question.

We have given little attention to the impact assessment of the CAH in this summary and refer the reader to specific notes and comments in Appendix I. In general, projected impacts on the CAH are highly overstated since 1002 developments would impinge on a smaller portion of the herd than do existing petroleum developments in the Central Arctic region.

3.2 The Insect Relief Habitat Issue

Although there is considerable theoretical concern for, and discussion of, the importance of insect relief habitat to the PCH and CAH, there is very little documentation of its role or significance to the herds. The overall requirements for insect relief and its relationship to herd health and energetics requires additional study and assessment. As a migratory herd the PCH has insect relief habitat options both north and south of the study area and has utilized both coastal and montane habitats for that purpose. Overall, insect relief habitats are neither scarce nor inaccessible. Maintenance of movement patterns as specified in the mitigation measures and as experienced by the CAH would ensure access to insect relief habitats both along the coast and inland. In addition, elevated areas of gravel pads will increase availability of insect relief sites inland albeit to a minor extent compared to natural areas.

At present, there is no basis to conclude that access to insect relief habitat will be impaired by the development scenario provided that mitigation measures proposed are implemented.

3.3 Mitigation

In general, we agree with the mitigation analysis. The major exception is the recommendations for ramps to facilitate caribou passage. Recent studies show that ramps are not necessary to ensure caribou passage across pipeline corridors provided adequate pipe clearance is available. Further, the construction of ramps has biological costs associated with gravel removal and transport and habitat alteration at source locations and ramp locations.

Although we are in agreement that air traffic should be controlled to minimize disturbance the mitigation analysis presents a one-sided scenario by omitting references to caribou populations exposed to aircraft disturbance which have not suffered demographic effects (Bergerud et al., 1984; Davis et al., 1985). The restrictions proposed for aircraft appear to be overly conservative. For example 2,000 ft-ceilings on overflights are proposed from 20 May to 15 August. However, by

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15 July the majority of caribou have left the 1002 area on their mid-summer migration into Canada.

There is also scope to add to and improve the mitigation measures to further reduce impacts on the PCH. These include site-specific scheduling to minimize activity during sensitive periods.

A major unknown is how large concentrations of caribou (100,000 or more in post-calving aggregations) would respond to and negotiate oil development infrastructure. There is reason to believe that large groups are more susceptible to influences such as deflection because of the impetus of their numbers and the dynamics of group leadership. Because of these unknowns it would be prudent to establish facilities such as roads and pipelines in areas of minimal potential conflict with large aggregations of caribou.

Despite evidence that caribou cross under pipelines with clearances as low as 5 ft, we have previously recommended a higher clearance where interaction with large aggregations are anticipated. We feel that a minimum of 7 ft ground/pipe clearance within the range of the Porcupine caribou herd would be a highly significant improvement as a mitigation measure. The major rationale for increasing the clearance is to provide a larger margin for facilitating passage of large

concentrations of caribou and because of the aforementioned impetus of large groups which can govern directional movements during post-calving and mid-summer migration. A higher clearance would facilitate passage of mature antlered bulls and would maintain a physical opening between passing animals and the overhead pipe which would be visible to those animals in the rearguard of large herds.

The existing scenario shows a proposed pipeline location traversing the known post-calving aggregation area for the PCH south of Camden Bay. Additional study is recommended to improve that location, possibly by moving it further north to avoid the area of massive aggregation without precluding access to insect relief habitat.

The foregoing and other measures such as scheduling or convoying traffic during periods of major caribou movements would serve to greatly minimize adverse impacts on the herd and reduce the magnitude of predicted impacts considerably.

In view of the foregoing we disagree with the statement (ref. 43, p. 111, App. I) that mitigation is not possible in Resource Category 1 lands and feel that there are significant mitigative opportunities and measures to reduce the adverse effects of development activities on those lands.

4.0 OTHER SPECIES

Appendix I provides specific annotations for other species. A major deficiency in the analysis is incomplete use of available literature and data sources. As a result, potential negative impacts tend to be over-emphasized, e.g., the status of Polar Bear denning is accorded considerable attention. However, denning in the 1002 area is an extremely minor component of denning adjacent to ANWR which in turn is a minor component of denning overall for the Beaufort Sea polar bear population.

We are in agreement with the projected impacts and description on grizzly bears. The exponential growth rate of muskoxen may be limited by habitat availability in future. Effects of disturbance on this growth rate are speculative at the present time. The history of the transplant and growth have established the capability of muskoxen to pioneer a new environment and is evidence that they are responsive to opportunities provided by mitigation. In the absence of controls or management, muskoxen would be forage regulated at some future point and might compete with caribou in a conflicting way.

APPENDIX I.

Detailed review comments on the ANWR impact assessment report, pp. 27-170.

A) Chapter II, Existing Environment, pp. 27-45.

Page	Reference No.	Comments
28	1-2	The "core calving area", as defined, has caribou densities of 50 animals/mi^2 or more during five of 14 years. Caribou use of their calving grounds is very dynamic with site-specific densities varying greatly within the calving period. Core calving area is not necessarily "traditionally" favored and the words "strong fidelity" are misleading. It is in fact an area where high density of calving has occurred frequently, i.e., yearly overlap within the overall calving range.
28	3	This paragraph lacks references and is misleading. The generalization that caribou use riparian areas as travel routes and important feeding areas is not fully supported by the available literature (see Jakimchuk and McCourt, 1975; LeResche and Linderman, 1975).
28	4	References or qualifications are required on types of disturbances which may affect bonding and increase in mortality. We need a more realistic impact prediction on the effects of disturbance on calf mortality.
28	5	Uplands are in southern part of calving grounds, not the northern part. Also, use of uplands by most calving cows contradicts previous statement (see #3) that calving "caribou" use vegetated riparian habitats (see Jakimchuk et al., in press). There are no citations of work done by Renewable Resources Consulting Services Ltd. on calving distribution of the Porcupine caribou herd during the 1970s.

Page	Reference No.	Comments
28	6	It is important to distinguish between post-calving movement and aggregation and the mid-summer migration (see Jakimchuk and McCourt, 1975). Summer movements (midsummer migration) are the most consistent movements of the year. Post-calving movements are also quite predictable.
28	7	There is no attempt to define the phrase "critical life stages".
29	8	Is productivity the basis for determining 'impact' or is habitat? Unless the direct link implied is documented for caribou both definitions should not be used simultaneously.
29	9	More documentation of August numbers is needed to determine the frequency of August occupation of the 1002 area (e.g., are numbers closer to 15,000 or to lower end of range?).
29	11	This paragraph requires references. The movements of Central Arctic herd in the 1002 area have not been adequately documented to date.
29	12	Again no references are provided. The most detailed information on calving distribution of the Central Arctic herd is available from Sopuck and Jakimchuk (1986), Carruthers and Jakimchuk (1985) and Carruthers et al, (1984a). The presence of 1,000 females and calves on Canning Delta in most years contradicts data which show more of a calving continuum along the coast with concentrations between major river valleys. Also, the calving situation at Prudhoe Bay oilfield is misleading. The results of Whitten and Cameron (1985) were rebutted by Jakimchuk (1986) who reviewed evidence that the Prudhoe Bay area was never an important calving area for the Central Arctic herd.
29	13	Use of riparian areas as travel corridors and feeding areas by the Central Arctic herd by cows and calves is not supported by the literature (see Carruthers et al., 1984a; Jakimchuk et al., in press).

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Page	Reference No.	Comments
		This paragraph ignores the Central Arctic herd as a whole and only discusses the 1002 area and is therefore, incomplete. Since most of the herd occurs outside the 1002 area, this paragraph gives a misleading view of importance of the area to the Central Arctic herd.
29	15	In the presentation of Central Arctic herd distribution and abundance there are no comments on productivity. This omission downplays the tripling of herd size which has occurred since the Prudhoe Bay development started.
30	16	Additional data on moose obtained in the 1970s are available from the Arctic Gas Biological Report Series, Vol. 6, Ch. 1.
20	17	Data on the Sadlerochit Mountains sheep herd are available in an earlier reference (see Arctic Gas Biological Report Series, Vol. 6, Ch. 1).
31	19	More detailed information than available in Chesemore (1967) on Arctic fox distribution in the 1002 area is available from Quimby and Snarski (1974), Arctic Gas Biological Report Series, Vol. 6, Ch. 2.
32	20	Additional information on wolverines in the 1002 area is available from Quimby and Snarski (1974), Arctic Gas Biological Report Series, Vol. 6, Ch. 2).
32	21	Again, earlier work on bears in the 1002 area by Quimby and Snarski (1974) is ignored.
33	24	This paragraph lacks references which are especially required since conculsions presented are controversial.
33	24	Numbers of polar bears in the ANWR part of the Beaufort should be indicated; the Beaufort Sea estimate of 2,000 includes Canadian waters. "Influx of females" implies large numbers moving into the 1002 area. This is not so. References for the population estimate are not given.

Page	Reference No.	Comments
33	25	This paragraph contains very vague and misleading statements. It leaves the impression that a high percentage of the 2,000 bears in the Beaufort population use ANWR. This is not the case. One to two dens in each of four out of five years does not indicate high use of the area by denning bears. See Moore and Quimby (1974) for earlier studies on polar bear denning locations (Biological Report Series, Vol. 32, Ch. 2) which also found a low frequency of denning in ANWR. The 15 dens found between 1951-1985 is cumulative and does not represent actual numbers in any one year.
34	30	Additional information on ringed seals adjacent to ANWR can be found in Moore (1976)Biol. Rept. Series, Vol. 36, Ch. 2. This reference was not cited.
37	31	Studies conducted by McCart et al. (Biol. Rept. Series) on fisheries resources in the ANWR area are not cited.
45	32	The impacts of oil development on the Wilderness resources of the 1002 area will be a key issue.

B) Chapter VI, Environmental Consequences, pp. 95-119.

96	1	These definitions of impacts do not attempt to quantify the changes in abundance in wildlife populations from the natural state that corresponds to each level of impact. Also there is no allowance for accommodation or habituation by species to modifying influences.
98	2	We agree that the PCH concentrated calving area is considered unique and irreplaceable.
98	3	The remainder of the 1002 area cannot be considered scarce habitats, nationally vs. regionally, and should be category 3-4 for most species.

Page	Reference No.	Comments
105	5	Although up to 82 percent of calving for the Porcupine caribou herd has occurred in the 1002 area, in some years almost no calving has occurred there. However, use of the area is more consistent during the late June/early July insect relief period. The statement that the insect relief period is highly stressful is based largely on theoretical considerations - insect relief habitats are widespread north and south of the 1002 area. An inland pipeline may interfere with movements to the coast and post-calving aggregations; however, a coastal pipeline would not.
105	6	This statement should be qualified as to extent of displacement and should indicate that only a minor component of the Central Arctic caribou herd is involved.
106	7	These statements are hypothetical and too generalized because: 1) Density is only an important consideration if proposed activities have effects on populations. 2) It is debatable if the interaction would be greater than at Prudhoe Bay. The Porcupine caribou herd does not always calve in core area and not all of the core area will be affected. 3) Nonetheless, calving and post-calving densities and numbers do differ significantly from the Central Arctic caribou herd and differing implications may occur. If an adverse effect occurs it would certainly affect a greater proportion of the population especially during post-calving aggregation. We agree also that the Porcupine caribou herd will form larger groups than the Central Arctic caribou herd during post-calving and that predator populations also differ between the two areas.
106	8	This paragraph is of major importance and is highly misleading (see Jakimchuk, 1986; Caribou workshop paper) because: - the Prudhoe Bay oil field was never an

Page	Reference No.	Comments
		important calving area. - Whitten and Cameron (1985) do not show an absence of calving for the entire period but co-incidentally with delayed snowmelt. - Whitten and Cameron also discuss other possibilities for low pre- and post-calving densities. - Other Central Arctic caribou herd calving areas show similar pre- and post-development low calving distributions. This section superficially covers a very important topic and uncritically accepts selected findings of one study (i.e., Whitten and Cameron, 1985).
106	9	Inappropriate secondary reference to a review paper when other references, e.g., Carruthers et al. (1984a), are original sources of systematic data with wider coverage than any other.
106	10	Long term data collected from 1981-86 by Renewable Resources Inc. indicates that the Canning River Delta is not a major calving area for the Central Arctic herd. However, it receives greater use during the post-calving period.
106	11	Table VI-4 shows progressive increase in calving numbers in the oilfield from 1972-1974. A detailed critique of these data is available in Jakimchuk (1986). Also, population estimates for the Central Arctic herd for 1981-1986 are available from various RRCS studies.
106	12	The amount of the "core calving areas" within the 1002 area depends on the definition of core calving ground used. The criteria of >50 caribou/km^2 in at least 5 of 14 years resulting in 80 percent within the 1002 area may be too conservative (i.e., the major calving grounds are actually much larger).
106	12	There are no recently published population estimates for the Porcupine caribou herd since 1983. The 1983 photocensus estimate

Page	Reference No.	Comments
		since 1983. The 1983 photocensus estimate was 135,000. Therefore recent estimates of 165,000 in 1985 and 181,000 in 1986 are guesses rather than actual censuses as implied.
106	13	Year-round use of the 1002 area by 4,000 Central Arctic caribou is undocumented.
106	14	Core-calving and concentrated calving areas are defined using the density of ≥50 caribou/ mi^2 yet there is no indication of how these estimates of density were made. Also, a better indication of the use of the 1002 area for calving would be data on the percentage of the herd that calved there each year.
107	16	Indirect habitat losses as a result of behavioral avoidance are difficult to quantify. Studies to date show that the degree of avoidance by caribou is variable and that caribou may habituate to these disturbances over the long term. Indirect habitat losses due to physical barriers may be more signficant depending on the success of mitigation measures employed. Insufficient pipe heights or over-reliance on ramps in combination with disturbance may impede free movements of caribou. This problem may be significant for very large aggregations of Porcupine herd caribou during the post-calving (insect relief) period. Data on the responses of very large groups of caribou to physical barriers are presently unavailable.
107	17	Present studies of behavioral avoidance by caribou of roads do not prove that disturbance is a major source of habitat loss. We need to know how many caribou show the displacement response and whether habituation will occur in the long term.
107	18	The statement is not true, and not definitive. Dau and Cameron (1986) show local response to roads consisting of reduced densities of maternal caribou not displacement from calving grounds. Conclusions and statements by Cameron and Whitten (1979) have been challenged by

Page	Reference No.	Comments
		Bergerud et al. (1984). Citation is used inappropriately here.
107	19	This statement is grossly misleading since there is no evidence available to support it. The following sentence can also apply to many other areas within the range of the CAH. Both the statement and cited study are misleading (Whitten and Cameron, 1985) and have been separately criticized by Jakimchuk (1986) and Carruthers et al. (1984a). The extent of displacement in the Prudhoe Bay area caused by development is difficult to quantify since the area was never an important calving area and because pre-development data are not sufficiently quantitative.
107	20	The study by Dau and Cameron (1986) shows reduced habitat use by caribou. However, the extent of reduced habitat use shows considerable variation. Habituation of caribou may reduce this effect in the long term.
108	21	If displacement does occur, adjacent areas may not be undesirable since they are frequently used with no short term adverse effects on productivity. Long term studies on effects on productivity of displacement would be required to determine the significance of displacement from a high density calving area. Although displacement of the Porcupine caribou herd from a "core calving area" may be deleterious, studies of the Central Arctic herd show that caribou numbers can increase despite development witnin their calving areas. We agree, however, that caution should be used in extrapolating Central Arctic caribou herd results to the Porcupine caribou herd since the Porcupine caribou herd occurs at much higher densities on their calving grounds and because predators are more abundant adjacent to the Porcupine caribou herd calving areas. In addition, caution should be used in the assumption that displacement of the Porcupine caribou herd

Page	Reference No.	Comments
		from a "core calving area" would occur in total as implied. The probability of this is low based on evidence from the CAH.
108	22	This statement presupposes a food limiting habitat and a complete loss - the references used deal with non-caribou apparently since caribou are not a food limited species and comparable references are not available for mainland herds of Barren-ground caribou in North America.
	25	There is no basis for "unlikely" conclusion. This is speculation only based on inference of higher density. Also presupposes a "massive" displacement rather than a local displacement. This is an example where the CAH experience is downplayed despite the existence of data on compatibility with development. "...no recognizable... long term effect... has been demonstrated to date (emphasis ours).
	26	However, all participants of the FWS workshop did not agree to the extent or significance of that displacement.
108	27-28	Dau and Cameron (1986) indicate that reduced density of maternal caribou which they term displacement may occur within 2 miles from active roads. However, the percentage of caribou affected is uncertain. A significant number of caribou within 2 miles may be unaffected by disturbance. Therefore, development would not result in the complete loss of 32 percent of the Porcupine caribou herd core calving area as calculated.
108	28	It is erroneous and misleading to imply a "total displacement" two miles wide. The term probable population decline is unsubstantiated i.e., displacement is linked to decline, but such an effect has never been demonstrated or documented. The assumption of massive displacement is unwarranted based on the Central Arctic caribou herd experience.
108	29	Several studies show that pipelines such as TAPS and Kuparuk do not create a barrier. Note one-sided refs. Need to clearly

Page	Reference No.	Comments
		establish the likelihood of conditions which constitute interference or provide better qualifications of statements made.
109	31	Agree - valid concern. I have previously recommended 7' ground to pipe clearance rather than the 5' level cited in this and the workshop report.
109	31	We agree that the effect of potential barriers are greater during post-calving than during calving because of the very large size of post-calving aggregations and the sudden, erratic movements between inland areas and coastal insect-relief habitats. There is insufficient evidence, however, to indicate that survival or productivity of caribou may be reduced as a result of a disruption in movements during this period. We recommend that the location of a main east-west pipeline be studied furtner and that pipe heights *should be raised from the minimum of* 5' cited in the EIS to 7' within the range of the PCH.
109	32	The European references used are not appropriate - carrying capacity and nutritional limitations are greater for European populations.
109	34	This statement is based on one example and hence is not objective.
109	35	There is no evidence that ramps will significantly increase crossing success - rather pipe heights and the presence of vehicular traffic are more important.
109	36	It is appropriate to discuss RRCS studies of the Nelchina herd (Carruthers et al., 1984b) here and reference it. This herd is exposed to TAPS only twice a year, but crosses it successfully.
109	37	This worst case is unjustified on the basis of known responses of caribou. It is unrealistic and ignores experience to date. Also should not assume 2-mile sphere of influence even without mitigation.

Page	Reference No.	Comments
110	38	Disturbance and harassment are significantly different. There is no evidence that disturbance will result in direct or indirect mortality as a result of trampling or increased energy loss.
110	39	This paragraph ignores several other studies some of which are more quantitative.
110	40	Davis et al. (1985) report no demographic effects or calving ground displacement on the Delta caribou herd from severe aircraft disturbance and other disturbance associated with military activity. This is an example where significant conclusions of a recent peer review paper (Davis et al., 1985) are ignored in favour of an outdated non-peer review reference.
110	41	The editorial comment "widely disputed view" is an inappropriate and unsubstantiated comment on a peer-review published paper.
111	43	We disagree with this conclusion since Category 1 habitats would not suffer an inevitable "loss". Mitigation of Category I habitat is possible because: 1) A 2-mile avoidance zone is not a valid assumption (see previous comments). 2) Many mitigation options are available including: - Traffic control - Reduced human activity during calving - Reduced aircraft overflights - Speed limits on traffic, etc.
111	44	Ramps are over-emphasized and not justified. Elevation of pipelines to 7' above ground (because of large groups) should be a priority over ramps.
111	46	Davis et al. (1985) do not indicate a problem. Restrictions could be lifted after 15 July because most PCH animals are gone on summer movements by that date. We agree with a minimum altitude of 2,000' May 20 through July 15th.
111	47	We basically agree with all mitigation measures except for ramps. However, more

Page	Reference No.	Comments
		measures could also be listed, to further ameliorate impacts.
112	48	Environmental description map in Chapter II shows extent of alternative habitats. Whether these could sustain a growing population assuming loss of all core calving area (although unlikely) is unknown.
112	49	Insect relief habitats need to be more accurately described. We need to know how much space is necessary to give relief to the Porcupine caribou herd.
112	50	There is a major step between potential undocumented effects and a population decline. However this paragraph seems to be properly qualified.
112	51	Is it a decline or distribution change or both? There is no basis for predicting either a 5-10 percent decline or distribution change. The opposite, a three-fold population increase in the CAH accompanied the Prudhoe Bay development which interacted with a much larger proportion of the CAH than would be the case for the 1002 area. The prediction of a decline and distribution change for the CAH throughout its range based on the 1002 interaction totally ignores the well-documented facts of the actual effects of development. This paragraph is unfounded.
113	52	There is no basis given for extrapolating effects on individuals to population effects.
113	54	A major unjustified assumption here is that disturbance will result in absolute loss of habitat value. Also an exponentially expanding population suggests that in the near term it is below carrying capacity.
114	55	Evidence is opposite, these sub-groups all originated from two transplants, one made on Barter Island (1969) and the other at Kavik Camp (13 muskox transplanted in 1970).

Page	Reference No.	Comments
116	56	These conclusions are entirely speculative and there is no possibility of subsequent determination if they are correct or incorrect.
117	57	Agree with this section in general.
118	59	This paragraph is misleading because 12-13 percent of the Beaufort Sea Population do NOT den on land.
119	60	This paragraph should be qualified with a more objective review of likelihood of effects on productivity of bears.

APPENDIX II

Review of Dau and Cameron (1986) Report entitled "Effects of a road system on caribou distribution during calving". "Rangifer", Special Issue No. 1:95-101.

Dau and Cameron have demonstrated a local, short-term reduced density of maternal caribou groups adjacent to an active road system which they refer to as partial displacement. However, several qualifications to their results need to be made that were absent in the report. The authors admit that it is speculative to extrapolate the local effects on maternal caribou to the population as a whole. Yet they imply that displacement will result in widespread, long-term loss of traditionally-used habitat. We argue that such conclusions are unwarranted at this time.

The experimental design of Dau and Cameron, although more rigorous than previous work, did not include adequate controls. The design requires a control area containing a hypothetical road alignment and located in an area of similar habitat and calving density, well away from human activity. Monitoring of a control area during an equivalent study period (1978-85) would indicate whether changes in caribou distribution similar to the experimental area can occur in the absence of development.

In addition, Dau and Cameron fail to note that:

1) despite partial displacement and increasing development activity, caribou densities increased in their study area from 1978-85;

2) most of the displacement was observed in the middle sections of the road, the north and south ends of the road alignment supported lower densities of caribou before and after the development;

3) non-maternal groups, which included up to 25 percent calves, occurred at higher densities (although not significantly higher) near the road alignment than away from the alignment during the post-development period;

4) habituation was not evident up to 1985 because the intensity of human activity was also increasing dramatically at this time.

The Dau and Cameron study showed statistically significant differences in caribou density vs. distance but also indicate that annual variability was high. In fact, the annual variability within each 4-year period was almost significant ($p = 0.053$) for calves. This suggests that the displacement response varied considerably from year to year.

It is noteworthy that Dau and Cameron showed that non-maternal caribou were not displaced by the road development. Also, the response by maternal groups was partial displacement within a zone of 0-3 km (0-1.9 mi). In the ANWR report it is implied that all caribou show a total displacement within 2 miles. This scenario is not supported by the Dau and Cameron report.

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THE RELATIONSHIP OF CARIBOU SUMMER DISTRIBUTIONS AND THE TRANS-ALASKA PIPELINE: DOES ABSENCE MEAN DISPLACEMENT?

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for

Joint Industry - Alaska Department of Fish & Game

Caribou Workshop

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INTRODUCTION

The ideal experimental design to test whether calving and post-calving cow/calf groups avoid TAPS and are displaced by oil developments in the Prudhoe Bay area is not available to us. Such a design would have as its basic elements comparable pre-development baseline data for control areas and areas which would subsequently be perturbed. Comparable techniques would be used to measure changes of various ecological variables in control and exposure areas before and following perturbation. The experimental design would be careful to ensure that comparisons are valid and would eliminate biases owing to either environmental variables or to the changing seasonal behaviors and distributions of caribou. The designs would endeavor to eliminate biases associated with the highly clumped or non-homogeneous distributions of caribou which characterize the species by recognizing the implications of differing densities, grouping behaviour, sexual segregation, and differential habitat use to the analysis. Surveys would be conducted during comparable time and life cycle periods to reduce the foregoing potential biases. The foregoing would ensure that data were comparable for the test and control areas within years, so that between-year comparisons could be made

between controls as well as test (exposure) areas both before and after development. Finally, the study design would encourage identification and measurement of exogenous environmental influences such as snow characteristics, plant phenology or seasonal flooding which may, independently of the previously mentioned variables, affect the distribution of and habitat use by caribou between two apparently similar areas. Such measurements would help account for variations in use or density which might occur even where exhaustive attempts were made to standardize the experiment based on the criteria I have previously mentioned.

The lack of many of the foregoing elements has contributed to differing interpretations on the relationship between caribou distributions and North Slope petroleum developments, especially as it pertains to calving distributions and the percentage calves associated with the TAPS corridor. These differing interpretations, in turn, have generated controversy which has often obscured rather than clarified issues. However, despite deficiencies in many of the data requirements I have described, there are numerous bodies of evidence which can objectively focus on questions of caribou interaction with the TAPS corridor and the implication of that interaction. These data, accumulated over a period of the past 16 years, provide a basis for interpreting the relative role of ecological factors and disturbance in governing the

distribution, movements and habitat use of Central Arctic caribou. In this paper I can only develop and substantiate some important principles: I do not intend to review and debate the minutiae of 15 years of survey data but to point out some of the most significant findings which encompass the period prior to and following development of the TAPS corridor.

Specific data for the area are available for the period before extensive oilfield development, the construction of the Dalton Highway in 1974, or the pipeline between 1975 and 1977. The main sources of pre-development data are studies by Angus Gavin from 1969 to 1978 (Gavin 1977; Gavin and Chamberlain 1979), White et al. (1975), and Child (1973). Post-development data are derived from a wide range of ADF&G and industry sponsored studies from 1975 to the present.

METHODOLOGICAL PROBLEMS: UNEQUAL COMPARISONS

One of the major difficulties in any analysis of Central Arctic caribou and development interactions is separating out the relative influence on caribou of the pipeline, the Dalton Highway and the oilfield development. Although this paper deals with the TAPS corridor, it cannot ignore pre-construction calving distributions as they relate to Prudhoe Bay and TAPS. Therefore I must comment, in part, on

the conclusions pertaining to the oilfield presented by Smith and Cameron (1983) and Whitten and Cameron (1985). Figure 1 shows the study area and the TAPS corridor.

The major conclusions of Cameron and Whitten (1980_) and Cameron et al. (1979) are that cow/calf groups avoid the TAPS corridor during calving and the summer period based on a comparison of calf percentages along the corridor versus regionally. The major conclusion of Smith and Cameron (1983) and Whitten and Cameron (1985) is that calving caribou have been displaced from the Prudhoe Bay Oilfield. This conclusion is based on low densities of calving caribou in the field and a lower calf percentage of total caribou in the field versus the regional percentage.

The problem of comparability of data is a major limitation to the conclusions drawn by Cameron and Whitten (1980_), Cameron et al. (1979, 1985). In the latter final report, comparisons of calf percentages between regional and corridor values during the calving period (June) are available for only two years (1975-76) of the seven-year study (1975-1982). Other seasonal periods were compared but they combined periods in which seasonal distributions are known to vary considerably and frequently in response to environmental factors. Thus, comparisons of short yearling percentages in April/May between the TAPS corridor and regional values does

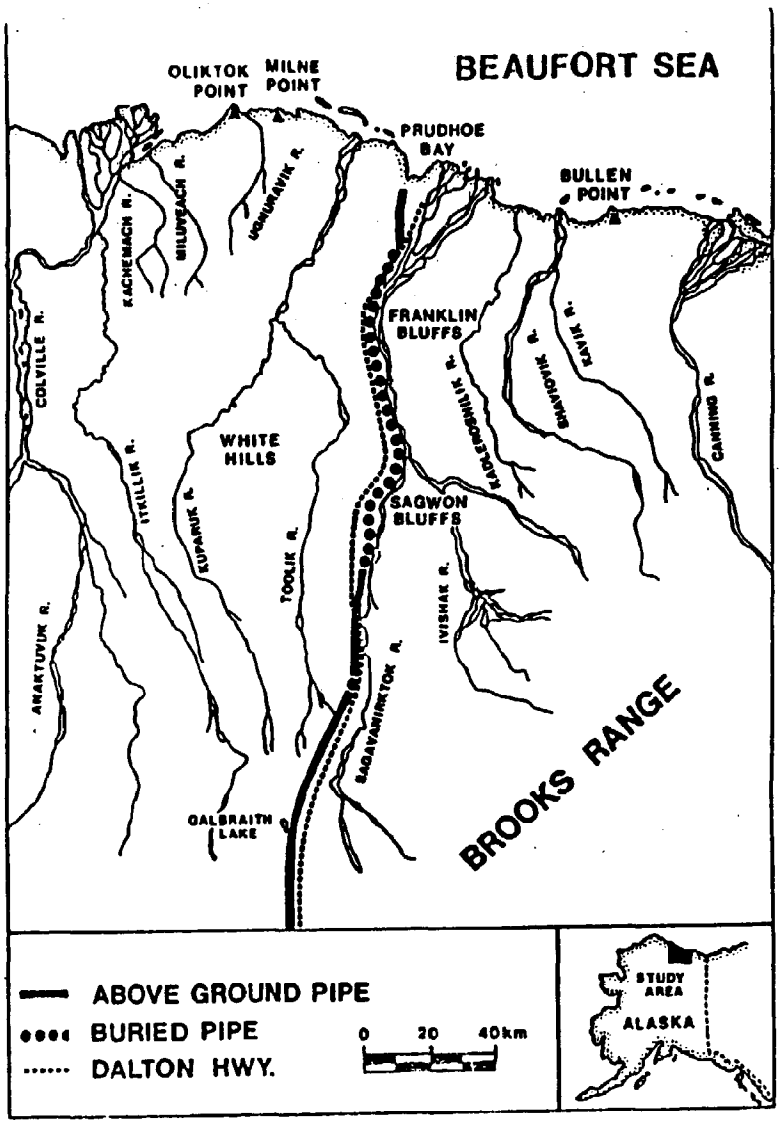

Figure 1. The study area.

not take into account sexual segregation (Figure 2) and differential habitat use by the sexes at that time (Figure 3), while comparisons for the July-August period are confounded by the extreme flux in movements in response to insects which can affect calf percentages in a specific area drastically even on a given day (White et al. 1978). Even so, calf percentages along the corridor and regionally were the same in two of five years for the July-August period (Cameron et al. 1985), suggesting that factors other than the TAPS corridor influenced those percentages.

Although Cameron et al. (1985) attempt to reduce previous biases in survey coverage of non-riparian habitats regionally by deleting road surveys south of Region 4 and coastal transects from aerial surveys, regional surveys still appear to oversample non-riparian habitats. The published methodology (Cameron and Whitten 1979) states a deliberate effort to sample non-riparian habitats on regional surveys for at least 3 km on either side of riparian habitats. Thus, many high density non-riparian calving areas are sampled in the regional surveys (Figure 4) and compared to the 1 km wide surveys on either side of the Dalton Highway which is closely associated with riparian habitat of the Sagavanirktok River (Figure 5). The route of TAPS does not transect such calving concentrations and traverses approximately three times the regional percentage of riparian habitat (Carruthers et al. 1984).

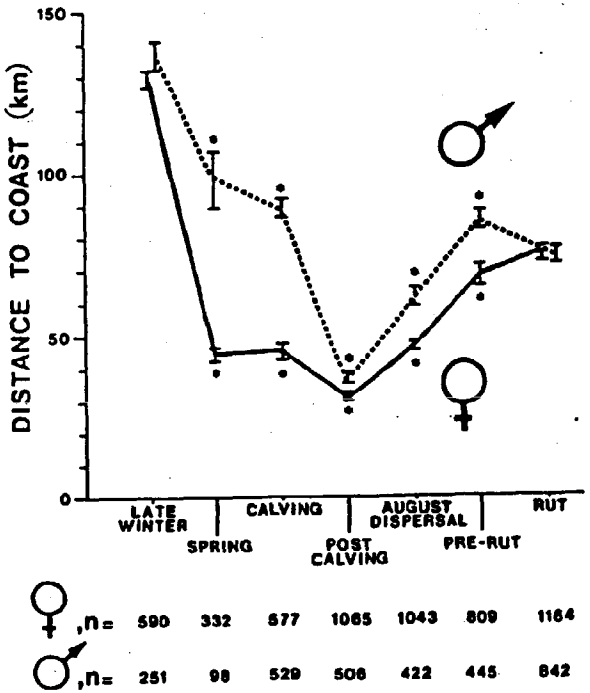

Figure 2. Seasonal variation in average distance to coast for male and female caribou groups within the study area (1981-1983).

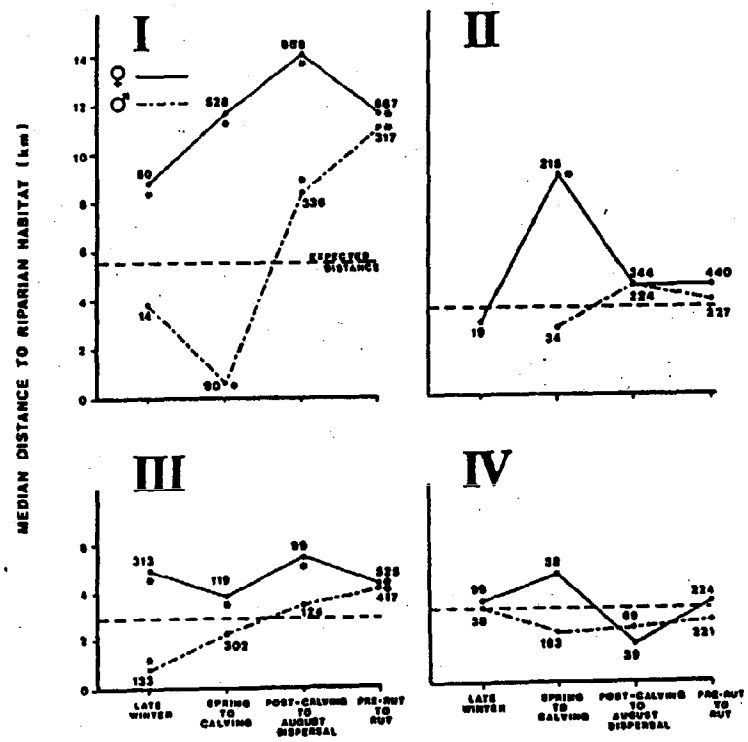

Figure 3. Seasonal variation in median distance to riparian habitat (km) of male and female caribou for four subregions of the study area (1981-1983).
*Asterisk denotes that median distance is significantly different than expected based on a random distribution.

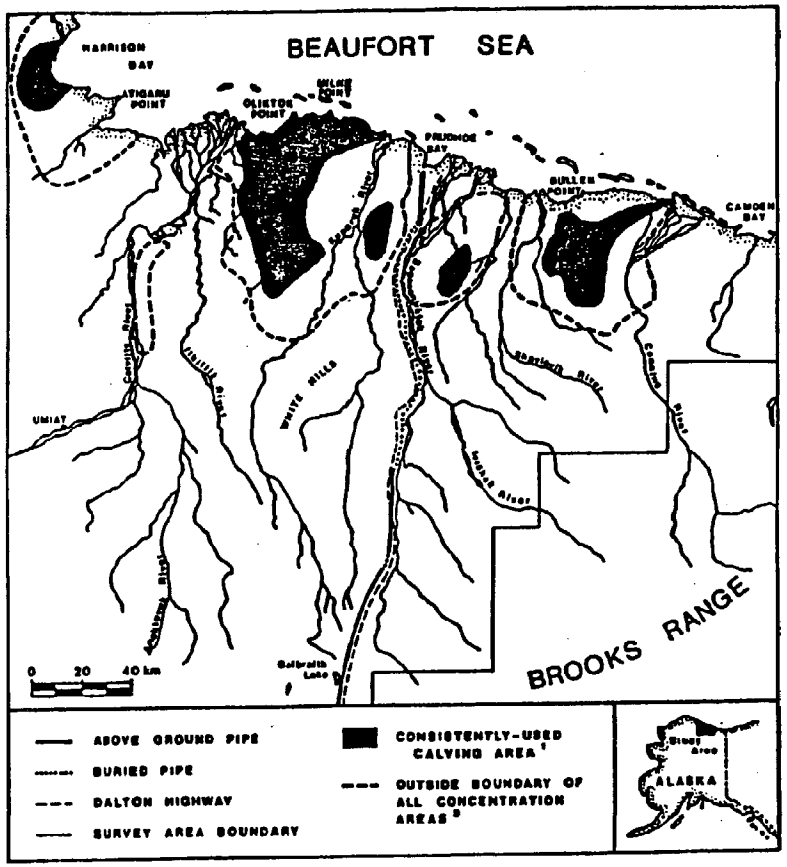

Figure 4. Location of calving concentration areas, 1981-1986.
[1]Area of concentrated calving in 4 of 6 years from 1981-1986 (between Canning and Colville Rivers) and in 2 of 3 years from 1984-1986 (west of Colville and east of Canning River only).
[2]This boundary encompasses all concentration areas recorded from 1981-1986.

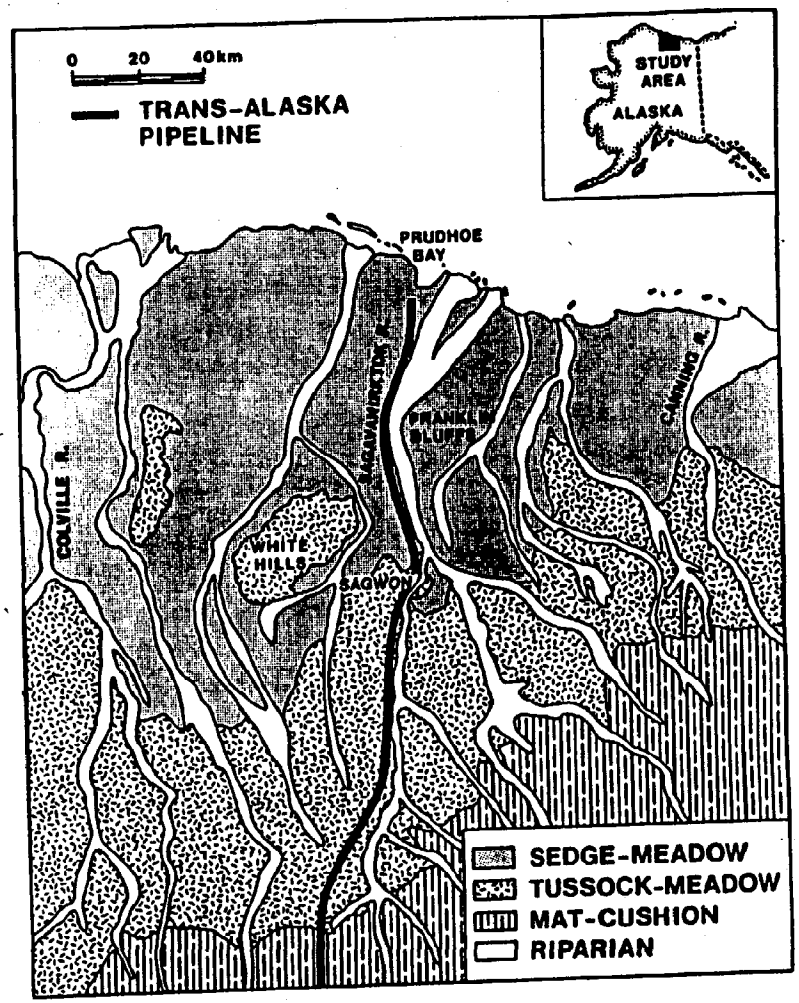

Figure 5. Generalized habitat types within the study area.

Table 1. Estimated caribou populations, North Slope, Alaska, 1970-1978.

	Colville-Canning Region, Ca. 9000 Sq. Mi.						Prudhoe Bay Area[1], Ca. 455 Sq. Mi.					
Year	Cows	Calves	Calves per100 Cows[2]	Year-lings	Bulls	Total	Cows	Calves	Calves per100 Cows[3]	Year-lings	Bulls[4]	Total
1970	8,868	5,962	67	5,193	1,581	21,604	24	17	71	8		49
1971	8,600	3,100	36	2,000	1,300	15,000	16	7	44	7		30
1972	1,200	450	37	350	500	2,500	8	5	63	4		17
1973	9,200	3,500	38	2,500	1,200	16,400	24	9	38	9		42
1974	10,000	3,800	37	3,500	1,100	18,600	34	9	27	8		51
1975	7,800	2,800	36	2,600	1,300	14,500	27	13	48	4		44
1976	2,200	750	34	1,100	950	5,000	19	4	21	5		28
1977	3,200	1,200	37	600	1,000	6,000	14	11	79	3		28
1978	3,170	1,580	50	970	1,100	6,820	29	15	52	7	6	57

[1]Encompasses the area from the Sagavanirktok River to Kuparuk River and from the Coast to Franklin Bluffs.
[2]Colville-Canning Region ten year average = 41 calves per 100 cows per year.
[3]Prudhoe Bay Area ten year average = 46 calves per 100 cows per year.
[4]No data available except for 1978.

SOURCE: Gavin and Chamberlain (1979).

I do not disagree that calf percentages are lower along the TAPS corridor than for the region as a whole but with the interpretation of why they are lower. There is considerable evidence that:

1. The Prudhoe Bay area was not an important calving area even prior to development (Table 1; White et al. 1975; Gavin 1977; Gavin and Chamberlain 1979) (Figure 6).

2. There is well documented evidence that sexual segregation (Cameron and Whitten 1979; Carruthers et al. 1984) and differential habitat use result in different distributions of cow/calf and bull groups in riparian versus non-riparian habitats (Jakimchuk et al., in press; Curatolo 1985). Indeed, Curatolo found that this differential habitat use occurred even within intensively developed areas and that calf percentages were consistently lower in riparian habitat. Jakimchuk et al. (in press) show that differing distance relationships to riparian habitats between bulls and cows are consistent regional distributional trend.

3. Finally, along the West Sak Road, where habitats normally used by cows and calves have been traversed by a road corridor, thus eliminating the habitat bias to a large degree, summer calf percentages have been the same or

virtually the same as regional values in five of seven years following the development of the corridor (Table 2).

Notwithstanding Table 2, which eliminates a major habitat bias, calf percentages alone are a poor measure of impact along the TAPS corridor when one considers seasonal variations in caribou distribution in response to environmental influences such as snow cover, insect harassment, and differential habitat use by the sexes.

The major evidence presented that calving has been displaced from the Prudhoe Bay area are the low calf percentages recorded, the low number of calving groups found there during summer and the higher incidence of calving south of Prudhoe Bay (Whitten and Cameron 1983; Smith and Cameron 1983). However, comparison of pre- and post-development calving distributions shows a similar distribution to that found in recent years (Sopuck and Jakimchuk 1986), with more calving south of Prudhoe Bay than in the Prudhoe Bay oilfield area even prior to extensive development (Figures 4 and 6). The apparent reason for this is the frequent, extensive flooding associated with sedge meadows in the Prudhoe Bay area. Late snow melt and flooding of lowland habitats in the coastal zone at calving has occurred in 7 of the past 13 years where data are available (Table 3). In years of delayed snow melt, calving farther inland has been consistently reported. This

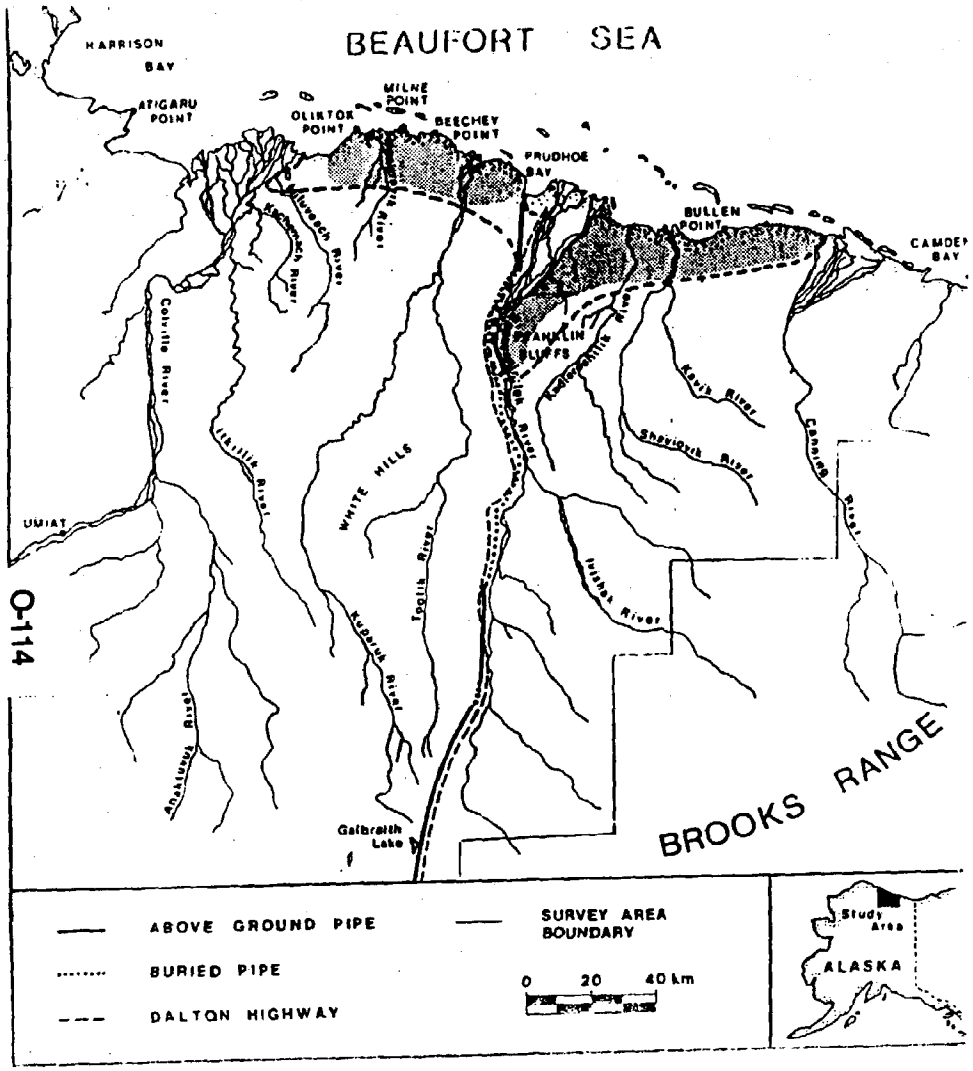

Figure 6. Major calving areas of Central Arctic caribou in 3 of 4 years (1981-1983 inclusive). Dotted line denotes calving in at least one of four years (After Gavin 1977).

Table 2. A comparison of regional calf percentages and calf percentages observed along the West Sak (Spine) Road during summer 1978-1984.

Year	Spine Road (West Sak) Percent Calves	Regional Calf Percentages Percent Calves	Source
1978	26	25	Cameron & Whitten 1979b
1979	25.0	25	Cameron & Whitten 1980b
1980	20.0	21	Cameron et al. 1981
1981	18.0[ab]	27	Cameron et al. 1983
1982	16.0	No Data	Smith et al. 1984
1983	17.5	21	Smith et al. 1984
1984	22.3	23.2	Smith et al. 1984

[a] Represents 14,966 total caribou seen from the road in 1981 versus 4,552 seen in 1980.

[b] Of caribou observed crossing West Sak road and Kuparuk pipeline in 1981, calves were 25% of total caribou.

Table 3. Pheonology of snowmelt and calving distributions in the central Arctic region, 1970-1986.

Year	Snowmelt Phenology During Calving	Comments on Calving Distribution	Source
1970	No data	"Usual distribution" (see Fig. 6)	Gavin 1977
1971	Deep snow coastal plain	Calving in foothills	Gavin 1977
1972	Heavy snow	Low use of Coastal Zone & Prudhoe Bay	Gavin 1977
1973	Dry year	Some inland calving	Gavin 1977
1974	No data	"Usual distribution" (Fig. 6)	Gavin 1977
1975	No data	Scattered calving, no concentration areas	
1976	Heavy snow	"Usual distribution" (Fig. 6)	Gavin 1977
1977		"Usual distribution" (Fig. 6)	Gavin 1977
1978	Late snowmelt, flooding		
1979	Dry - relatively snow-free	No data	Cameron et al. 1981
1980	Late Snowmelt - extensive flooding	More inland caribou	Whitten & Cameron 1985
1981	Dry, snow-free calving	Little inland	Cameron et al. 1983
1982	Late snowmelt - extensive flooding	More calving inland	Whitten & Cameron 1985
1983	Relatively dry	Usual (see Fig. 6)	
1984	Relatively dry	Usual (Fig. 6)	Sopuck & Jakimchuk 1986
1985	Relatively dry	Usual	Sopuck & Jakimchuk 1986
1986	Late snowmelt	Majority inland calving east of Sag River.	Sopuck & Jakimchuk 1986

seems to be a reasonable explanation for the consistent calving associated with the Franklin Bluffs area south of Prudhoe Bay which was documented prior to extensive oilfield development at Prudhoe Bay.

If we look at factors affecting pre- and post-calving distributions we find strong well-documented ecological reasons to explain observed distributions. When we test these hypotheses by looking at known calving and post-calving areas where development has occurred, such as the West Sak Road area and Prudhoe Bay, we find that the hypotheses pertaining to habitat use and their effects on distribution hold (Curatolo 1985; Jakimchuk et al., in press; this paper). The explanations for apparent discrepancies between what occurs along the TAPS corridor and regionally are in response to ecological factors. This explains the apparent contradiction of avoidance of TAPS but no avoidance of the Spine Road during summer by the same caribou on the same summer range.

I have concluded that absence does not equal displacement. I do not think that cow/calf groups avoid TAPS but the major river valley associated with TAPS - a relationship which also holds regionally for other comparable major rivers such as the Canning and Colville. Similarly, I think the evidence is strong that the Prudhoe Bay complex prior to development was not an important calving area. Its present

ATTACHMENT E

TESTIMONY ON THE
DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT
"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"
Anchorage, Alaska
Presented by the Alaska Oil and Gas Association (AOGA)
January 5, 1987

I am Tom Cook, Alaska Exploration Representative for Chevron U.S.A. Inc. Today I am appearing before you on behalf of the Alaska Oil and Gas Association. AOGA is a trade association whose member companies account for the majority of oil and gas exploration, production and transportation activities in Alaska. Let me say at the outset that AOGA strongly supports the Department of Interior's proposed recommendation that the entire "1002" area, also known as the Coastal Plain, be authorized for oil and gas exploration and production. We have restricted our comments today to three aspects of the "1002(h) report", but will submit detailed written comments on the entire report before the January 23, 1987 deadline specified in the Federal Register Notice.

Mr. Mike Bradshaw of Conoco will first address the national interest in developing the petroleum resources discussed in Chapter VII, then Mr. Mark McDermott of ARCO will comment on the biological content of Chapters II and VI. I will conclude our statement with comments on the recommended stipulations applicable to the area, together with an endorsement of the proposed full leasing Alternative A selected for recommendation by the Assistant Secretary for Fish and Wildlife and Parks, William P. Horn.

Comments on National Need for Oil and Gas (Chapter VII)

Thank you. For the record, I am Mike Bradshaw, Operations Director-Alaska for Conoco Inc. There are many factors that are relevant in determining why opening the ANWR Coastal Plain to oil and gas leasing, exploration and production is in the national interest.

- The U.S. is rapidly depleting its domestic reserves of oil and gas.
- Domestic crude oil production from existing fields is forecast to decline from the 8.9 million barrels per day average in 1985 to 6.2 million barrels per day by 1991, if prices remain at $15 per barrel. Current domestic production has already fallen to about 8.5 million barrels per day. Domestic production is forecast to fall as low as 4 million barrels per day by the year 2000.
- Currently Alaska supplies our nation with approximately 20% of the total U.S. production.

- Barring new domestic discoveries to replace depleted reserves, and assuming the demand for petroleum does not increase, the U.S. may need to import 12 million barrels per day by the year 2000. Thus, without significant new discoveries, our nation could be dependent upon foreign sources for 60-75% of its demand, within the next 10-15 years, almost double the present level of dependency.

Currently the U.S. consumes more than 25 percent of worldwide petroleum production even though it has less than 4 percent of proven worldwide reserves. Policy decisions which slow or prohibit replenishment of domestic reserves only exacerbate this problem. Opportunities to explore for and develop new reserves must be forthcoming.

As we have seen in recent years, the U.S. is vulnerable to serious supply disruptions because of its dependence on foreign oil. Foreign sources of petroleum are concentrated largely in the Middle East where two-thirds of the proven reserves of the non-communist world exist. Saudi Arabia alone possesses over one-fourth of the free world's reserves. Increased future dependency on these politically unstable Middle Eastern areas is highly undesirable from a national interest viewpoint.

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As domestic production continues to decline, and imports continue to rise, U.S. vulnerability to supply disruption will increase. A reliable domestic energy supply is a key factor in maintaining a viable foreign policy.

It is in the national security and economic interest to encourage exploration for new domestic reserves wherever the potential exists, on the Coastal Plain of ANWR and other promising areas. Any decision to delay that search is a step toward increased dependency on foreign supply. Lead times to develop frontier Alaska oilfields are very long, typically 10 to 15 years from discovery to first production. If a major discovery were made on the Coastal Plain today, first production would not be likely before the year 2000.

Increasing consumption, decreasing domestic production, and rising imports, coupled with delay in opening promising new areas to exploration and development are all factors which collectively will contribute to the likelihood of a future energy crisis. 1986 was a year of drastic change throughout the oil and gas industry. Exploration is currently at a near standstill, marginal and uneconomic fields are being shut-in, and research and development have been drastically reduced. Continuity of exploration and development are necessary to replace depleted reserves. Delays in the exploration process today will cause greatly reduced future production.

Those who oppose oil resource development argue that the reserve potential of the Coastal Plain may represent only a few months supply of oil to the nation. This statement, though misleading,

illustrates very well the significance of such a reserve if it is discovered and produced from the Coastal Plain. A few months is indeed significant when compared on the same terms with the 18 month supply in the largest oilfield ever discovered in North America - Prudhoe Bay. But, the statement is misleading for two very important reasons. First, no oil field can be fully produced in a few months. Prudhoe Bay, for example, may produce oil and gas for at least 30 years. Second, the statement assumes a reserve estimate which would offset total daily consumption rather than an offset to imports during the life of the field. From a national security perspective, offsetting imports is a more important comparison. Prudhoe Bay, on average, could offset approximately 13% of foreign oil imports for 30 years (assuming 10 billion barrels recoverable reserves and 7 million barrels per day imports).

The report estimates a 19% chance of finding economically recoverable oil on the Coastal Plain. This promising outlook for success helps explain industry's high interest in exploring the Coastal Plain because it is a ten-fold increase over the statistical industry success rate in Alaska. Historically only one out of fifty, or 2%, of the exploratory wells drilled in Alaska has ever resulted in a commercial discovery

Economic benefits of further North Slope development to the nation are extremely significant. In addition to the direct benefits to the State and Federal governments from bonus payments, rentals, royalties, and taxes, the discovery of large new reserves would significantly reduce oil imports and the associated national trade deficit. Nearly half of the U.S. trade deficit today results from imported oil.

Oil development on the North Slope of Alaska has provided hundreds of billions of dollars to the U.S. economy, representing a benefit to all of the 50 states. Therefore, petroleum development from the Coastal Plain, especially on the order of magnitude of Kuparuk or Prudhoe Bay, would promote economic development not only within Alaska, but also throughout the United States. Jobs would be created as the demand for goods and services increase and the positive impacts would be felt well beyond the petroleum industry.

If highly prospective areas such as the Coastal Plain are placed off limits to petroleum exploration, the nation may experience a future energy crisis which will make the 1973 embargo and the 1979-1980 price escalation seem mild by comparison.

In summary, we believe it is clearly in the national interest to open the Coastal Plain of ANWR to leasing and development.

I will now turn the microphone to Mark McDermott with ARCO who will comment on the biological aspects of the draft report.

Biological Review Comments

My name is Mark McDermott and I am a Senior Environmental Coordinator for ARCO Alaska, Inc. Following a detailed review of the LEIS Chapter II - Existing Environment and Chapter VI - Environmental Consequences, the Alaska Oil and Gas Association strongly endorses the DOI recommendation to lease the entire "1002" Coastal Plain area for oil and gas exploration, development and production based on the following points and conclusions:

Prudhoe Bay Region/TAPS

Often the National Environmental Policy Act (NEPA)-mandated EIS process tries to predict environmental consequences of new developments with little or no previous field experience to guide the predictions. Clearly, for the ANWR Coastal Plain, test cases have already been run at Prudhoe Bay, Kuparuk, Milne Point, Lisburne, and Endicott, and with the Trans Alaska Pipeline. Collectively, the experience of the regulatory agencies and industry is summarized in the LEIS on page 2: "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the Coastal Plain and generate similar minimal effects."

Furthermore, we support the statement, also on page 2 of the LEIS, that "Most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at other North Slope oilfields and from the construction and operation of the Trans-Alaska Pipeline System (TAPS)".

Indeed, we would like to point out that all of the dire predictions of environmental degradation made 15 years ago, prior to the construction of TAPS, have subsequently been proven to be unfounded. The predicted demise of major caribou herds, deterioration in water quality and major losses of habitat simply have not occurred. Instead, the development of Prudhoe Bay and the TAPS have allowed Alaskans to enjoy economic prosperity in harmony with a high quality environment and thriving wildlife populations.

National Environmental Policy Act

We understand that the draft document is a legislative EIS largely following the requirements of the National Environmental Policy Act. We would like to point out that many of the environmental consequences predicted to occur for the 5 alternatives appear to be based on "worst case" evaluations. In April 1986 the NEPA-EIS guidelines were changed from requiring a "worst case" assessment to one of "most likely to occur." We feel that many of the major conclusions of significant effects carry the earlier "worst case" assessment to an extreme and thus we ask that the authors reconsider many of their conclusions in light of the "most likely to occur" assessment of impacts. The standard for the "most likely to occur" case exists in the experience from other North Slope oilfields. Many of these specific points will be detailed in our written comments.

Caribou

We agree that caribou, both from a standpoint of numbers and distribution, is the specie most likely to encounter developmental activities in the "1002" area. The LEIS quote from page 6 states that "Changes could include displacement and reduction in the size of the Porcupine Caribou Herd. The amount of reduction and its long-term significance for herd viability is highly speculative" (emphasis added). We ask that these acknowledged qualifications be presented throughout the environmental consequences section to ensure that all readers of the document are fully aware of the highly speculative nature of some of the hypothesized impacts.

Carrying Capacity

In the management of wildlife populations, the concept of habitat carrying capacity is key to defining management goals. It is an established fact that the Porcupine Herd does not approach the carrying capacity of its range. Indeed, former Alaska Fish & Game Commissioner, R. Skoog, in his Doctoral dissertation (1968) stated that "It seems likely that the Alaskan caribou population has remained far below range carrying capacity and that the total habitat has never been fully occupied. In reality, caribou populations seem to have maintained densities much lower than the maximum dictated by food alone, and hence the reduction in total range becomes less meaningful." Thus, we agree with the conclusions that habitat is not currently limiting the growth of the Porcupine Herd and that the small loss of habitat represented by likely development in the "1002" area will not impact growth or productivity of caribou. Consequently, we disagree with the speculation that a reduction of caribou population is likely to occur as a result of small reductions in habitat availability and value.

"Core Calving Area" Concept

Significant year-to-year variability in calving distribution has been recorded for the Porcupine Herd all across the Arctic coast from east into Canada and west to the Canning River. Concentrated calving has been observed across the entire so-called core calving area during only 5 of the past 14 years. Therefore, calving habitat is more appropriately represented as a true continuum across the Coastal Plain including portions of the Arctic coast outside the "1002" study area. The Porcupine Caribou Herd has demonstrated numerous times in the past, including this past year, that it can and will successfully calve miles from the (quote) "core calving area" (unquote). Thus, the "unique and irreplaceable" nature required for designation as Resource Category 1 does not apply.

While AOGA embraces the responsible use of mitigation procedures in the Arctic, it is inappropriate to emphasize habitat loss alone without consideration of actual effects or lack of effects on wildlife populations from development.

Muskox

We feel that the conclusions regarding potential impacts of development on muskox are unnecessarily severe and unfounded. While it is true that very few data characterizing muskox responses to oil field development are available, it is also true that the muskox have shown ready adaptability to human presence and have even been semi-domesticated in several areas. This adaptability to human presence will significantly reduce the "worst-case" conclusions stated in the LEIS.

Mammalian Species

We feel that it is important to point out that the remaining mammalian species including moose, dall sheep, wolves, arctic fox, wolverines and brown bears are present on the Coastal Plain in relatively low population densities or for relatively short periods during the year. Thus, we support the conclusions of minimal or negligible impacts on these species.

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Fishery Populations

We support the conclusion that only minor to negligible effects on coastal fishery resources or fishery habitat will occur. Experience at Prudhoe Bay and Endicott has provided a significant volume of data to support this judgment.

Threatened and Endangered Species

We also support the conclusions of minor to negligible impacts on endangered and threatened animal species such as bowhead and grey whales and the peregrine falcon. We feel that the transient nature of their presence on the Coastal Plain and the history of developmental interaction in the Prudhoe Bay field clearly demonstrate the lack of meaningful impacts on these species. Regarding the plant, Thlaspi arcticum, we feel that conclusions and set-back stipulations based on the presence of this specie are overly restrictive because the plant has not been determined to be threatened or endangered.

Recreation

We would like to underscore the extraordinarily low use of the Coastal Plain as a recreational area. History indicates that only a small number of individuals have actually utilized the Coastal Plain for recreation in the form of hunting, fishing, camping or hiking. It is extremely expensive to reach the area; a trip from

the contiguous states costs thousands of dollars and requires an air charter flight to reach the Coastal Plain. Wet and moist ground conditions make hiking difficult during the 8-10 week "summer." Extreme cold and darkness during most of the year further reduce recreational use of the Coastal Plain. For most of the year this is an extremely harsh and hostile environment.

While there is no reason to believe that leasing and development would lead to a permanent loss of aesthetic values, over 30 miles of Coastal Plain from the "1002" area east to the Canadian border are already classified as wilderness, thus preserving the complete spectrum of arctic ecosystems represented in the Arctic Refuge.

Summary

Before I ask Mr. Cook to conclude our statement, I would like to acknowledge the 5 years of extensive field investigations, data collections and analyses by over 50 trained professional scientists, including wildlife and fishery biologists, botanists, zoologists, chemists, geologists and resource specialists who contributed to this draft report. We consider the factual basis for the scientific analysis to be adequate and the conclusions to be reasoned. However, we cannot support some of the speculation on environmental consequences found in the report which result in an over estimation of potential impacts.

Concluding Remarks

As previously stated AOGA supports the full leasing of the ANWR Coastal Plain under reasonable measures for environmental protection. Except for a few provisions, the proposed stipulations found in the report and the land use stipulations found in the Agreement Between the Arctic Slope Regional Corporation and the United States of America (incorporated into the report by reference), appear reasonable. The proposed mitigation measures are generally consistent with current and proven industry practices for the protection of wildlife and the environment. The application of reasonable mitigation can ensure that development is conducted in a manner compatible with the purposes of the Refuge and ensure that no unnecessary adverse environmental impacts occur. Our written comments will address in detail, those measures that we believe are unduly restrictive.

AOGA strongly endorses Alternative A, full leasing of the "1002" study area, as the most acceptable alternative consistent with the national interest. Alternative B, partial leasing, is based on a speculative premise that a traditional core calving area exists and is necessary for the maintenance of a healthy caribou herd. This has not been demonstrated in the scientific literature and there is a large body of data which indicates otherwise. Alternative C makes no positive contribution. Surface and regional geologic information already confirm that the area has oil potential. The amount can only be verified by on-structure drilling.

Stratigraphic type drilling is an unnecessary duplication and its surface impact would be in addition to that eventually required for on-structure wells. Also, Alternative C would just be another delay in the eventual production from the area. Neither Alternatives D, no action, nor E, wilderness designation, would determine whether or not substantial petroleum reserves exist in the "1002" study area. Alternatives D and E preclude reasoned planning and would deny the nation the positive benefits that could come from oil and gas production on the Coastal Plain.

We fully support the proposed recommendation on page 169 which contains the following statement: "even though the billions of barrels of oil reserves have been brought on line and the infrastructure developed to bring that oil to U.S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy. The Central Arctic Caribou Herd has increased substantially during the period that development has occurred within the heart of its range. Estimated at about 3,000 animals in 1972, the herd now numbers more than 13,000. Similarly, important waterfowl species continue to successfully nest and rear their brood within the developed area. Although circumstances within the "1002" area may be somewhat different, the evidence derived from the Prudhoe Bay experience leads one to be quite optimistic about the ability to explore for and develop the hydrocarbon potential of the "1002" area without significant deleterious effects on the unit's wildlife resources."

Thank you for this opportunity to comment.

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TESTIMONY ON THE
DRAFT LEGISLATION ENVIRONMENTAL IMPACT STATEMENT
"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"
Washington, D.C.
Presented by the Alaska Oil and Gas Association (AOGA)
January 9, 1987

I am Wayne Smith, District Manager of Amoco Production Company and President of the Alaska Oil and Gas Association (AOGA). I am appearing before you today on behalf of AOGA which is a trade association whose member companies account for the majority of oil and gas exploration, production and transportation activities in Alaska. AOGA strongly supports the Department of the Interior's proposed recommendation that the entire "1002" area, also known as the Coastal Plain of the Arctic National Wildlife Refuge (ANWR), be authorized for oil and gas leasing, exploration and production.

Currently, Alaska supplies our nation with approximately 20% of its total domestic production. Lead times are long in frontier Alaska regions--at least 10 years from discovery to first production, but more likely to extend as long as 15 years in the case of the ANWR Coastal Plain. Without significant new discoveries, our nation could be dependent upon foreign sources for 60-75% of its petroleum needs within the next 10-15 years, almost double the present level of dependency.

Production from existing Arctic Alaska oil fields which are presently being produced at about 1.8 million barrels per day will begin a precipitous decline by 1988. It is a matter of technical certainty that the present level of production from Alaska's North Slope will decline to about 500,000 barrels per day by the year 2000, earliest date by which new production from the ANWR Coastal Plain would likely be available.

If highly prospective areas such as the Coastal Plain are placed off limits to petroleum exploration, the nation may experience a future energy crisis which will make the 1973 embargo and the 1979-1980 price escalation seem mild by comparison.

Increasing consumption and rising imports along with decreasing domestic reserves and production, coupled with delay in opening promising new areas to exploration and development, are all factors which collectively will contribute to the likelihood of a future energy crisis.

The resource assessment contained in the draft LEIS for the Coastal Plain supports our view that the area may contain *significant reserves. The Coastal Plain has great potential for* making a substantial contribution to our domestic energy supply.

Even the most optimistic production scenario will physically utilize only a very small area of the Coastal Plain. The very small area which would be affected by discovery and development of

1 or 2 giant oil fields should be balanced against the very strong contribution to the national interest that such discoveries could represent.

Our industry has demonstrated its compatibility to explore for, develop, and produce oil in the Alaska Arctic without significant adverse impact on wildlife and the environment. The dire predictions of environmental degradation and harm to wildlife made 15 years ago, prior to the development of the giant Prudhoe Bay field and the construction of the Trans-Alaska Pipeline have proven to be unfounded. The predicted demise of major caribou herds, deterioration in water quality and major losses of habitat simply have not occurred.

Instead, the development of Prudhoe Bay and the Trans-Alaska Pipeline have permitted the production of 5 billion barrels of much needed oil with minimal environmental impact. During the 15 year period of development wildlife have thrived in the midst of oil field development and evidenced by the fact that the Central Arctic Caribou Herd has grown from about 3,000 to a population now estimated at over 13,000 animals.

With regard to the issue of protecting the Porcupine Caribou Herd which uses the Coastal Plain on a seasonal basis, there has been a development since the issuance of the draft report which I would like to mention. On December 3, 1986, the United States and Canada have devised an agreement for the management and conservation of the Porcupine Caribou Herd. This agreement which also involved the native subsistence users of both the Canadian and American Arctic assures that appropriate steps will be taken to guarantee the well-being and preservation of the Porcupine Caribou Herd. In view of this development, the final report to be submitted to the Congress should be revised to reflect this new measure of protection afforded the Porcupine Caribou Herd.

I would like to acknowledge the 5 years of extensive field investigations, data collections and analyses by over 50 trained professional scientists, including wildlife and fishery biologists, botanists, zoologists, chemists, geologists and resource specialists who contributed to this draft report. We consider the factual basis for the scientific analysis to be adequate and the conclusions to be reasoned. However, we cannot support some of the speculation on environmental consequences found in the report which result in an over estimation of potential impacts.

Except for a few provisions, the proposed stipulations found in the report and the land use stipulations found in the Agreement Between the Arctic Slope Regional Corporation and the United States of America (incorporated into the report by reference), appear reasonable. The proposed mitigation measures are generally consistent with current and proven industry practices for the protection of wildlife and the environment. The application of reasonable mitigation can ensure that development is conducted in a manner compatible with the purposes of the Refuge and ensure

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that no unnecessary adverse environmental impacts occur. Our written comments will address in detail, those measures that we believe are unduly restrictive.

AOGA strongly endorses Alternative A, full leasing of the "1002" study area, as the most acceptable alternative consistent with the national interest. Alternative B, partial leasing, is based on a speculative premise that a traditional core calving area exists and is necessary for the maintenance of a healthy caribou herd. This has not been demonstrated in the scientific literature and there is a large body of data which indicates otherwise. Alternative C makes no positive contribution. Surface and regional geologic information already confirm that the area has oil potential. The amount can only be verified by on-structure drilling. Stratigraphic type drilling is an unnecessary duplication and its surface impact would be in addition to that eventually required for on-structure wells. Also, Alternative C would just be another delay in the eventual production from the area. Neither Alternatives D, no action, nor E, wilderness designation, would determine whether or not substantial petroleum reserves exist in the "1002" study area. Alternatives D and E preclude reasoned planning and would deny the nation the positive benefits that could come from oil and gas production on the Coastal Plain.

AOGA's expresses its full support of the Department of the Interior's proposed recommendation to Congress which states "...even though the millions of barrels of oil resources have been brought on line and the infrastructure developed to bring that oil to U.S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy. The Central Arctic Caribou Herd has increased substantially during the period that development has occurred within the heart of its range. Estimated at about 3,000 animals in 1972, the herd now numbers more than 13,000. Similarly, important waterfowl species continue to successfully nest and rear their brood within the developed area. Although circumstances within the "1002" area may be somewhat different, the evidence derived from the Prudhoe Bay experience leads one to be quite optimistic about the ability to explore for and develop the hydrocarbon potential of the "1002" area without significant deleterious effects on the unit's wildlife resources".

Thank you for the opportunity to present this statement.

DO YOU WANT TO MAKE PUBLIC COMMENTS? AOGA 3 speakers

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to subuit written comments. Thank you.

10:17:50

Please print

Name Tom Cook

Mailing Address 121 W Firewood # 207

Anchorage AK 99503

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☑ I am speaking for Alaska Oil & Gas Assoc (AOGA)
(please enter name of organization you represent)

TESTIMONY ON THE
DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT
"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"
Anchorage, Alaska
Presented by the Alaska Oil and Gas Association (AOGA)
January 5, 1987

I am Tom Cook, Alaska Exploration Representative for Chevron U.S.A. Inc. Today I am appearing before you on behalf of the Alaska Oil and Gas Association. AOGA is a trade association whose member companies account for the majority of oil and gas exploration, production and transportation activities in Alaska. Let me say at the outset that AOGA strongly supports the Department of Interior's proposed recommendation that the entire "1002" area, also known as the Coastal Plain, be authorized for oil and gas exploration and production. We have restricted our comments today to three aspects of the "1002(h) report", but will submit detailed written comments on the entire report before the January 23, 1987 deadline specified in the Federal Register Notice.

Mr. Mike Bradshaw of Conoco will first address the national interest in developing the petroleum resources discussed in Chapter VII, then Mr. Mark McDermott of ARCO will comment on the biological content of Chapters II and VI. I will conclude our statement with comments on the recommended stipulations applicable to the area, together with an endorsement of the proposed full leasing Alternative A selected for recommendation by the Assistant Secretary for Fish and Wildlife and Parks, William P. Horn.

Comments on National Need for Oil and Gas (Chapter VII)

Thank you. For the record, I am Mike Bradshaw, Operations Director-Alaska for Conoco Inc. There are many factors that are relevant in determining why opening the ANWR Coastal Plain to oil and gas leasing, exploration and production is in the national interest.

- The U.S. is rapidly depleting its domestic reserves of oil and gas.
- Domestic crude oil production from existing fields is forecast to decline from the 8.9 million barrels per day average in 1985 to 6.2 million barrels per day by 1991, if prices remain at $15 per barrel. Current domestic production has already fallen to about 8.5 million barrels per day. Domestic production is forecast to fall as low as 4 million barrels per day by the year 2000.
- Currently Alaska supplies our nation with approximately 20% of the total U.S. production.
- Barring new domestic discoveries to replace depleted reserves, and assuming the demand for petroleum does not

increase, the U.S. may need to import 12 million barrels per day by the year 2000. Thus, without significant new discoveries, our nation could be dependent upon foreign sources for 60-75% of its demand, within the next 10-15 years, almost double the present level of dependency.

Currently the U.S. consumes more than 25 percent of worldwide petroleum production even though it has less than 4 percent of proven worldwide reserves. Policy decisions which slow or prohibit replenishment of domestic reserves only exacerbate this problem. Opportunities to explore for and develop new reserves must be forthcoming.

As we have seen in recent years, the U.S. is vulnerable to serious supply disruptions because of its dependence on foreign oil. Foreign sources of petroleum are concentrated largely in the Middle East where two-thirds of the proven reserves of the non-communist world exist. Saudi Arabia alone possesses over one-fourth of the free world's reserves. Increased future dependency on these politically unstable Middle Eastern areas is highly undesirable from a national interest viewpoint.

As domestic production continues to decline, and imports continue to rise, U.S. vulnerability to supply disruption will increase. A reliable domestic energy supply is a key factor in maintaining a viable foreign policy.

It is in the national security and economic interest to encourage exploration for new domestic reserves wherever the potential exists, on the Coastal Plain of ANWR and other promising areas. Any decision to delay that search is a step toward increased dependency on foreign supply. Lead times to develop frontier Alaska oilfields are very long, typically 10 to 15 years from discovery to first production. If a major discovery were made on the Coastal Plain today, first production would not be likely before the year 2000.

Increasing consumption, decreasing domestic production, and rising imports, coupled with delay in opening promising new areas to exploration and development are all factors which collectively will contribute to the likelihood of a future energy crisis. 1986 was a year of drastic change throughout the oil and gas industry. Exploration is currently at a near standstill, marginal and uneconomic fields are being shut-in, and research and development have been drastically reduced. Continuity of exploration and development are necessary to replace depleted reserves. Delays in the exploration process today will cause greatly reduced future production.

Those who oppose oil resource development argue that the reserve potential of the Coastal Plain may represent only a few months supply of oil to the nation. This statement, though misleading, illustrates very well the significance of such a reserve if it is discovered and produced from the Coastal Plain. A few months is

indeed significant when compared on the same terms with the 18 month supply in the largest oilfield ever discovered in North America - Prudhoe Bay. But, the statement is misleading for two very important reasons. First, no oil field can be fully produced in a few months. Prudhoe Bay, for example, may produce oil and gas for at least 30 years. Second, the statement assumes a reserve estimate which would offset total daily consumption rather than an offset to imports during the life of the field. From a national security perspective, offsetting imports is a more important comparison. Prudhoe Bay, on average, could offset approximately 13% of foreign oil imports for 30 years (assuming 10 billion barrels recoverable reserves and 7 million barrels per day imports).

The report estimates a 19% chance of finding economically recoverable oil on the Coastal Plain. This promising outlook for success helps explain industry's high interest in exploring the Coastal Plain because it is a ten-fold increase over the statistical industry success rate in Alaska. Historically only one out of fifty, or 2%, of the exploratory wells drilled in Alaska has ever resulted in a commercial discovery

Economic benefits of further North Slope development to the nation are extremely significant. In addition to the direct benefits to the State and Federal governments from bonus payments, rentals, royalties, and taxes, the discovery of large new reserves would significantly reduce oil imports and the associated national trade deficit. Nearly half of the U.S. trade deficit today results from imported oil.

Oil development on the North Slope of Alaska has provided hundreds of billions of dollars to the U.S. economy, representing a benefit to all of the 50 states. Therefore, petroleum development from the Coastal Plain, especially on the order of magnitude of Kuparuk or Prudhoe Bay, would promote economic development not only within Alaska, but also throughout the United States. Jobs would be created as the demand for goods and services increase and the positive impacts would be felt well beyond the petroleum industry.

If highly prospective areas such as the Coastal Plain are placed off limits to petroleum exploration, the nation may experience a future energy crisis which will make the 1973 embargo and the 1979-1980 price escalation seem mild by comparison.

In summary, we believe it is clearly in the national interest to open the Coastal Plain of ANWR to leasing and development.

I will now turn the microphone to Mark McDermott with ARCO who will comment on the biological aspects of the draft report.

Biological Review Comments

My name is Mark McDermott and I am a Senior Environmental Coordinator for ARCO Alaska, Inc. Following a detailed review of the LEIS Chapter II - Existing Environment and Chapter VI - Environmental Consequences, the Alaska Oil and Gas Association strongly endorses the DOI recommendation to lease the entire "1002" Coastal Plain area for oil and gas exploration, development and production based on the following points and conclusions:

Prudhoe Bay Region/TAPS

Often the National Environmental Policy Act (NEPA)-mandated EIS process tries to predict environmental consequences of new developments with little or no previous field experience to guide the predictions. Clearly, for the ANWR Coastal Plain, test cases have already been run at Prudhoe Bay, Kuparuk, Milne Point, Lisburne, and Endicott, and with the Trans Alaska Pipeline. Collectively, the experience of the regulatory agencies and industry is summarized in the LEIS on page 2: "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the Coastal Plain and generate similar minimal effects."

Furthermore, we support the statement, also on page 2 of the LEIS, that "Most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at other North Slope oilfields and from the construction and operation of the Trans-Alaska Pipeline System (TAPS)".

Indeed, we would like to point out that all of the dire predictions of environmental degradation made 15 years ago, prior to the construction of TAPS, have subsequently been proven to be unfounded. The predicted demise of major caribou herds, deterioration in water quality and major losses of habitat simply have not occurred. Instead, the development of Prudhoe Bay and the TAPS have allowed Alaskans to enjoy economic prosperity in harmony with a high quality environment and thriving wildlife populations.

National Environmental Policy Act

We understand that the draft document is a legislative EIS largely following the requirements of the National Environmental Policy Act. We would like to point out that many of the environmental consequences predicted to occur for the 5 alternatives appear to be based on "worst case" evaluations. In April 1986 the NEPA-EIS guidelines were changed from requiring a "worst case" assessment to one of "most likely to occur." We feel that many of the major conclusions of significant effects carry the earlier "worst case" assessment to an extreme and thus we ask that the authors reconsider many of their conclusions in light of the "most likely to occur" assessment of impacts. The standard for the "most likely to occur" case exists in the experience from other North Slope oilfields. Many of these specific points will be detailed in our written comments.

Caribou

We agree that caribou, both from a standpoint of numbers and distribution, is the specie most likely to encounter developmental activities in the "1002" area. The LEIS quote from page 6 states that "Changes could include displacement and reduction in the size of the Porcupine Caribou Herd. The amount of reduction and its long-term significance for herd viability is highly speculative" (emphasis added). We ask that these acknowledged qualifications be presented throughout the environmental consequences section to ensure that all readers of the document are fully aware of the highly speculative nature of some of the hypothesized impacts.

Carrying Capacity

In the management of wildlife populations, the concept of habitat carrying capacity is key to defining management goals. It is an established fact that the Porcupine Herd does not approach the carrying capacity of its range. Indeed, former Alaska Fish & Game Commissioner, R. Skoog, in his Doctoral dissertation (1968) stated that "It seems likely that the Alaskan caribou population has remained far below range carrying capacity and that the total habitat has never been fully occupied. In reality, caribou populations seem to have maintained densities much lower than the maximum dictated by food alone, and hence the reduction in total range becomes less meaningful." Thus, we agree with the conclusions that habitat is not currently limiting the growth of the Porcupine Herd and that the small loss of habitat represented by likely development in the "1002" area will not impact growth or productivity of caribou. Consequently, we disagree with the speculation that a reduction of caribou population is likely to occur as a result of small reductions in habitat availability and value.

"Core Calving Area" Concept

Significant year-to-year variability in calving distribution has been recorded for the Porcupine Herd all across the Arctic coast from east into Canada and west to the Canning River. Concentrated calving has been observed across the entire so-called core calving area during only 5 of the past 14 years. Therefore, calving habitat is more appropriately represented as a true continuum across the Coastal Plain including portions of the Arctic coast outside the "1002" study area. The Porcupine Caribou Herd has demonstrated numerous times in the past, including this past year, that it can and will successfully calve miles from the (quote) "core calving area" (unquote). Thus, the "unique and irreplaceable" nature required for designation as Resource Category 1 does not apply.

While AOGA embraces the responsible use of mitigation procedures in the Arctic, it is inappropriate to emphasize habitat loss alone without consideration of actual effects or lack of effects on wildlife populations from development.

Muskox

We feel that the conclusions regarding potential impacts of development on muskox are unnecessarily severe and unfounded. While it is true that very few data characterizing muskox responses to oil field development are available, it is also true that the muskox have shown ready adaptability to human presence and have even been semi-domesticated in several areas. This adaptability to human presence will significantly reduce the "worst-case" conclusions stated in the LEIS.

Mammalian Species

We feel that it is important to point out that the remaining mammalian species including moose, dall sheep, wolves, arctic fox, wolverines and brown bears are present on the Coastal Plain in relatively low population densities or for relatively short periods during the year. Thus, we support the conclusions of minimal or negligible impacts on these species.

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Fishery Populations

We support the conclusion that only minor to negligible effects on coastal fishery resources or fishery habitat will occur. Experience at Prudhoe Bay and Endicott has provided a significant volume of data to support this judgment.

Threatened and Endangered Species

We also support the conclusions of minor to negligible impacts on endangered and threatened animal species such as bowhead and grey whales and the peregrine falcon. We feel that the transient nature of their presence on the Coastal Plain and the history of developmental interaction in the Prudhoe Bay field clearly demonstrate the lack of meaningful impacts on these species. Regarding the plant, Thlaspi arcticum, we feel that conclusions and set-back stipulations based on the presence of this specie are overly restrictive because the plant has not been determined to be threatened or endangered.

Recreation

We would like to underscore the extraordinarily low use of the Coastal Plain as a recreational area. History indicates that only a small number of individuals have actually utilized the Coastal Plain for recreation in the form of hunting, fishing, camping or hiking. It is extremely expensive to reach the area; a trip from

the contiguous states costs thousands of dollars and requires an air charter flight to reach the Coastal Plain. Wet and moist ground conditions make hiking difficult during the 8-10 week "summer." Extreme cold and darkness during most of the year further reduce recreational use of the Coastal Plain. For most of the year this is an extremely harsh and hostile environment.

While there is no reason to believe that leasing and development would lead to a permanent loss of aesthetic values, over 30 miles of Coastal Plain from the "1002" area east to the Canadian border are already classified as wilderness, thus preserving the complete spectrum of arctic ecosystems represented in the Arctic Refuge.

Summary

Before I ask Mr. Cook to conclude our statement, I would like to acknowledge the 5 years of extensive field investigations, data collections and analyses by over 50 trained professional scientists, including wildlife and fishery biologists, botanists, zoologists, chemists, geologists and resource specialists who contributed to this draft report. We consider the factual basis for the scientific analysis to be adequate and the conclusions to be reasoned. However, we cannot support some of the speculation on environmental consequences found in the report which result in an over estimation of potential impacts.

Concluding Remarks

As previously stated AOGA supports the full leasing of the ANWR Coastal Plain under reasonable measures for environmental protection. Except for a few provisions, the proposed stipulations found in the report and the land use stipulations found in the Agreement Between the Arctic Slope Regional Corporation and the United States of America (incorporated into the report by reference), appear reasonable. The proposed mitigation measures are generally consistent with current and proven industry practices for the protection of wildlife and the environment. The application of reasonable mitigation can ensure that development is conducted in a manner compatible with the purposes of the Refuge and ensure that no unnecessary adverse environmental impacts occur. Our written comments will address in detail, those measures that we believe are unduly restrictive.

AOGA strongly endorses Alternative A, full leasing of the "1002" study area, as the most acceptable alternative consistent with the national interest. Alternative B, partial leasing, is based on a speculative premise that a traditional core calving area exists and is necessary for the maintenance of a healthy caribou herd. This has not been demonstrated in the scientific literature and there is a large body of data which indicates otherwise. Alternative C makes no positive contribution. Surface and regional geologic information already confirm that the area has oil potential. The amount can only be verified by on-structure drilling.

Stratigraphic type drilling is an unnecessary duplication and its surface impact would be in addition to that eventually required for on-structure wells. Also, Alternative C would just be another delay in the eventual production from the area. Neither Alternatives D, no action, nor E, wilderness designation, would determine whether or not substantial petroleum reserves exist in the "1002" study area. Alternatives D and E preclude reasoned planning and would deny the nation the positive benefits that could come from oil and gas production on the Coastal Plain.

We fully support the proposed recommendation on page 169 which contains the following statement: "even though the billions of barrels of oil reserves have been brought on line and the infrastructure developed to bring that oil to U.S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy. The Central Arctic Caribou Herd has increased substantially during the period that development has occurred within the heart of its range. Estimated at about 3,000 animals in 1972, the herd now numbers more than 13,000. Similarly, important waterfowl species continue to successfully nest and rear their brood within the developed area. Although circumstances within the "1002" area may be somewhat different, the evidence derived from the Prudhoe Bay experience leads one to be quite optimistic about the ability to explore for and develop the hydrocarbon potential of the "1002" area without significant deleterious effects on the unit's wildlife resources."

Thank you for this opportunity to comment.

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TESTIMONY ON THE
DRAFT LEGISLATION ENVIRONMENTAL IMPACT STATEMENT
"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"
WASHINGTON, D.C.
PRESENTED BY THE ALASKA OIL AND GAS ASSOCIATION (AOGA)
JANUARY 9, 1987

I AM WAYNE SMITH, DISTRICT MANAGER OF AMOCO PRODUCTION COMPANY AND PRESIDENT OF THE ALASKA OIL AND GAS ASSOCIATION (AOGA). I AM APPEARING BEFORE YOU TODAY ON BEHALF OF AOGA WHICH IS A TRADE ASSOCIATION WHOSE MEMBER COMPANIES ACCOUNT FOR THE MAJORITY OF OIL AND GAS EXPLORATION, PRODUCTION AND TRANSPORTATION ACTIVITIES IN ALASKA. AOGA STRONGLY SUPPORTS THE DEPARTMENT OF THE INTERIOR'S PROPOSED RECOMMENDATION THAT THE ENTIRE "1002" AREA, ALSO KNOWN AS THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE (ANWR), BE AUTHORIZED FOR OIL AND GAS LEASING, EXPLORATION AND PRODUCTION.

CURRENTLY, ALASKA SUPPLIES OUR NATION WITH APPROXIMATELY 20% OF ITS TOTAL DOMESTIC PRODUCTION. LEAD TIMES ARE LONG IN FRONTIER ALASKA REGIONS--AT LEAST 10 YEARS FROM DISCOVERY TO FIRST PRODUCTION, BUT MORE LIKELY TO EXTEND AS LONG AS 15 YEARS IN THE CASE OF THE ANWR COASTAL PLAIN. WITHOUT SIGNIFICANT NEW DISCOVERIES, OUR NATION COULD BE DEPENDENT UPON FOREIGN SOURCES FOR 60-75% OF ITS PETROLEUM NEEDS WITHIN THE NEXT 10-15 YEARS, ALMOST DOUBLE THE PRESENT LEVEL OF DEPENDENCY.

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PRODUCTION FROM EXISTING ARCTIC ALASKA OIL FIELDS WHICH ARE PRESENTLY BEING PRODUCED AT ABOUT 1.8 MILLION BARRELS PER DAY WILL BEGIN A PRECIPITOUS DECLINE BY 1988. IT IS A MATTER OF TECHNICAL CERTAINTY THAT THE PRESENT LEVEL OF PRODUCTION FROM ALASKA'S NORTH SLOPE WILL DECLINE TO ABOUT 500,000 BARRELS PER DAY BY THE YEAR 2000, EARLIEST DATE BY WHICH NEW PRODUCTION FROM THE ANWR COASTAL PLAIN WOULD LIKELY BE AVAILABLE.

IF HIGHLY PROSPECTIVE AREAS SUCH AS THE COASTAL PLAIN ARE PLACED OFF LIMITS TO PETROLEUM EXPLORATION, THE NATION MAY EXPERIENCE A FUTURE ENERGY CRISIS WHICH WILL MAKE THE 1973 EMBARGO AND THE 1979-1980 PRICE ESCALATION SEEM MILD BY COMPARISON.

INCREASING CONSUMPTION AND RISING IMPORTS ALONG WITH DECREASING DOMESTIC RESERVES AND PRODUCTION, COUPLED WITH DELAY IN OPENING PROMISING NEW AREAS TO EXPLORATION AND DEVELOPMENT, ARE ALL FACTORS WHICH COLLECTIVELY WILL CONTRIBUTE TO THE LIKELIHOOD OF A FUTURE ENERGY CRISIS.

THE RESOURCE ASSESSMENT CONTAINED IN THE DRAFT LEIS FOR THE COASTAL PLAIN SUPPORTS OUR VIEW THAT THE AREA MAY CONTAIN SIGNIFICANT RESERVES. THE COASTAL PLAIN HAS GREAT POTENTIAL FOR MAKING A SUBSTANTIAL CONTRIBUTION TO OUR DOMESTIC ENERGY SUPPLY.

EVEN THE MOST OPTIMISTIC PRODUCTION SCENARIO WILL PHYSICALLY UTILIZE ONLY A VERY SMALL AREA OF THE COASTAL PLAIN. THE VERY SMALL AREA WHICH WOULD BE AFFECTED BY DISCOVERY AND DEVELOPMENT OF 1 OR 2 GIANT OIL FIELDS SHOULD BE BALANCED AGAINST THE VERY STRONG CONTRIBUTION TO THE NATIONAL INTEREST THAT SUCH DISCOVERIES COULD REPRESENT.

OUR INDUSTRY HAS DEMONSTRATED ITS COMPATIBILITY TO EXPLORE FOR, DEVELOP, AND PRODUCE OIL IN THE ALASKA ARCTIC WITHOUT SIGNIFICANT ADVERSE IMPACT ON WILDLIFE AND THE ENVIRONMENT. THE DIRE PREDICTIONS OF ENVIRONMENTAL DEGRADATION AND HARM TO WILDLIFE MADE 15 YEARS AGO, PRIOR TO THE DEVELOPMENT OF THE GIANT PRUDHOE BAY FIELD AND THE CONSTRUCTION OF THE TRANS-ALASKA PIPELINE HAVE PROVEN TO BE UNFOUNDED. THE PREDICTED DEMISE OF MAJOR CARIBOU HERDS, DETERIORATION IN WATER QUALITY AND MAJOR LOSSES OF HABITAT SIMPLY HAVE NOT OCCURRED.

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INSTEAD, THE DEVELOPMENT OF PRUDHOE BAY AND THE TRANS-ALASKA PIPELINE HAVE PERMITTED THE PRODUCTION OF 5 BILLION BARRELS OF MUCH NEEDED OIL WITH MINIMAL ENVIRONMENTAL IMPACT. DURING THE 15 YEAR PERIOD OF DEVELOPMENT WILDLIFE HAVE THRIVED IN THE MIDST OF OIL FIELD DEVELOPMENT AND EVIDENCED BY THE FACT THAT THE CENTRAL ARCTIC CARIBOU HERD HAS GROWN FROM ABOUT 3,000 TO A POPULATION NOW ESTIMATED AT OVER 13,000 ANIMALS.

WITH REGARD TO THE ISSUE OF PROTECTING THE PORCUPINE CARIBOU HERD WHICH USES THE COASTAL PLAIN ON A SEASONAL BASIS, THERE HAS BEEN A DEVELOPMENT SINCE THE ISSUANCE OF THE DRAFT REPORT WHICH I WOULD LIKE TO MENTION. ON DECEMBER 3, 1986, THE UNITED STATES AND CANADA HAVE DEVISED AN AGREEMENT FOR THE MANAGEMENT AND CONSERVATION OF THE PORCUPINE CARIBOU HERD. THIS AGREEMENT WHICH ALSO INVOLVED THE NATIVE SUBSISTENCE USERS OF BOTH THE CANADIAN AND AMERICAN ARCTIC ASSURES THAT APPROPRIATE STEPS WILL BE TAKEN TO GUARANTEE THE WELL-BEING AND PRESERVATION OF THE PORCUPINE CARIBOU HERD. IN VIEW OF THIS DEVELOPMENT, THE FINAL REPORT TO BE SUBMITTED TO THE CONGRESS SHOULD BE REVISED TO REFLECT THIS NEW MEASURE OF PROTECTION AFFORDED THE PORCUPINE CARIBOU HERD.

I WOULD LIKE TO ACKNOWLEDGE THE 5 YEARS OF EXTENSIVE FIELD INVESTIGATIONS, DATA COLLECTIONS AND ANALYSES BY OVER 50 TRAINED PROFESSIONAL SCIENTISTS, INCLUDING WILDLIFE AND FISHERY BIOLOGISTS, BOTANISTS, ZOOLOGISTS, CHEMISTS, GEOLOGISTS AND RESOURCE SPECIALISTS WHO CONTRIBUTED TO THIS DRAFT REPORT. WE CONSIDER THE FACTUAL BASIS FOR THE SCIENTIFIC ANALYSIS TO BE ADEQUATE AND THE CONCLUSIONS TO BE REASONED. HOWEVER, WE CANNOT SUPPORT SOME OF THE SPECULATION ON ENVIRONMENTAL CONSEQUENCES FOUND IN THE REPORT WHICH RESULT IN AN OVER ESTIMATION OF POTENTIAL IMPACTS.

EXCEPT FOR A FEW PROVISIONS, THE PROPOSED STIPULATIONS FOUND IN THE REPORT AND THE LAND USE STIPULATIONS FOUND IN THE AGREEMENT BETWEEN THE ARCTIC SLOPE REGIONAL CORPORATION AND THE UNITED STATES OF AMERICA (INCORPORATED INTO THE REPORT BY REFERENCE),

APPEAR REASONABLE. THE PROPOSED MITIGATION MEASURES ARE GENERALLY CONSISTENT WITH CURRENT AND PROVEN INDUSTRY PRACTICES FOR THE PROTECTION OF WILDLIFE AND THE ENVIRONMENT. THE APPLICATION OF REASONABLE MITIGATION CAN ENSURE THAT DEVELOPMENT IS CONDUCTED IN A MANNER COMPATIBLE WITH THE PURPOSES OF THE REFUGE AND ENSURE THAT NO UNNECESSARY ADVERSE ENVIRONMENTAL IMPACTS OCCUR. OUR WRITTEN COMMENTS WILL ADDRESS IN DETAIL, THOSE MEASURES THAT WE BELIEVE ARE UNDULY RESTRICTIVE.

AOGA STRONGLY ENDORSES ALTERNATIVE A, FULL LEASING OF THE "1002" STUDY AREA, AS THE MOST ACCEPTABLE ALTERNATIVE CONSISTENT WITH THE NATIONAL INTEREST. ALTERNATIVE B, PARTIAL LEASING, IS BASED ON A SPECULATIVE PREMISE THAT A TRADITIONAL CORE CALVING AREA EXISTS AND IS NECESSARY FOR THE MAINTENANCE OF A HEALTHY CARIBOU HERD. THIS HAS NOT BEEN DEMONSTRATED IN THE SCIENTIFIC LITERATURE AND THERE IS A LARGE BODY OF DATA WHICH INDICATES OTHERWISE. ALTERNATIVE C MAKES NO POSITIVE CONTRIBUTION. SURFACE AND REGIONAL GEOLOGIC INFORMATION ALREADY CONFIRM THAT THE AREA HAS OIL POTENTIAL. THE AMOUNT CAN ONLY BE VERIFIED BY ON-STRUCTURE DRILLING. STRATIGRAPHIC TYPE DRILLING IS AN UNNECESSARY DUPLICATION AND ITS SURFACE IMPACT WOULD BE IN ADDITION TO THAT EVENTUALLY REQUIRED FOR ON-STRUCTURE WELLS. ALSO, ALTERNATIVE C WOULD JUST BE ANOTHER DELAY IN THE EVENTUAL PRODUCTION FROM THE AREA. NEITHER ALTERNATIVES D, NO ACTION, NOR E, WILDERNESS DESIGNATION, WOULD DETERMINE WHETHER OR NOT SUBSTANTIAL PETROLEUM RESERVES EXIST IN THE "1002" STUDY AREA. ALTERNATIVES D AND E PRECLUDE REASONED PLANNING AND WOULD DENY THE NATION THE POSITIVE BENEFITS THAT COULD COME FROM OIL AND GAS PRODUCTION ON THE COASTAL PLAIN.

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AOGA'S EXPRESSES ITS FULL SUPPORT OF THE DEPARTMENT OF THE INTERIOR'S PROPOSED RECOMMENDATION TO CONGRESS WHICH STATES "...EVEN THOUGH THE MILLIONS OF BARRELS OF OIL RESOURCES HAVE BEEN BROUGHT ON LINE AND THE INFRASTRUCTURE DEVELOPED TO BRING THAT OIL TO U.S. MARKETS, THE FISH AND WILDLIFE RESOURCES OF THE PRUDHOE BAY AREA REMAIN EXTREMELY HEALTHY. THE CENTRAL ARCTIC CARIBOU HERD HAS INCREASED SUBSTANTIALLY DURING THE PERIOD THAT DEVELOPMENT HAS OCCURRED WITHIN THE HEART OF ITS RANGE. ESTIMATED AT ABOUT 3,000 ANIMALS IN 1972, THE HERD NOW NUMBERS MORE THAN 13,000. SIMILARLY, IMPORTANT WATERFOWL SPECIES CONTINUE TO SUCCESSFULLY NEST AND REAR THEIR BROOD WITHIN THE DEVELOPED AREA. ALTHOUGH CIRCUMSTANCES WITHIN THE "1002" AREA MAY BE SOMEWHAT DIFFERENT, THE EVIDENCE DERIVED FROM THE PRUDHOE BAY EXPERIENCE LEADS ONE TO BE QUITE OPTIMISTIC ABOUT THE ABILITY TO EXPLORE FOR AND DEVELOP THE HYDROCARBON POTENTIAL OF THE "1002" AREA WITHOUT SIGNIFICANT DELETERIOUS EFFECTS ON THE UNIT'S WILDLIFE RESOURCES".

THANK YOU FOR THE OPPORTUNITY TO PRESENT THIS STATEMENT.

NS3:366

WHITE PAPER REPORT

TO THE SECRETARY OF

THE U.S. DEPARTMENT OF THE INTERIOR

ON THE

ARCTIC NATIONAL WILDLIFE REFUGE

* * * * * * * * * * *

(16 U.S.C. 3142)

Submitted by

Alaska State District
Council of Laborers

WHITE PAPER REPORT

At the request of the U.S. Senate Committee on Energy and Natural Resources, the Department of Interior has commenced a resource analysis and assessment for the Arctic National Wildlife Refuge in northeast Alaska. Upon full compilation of the information available on the impact proposed oil activity will have on Alaska's many resources, the Department of Interior will then, in turn, report to Congress and, ultimately, the nation on the interests at stake. It is the purpose of this White Paper to assure full attention to the Alaskan human resources of affected Alaskan workers as a vital interest to be judiciously considered.

To date, the U.S. Department of Interior's course of study has largely consisted of its assessment of geophysical, environmental, and geological surveys undertaken by the Fish and Wildlife Service and U.S. Geological Survey. Study of the human resource component should be expanded to fully meet the assessment mandated by Congress. The interests of Alaskan workers must be recognized and considered in this national debate.

A growing trend has resulted in Alaskan workers being bypassed by the oil industry currently operating in the state of Alaska. Studies indicate that significant unemployment results in Alaska as its workers are displaced by a nonresident work force in the industry. And as indicated by the below data, unemployment levels in Alaska are among the highest in the nation.

TABLE I

1984 ALASKA UNEMPLOYMENT RATE

	Total	Construction	Manufacturing
Alaska	12.4%	23.8%	16.9%
(Rank Nationally)	2nd	1st	1st

Displacement of Alaskan workers in the oil industry by foreign nationales*1 and nonresidents*2 is a particularly troublesome social problem in Alaska. This stems, no doubt, from the related effects of unemployment on the Alaskan communities*3 but also on the loss of "benefit" while bearing the "cost" of the industry's activities. Accordingly, any cost benefit analysis should astutely account for this shortcoming.

Operations by the petroleum industry in the Arctic National Wildlife Refuge pose similar and substantial displacement of Alaskan workers. A balanced assessment of the critical question of opening this wilderness refuge to oil industry activities must recognize*4 the significant failure of the industry in Alaska to promote the "human resource"--the interest of Alaskan workers--posed by undertaking this project at this time.

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*1 See Memorandum Investigation of Steelhead Project, State of Alaska, 1986, regarding employment of foreign national workers. Also Beaufort Sea operations performed by predominantly Canadian work force in Alaskan oil fields.

*2 See 67% nonresident/17% Alaskan resident employment ratio, as attached, for Haliburton Corporation, a large North Slope oil industry employer.

*3 See A Special Study to Measure the Economic Impact of Nonresidents on Alaska's Economy, (DOL 1984), Governor B. Sheffield; and attached news articles for graphic insight.

*4 Due recognition of local employment concerns is contemplated by

City/State/Weather Section B

Angry Alaskans blast oil industry

Fairbanks hearing draws Outside hire protest

FAIRBANKS (A.P.) — A standing-room-only crowd of angry Alaskans jammed a state Senate Labor and Commerce Committee hearing during the weekend to protest oil industry hiring practices on the North Slope.

"They said we could use [illegible] on it as our governor or a grand jury [illegible]

Horton said his VECO job on which he worked employed about 300 people. Only a handful were Alaskans, he said.

Union officials and others have charged that the oil industry imports workers who will work cheaper than Alaska residents and turns them into seasonal (oil industry) jobs and they've just been dropped off [illegible]

Borough Assemblyman Joe Stuen, who heads the Fairbanks office of Alaskans First, said the group documents "about 'Arco hiring practices and would turn them over to the committee.

"You've got to put these guys back to work or you've got problems in Fairbanks you never dreamed possible in the next few months," Walley warned.

Senate President Don Donley, R-Fairbanks, urged those at the hearing to spread their money around Alaska.

"There are three branches of government," he said. "You vote for judges and you vote for the chief executive officer, who appoints the commissioners. There are 13 and 20-year residents of Fairbanks who have lost their homes in the last couple of weeks, or months," he said. "They've tried, they've applied, they've done everything possible to get (oil industry) jobs and they've just been dropped off [illegible]

Rep. Marco Pignalberi, R-Anchorage, urged Fairbanks residents to carry their message to Anchorage, he said, people are about evenly divided on whether Alaska hire is a serious issue.

"You feel it much more intensely here because you feel the impact of the economic downturn first," he said. "You need to tell them it's going to spread down and hurt the rest of the state pretty soon."

"Several witnesses said they've been told Alaskans are entitled to the North Slope jobs, in part because the oil belongs to the state.

"That's what we think should be our work, and they're determined not to let us have it," said Mitch Fuchs. He predicted the influx of outsiders might lose your home!" shouted a man in the audience.

Kathy Fitzgerald chastised Alaskans First for hiring as promotional director a woman who had been in the state less than three weeks.

"It's a total embarrassment," Fitzgerald said. "Cleaning (your own) house is probably the first place we should start."

Pignalberi, who formerly headed Alaskans First, said the woman was an Alaskan when she was hired.

"You ain't an Alaskan till you

pressed difficulty of the Southwest swarm north.

"We have a really bad problem now, but it has the potential of getting even worse," he said.

In addition to oil interests, others also were targets of criticism.

Learning center offers help in math, reading

"There are always kids who are going to fall through the cracks," he said.

The center operates Monday through Thursday with classes beginning at 4, 5 and 6 p.m. Friday and Saturday are reserved for make-up sessions. Each student visits the center for one hour twice a week.

Before beginning a program, students take a series of diagnostic tests designed to determine their grade level and establish weaknesses in either math or reading. The fee for two hours of testing in one subject area is $100. There are discounts for a second test area and for siblings.

Once problems are identified a program is designed to meet the individual student's needs, he

Anchorage Times, February 24, 1986

Total Number of Employees: 86

Number of Residents: 19
Total Wages paid to Residents: $725,626.72
Relationship - Residents 22 %

Number of Non-Residents: 67
Total Wages paid to Non-Residents: $2,558,75
Non 78 %

Number Male Workers:
Residents: 17
Non-Residents: 67

Number of Female Workers:
Residents: 2
Non-Residents: -0-

Classifications used:	Wage Rate	Work Schedule
Specialist (1)	$14.10/hour	3 weeks on/3 weeks off
Specialist (2)	$12.25/hour	" "
Specialist (1)	$11.53/hour	" "
Specialist (1)	$12.47/hour	" "
Specialist (8)	$13.11/hour	" "
Specialist	$24.84/hour	varies
Specialist (1)	$12.78/hour	varies
Specialist (1)	$14.90/hour	2 weeks on/2 weeks off
Specialist (4)	$10.00/hour	3 weeks on/3 weeks off
Specialist (3)	$12.36/hour	" "
Specialist (1)	$13.17/hour	" "
Specialist (1)	$19.24/hour	varies
Specialist (1)	$18.46/hour	varies
Specialist (1)	$12.40/hour	3 weeks on/3 weeks off
Specialist (1)	$18.14/hour	varies
Specialist (1)	$12.18/hour	3 week on/3 weeks off
Specialist (2)	$11.74/hour	" "
Specialist (1)	$24.03/hour	2 weeks on/2 weeks off
Specialist (1)	$12.50/hour	3 weeks on/3 weeks off
Specialist (1)	$29.02/hour	varies
Specialist (1)	$12.22/hour	3 weeks on/3 weeks off
Specialist (1)	$23.08/hour	2 weeks on/2 weeks off
Specialist (1)	$15.50/hour	3 weeks on/3 weeks off
Specialist (1)	$13.62/hour	" "
Specialist (1)	$10.11/hour	" "
Specialist (1)	$10.24/hour	" "
Specialist (1)	$10.58/hour	" "
Specialist (1)	$14.13/hour	" "
Specialist (1)	$12.22/hour	" "
Specialist (1)	$22.59/hour	" "
Specialist (1)	$11.43/hour	" "
Specialist (1)	$12.45/hour	" "
Specialist (1)	$12.57/hour	varies
Specialist (1)	$12.73/hour	3 weeks on/3 weeks off
Specialist (1)	$24.03/hour	2 weeks on/2 weeks off
Specialist (1)	$13.63/hour	3 weeks on/3 weeks off
Specialist (1)	$11.40/hour	" "
Specialist (1)	$13.10/hour	" "
Specialist (1)	$15.74/hour	" "
Specialist (1)	$12.98/hour	" "
Specialist (1)	$13.69/hour	" "
Specialist (1)	$10.63/hour	" "
Specialist (1)	$20.77/hour	varies
Specialist (2)	$11.65/hour	3 weeks on/3 weeks off
Specialist (1)	$11.12/hour	" "
Specialist (1)	$10.97/hour	" "
Specialist (1)	$16.59/hour	" "
Specialist (1)	$12.83/hour	" "
Specialist (1)	varies	varies

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The Alaska State District Council of Laborers has represented Alaskan workers for decades before Alaska statehood or the entry of the oil industry to the state of Alaska. Adequate resolution of potential conflict by the oil industry with the people of the state of Alaska must be resolved prior to any activity being permitted. It is only with this assurance that Alaska's human resource interests will be effectively protected.

STATE OF ALASKA)
) ss.
THIRD JUDICIAL DISTRICT)

AFFIDAVIT OF A. GWENDOLYN JOINER

A. Gwendolyn Joiner, upon being duly sworn, deposes and states:

1. I was employed by VECO, Inc. from January 24, 1986 until May 6, 1986.

2. I was the timekeeper in charge of payroll duties on the night shift. This work involved payroll duties for 375 to 400 employees including personnel changes in the computer system (names, addresses, dates of birth, emergency phone numbers and other data).

3. At approximately the end of February, 1986, or the first of March, 1986, I was instructed by my supervisor, Nancy Green, to enter a change of address for certain VECO, Inc. employees who were working on the Kapurak Pipeline Project. This group of employees totaled more than 100 and had previous addresses outside of Alaska, primarily in Texas and Louisiana. In making the address changes, however, the emergency phone numbers at the outside of Alaska address were left intact.

4. I asked my supervisor, Nancy Green, for the reason for making the changes. Nancy Green stated, "The order came from the top." She also directed me to make the changes as soon as possible. The majority of the addresses were changed to the VECO, Inc. mail pouch number. The remainder were changed to the Anchorage addresses at that time on record for other VECO, Inc. employees.

Further, affiant sayeth naught.

DATED this 18th day of August, 1986.

A. Gwendolyn Joiner

A. Gwendolyn Joiner

SUBSCRIBED AND SWORN to before me this 18th day of August, 1986.

Notary Public

THE ALASKA WILDLIFE ALLIANCE

P.O. BOX 190953
ANCHORAGE, ALASKA 99519
907-277-0897

January 20, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Bldg.
Washington D.C. 20240

Dear Sir:

I am Ginny De Vries, Staff Representative of the Alaska Wildlife Alliance and the following is our testimony. To begin with, we would like to protest the facts that hearings were not held in Fairbanks, (the location of the refuge's administrative headquarters) Arctic Village, and Venitie; and that most working people other than oil executives were excluded by the hours of the hearings and because advance sign up was not offered. We have read the three volume baseline study and the draft on the arctic National Wildlife Refuge, Coastal Plain Resource Assessment and we recommend that the Department of Interior forbid the exploration and development of oil and gas in the area. The northernmost unit of the National Wildlife refuge System was established to protect a fraction of Alaska's unique arctic environment. The region encompasses an outstanding arctic and subarctic ecosystem harboring all three species of North American bears (polar, brown, and black), caribou, wolves, wolverines, Dall's sheep, raptors and abundant fish life including arctic char and grayling. The arctic refuge is the only conservation system in North America, and perhaps in the world, that protects such a wide spectrum of the various arctic and subarctic ecosystems in an undisturbed condition.

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In the few minutes alloted, I would like to point out the effects of development on wolf, polar bear, caribou, and whale populations.

Of wolves, the draft study states (p. 31), "Wolves are found throughout Alaska's North Slope. On the 1002 Area, the population density is lower than in areas farther south. "Development in the area would mean roads which would give hunters and other user groups access to an already low population.

Should development occur, caribou would be adversely affected which in turn would adversely affect the wolf population. Page 24 of the baseline study states, "Distribution showed that wolves used the ANWR Coastal Plain East of the Aichilik River extensively, and this used coincided with the presence of caribou. (Information is lacking on the use of the Coastal Plain by wolves in late may to June.) Minimum population estimates for the study area were 27 adults and seven pups in late summer, 1984, not including five known and three suspected mortalities." This information suggests that wolves are being removed in the 1002 area faster than they are reproducing without the presence of roads. Roads, increased human population, and additional human activity would drastically add to the decrease in wolf population.

In relation to polar bears, page 33 of the draft study states, "Pregnant polar bears, and later their cubs, probably spend more time on the 1002 area than other segments of the polar bear population.. At least 15 dens have been locate on ice near the 1002 area (1951-85). Another five dens have been located on ice near the 1002 area. Three locations in the 1002 area have been delineated as confirmed denning areas, that is areas in which polar bear dens and denning activity have been observed in more than one winter."

The draft study goes on to say, "Polar bears are protected under the provisions of the Marine Mammal Protection Act of 1972. An international agreement for the conservation of polar bears was ratified in 1976 by the governments of Canada, Denmark, Norway, The Union of Soviet Socialist Republics, and the United States of America. Article II requires that appropriate actions be taken to protect ecosystems of which polar bears are a part, especially denning and feeding sites."

We have all heard of the dangers to the Porcupine Caribou herd that development poses. If excluded from their calving area, many caribou may be forced to use less suitable areas where they would have difficulty avoiding insects and predators. Also the porcupine Caribou could use up precious fat reserves which are extremely important for winter survival due to fright reaction and disruption caused by development.

In making the decision on whether to lease this area, it is important to remember that of the 1,100 miles of arctic coastline in Alaska, the Arctic National Wildlife Refuge Coastal Plain is the only section of the entire NOrth Slope currently closed to oil and gas development. The U.S. Fish and Wildlife Service has a higher responsibility to conserve the natural diversity of species on the refuge for all wildlife interest. As the report itself states: "Long-term losses in fish and wildlife resources, subsistence uses, and wilderness values would be the inevitable consequences of a long term commitment to oil and gas development, production and transportation."

To summarize, the Alaska Wildlife Alliance is opposed to any oil and gas exploration and development on the Coastal Plain, and supports the designation of the Coastal Plain as wilderness. Thank you for your time.

Sincerely,

Ginny De Vries
Staff Representative

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005
202-682-8170

S. P. Chamberlain
Director, Exploration

February 6, 1987

Mr. Frank Dunkle
Director
U.S. Fish and Wildlife Service
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Dunkle:

The American Petroleum Institute (API) appreciates the opportunity to provide supplemental comments for the Department's consideration on the Draft Legislative Environmental Impact Statement (LEIS) on the Arctic National Wildlife Refuge (ANWR) 1002 area. Our written statement, presented at the January 9 hearing, discussed the national security and economic benefits that may result from leasing the coastal plain area, as well as the compatibility of oil, wildlife and the environment. In addition to those comments, we wish to clarify the significance of the statements on pages 49, 68 and 72 of the LEIS regarding the estimated 19 percent chance of finding any economically recoverable oil from the 1002 area.

Petroleum exploration is an extremely high risk activity. Even the best data are often misleading, misinterpreted or erroneous. Exploration always carries a higher chance of failure than of success. However, the one-in-five chance represented by the 19 percent calculations of the U.S. Geological Survey and Bureau of Land Management professionals reflects a higher-than-normal success probability.

Unfortunately, the draft report fails to explain that this is a very promising percentage for successfully finding economically recoverable oil resources, particularly in frontier areas such as those covered by the LEIS. In fact, this is nearly a tenfold increase in the industry's success rate in Alaska. Only one out of 50, or about 2 percent, of the exploratory wells drilled in Alaska has ever resulted in a commercial discovery.

Undiscovered resources are not proved reserves and, until exploratory drilling occurs, no one can say if any producible oil exists. In order for oil to accumulate in recoverable quantities

An equal opportunity employer

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five basic criteria must occur. These include: a source sequence from which the oil can be derived; a migration path from the source to an area of accumulation; a reservoir rock and pore space; a trap to hold the oil in one area; and a seal to prevent the oil from escaping and migrating to the surface. All five factors must be favorable or the result is no oil. Given the high degree of uncertainty and the unlikelihood of the existence of all five factors, the 19 percent noted in the LEIS is an exceptionally promising prospect.

We urge the Department to make the significance of this percentage more understandable in the final report to Congress. Additionally, many of the individual companies with the expertise and technology to operate in the arctic environment are providing detailed comments on the LEIS. We urge you to carefully review their comments, as you proceed in fulfilling the mandates of the report and recommendations to Congress.

At a time of escalating heavy U.S. dependence on oil imports and depressed conditions in the domestic petroleum industry, it is vital for the United States to increase its domestic energy production and provide for secure and reliable energy supplies for the 1990s and beyond. That is why the ANWR 1002 area is so vital to our nation's energy future. If we can find and develop the potentially vast resources of the 1002 area, we can help reduce our future dependence on oil imports and increase the domestic oil and gas available to meet our needs a decade from now and beyond. We can lessen the threat of the Organization of Petroleum Exporting Countries regaining its dominant control over world oil prices and we can lessen the chance of a return to the severe energy disruptions experienced in the 1970s. It is important to keep in mind that it takes as much as 10 to 15 years to explore for and place into production oil fields from arctic environments.

Crude oil from the North Slope's producing oil fields is already contributing over 20 percent of total U.S. crude oil production. The nation's dependence on foreign oil could increase markedly in the years ahead, as these fields -- along with other fields in the lower-48 states -- reach peak production and start to decline -- as many already have. One very promising place the United States must turn to is Alaska's undiscovered oil and gas, if our future energy security is to be enhanced. The petroleum industry's record in developing the producing fields on the Alaska North Slope proves that such operations can be and are being conducted in an environmentally sound manner. The technology developed for arctic operations near Prudhoe Bay can be used within ANWR in the search for the large deposits of crude oil that may underlie the 1002 area. Nearly 20 years of experience on the North Slope demonstrates that oil and gas exploration and development can exist in harmony with the arctic environment.

Development of petroleum resources in the 1002 area would result in significant economic benefits to Americans throughout the nation. For example, extrapolating from the employment and Gross National Product (GNP) effects of a recent Battelle/DRI study, which looked at the aggregate employment effects of incremental peak OCS production of 2.5 million barrels a day of crude oil equivalent, the following orders of magnitude are suggested. Based on a Department of the Interior peak production estimate of 659,000 barrels daily (assuming recoverable reserves of 3.2 billion barrels), the cumulative employment gains could be 254,085 jobs. Using the same base projection of production, the GNP could increase about 0.25 percent above the level that would otherwise exist. Finally, significant discoveries within the 1002 area could help reduce the nation's reliance on oil imports. The 1002 area could thus benefit the economic and national security of the United States by helping to reduce oil imports and the flow of American dollars overseas.

In conclusion, the API reiterates its support for the proposed "alternative A" recommendation to permit full oil and gas leasing in the 1002 area.

Sincerely,

S. P. Chamberlain

STATEMENT ON

ARCTIC NATIONAL WILDLIFE REFUGE

BY

MICHAEL JOHNSON

REPRESENTING
AMERICAN PETROLEUM INSTITUTE

BEFORE THE

DEPARTMENT OF THE INTERIOR
JANUARY 9, 1987

My name is Michael Johnson and I am Manager of Economics & Planning for North America Exploration for Conoco Inc. based in Houston, Texas. I am representing the American Petroleum Institute (API) which is a national trade association representing the domestic petroleum industry. API's membership consists of a broad cross section of the industry's functions, including exploration, production, transportation, refining and marketing. API's membership currently includes 215 companies and about 5,000 individuals.

API supports the U.S. Department of the Interior's (DOI) proposed "Alternative A" recommendation to Congress that the Arctic National Wildlife Refuge (ANWR) coastal plain be opened to oil and natural gas leasing. As DOI's draft report states: "The (1002) area is clearly the most outstanding oil and gas frontier remaining in the United States and could contribute substantially to our domestic energy supplies."

At a time of escalating heavy U.S. dependence on oil imports and depressed conditions in the domestic petroleum industry, it is vital for the United States to increase its domestic energy production and provide for secure and reliable energy supplies for the 1990s and beyond. We agree with the DOI's draft report that Alaska's 1002 area provides one of the nation's best hopes for the energy supplies needed in the years ahead. But the area's vast potential will remain untapped unless oil and gas leasing is permitted in the area.

Why the 1002 Area is Vital to America's Energy Future

Current U.S. energy supply trends underscore the urgent need to find and produce the potentially vast oil and gas resources of the 1002 area. Oil prices during 1986 dropped by about one-half. As a result, U.S. consumption has risen and domestic production has fallen. These trends have been accelerating. Consumption was up 1.2 percent in the first quarter of 1986 over the first quarter of 1985, 2.4 percent in the second quarter and 3.8 percent in the third quarter. Production was barely down in the first quarter, but fell 2.9 percent in the second quarter and 3.1 percent in the third quarter.

This growing gap between domestic consumption and production has been filled by oil imports, which were up 23 percent in 1986 over the 1985 level. Imports in November constituted 38 percent of U.S. oil consumption -- a higher level of dependence than at the time of the 1973-74 oil embargo. Furthermore, U.S. imports from the volatile Persian Gulf area have increased 300 percent in 1986 and accounted for more than half of the total increase in imports in 1986.

If prices remain roughly equal to those of the late fall and early winter of 1986, these current production and consumption trends are likely to continue. If they do, U.S. dependence on oil imports also will continue to rise. As U.S. and other world demand grows, more and more oil will be imported from the OPEC cartel. Within OPEC, a small group of countries concentrated in the Middle East has most of the excess oil production capacity which will be called upon as the demand for oil increases.

This means that there is a significant probability that within a relatively short period -- perhaps as few as three years -- the United States and our allies could once again be significantly more dependent on the Middle East for our oil supplies. Moreover, when supplies tighten and shortages threaten, there is no rapid or easy way to curtail demand, increase domestic supplies, or find substitutes for many critical uses for oil. Thus, we will become more dependent on foreign oil and extremely vulnerable to any form of disruption of supply from the Middle East or from elsewhere. It is important to keep in mind that it takes as much as 10 to 15 years to explore for and place into production oil fields from arctic environments.

That is why the ANWR 1002 area is so vital to our nation's energy future. If we can find and develop the potentially vast resources of the 1002 area, we can sharply reduce our dependence on oil imports and have the domestic oil and gas we need to meet our needs a decade from now and beyond. We can lessen the threat of OPEC regaining its dominant control over world oil prices and we can lessen the chance of a return to the severe energy disruptions experienced in the 1970s.

Resource Potential of the 1002 Area

In its draft report on the 1002 area, DOI estimates that there may be billions of barrels of crude oil to be found under that 1.5 million acre area. DOI estimates that "recoverable

reserves" range from 600 million to 9.2 billion barrels of oil, while the "in-place resources" range from 4.8 billion to 29.4 billion barrels. Recoverable reserves are estimates of economically producible reserves using today's technology; in-place resources are estimates of the total amounts of oil thought to be in the reservoirs, some of which will not be economically producible.

Although there is uncertainty inherent in all oil and gas exploration methods which do not include actual drilling, the Interior Department estimates indicate a very large crude oil potential -- on the same order of magnitude as the nearby Prudhoe Bay field, the largest U.S. discovery to date.

Crude oil from the North Slope's producing oil fields is already contributing about 20 percent of U.S. crude oil production. The nation's dependence on foreign oil could increase markedly in the years ahead, as these fields -- along with older fields in the lower-48 states -- reach peak production and start to decline -- as many already have. One very promising place the United States must turn to is Alaska's undiscovered oil and gas if our future energy security is to be enhanced.

Oil and Gas Operations in the 1002 Area

Only a small portion of the 1002 area would actually be disturbed during exploration and production activities. Based on experience at nearby Prudhoe Bay, less than 1 percent of the surface of the 1002 area could be expected to be affected by drilling and production pads, roads and facilities.

Moreover, if exploration resulted in no commercially producible discoveries, disturbance of the area by petroleum activities would cease and restoration measures would begin. If economically significant oil and gas discoveries were made, the occupation of the area would last only as long as those discoveries were producible, perhaps 20 to 30 years -- a very short time in man's historical use of the area.

The petroleum industry's record in developing the producing fields on the Alaska North Slope proves that such operations can be and are being conducted in an environmentally sound manner. The technology developed for arctic operations near Prudhoe Bay -- the area of the nation's largest oil and gas fields -- can be used within ANWR in the search for the large deposits of crude oil that may underlie the 1002 area.

Numerous laws and regulations assure that oil and gas activities are designed to protect the surrounding environment. Experience in Alaska and the lower 48 states shows that oil and gas activities are consistent with other goals such as wildlife protection. Nearly 20 years of experience on the North Slope demonstrates that oil and gas exploration and development can exist in harmony with the arctic environment. Techniques to minimize disturbance include directional drilling, smaller and consolidated facilities, winter construction, use of temporary ice roads, use of special arctic equipment, and elevated pipelines and facilities. The U.S. Fish and Wildlife Service (USFWS) monitored all of the surface activities and geophysical

operations conducted on the coastal plain and reported that no significant environmental impact resulted from that activity.

Oil from the 1002 area would be transported by onshore pipeline to the Trans-Alaska Pipeline System (TAPS). Experience from TAPS and the Prudhoe Bay, Milne Point and Kuparuk developments proves that pipelines can be designed, constructed and operated on the North Slope to allow passage of caribou and other wildlife.

Exploration activities would also be supported by temporary ice roads, barges and ice airstrips. During development and production, more permanent gravel pads, roads and airstrips would be used to support year-round activities. One main road along a pipeline into ANWR would be needed for pipeline service and resupply. Roads and facilities would be placed in the most efficient manner possible and concurrence would be required from the USFWS and the Alaska Department of Fish and Game.

Sensitive habitats are routinely avoided when routing roads on the North Slope. Some construction activities can be conducted during the winter season when most wildlife is absent from the 1002 area. A pipeline can be designed to ensure passage of caribou and other wildlife during the summer by properly located sections which are elevated, buried or ramped.

Development at Prudhoe Bay, Kuparuk and Milne Point in the calving range of the Central Arctic caribou has not had a harmful effect on this caribou herd. The herd has grown from about 3,000 animals in 1975 to its current size of over 13,000 animals. This experience is reason to believe that development in the 1002 area

would not hurt the Porcupine caribou herd. The 1002 area is only a portion of the calving grounds of the Porcupine herd. Even discovery of a supergiant field would only involve a small portion of the area. In some years, little or no calving occurs in the 1002 area, but takes place in the foothills to the south and/or in Canada.

Oil and gas operations would also be compatible with other wildlife and environmental aspects of the 1002 area:

- Muskoxen were introduced into ANWR only 17 years ago and are still expanding their range. As of 1984, there were 384 muskoxen in ANWR. Muskoxen spend most of their time in the foothills and water-adjacent habitat, so little contact with oil and gas facilities would be likely.
- A 1986 joint industry/state/federal bird impact study indicates that the development at Prudhoe Bay has not affected the general use of the area by birds. While some habitat loss resulted from the placement of facilities, certain species created new habitats at roadsides and pads.
- All 1002 area facilitites will require air quality permits to construct and operate. Air quality monitoring at the large Prudhoe Bay facilities and the other North Slope oil fields shows that oil and gas operations at these locations fully meet state and federal air quality standards.

Economic Benefits of 1002 Area Development

With regard to the economic benefits of coastal plain development, the DOI draft report cites no Gross National Product (GNP) or employment gain estimates. While we have not derived such estimates directly, it is possible to develop some approximate effects by extrapolating from other analyses. Development of petroleum resources in the 1002 area could result in significant economic benefits to Americans throughout the nation. For example, extrapolating from the employment and GNP effects of a recent Battelle/DRI study, which looked at ~~the~~ aggregate employment effects of incremental peak OCS production of 2.5 million barrels a day of crude oil equivalent, we can project the following results. Based on a DOI peak production estimate of 659,000 barrels daily (assuming recoverable reserves of 2.3 billion barrels), the cumulative employment gains could be 254,085 jobs. Using the same base projection of production, the GNP could increase about 0.25 percent above the level that would otherwise exist.

API estimates that, since 1980, when peak production of about 1.5 million barrels per day from the Prudhoe Bay field was achieved, North Slope development has contributed to an increase in the gross domestic product[1] in excess of $19 billion per year.

1 The gross domestic product is the sum of all goods and services produced within a nation's border. The gross national product is the sum of all goods and services produced by a nation's firms anywhere in the world.

Peak annual employment effects are estimated at about 39,000 direct jobs, and about 29,000 indirect jobs. Aggregate development expenditures for North Slope fields, including expenditures for the Trans-Alaskan Pipeline System of about $8.8 billion, are estimated at about $36 billion through 1985.

Experience on Alaska's North Slope shows how states and communities benefit from an active exploration and production program. It is estimated that, between 1980 and 1986, the major oil companies operating on the North Slope spent more than $10.5 billion in the United States developing the North Slope oil fields. Every state in the union participated in supplying goods or services, with the shares of business ranging from nearly $1.4 billion in Alaska to ~~some~~ $200,000 in West Virginia.

However, the individual states and companies within those states have not been the sole beneficiaries of oil company activities. Federal lease sales, rents and royalties on federal land in the U.S. are providing a major source of revenue -- second only to the income tax in size -- for the federal government.

If the coastal plain were to be leased and a large field discovered in the 1002 area, large royalty payments would be generated. The distribution of ~~the~~ potential revenues among the federal, state and local governments depends on the details of how the area will be leased, which has not yet been determined. However, the federal share of the bonus monies, rents and royalties could help offset declining federal revenues from other fields which have passed -- or will soon pass -- peak production.

To put potential revenues into perspective, consider that, in 1984 alone, Alaska received about $1.4 billion in oil and gas royalties, rents and bonuses from leases on its own lands.

Development of the 1002 area would also have the important economic benefit of providing a continuing oil flow for the Trans-Alaska Pipeline as oil fields elsewhere on the North Slope are depleted.

Finally, significant discoveries within the 1002 area could help reduce the nation's reliance on oil imports. The 1002 area could thus benefit the economic and national security of the United States by helping to reduce the flow of American dollars to overseas.

Conclusion

At a time of continuing political instability in the Middle East -- and when U.S. oil imports are at a level even higher than at the time of the 1973-74 oil embargo -- it is critically important for this nation to increase its development of domestic energy resources. As the Department of the Interior's draft report so effectively demonstrates, the 1002 area offers one of America's best prospects for major new oil and gas discoveries. However, as noted earlier, it takes as much as 10 to 15 years to explore for and place into production oil fields in hostile environments such as that of the 1002 area.

Thus, the national interest requires that action be taken now to open the 1002 area to oil and gas exploration and production. We endorse the Interior Department's proposed Alternative A

recommendation to permit full oil and gas leasing in the 1002 area. We regard this step as vital to meeting the nation's future energy supply needs and reducing the risk of a return to the energy disruptions of the 1970s.

P.O. Box 100767
Anchorage, Ak. 99510
January 10, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Bldg.
18th and C Sts., N.W.
Washington, D.C. 20240

To Whom It May Concern:

Enclosed are written comments on the draft, Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. I have prepared and submitted these comments on behalf of the American Wilderness Alliance, 7600 East Arapahoe Road, Suite 114, Englewood, Colorado 80112.

Sincerely,

Steve Livingston

Steve Livingston, M.D.

O-143

WRITTEN COMMENTS ON DRAFT, ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT

SUBMITTED ON BEHALF OF THE AMERICAN WILDERNESS ALLIANCE BY STEVE LIVINGSTON, M.D., ANCHORAGE, ALASKA

American Wilderness Alliance
7600 East Arapahoe Road / Suite 114 / Englewood, Colorado 80112 / (303) 771-0380

The American Wilderness Alliance strongly opposes the Secretary of the Interior's preliminary recommendation for full oil leasing of the 1002 area in the Arctic National Wildlife Refuge. We urge the Secretary to reconsider this decision in his final recommendation. After a thorough review of the draft report, we have a number of comments to make on the serious environmental consequences of oil exploration and development in this area.

We would first like to comment on the process used by the Department of the Interior in producing this report. It is only through a lawsuit filed by Trustees for Alaska (and joined by the American Wilderness Alliance as a co-plaintiff), that the draft report was made public at all prior to its presentation to Congress. This constituted a blatant attempt to keep the public from commenting on a major issue, and appeared to be collusion with the oil industry. Such attempt to influence Congress without public input is not compatible with the democratic process. Furthermore, we question both the timing and the location of the public hearings. The hearings began immediately after the longest holiday season of the year, and were held in only three places. In particular, there was little opportunity for Alaskans, who would be affected most by oil drilling in ANWR, to give their views. A 60-day comment period may fulfill the letter of the law, but coming in mid-winter at a busy time, certainly does not fulfill its spirit. In addition, the Department of the Interior continued to demonstrate its contempt for the public process by appealing the original decision requiring public comment. This appeal, which also failed, was moot, and an unwarranted waste of taxpayers' money. We urge the Department to be more forthright in its future dealings regarding public lands.

We have numerous objections to the Secretary's recommendation itself. The Secretary's recommendation almost mimics the oil industry in its attempt to compare environmental effects of Prudhoe Bay oil development with potential effects in

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the 1002 area. The major adverse environmental impacts of oil leasing are understated throughout the recommendation. We will document this further in our specific comments below.

The executive summary is quite misleading, stating that the "evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources." This summary virtually ignores the potential environmental consequences of oil leasing on wildlife, and relegates its comments to a few small, meek paragraphs near the end of the summary. While we are not certain who wrote the executive summary, the author obviously did not read or chose to ignore the chapter on environmental consequences prepared by the U.S. Fish and Wildlife Service, for there are no references to the enormous adverse effects that are well-documented by FWS. Since many congressmen, news media, and other officials are too busy to read the full report, we feel that the current executive summary offers a biased and unfair view of the reality of oil leasing in the 1002 area. We urge the "executive" who wrote this summary to prepare a more balanced one for the final report.

The potential consequences to the physical environment of full oil leasing may be considerably greater than that predicted in the draft report, for there is little attention paid to the issue of water access. As the FWS notes, there simply is not much water available in the 1002 area for oil exploration. Most of the lakes that occur in the 1002 area are shallow, and freeze to the bottom in winter, making them inaccessible for use as water sources during the usual time for exploratory drilling on the North slope, which is winter. Furthermore, almost every one of the 10 major and 14 smaller streams in the 1002 area freezes to the bottom in winter, making these also inaccessible for use as water sources. The few that do not freeze to the bottom are used as fish over-wintering areas, and, therefore, could not logically be used for water sources without doing irreparable harm to the fish. According to FWS, as much as 15 million gallons of water

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would be necessary to drill a single exploratory well.

There is water available from Sadlerochit Spring in the southwestern part of the 1002 area, as there is year-round flow from the spring. However, this 4,000-acre area has been nominated as a National Natural Landmark and would be off-limits for exploration under almost any foreseeable circumstances. There is a dense population of macro-invertebrates, as well as arctic char and grayling in this area and the five miles downstream which remain open during winter, and thus it is used as a fish-wintering area. In addition, this area is used for traditional subsistence.

The report gives a totally inadequate evaluation of this problem, as illustrated by the three suggestions offered for exploratory drilling. One only addresses drilling near the coast, and involves the use of shallow ponds and snowmelters. The second addresses the few wells that could be drilled on corporation lands or near the band of small lakes east of the Jago River. The third concerns most of the 1002 area. According to FWS, "the same innovative effort (obtaining water, snow, or ice from wherever it can be found without disrupting the biological environment) would be required for exploratory drilling elsewhere in the 1002 area." One wonders, from reading these suggestions, if this innovation would include a reversal of the miracle at Cana, i.e., turning wine into water.

The problem of obtaining water for winter exploration pales by comparison to the engineering problems faced for full oil development and production. Water would be needed for up to 50-60 drilling pads, each with one or more wells, plus about seven large and four small central processing facilities. This water would be needed for human use as well as oil exploration and production. This means up to 10,000 gallons of water per day for a construction camp of some 1,500 workers could be needed for human use alone. In addition, there would be up to 200-500 workers in a central processing facility once construction is

finished.

The report gives two suggestions for obtaining water during full oil drilling and production. One is to use sea water for the waterflooding used to sweep the oil toward producing wells and to maintain reservoir pressure. Waterflooding can involve enormous amounts of water. For example, up to 400,000 barrels per day are injected into the Kuparuk River field and up to two million barrels for Prudhoe Bay. The full leasing scenario, in fact, suggests two marine and saltwater treatment facilities, both presumably located at the coast. This would require an insulated pipeline from the plants to each central processing facility, as well as heat generators spaced at intervals to keep the water from freezing. The treated sea water then would be piped to the individual drilling pads for injection. This scenario could contribute to the major environmental hazards caused by the proposed east-west oil pipeline, particularly with regard to loss of insect-relief habitat for the Porcupine caribou herd. The environmental consequences of these structures are not addressed in the report and, of course, should be.

Second, the report states that "the most obvious, and probably only feasible, solution relates to gravel sources." Full development would involve possible mining and use of as much as 50 million cubic yards of gravel from within the 1002 area. The FWS suggests that the gravel be mined from streambeds to create elongated deep pools up to 40-50 feet deep, which, after spring runoff, can supply water year round. It suggests excavations within the river channel or immediately adjacent but connected to the channel. The environmental consequences of this are not addressed. The only comment is that this might create 20 to 30 elongated deep pools for water storage within or adjacent to river beds that now run dry during winter months. There is no attempt made to assess what effects this would have on streambeds, floodplains, fish habitat, subsistence, etc.

A careful reading of the draft report reveals that the FWS appears to be unprepared to address the major issue of water access for oil exploration and production. An in-depth study would be necessary on this issue alone.

Potential adverse effects on both the Porcupine caribou herd (PCH) and Central arctic caribou herd (CAH) are well-documented in the chapter on environmental consequences. It should be noted that input on this part of the report was received from 14 caribou biologists, including oil industry representatives. Despite this notation on page 97, and the subsequent report of major adverse effects on the PCH, the Secretary's recommendation only describes the potential effects on the PCH as "some long-term widespread effects." In addition, the Secretary states on page 169 that the CAH "has increased substantially during the period that development has occurred within the heart of its range."

Unlike the Secretary of the Interior and oil industry officials, the caribou biologists were quite cautious in making analogies comparing the effects of current oil development on the CAH and effects of potential 1002 development on the PCH. Because of greater density of PCH on their calving grounds, the PCH would interact with oil development "much more extensively and intensively" than the CAH has interacted with oil development in Prudhoe Bay.

Although the oil industry often points to the increase in the CAH from about 3,000 animals to some 12,000-14,000 after development at Prudhoe Bay, it does not add that almost no calving has been noted in the Prudhoe area since oil development began. According to the report, this increase has been attributed to high calf production and survival as well as relatively light hunting pressure. Attempting to attribute this even in part to the presence of oil development is absurd, as the facts clearly show.

In addition to studies which show decreased calving densities around Prudhoe Bay, a 1985 study reported that maternal caribou groups showed measurable declines in habitat use within

approximately two miles on either side of the Milne Point road. The picture of caribou grazing next to the Transalaska Pipeline is quite misleading, based on this information.

Attempting to compare the effects on the CAH in Prudhoe Bay and those that potentially may occur on the PCH again may be inappropriate, for several reasons. The CAH has been displaced from only part of its calving grounds; suitable alternative high-quality habitat appears available for the CAH, and the overall density of CAH caribou on their calving grounds is very low. The absolute density for the PCH on their calving grounds is 14 times that of the CAH, and the difference in effective densities is even greater.

A substantially greater proportion of important calving habitats would be involved with development that included the PCH core calving area. There is a large overlap of potential oil development facilities with PCH calving areas. The PCH would annually encounter oil development during the most critical time in their yearly cycle, the report states. Seventy-eight percent of the PCH's core calving areas is within the 1002 area and is designated as Resource Category 1 habitat. Category 1 habitat has a FWS mitigation goal of "no loss of existing habitat value." However, according to the report, an approximately two-mile displacement of caribou out from oil facilities would include loss of 32 percent of the most critical PCH core calving areas! According to the FWS, this would represent a complete loss of habitat values.

In addition, predation on the PCH is more important than for the CAH in the Prudhoe area. The CAH has been exposed to minimal predation in recent years. The wolf population in the Central arctic area decreased in the 1970's and has remained low, due to hunting. Brown bears are only moderately abundant in the area. In the 1002 area, however, brown bears are more abundant and, in fact, shift their habitat use to coincide with areas occupied by the PCH during calving and postcalving.

Oil industry claims that caribou easily cross under the Transalaska Pipeline appear to be just as misleading as other

industry claims. The report states that caribou crossing success is generally greatest at buried pipelines and then decreases for roads without traffic, to elevated pipelines adjacent to roads without traffic, to pipelines adjacent to roads with traffic, respectively. Large mosquito-harassed groups do not readily cross beneath elevated pipelines. In the full leasing scenario recommended by the Secretary, the pipeline/haul road would bisect the 1002 area east-to-west. This barrier could significantly inhibit movements for the large postcalving aggregations which annually occur on the 1002 area as the caribou move between inland feeding areas and coastal insect-relief habitats. Insect (mosquito) harassment is one of the primary driving forces in the annual caribou cycle, the report points out, and follows closely behind the calving period. Insect harassment can have a pronounced negative effect on caribou survival, the report states.

Eighteen percent (294,000 acres) of the 1002 area, including native corporation lands, used for insect-relief and other purposes by the PCH lie north of the proposed pipeline/road corridor. If caribou refuse to cross through any development areas, then this area would be unavailable as habitat. This represents 80 percent of coastal insect-relief habitats. Even without such a major problem, the report states that 29 percent of the coastal insect-relief habitat could be reduced or eliminated. This could lead ultimately to reduced survival, particularly for calves.

Increased harvest also could be expected to occur due to oil development. Based on experience of the North Slope haul road, a significant proportion of the caribou harvest could be from illegal hunting, due to increased access for all-terrain vehicles.

In conclusion, the FWS states that full oil development of the 1002 area could result in a major population decline and change in distribution of 20-40 percent, although this estimate is uncertain. A more moderate decline of 5-10 percent was predicted for the CAH.

The above reiteration of the 1002 report on the PCH should not have been necessary in our comments. However, the Secretary's recommendation and the executive summary persist in inappropriate comparisons of the CAH to the PCH and ignore the rest of the data accumulated by FWS. We feel this is unfortunate, as it distorts the issue of whether or not the PCH would suffer major adverse effects with full oil development. The mitigation proposed by FWS could do little to help the PCH.

Other wildlife would be affected adversely as well by oil development. There would be major effects on the muskoxen population. The report predicts that they could be displaced from up to 71 percent of their high-use habitats within the 1002 area, with a possible change in distribution or decline affecting 25 to 50 percent of the population. A moderate adverse impact is predicted for wolverines in the 1002 area, but the FWS cautions that "inadequate controls on access and harvest could possibly reduce by half or more the 1002 area wolverine population." The report also predicts moderate effects on brown bears due to several factors. While there are mitigation factors proposed for these animals that the FWS states would minimize many of the effects, they still should be considered in the overall evaluation of the Secretary's recommendation.

We are very much concerned about the environmental consequences on marine mammals if oil development occurs, and feel that the report does not evaluate one very important factor that could affect marine mammals. That is the cumulative impact of offshore oil drilling from other lease sales, such as Camden Bay, on marine mammals, along with development in the 1002 area. This was not evaluated at all. We feel that such a comprehensive study is essential, and do not feel that the effects of 1002 drilling and offshore drilling could be isolated. This is particularly of concern with regard to polar bears. Even though only a few bears use the 1002 area, the report states that "the exclusion of only one or two bears from areas consistently used for denning would be a moderate impact on that segment of the Beaufort Sea population." What would happen to the polar bear

population if offshore development also occurs? We urge that this be addressed.

We also have some concerns on the effect of drilling and development on birds that use the 1002 area, particularly lesser snow geese. Although annual staging use by snow geese in the 1002 area is noted to be quite variable, the report states that the average number of snow geese annually staging on the 1002 area could be reduced by almost 50 percent. Mitigation factors offered for this potentially serious adverse effect include number 25 listed on page 147. This calls for time and area closures or restrictions on surface activity in areas of wildlife concentration for a number of species, including snow geese. The dates for the various wildlife listed would require rather significant restrictions throughout certain parts of the 1002 area from mid-April until late September. We wonder if such restrictions are enforceable or even practical in the face of massive oil development. If not, this mitigation factor would not be useful.

We also would like to point out the effects predicted on golden eagles, which could be a moderate population decline or change in distribution. The major mitigation factors proposed to protect eagles in the 1002 area are the same as those proposed to protect caribou. This causes some concern since there is so much evidence presented that indicates the PCH may decline significantly irrespective of attempted mitigation.

Effects predicted on fish in the 1002 area are minimal. However, this depends in large part on what would be allowed in terms of water access and gravel removal. We have expressed our serious concerns about these factors previously.

In the summary of unavoidable impacts with full leasing, there are 24 listed impacts. We have chosen to comment on only some of these. The 32 mitigation factors proposed on pages 145-147 certainly could have some positive effects. However, there is no comprehensive plan for what oil development would look like if all of these factors were implemented. Would it even be feasible to implement them all without paralyzing oil

exploration and production during certain times of the year? Apparently not, for oil industry representatives objected to some of these proposed mitigation factors at the initial public hearing in Anchorage.

Full oil leasing of the 1002 area would have a major adverse effect on subsistence uses, according to the draft report. We do not see how any mitigation factors could prevent, in particular, the adverse psychological aspects associated with such a change in the subsistence lifestyle. Increased hunting pressures from nonresidents who would work in the oil fields undoubtedly would affect subsistence adversely. We object to the lack of concern demonstrated for Native villages which could be impacted severely by a decline in the PCH population. The failure to hold a public hearing in Arctic Village is a blatant example of this, as well as another example of the Department of the Interior's hurry to railroad its plans for oil development through Congress at the expense of the public's right to know. These same sentiments have been expressed by villagers from Yukon Territory, as well as the Yukon territorial government. We do not feel that the secret and unethical dealings with Native corporations for land trades in ANWR would mitigate adverse effects upon the subsistence lifestyle, for in some cases Native corporations have demonstrated no more concern for villagers than have the oil companies which traditionally have not hired Natives.

Our most important objection to oil drilling in the 1002 area has not even been mentioned yet, and appears to hold no weight in the eyes of those who see only dollar signs as the "national interest." The coastal plain of ANWR is one of America's premiere wilderness areas, yet only a small portion of it, i.e., the northeastern corner, has been designated wilderness. There is no doubt from any point of view that the 1002 area is wilderness. It should be so designated. In addition, the rest of Alaska's arctic coastal plain outside ANWR is open to oil drilling. Those who say we already have enough wilderness have missed the point. We do not hold the purely anthropocentric

view that wilderness is primarily for human beings to enjoy and contemplate, even though development types speak of an elite corps of backpackers and river runners. While we certainly value the 1002 area for its recreational opportunities, we seek its preservation as wilderness for much more profound reasons than that. Our view is biocentric. We believe humans are part of the earth's ecosystem, not its masters who have the right to interrupt it on a whim.

We strenuously object to the Secretary's contention that oil drilling in the 1002 area is necessary for national security. This is typical of the hoax perpetrated on the American people by the Reagan administration for the past six years to justify everything from environmental pollution to its Star Wars program. It is obvious the Secretary is following the party line, with not a thought about what,really is necessary for our national security. Is it in our national interest to continue to waste our natural resources as we have done for years with no plan for the future and no concern for future generations? Why do we have no national energy plan? What happens in the year 2030 when we have guzzled most of the oil from the 1002 area? Will technology have found a way to circumvent our need for oil completely by then? The wasteful habits promoted by the Reagan administration are indeed myopic, and the failure to complete the ANWR ecosystem by adding the arctic coastal plain to its wilderness is just another illustration of this. How will the four percent of our nation's lustful oil demand supplied by the 1002 area in 2005 help us in the long run? Why is there no discussion in the draft report of energy conservation or alternative energy sources? In our paranoia about foreign control of oil sources, we have decreased dramatically funding for research on the latter. We submit that what the Secretary really means by "national interest" and what the oil companies really mean by that term is simply profit cloaked in the word patriotism. It is a fact that oil development in the 1002 area will not be the panacea for our energy needs that the oil industry seems to claim. In fact, its

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contribution to independence from our reliance on foreign oil will be miniscule in the long run. The main reason to promote oil development in ANWR is not national security, it is pure profit. While we certainly do not object to the latter, we feel that this magnificent area's preservation far outweighs any profit motive. Any claim that oil development can proceed in the 1002 area and preserve its wilderness values simultaneously is absurd. To quote from the draft report on page 131, the "wilderness value of the coastal plain of the Arctic Refuge would be destroyed."

In summary, we oppose full oil leasing of the 1002 area for the following reasons:

1.The 1002 area of ANWR is incomparable wilderness.
2.There is very little water available for oil exploration and development, and the adverse consequences of obtaining it are unacceptable.
3.Oil development would have unacceptable adverse consequences on the physical environment of the coastal plain.
4.Oil development would have a major adverse effect on the Porcupine caribou herd, possibly resulting in a 20 to 40 percent decline in population.
5.Oil development would have a major adverse effect on muskoxen.
6.There would be major adverse effects on snow geese staging in the 1002 area.
7.There would be moderate effects on golden eagles, wolverines, wolves, brown bears, and the Central arctic caribou herd.
8.The effects on marine mammals have not been studied adequately.
9.There is no comprehensive study of the cumulative effects of offshore oil development and oil development in the 1002 area.
10.There is no comprehensive plan for the use of mitigation factors in oil development.
11.Subsistence would be affected severely by oil development.
12.There is no evidence that oil development is necessary for national security.
13.Oil development is not in the national interest in the 1002 area.
14.The nation has no comprehensive plan for energy production,

use, and conservation.

In conclusion, we will work diligently to see that the Congress of the United States designates the 1002 area wilderness.

Steve Livingston

Steve Livingston, M.D.
January 10, 1987

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W. EUGENE GUESS 1932-1975
JOSEPH RUDD 1933-1978

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MICHAEL D. BRIGGS
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February 6, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Re: Alliance Testimony on ANWR Draft Environmental Impact Statement

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Dear Sirs:

The Alaska Support Industry Alliance (the Alliance) is pleased to offer testimony on the draft Environmental Impact Statement prepared regarding the opening of the Arctic National Wildlife Refuge (ANWR) to oil and gas leasing.

The Alliance strongly endorses leasing in this area.

The Alliance consists of 300 corporate and private members engaged in the oil and gas and mining support industries in Alaska. Our unique level of experience with oil and gas operations on the North Slope is reflected in our testimony. We have focused upon subjects we believe probably will not be adequately covered in other testimony, including leasing methods, transportation, existing regulatory mechanisms, etc.

Sincerely,

James D. Linxwiler
Chairman
Alliance ANWR Committee

JDL:kdw

Enclosure

#7232W

ANWR TESTIMONY - ALLIANCE

I. Leasing Methods

The most basic action contemplated by Congress with respect to the Arctic National Wildlife Refuge (ANWR) is leasing. However, a full discussion of the merits of this basic action has been obscured by the debate about the environmental consequences of oil development in ANWR. There are significant aspects with respect to the leasing program which should be developed with care. The purpose of this section is to discuss this issue.

The draft Environmental Impact Statement states, with respect to leasing systems, as follows as page 89, in its discussion of "Alternative A":

> Under the alternative of full leasing, it is assumed that Congressional action would allow all Federal subsurface ownerships of the § 1002 area to be available for development through a leasing program administered by the Department of the Interior. This action would also open to oil and gas development in production the private lands within the refuge. The exact terms of the leasing program would be developed in response to specific legislation passed by the Congress. If the Congress chooses to authorize leasing in the entire § 1002 area, the legislation would probably contain the important elements of the Mineral Leasing Act and the NPRA legislations, with special provisions to meet the unique needs of the Arctic Refuge.

This statement appears to be made almost in passing, and there are several significant problems with it:

First, it is important that no element of the NPRA legislation be used. The well demonstrated record is that the NPRA leasing program was not a success. It was created by the Secretary using regulations because the Department itself lacked the statutory authority to provide a normal leasing program. In this environment, the leasing program did not, for instance, contain normal and necessary lease provisions regarding unitization, for the maintenance of the lease and the extension of the primary period by shut-in production, etc. The above-referenced statement encourages Congress to create a new and untested program, and experience has shown this to be unnecessary and undesirable.

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Second, this statement ignores that there already exists a well-developed and environmentally sensitive program expressly created for Alaska game refuges in §§ 1008 and 1009 of ANILCA (16 U.S.C. §§ 31, 48 and 49).

We believe that the Secretary should recommend to Congress that it adopt, with respect to ANWR, the ANILCA §§ 1008 (16 U.S.C. § 3148) and 1009 (16 U.S.C. § 3149) onshore leasing program. The §§ 1008 and 1009 program is the

competitive onshore leasing program utilizing the statutory authority and well developed procedures of the Mineral Lands Leasing Act, as applied by ANILCA to the unique circumstances in Alaska. The important features of this program include procedures intended to provide significant environmental protection, and to apply in the case of game refuges in Alaska in particular.

The procedures provided in § 1008 are similar to those contained in the Outer Continental Shelf Leasing Act (OCSLA, 43 U.S.C. § 1401 et seq.) including the preparation, pursuant to § 1008(f), of an exploration plan, and, pursuant to § 1008(g), preparation of a development and production plan. The Secretary retains the authority to monitor and modify the terms of such plans pursuant to § 1008(h), and if the Secretary determines that "immediate and irrepairable damage will result from a continuation enforce of a lease," then the lease may be suspended or cancelled pursuant to § 1008(i).

Congress need not attempt to "reinvent the wheel." The preparation of an environmentally sensitive leasing program which applies to game refuges in Alaska has already been accomplished by Congress and all Congress need do is to implement it. In other words, the simplest action for Congress to take in this instance would simply be to revoke §§ 1002(i) (16 U.S.C. § 3142(i)) and 1003 (16 U.S.C. § 3143), and the §§ 1008 and 1009 program will automatically apply.

II. NATIVE SUBSISTENCE WITHIN ANWR

Preservation of the subsistence resource is one of the most difficult and important issues relating to opening ANWR to oil and gas development. In evaluating this issue, it is important to keep in mind the following points:

First, the oil and gas industry has a strong commitment to preserving subsistence resources, and an excellent track record in having done so. The oil and gas industry has worked on the North Slope and in western Alaska in close contact with Native communities and regulatory agencies seeking to preserve the subsistence resources which otherwise might be affected by oil and gas exploration and development. As a result, no significant impact upon any subsistence resource has ever been substantiated as a result of oil exploration and development in Alaska -- and it is our strong belief that this excellent track record will continue in ANWR. The industry is strongly committed to this concern and will closely cooperate with Native subsistence users.

Second, it is also important to take note that subsistence impacts can only occur if there are significant impacts upon the wildlife resources of the area. The primary subsistence resource in this area is the Porcupine Caribou

herd, along with water fowl. The industry's excellent record in protecting caribou and other subsistence resources from impact at Prudhoe Bay and Kuparuk is a further reason why subsistence resources will not be impacted in this area.

Third, the subsistence lifestyle requires access to cash, for purposes of obtaining three-wheelers, guns, ammunition, and related supplies. The villagers in the local area will be able to utilize job opportunities offered by oil development to enhance their subsistence activities.

Fourth, Natives in the area, who are well experienced with the interactions between oil and gas development and subsistence, favor oil and gas development in ANWR. In fact, Jacob Adams, President of the Arctic Slope Regional Corporation, himself a whaling captain, has offered testimony in favor of opening ANWR to leasing which states that the Eskimo community is familiar with the favorable record of the oil companies in regard to the preservation of the subsistence resource.

Preservation of subsistence resources, and access to them, is a high priority of Kaktovik residents. Dall sheep, caribou, fish, seals, whales, birds and eggs, moose, and furbearers contribute to their subsistence economy.

As is the case in other North Slope villages, most residents obtain at least some of their food by hunting and fishing, and many get half or more of their total household food through hunting and fishing.

While the villagers of Kaktovik retain strong ties to the land, they also have adopted and incorporated many elements of western culture, technology and economy into their lifestyle. Oil and gas development, and the subsequent North Slope Borough capital improvement program, have increased the village's economic activity.

Changes in the Inupiat subsistence economy at Barter Island began about 1890 when whaling ships anchored in the harbor, and food, utensils, firearms and other items were exchanged for caribou and sheep meat, and clothing made of caribou hides. Bowhead whaling ceased from 1910, but economic activity continued in the forms of reindeer herding, trapping and postwar construction.

This activity created a dependence upon cash, and most villagers see local petroleum development as a positive means for maintaining a cash flow. At the same time they believe that, given appropriate environmental safeguards, oil and gas development will not endanger important subsistence resources.

III. DRILLING TECHNOLOGY

We believe the EIS should take more complete recognition that drilling conditions in ANWR will not be vastly different from Prudhoe Bay. The terrain, climate, logistics and necessary support system will not be anything new and we will have had the benefit of over 40 years of arctic experience. This is especially important in that a "learning curve" has been established and we will not be making the same mistakes. Over 1100 wells have been drilled in the North Slope area with no disastrous consequences to the environment. The oil industry record and methods of operation in the arctic are truly exceptional.

Prior to drilling in ANWR, a comprehensive environmental study will probably be required. Assuming this is completed, a variety of permits will be requested that will insure environmental integrity. This is the first phase of the drilling operation and it will be administered by a host of government agencies. These agencies will spell out stipulations pertaining to all aspects of the program so that in a sense, the government will be implementing and enforcing their own recommendations.

Extensive use of ice roads, and ice airstrips will be used resulting in no environmental damage.

In addition, depending on well requirements the use of ice pads may be applicable. This type of construction is cheaper and more time effective than conventional gravel contruction. It is also in the best interest of the operators since it is more cost effective.

With today's state of the art rigs less pad space is required and a rig can fit on a 25,000 sq. ft. site. Additional space for camp and other drilling equipment will be needed.

Once the rig is mobilized actual drilling operations can commence. Of primary concern is well control and mud disposal since these are the major sources of any potential pollution. Well control is of utmost importance to everyone on the rig and all supervisory personnel will be MMS certified in well control.

In addition to trained personnel, all equipment will be "state of the art." Normal blowout prevention equipment would include three ram type preventors and one annular preventor designed to exceed all expected pressures.

Hydraulically operated chokes, pump stroke counters, trip tanks "flow-show" meters, Kelly cocks, trip tanks and inside BOP's are all part of the well control equipment. These items are considered "standard" on arctic drilling rigs.

In addition to the basic equipment, mud logging functions would normally be used on exploratory work. This system provides continuous monitoring of the mud flow and other drilling parameters such as mud density, background gas, drilling rate and pore pressure.

The use of this equipment helps predict bottom hole pressures and consequently adjustments to mud density can be made before actually needed. Pit level indicators, pit watchers and continuous monitoring by the mud loggers are a normal part of well control. All of this equipment and measuring devices help insure minimal risk of a blowout.

Another area of concern is mud disposal. Mud cuttings are normally dumped in a reserve pit and then covered and reseeded. This system works quite well and the top soil removed is usually stockpiled so it can be used to cover the reserve pit.

Again, it is in the operator's best interest to minimize the fluids in the pit since "mud" costs money. By using solids control equipment such as shale, shakers, desanders, desilters and centrifuges only the cuttings end up in the reserve pit with minimal amounts of mud.

Mud monitoring is usually required and includes data on muds discharged, cuttings discharged, product concentrations and other parameters. Certain products may also be prohibited by the EPA, and the mud system must fall into one of their "generic" types. All mud additives are basically approved prior to actual drilling operations. Alot of effort is extended in these two areas, (blowout prevention, and mud disposal) and again our record to date in Prudhoe shows that we have done a good job.

Other areas of concern include water supply, fuel storage, and sewer discharge. Again these are closely monitored and spelled out in the permits.

Only deep water lakes will be used for water sources with screen hoses to insure no fish are pulled into the hose. Fuel storage is normally in double walled tanks set in a lined and boxed in area. Sewer discharge is monitored daily and all plants must have an approved system.

The agencies issuing the drilling permit set the ground rules and they also monitor the overall drilling program. Provided they do not put prohibitive restrictions in the permit we can meet and often exceed their requirements.

Once drilling operations are complete, the rig will be demobilized to Prudhoe Bay. Normal procedure is to clean up the location after demob and then return again in the summer to pick up any debris that was frozen in.

Other than a wellhead sticking up, many locations are difficult to find once final clean up has been done.

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IV. REGULATORY FRAMEWORK IN ARCTIC NATIONAL WILDLIFE REFUGE (ANWR)

A. INTRODUCTION

The mitigation measures directly applied as part of the opening of ANWR are not the only applicable mitigation measures. We believe the EIS in its discussion of potential impacts and mitigation should take fuller account of the extensive local, state and federal regulatory system already in place, and which has mitigated essentially all major impacts for existing North Slope developments. Oil and gas operations

which take place within the State of Alaska, whether they be conducted on federal, State, Municipal or private lands, are governed by a broad array of regulatory programs to insure the prevention or mitigation of environmental impact. The Arctic National Wildlife Refuge is no exception to this rule. The 1002(h) report does not acknowledge the importance of these programs, which are above and beyond any operating conditions and stipulations which the Department of Interior, Fish & Wildlife Service will impose on operations in that area.

B. FEDERAL PROGRAMS

On federal lands such as ANWR, federal agencies provide the primary regulatory structure governing oil and gas operations. The Department of the Army, Corps of Engineers and Environmental Protection Agency are responsible for implementing programs established by the Clean Water Act and the Clear Air Act. The Corps of Engineers is responsible for administering the Section 404 program which governs the deposition of fill materials in "waters of the United States," which includes wetlands. In its lead agency role it accepts comments from all interested state and federal agencies as well as the public in developing conditions and stipulations to mitigate or prevent any environmental impacts related to fill operations. Many of these conditions and stipulations in the

past have extended to restrictions on operations not directly related to the actual construction fill operations. By the imposition of these stipulations and conditions the interested agencies and the public have strictly controlled the type and quantity of operations which take place in those areas falling under the jurisdiction of the Corps of Engineer's program.

The Environmental Protection Agency and Fish & Wildlife Service play key roles in the management of the Section 404 program. Although the Corps of Engineers is the lead federal agency in managing the program, the Environmental Protection Agency has the authority to veto any Corps of Engineers' approval of a project which it considers to be a detrimental fill. Though this authority is rarely used, the potential that it might be used gives the Environmental Protection Agency a substantial voice in project reviews. Under the Fish & Wildlife Service Coordination Act the Fish & Wildlife Service also has substantial influence over what stipulations and conditions are imposed on a project, specifically relative to how such projects might impact fish and wildlife in the vicinity of the project area. Though the Fish & Wildlife Service does not have an absolute veto, it does have the capability of elevating a decision made at the local level of the Corps of Engineers to the headquarters offices of the Corps of Engineers and Fish & Wildlife Service in

Washington, D.C. This authority has a similar affect to that of the Environmental Protection Agency veto authority described above. Fish & Wildlife Service uses this authority more frequently. Such elevation makes the review process even more exhaustive and is one more guarantee that impacts will be prevented or mitigated, even when the quality and scale of impact is questionable.

The Environmental Protection Agency has primary authority over two important regulatory programs -- the Clean Water Act discharge program known as the National Pollution Discharge Elimination System (NPDES) and the Clear Air Act permitting program known as Prevention of Significant Deterioration (PSD). The NPDES program regulates the discharge of water or other fluids from a "point source." A point source is any means of transmitting or carrying or disposing of water or other liquids such as a pipeline, outfall line, hose or even a tanker truck. As a part of the Clean Water Act, this program dovetails with that of the Corps of Engineers under Section 404 to provide a complete system of regulatory coverage of water quality. The PSD permit regulates the discharge of elements into the air from operation of equipment, machinery, motors, and other devices. Both the NPDES and PSD programs require intensive coordination between the applicant and the Environmental Protection Agency, including the providing by the

applicant of large amounts of detailed specifications and chemical analyses. In the case of the PDS application, in particular, the process may take years to complete.

The regulatory umbrella described above provides complete coverage of land, water and air quality concerns. Superimposed on that coverage that is proposed by the Fish & Wildlife Service through the stipulations is proposed for application throughout the 1002 area, as well as the coastal zone management certification requirements described below.

C. STATE COASTAL ZONE MANAGEMENT

State agencies have the opportunity to influence the federal regulatory program on federal lands through the State of Alaska Coastal Zone Management Program. The State program was conceived with federal authorization under the Federal Coastal Zone Management Act of 1972. Since the approval by the federal government of the State program, it is required that federal agencies receive from the State of Alaska a certification that a given project or permit approval therefor, is consistent with the federally approved State Coastal Zone Management Program. Until the State of Alaska approves the administration of the State program by a local area, the Office of the Governor, Division of Governmental Coordination acts as

a clearing house for the comments from all interested State agencies. The ANWR lands fall within the coastal zone, as defined by the State program, and are therefore subject to this consistency requirement.

The interested State agencies include agencies such as the Department of Environmental Conservation and the Department of Fish and Game which are the counterparts of the federal Environmental Protection Agency and Fish & Wildlife Service. Accordingly, this program provides yet another layer of regulatory mitigation or prevention of environmental impacts.

D. CONCLUSION

The existing panoply of regulatory programs vitiates a perceived need for additional regulatory control. Any management program conceived by the Fish & Wildlife Service should take into account these programs which are already in place and not duplicate or layer further upon these programs.

V. TRANSPORTATION - SEA & ROADS

The discovery and subsequent production of large quantities of oil and gas in remote areas of the Arctic brought about the development of innovative logistical support systems,

insuring timely delivery of supplies and equipment under severe conditions without damage to the fragile environment.

A network of snow trails, offshore ice roads and ice landing strips combine to provide environmentally sound water transportation. Summer transportation may be accomplished utilizing barges and CATCO type low ground pressure vehicles.

Exploratory well pads made from ice have replaced the gravel pad further lessening the impact of exploration.

Equipment designed for the environmentally sensitive tundra has been developed and exhaustively tested in Alaska and Canada. The hovercraft and hoverbarges were designed to transport loads over water, sea ice and tundra without damaging the surface. For local tundra travel CATCO designed a top roller driven airbag tractor which traverses the delicate summer tundra without lasting effect. After many years of Arctic experience, industry has developed the equipment and more importantly an attitude of sensitivity in the work force so exploration and production can develop fields without environmental damage.

Transportation from coastal staging areas to particular well locations is easily done over the tundra by

all-terrain vehicles or by ice roads. Ice roads are constructed of ice and fresh water which allows conventional trucks to transport cargo over four to six inches of ice. This ice protects the tundra. Exhaustive tests have been done on the effects of ice roads on tundra degradation and compacting. The end results are no long term effect.

All-terrain vehicle design has evolved from tracked caterpillar type units, to low pressure tracked units, to rubber tired units and finally to low pressure soft pliant airbag units. The designing and utilization of the CATCO all-terrain vehicle has proven that operations over tundra in summer and winter operations can be completed with no degradation to the tundra. CATCO offers an innovative strategy in off-road heavy cargo transport. Designed to protect fragile ecosystems and get the job done, the CATCO is a lightweight vehicle that looks and handles like a truck but rolls on pliant, low-pressure airbags which allow the vehicle to "float" heavy loads over the ground. With this cushioning effect and a unique system of suspension and locomotion the CATCO can operate throughout the year on all types of terrain with a minimum of environmental disturbance. Most importantly is CATCO's experienced work force; when combined with the unique CATCO all-terrain equipment has an unsurpassed record of environmental safe operations in over 14 years of operation in the Alaskan Arctic.

The annual Sealift has developed equipment and techniques which allow the cost effectiveness of modular construction methods in developing production facilities. Since 1969 over thousands of tons of modules and general cargo have been delivered to Prudhoe, Kuparuk, Milne Point and Endicott fields. Development of ANWR would be considerably easier due to the perfected techniques of Prudhoe Bay.

VI. INTERNATIONAL COMMUNICATIONS

A Canadian government official, speaking at the ANWR hearing in Anchorage, contended that the oil and gas leasing issue should take into consideration the concerns of his country. The official reflected a sentiment that opening the coastal plain to leasing could damage the integrity of the Porcupine caribou herd, and thereby hurt the interests of Yukon Territory residents.

In addition, he said the U.S. Interior Department has not solicited input from Canadians regarding this "international issue."

In evaluating these comments, the following should be considered:

During the mid 1970s, the Canadian Arctic Gas Study Ltd., and its counterpart, the Alaskan Arctic Gas Study Company, engaged in a $200 million research project that examined the impact of development on caribou and other aspects of the arctic environment. The studies indicated that the impact of development could be minimized.

In addition, since the mid 1970s the state of Alaska and the United States Fish and Wildlife Service have discussed with Canadian officials mutual concerns about management of the Porcupine caribou herd. The discussions were motivated by pending settlement of lands issues, and proposed oil and gas leasing within the range of the herd.

Talks were suspended in 1980 pending resolution of domestic issues on both sides of the border. ANILCA resolved a major conservation issue for Alaska and the United States, and the Canadian government reached settlements with the Natives by 1985. These events set the stage for subsequent international negotiations. Now the two countries are nearing the point where an agreement can be written that will promote international coordination of management of the Porcupine caribou herd. The pending agreement will ensure the continued integrity of the herd.

National Wildlife Refuge Association

11405 Hawkins Lane
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January 26, 1987

Mr. William P. Horn
Assistant Secretary for
Fish and Wildlife and Parks
U.S. Department of the Interior
Fish & Wildlife Service
2343 Main Interior Building
18th & C Street, N.W.
Washington, D.C. 20240

Attn: Division of Refuge Management

Dear Mr. Horn:

This supplements previous comments made by the National Wildlife Refuge Association (NWRA) as transmitted January 15, 1987 by Mr. Forrest A. Carpenter regarding the draft Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment (1002) report released for public review on November 24, 1986.

To reiterate NWRA's position, we cannot support the Interior Department's recommendation of leasing the 1002 area, and we instead favor the "no action alternative" and urge that the Arctic NWR be managed for its intended purposes. This position is predicated in part upon the inadequacies of the 1002 assessment report. We suggest this report be redrafted to improve overall objectivity, organization, accuracy, completeness, etc., if indeed it is to be used as a decision-making document.

Our previous memorandum dealt with concerns in a general way and provided some examples in their support. These comments here deal with technicalities as a means of further substantiating the reasons underlying NWRA's position on this issue. These comments are neither complete nor exhaustive because this complex issue, together with the extensive deficiencies of the draft 1002 report, make the task of providing a comprehensive review too unreasonable for me to undertake at this time. Although these comments represent the tip of the iceberg, they amply demonstrate that the 1002 report is badly flawed. Our position is consequently well justified.

Chapter I, Purpose and Need for this Report is overly complicated, disjointed and superfluous in some instances. The purpose(s) of this report are not expressed in succinct terms; background material is excessive in some instances, incomplete in others; topical material is awkwardly organized. The organizational problem can be alleviated by placing the topic, Program Description and Implementation, together with the subtopic, Report Preparation, on page iv (now blank). Pages iv and v in the final report would thus have two topics: 1) Program Description and Implementation, and 2) Report Preparation which would include "Contributions to the Report" material appearing in pages iv through ii of the draft document.

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Dedicated to the preservation and perpetuation of the National Wildlife Refuge System.

The Baseline Study of Fish and Wildlife Resources section should be moved to the Fish and Wildlife Resources section on page 27 and the Oil and Gas Exploration Program section to page 47 to improve continuity and clarity, as well as to avoid cluttering the introductory chapter if there is to be one. A concisely written introduction would suffice in lieu of draft chapter 1. The introduction would incorporate the existing introductory material, report purposes and a more comprehensive review of legislative history (aside from ANILCA deliberation period as reported). The latter is important background material for readers to have a complete and accurate insight of the establishing process, resource values, and the vulnerability of these values under leasing incursions. In sum, the introduction should be limited to study purposes and scope, and that background material required to put problems and requirements in perspective. Guideposts should be included to help orient the reader.

In Chapter II, Existing Environment, the text contains misleading, contradictory, and inadequate information.

Page 21, Water Resources, the lead statement that "water resources are very limited" contradicts the reporting of 12 major riverine systems (29 percent of the 1002 area) and extensive wetland habitats (99 percent of the 1002 area).

Page 27, Fish and Wildlife Resources section inappropriately refers first to treaty obligations. This is not in context with the Existing Environment Chapter. Treaty and congressional obligations should be elevated to a separate, clearly-defined section and discussed in terms of their relationships to oil and gas leasing.

As mentioned, the page 11 Baseline Study of Fish and Wildlife studies should be part of the introduction (lead paragraphs) to the Fish and Wildlife Resources section beginning on page 27. The baseline study effort should be better described in terms of when and where studies were performed. Were studies, for example, limited to summer field periods or were they conducted throughout the year?

Baseline studies are ordinarily performed to determine specific biological parameters as a basis for monitoring change attributed to consequential factors. Considering this as a baseline study purpose, the species-specific information reported for some mammals, birds, and fish in the Fish and Wildlife Resources section does not reflect such a baseline study approach. We understand that the final baseline and 1985 update reports were not prepared in time for the results to be incorporated in the 1002 report. If this is true, then a statement to this effect should be made.

In certain instances, life history aspects presented for specific species are irrelevant and without bearing on 1002 report purposes.

Page 29, next to last paragraph, reference is made to an estimated 2- to 3 thousand post-calving caribou using the 1002 area and an additional 1,000 caribou located west of the Sadlerochit River and north of the Sadlerochit Mountains. Do these caribou use the 1002 area or not?

Page 30. The section on muskox does not report the number of animals using the 1002 area. If use varies seasonally, an average annual use figure would be important to document.

The Moose section does not recognize the average number of moose ranging in the 1002 area. In view of the 60 some staff years represented in the baseline study effort, i.e. 57 separate filed studies conducted over a five-year period, we would expect a substantive accounting of 1002 area moose and other large mammal populations. The statement that "moose numbers are probably less than 25 animals" should be a highlight of the lead paragraph rather than relegated to a supportive paragraph as drafted, for this single remark is the most meaningful "observation" in this section. Again, a crucial need is to quantify mammal use of the 1002 area, and while winter moose populations occurring outside the 1002 area is a noteworthy subject, such remarks have less importance and can thus be relegated to subordinate paragraphs.

Page 31, Dall Sheep. This section is superfluous unless Dall sheep occur within or proximal to the 1002 area. What is the linear distance between their Sadlerochit Mountain rangelands and the southern edge of the 1002 area? Mention of traditional Dall sheep range characteristics has no relevancy to the purposes of this report.

Page 31, Wolves. This section has no substantive value. Using a density estimate reported by biologist Mech is invalid for the Arctic Coastal Plain. To see a wolf in the 1002 area would be an absolute rarity. A partial reason for wolf (and wolverine) scarcity along the coastal fringe is their vulnerability to Native hunters using snowmachines. Some life history material here is not relevant to report requirements.

Page 31, Arctic Foxes, has no substantive value. Ideally, it would be useful to show density estimates for the 1002 area during years of low, moderate, and high levels of abundance, but evidently this was not an objective of the baseline studies unfortunately.

Page 31, Wolverines. It is utterly ridiculous to use density figures reported by Magoun (an unexploited wolverine population in the mountainous foothill habitats of the Petroleum Reserve) as a basis to estimate a heavily exploited wolverine population occupying flat open terrain of the coastal plain. Wolverine, like wolves, would expectedly be as scarce as hen's teeth here during the optimum observation period of winter. How many wolverines were observed when they scavenged caribou during May and June, and in June and July when they preyed on birds and eggs as reported? Do ADF&G pelt sealing records reveal the locations wolverines were actually taken?

Page 32, Brown Bears. This section has substantive content and this, along with the caribou presentation, serves as a baseline information model that should be used to report other mammals of socioeconomic significance.

Page 32, Arctic Ground Squirrels and Other Rodents. This section contains life history information of little importance to the report's purposes. Ground squirrel density estimates should have been obtained during periods of low, moderate, and high levels of population abundance. In the absence of such information, this section should merely describe species present and a statement to the effect that arctic rodent populations exhibit cyclic fluctuations.

Page 39, Subsistence Use. With reference to the second paragraph statement that, "aside from Kaktovik, villages dependent upon PCH caribou are considered only generally," appears to be overly simplistic. Arctic village and Old Crow, for example, may have a greater need of PCH caribou than Kaktovik residents who have greater access to marine and fish resources.

Page 41, last paragraph, with reference to whaling, lead sentences are confusing. What is meant by "historic period?"

Page 45, Recreation. This section contains little quantified information on recreational use of the 1002 area. If there is an explanation for not having conducted a recreational use survey during the five-year study period, it should be presented in this section.

Wilderness and Esthetics. This section does not provide enough descriptive background to adequately inform the reader about wilderness qualities. Are abandoned DEW-line sites part of the wildland environs or deemed to be obtrusive and in conflict with wilderness classification? We find this section scant--considering the importance of wildland resources relative to the implications of oil and gas leasing.

Page 46, first paragraph, reference the statement that the entire 1002 area could meet the criteria. We suggest, truthfully, that the word "does" should be used in place of "could."

Chapter III, Assessment of Oil and Gas Potential and Petroleum Geology of the 1002 Area points to disproportionate reporting of assessed resources. This is a wildlife refuge, not a petroleum reserve. As drafted, the oil and gas potential was described in 24 pages of a single chapter compared to 11 pages and sectional treatment of fish and wildlife resources.

Page 50, Significant Findings and Perspectives. This section, reference Figure III-2, contradicts the proposition that the 1002 area is the "most outstanding prospect in the USA." This figure compares estimated recoverable reserves with proven fields. Recoverable amounts (95%) depicted are far below that of largest known fields.

Page 54, in reference to the statement that "exploratory drilling would resolve the questionable presence of Ledge Sandstone rocks, as an indicator of oil deposit," it appears to conflict with the full leasing recommendation in lieu of the further exploratory drilling alternative.

Page 91, Chapter V, Alternatives. The statement in reference to not leasing or developing the "traditional core calving area" merits an explanation as to why this exclusion instead of the "concentrated calving" area. The use of the terms "concentrated" and "core" is confusing. Plates (maps) contained in the report envelope are difficult to interpret. We suggest clearly delineating the peripheral boundaries of the traditional core and concentrated calving areas on these maps.

Page 93, reference to comprehensive conservation planning (CCP) process in second paragraph, it is prudent to include the 1002 area, "the most biologically productive part of the refuge," in the ongoing CCP effort for obvious reasons. Again, this is a refuge, not an oil reserve, and Congress must render a decision on both the Interior Department's 1002 report recommendation and the "preferred alternative" advanced by CCP document for the Arctic Refuge. If the 1002 area leasing recommendation prevails, what management category, i.e., intensive, minimum, and traditional, will apply to the 1002 area?

Page 94, reference to ANILCA, Section 1010, implies use of motorized equipment throughout the entire refuge when, in fact, this section applies only to the most southerly part of the refuge. Impartial or distorted reporting of this nature reflects negatively on agency credibility.

Pages 97-98, Chapter IV, Environmental Consequences, in reference to FWS mitigation policy, this bureaucratic verbosity does little to improve the quality of this report nor the reputation of the FWS. If it comes to employing mitigation measures, it would seem necessary to consider steps to minimize degradation of the wildland resource which, after all, is a prime factor for originally designating the Arctic Range. The habitat resource categories may fit a typical refuge, but the Arctic Refuge's wildland uniqueness warrants special consideration.

Page 99, Alternative A, reference the environmental effects of ice roads and airstrips, and reported nil effects on arctic tundra, is without scientific basis. Repeated use of ice structures alters the microclimate and prolonged physical changes would indeed effect tundra ecology. A number of studies relative to motorized equipment and ice road use support this thesis. Scars left by the "Hickel Highway" (ice road used to freight supplies to Prudhoe Bay during Hickel's administration as governor of Alaska) are still much in evidence today.

Pages 104-105, Sadlerochit Special Spring Area, in reference to use of water, the best mitigation measure in this special case would be avoidance. Under no circumstances must water removal be allowed. The statement that "full leasing, and implied use of spring water, would have negligible effect on this special area" is an absurdity.

Page 108, reference next to the last paragraph, on effects of leasing the 1002 area on caribou calving. According to this report, the Interior Department's recommendation blatantly violates FWS mitigation policy. The loss of existing habitat value conflicts with the purpose of refuge establishment and flaunts congressional management and conservation mandates.

Page 111, Mitigation section, in reference to measure numbers 8 and 9 whereby herd size would be monitored toward determining adverse effects of leasing, should not be viewed as a mitigative measure unto itself. This is a procedural activity and not mitigative by definition. Annual surveys are standard refuge and state game management practices. Other measures reported are too general and nebulous to be as definitive as this section should be for a decision-making document.

Pages 114-125, concerning conclusive effects on major species, are misleading, incomplete, and incorrect. Alterations of habitats, particularly in productive riparian zones associated with development and water removal, would have substantial effects on moose and other wildlife. Increased hunting and sportsfishing pressure would have an adverse effect on population composition and productivity. To say that regulatory

adjustments could be made to offset use effects is too simplistic and irrational considering that the regulating mechanism is already overburdened and stressed from addressing regulatory problems in the more accessible parts of Alaska, let alone the remote Arctic. Intelligent conclusions are difficult to draw in light of the superficial baseline studies pertaining to wolves, Arctic fox, and wolverine. Major declines in respective populations and brown bears can be anticipated. The statements that "brown bears are not readily displaced by human activities" and "bears along the TAPS corridor became habituated to development" are absolute absurdities. As a wilderness critter, brown bears are readily displaced by human activity. Immature and yearling family groups exhibit a proclivity to habituate human developments, but this should not be construed to mean all brown bears react accordingly. Black bear habituation poses a different problem. The loss of immature and family group brown bears, either through habituation or natural mortality factors, is a normal aspect of population ecology. Other population components, mature males and females, females with young of the year, and many subadult bears will be affected by leasing developments. The conclusion dispelling the impact on fish does not recognize the effect of water removal.

We could elaborate further upon this report, but quite candidly, the quality of this report should reflect the ability of the authors rather than the comprehensive input of its reviewers. Considering the time, personnel, and funds allocated for the 1002 assessment study, we who understand what's going on and what may happen have every reason to be disappointed with the Interior Department's recommendation and the myopic manner in which it was formulated.

Sincerely yours,

Richard J. Hensel
Alaska Representatives

RJH:sw
33C/160a

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January 23, 1987

U. S. Fish and Wildlife Service
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Washington, DC 20240

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The Animal Protection Institute requests that the following comments on the Arctic National Wildlife Refuge Draft Coast Plain Resource Assessment be entered into the hearing record and addressed more fully in preparing the final plan. Having read the assessment, we are opposed to oil and gas development in the areas of the Arctic National Wildlife Refuge (ANWR) as proposed by section 1002 of the Alaska National Interest Lands Conservation Act (ANILCA).

The Department of the Interior's selection of Alternative A - "Full leasing of the 1002 area" - completely ignores the findings of the U.S. Fish and Wildlife Service that a long-term commitment to oil and gas development, production, and transportation would inevitably result in long-term losses in fish and wildlife resources, subsistence uses, and wilderness values.

The report minimizes the impact of development on the Porcupine caribou herd with the statement that the TAPS pipeline has had "minimal impact on wildlife resources" and projects this conclusion to the circumstances surrounding the Porcupine herd. We believe that this is not a valid assumption, since the Central Arctic caribou herd does not migrate from a winter range to a coastal calving ground as does the Porcupine herd. The density of calving caribou on the Porcupine calving grounds is 14 times greater than the density of calving caribou

continued . . .

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on the Central Arctic herd's calving grounds.

In light of the reported displacement of calving Central Arctic caribou resulting from oil development at Prudhoe Bay (1), it is reasonable to expect that not only will displacement of calving occur on the ANWR, but that displacement will be more severe due to the increased density of caribou on the ANWR calving grounds. This is alluded to by the statement on page 112 of the report which says (in reference to calving Porcupine caribou), "Given the geography of the calving areas and the current densities in those areas, the availability of suitable alternative habitats is not apparent." Clearly, if calving caribou are displaced, they will be displaced to habitat not conducive to successful calving which would result in a population decline for the Porcupine herd.

Immediately after calving, herds of caribou cows and calves form in the area south of Camden Bay (a proposed drilling site). These herds move constantly to forage and find habitat providing shelter from the millions of mosquitos which hatched around calving time. Mosquitos are a major cause of calf mortality. It has been demonstrated (Curatolo and Murphy, 1983) that mosquito-harassed caribou herds do not readily cross under elevated pipelines. The development of main and subsidiary pipelines south of Camden Bay would provide an additional stress on the caribou at a time when it could not be tolerated, e.g. when newborn calves and their mothers have the lowest energy reserves of the year. We believe this would magnify the effect of calving displacement and lead to further decreases in the size of the Porcupine herd.

The Interior Department's recommendation also ignores the USFWS finding that muskoxen - a species successfully reintroduced to the Arctic Refuge - could be affected adversely by the destruction of habitat values on nearly 75 percent of the areas heavily used for calving. A decrease in the productivity of muskoxen, due to displacement of calving activity, appears to be in direct opposition to the ANWR's stated goal of encouraging a healthy growth of the muskoxen population.

As reported by USFWS biologists in the assessment, other wildlife species (vertebrate and invertebrate) and native plant species will be impacted, some to a greater degree than others, but all will be adversely affected by direct oil and gas development, auxiliary activities, and possible contamination from spills and leakages. To

disrupt critical breeding areas of caribou, muskoxen, and waterfowl, among other wildlife, in order to recover an unsubstantiated amount of oil when producing wells are currently being capped throughout the United States, provides a weak argument for the full or partial leasing of the ANWR at this time. Equally nonsensical is the practice of promoting oil drilling on the North Slope based on current and future consumption estimates, while at the present energy conservation programs are tossed aside in favor of more consumptive choices.

The Animal Protection Institute of America takes a firm position in believing that opening the Arctic National Wildlife Refuge to oil and gas exploration will set a precedent to opening other refuges and wilderness lands to exploitation detrimental to the health of native plant and animal species and is in direct conflict with the goals of the Department of the Interior and its divisions to protect and preserve these species as national treasures and for the benefit of the people of the United States and future generations.

We recommend that the Secretary of Interior designate the Arctic National Wildlife Refuge as a wilderness area.

Most sincerely,

Catherine A. Smith
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CAS/bms

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ARCTIC AUDUBON SOCIETY

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U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, NW
Washington, DC 20240

January 30, 1987

Dear U.S. Fish and Wildlife Service:

O-168

The Arctic Audubon Chapter of the National Audubon Society is pleased to respond to the U.S. Fish and Wildlife Service's (hereafter FWS) Report and Recommendation to the Congress of the United States regarding the future management of the coastal plain area of the Arctic National Wildlife Refuge (Arctic Refuge). Arctic Audubon, with a membership of 320 residents, recently "adopted" the Arctic Refuge as part of the National Audubon Society's "Adopt-A-Refuge" program. This reflects the special interest of chapter members in the Refuge and it commits us to active service toward wise and benevolent stewardship for the Refuge.

The FWS Report and Recommendation to Congress, which is a resource assessment of 1.55 million acres of coastal plain within the Arctic Refuge and a recommendation for management policy, was mandated by Section 1002 of the 1980 Alaska National Interests Lands Conservation Act (ANILCA). The "1002 area" (that part of the Arctic Refuge defined as the "coastal plain" by Section 1002(b) of ANILCA) required special treatment, independent from the Comprehensive Conservation Management Plan process for the rest of the Refuge, due to Congressional hesitation to act on this part of the refuge without accurate and adequate information regarding both the oil and gas potential of the area and the wildlife and wilderness values. To gather comprehensive information, to provde it to Congress in comprehensible and useful terms, and to recommend management policy for the area based on this data, was the point of the report.

In brief, we disagree with the Executive Summary of the 1002 report and belive that the Arctic Refuge is best managed under Alternative E, with wilderness designation. This is the best way to permanently protect the refuge in a manner consistent with the purposes for which it was established, the conservation of unique wildlife and wilderness values.

Arctic Audubon finds the report profoundly flawed. There are numerous errors in scientific detail and there are illustrations of bad faith in the execution of the process. The following comments, while not totally inclusive of all objectional assumptions and items, summarize our response to the "1002 report."

PRECONCEPTIONS AND BIAS

It should be kept in mind that it required a lawsuit by several Alaskan environmental organizations to make the FWS "1002 report" available to the public and open to public comment. Although court action required public hearings and time for public comment, FWS held hearings in only two Alaskan locations, Anchorage and Kaktovik. This omitted two critical locations for hearings: Arctic Village, a Native village south of the Arctic Refuge which will certainly feel impacts from any decision regarding its resources, and Fairbanks, the hometown of one of the organizations originally requesting hearings. Fairbanks is the northernmost urban area in Alaska and is the home of thousands of citizens with interest in the future of the Arctic Refuge. Arctic Audubon had to allocate membership dues for plane fare to have our organization represented at the Anchorage hearings, as did other small, nonprofit organizations.

Furthermore, the two hearings were held during the first week of January, close on the heels of Christmas and New Year's during which many people are out of down, and decidedly inconvenient for those of us who remained. And, finally, the period for public comment was originally only 60 days as compared with a more usual 90 day comment period, and was extended by two weeks only after the request of the Governor of Alaska.

This peculiar timing and haste on the part of FWS is attributed by agency personnel to the fact that the report was late and they were hurried. However, the report was more than three months past deadline already. The decision to make up time lost by government personnel, at the expense of public comment on what is by law a public process, seriously calls into question agency regard for citizen input.

In addition to the above difficulties, the report itself contains many subtle indications of bias toward industrial development of the Arctic Refuge. These include:

a) language patterns favoring development, i.e., on page 84 and with increasing frequency thereafter, "will" instead of "would" is used when describing oil development, thus strengthening the assumption of this eventuality;

b) very tentative language when discussing wilderness values, i.e., page 131 states, "Most recreationists...might perceive the existence of oil facilities in the area as lessening the quality of that experience." We think "would" is more accurate than "might";

c) the disproportionate discussion of oil and gas values (24 pages) when compared to the discussion of wildlife values (11 pages) and to the startlingly cursory discussion of wilderness values (five paragraphs).

CONFUSING AND CONTRADICTORY PRESENTATION OF EVIDENCE

More important than a suspect process and some questionable overtones to the text, however, is the confusing and oftentimes misleading manner in which the scientific research and data are presented. The confusion is so extreme that the report contains numerous contradictory statements and conclusions on pivotal issues. Some examples, which do not exhaust the list which has been culled from the report, follow:

a) By discussing the oil-bearing geology of the Prudhoe Bay area and by noting the proximity of the Arctic Refuge area to Prudhoe, the report suggests that the geology of the 1002 area is similarly, significantly oil-bearing. The evidence is confused:

Point: "All of the oil production in the Prudhoe Bay-Kuparak River field areas is from rocks of the Ellesmerian sequence." (p.54)

"The Ledge Member [of the Ellesmerian sequence]...is the main producing reservior at the Prudhoe Bay field." (. p. 56)

"The Shublik [shale, of the Ellesmerian sequence] is considered to be an important oil-source rock for Prudhoe Bay oil." (p.56)

"Parts of the Kingak [shale, of the Ellesmerian sequence) are thought to contain enough organic matter to be a source rock for some of the Prudhoe Bay oil and gas." (p.56)

"Analyses of different rock units throughout northeastern Alaska (-location of the Arctic Refuge) indicates that the Shublik Formation, Kingak shale, pebble shale unit, Hue Shale, and shales in the Canning Formation may be potential oil or gas source rocks. The first three units are considered to be the source for the oil in the Prudhoe Bay field." (p. 62)

Counter-point: "Analysis of the oils from seeps and stained outcrops in or adjacent to the 1002 area, and of the different potential source rocks, suggests that the Hue Shale is the most likely source rock in the 1002 area. None of the sampled oils are similar to Prudhoe Bay oil." (p.62)

"In addition, the distribution of the Shublik and Kingak is not known, and because of the pre-pebble shale erosion, these rocks may not be present in much of the 1002 area." (p.62)

"If most of the Ellesmerian rocks are missing in most of the 1002 area, the assessment number would be reduced considerably." (p.54)

"Well control west of the 1002 area and seismic data indicate that most of the Ellesmerian sequence is missing in the northwestern quadrant of the 1002 area, but seismic data suggests that a significant part of the sequence may be present in the eastern part of the area." (p.54)

"Such fault-bounded blocks [as the Ellesmerian rocks] are well known in the Prudhoe Bay area, but have not been identified thus far on the seismic data in the 1002 area." (. p. 67)

These confusing and contradictory statements attest to the wisdom of the suggestion on page 54: "If most of the Ellesmerian rocks are missing in most of the 1002 area, the assessment number would be reduced considerably. Drilling one or two wells in critical areas would resolve this question." But these statements could not support the conclusion on page 50: " The 1002 area is clearly one of the most outstanding prospective oil and gas areas remaining in the United States" since the evidence of what it may contain is unclear.

It should be remembered that the whole discussion is within the context of an 81% chance that no oil will be located at all, let alone the 5% conditional probability that, if any oil at all is found, it will be of the Prudhoe Bay field size. The computation of conditional probability puts the liklihood of a large oil find, realistically, in the arena of 1%.

Regarding consideration of gas as a potential resource in the 1002 area, the conclusion above appears to be directly contradicted by a passage from the same page, "Gas was not included in the calculation of economically recoverable resources. Gas resources are unlikely to be *economic at any point in the time period being considered.*"

II. On page 50, the bar graph at Figure III-2 compares the estimated recoverable reserves of oil on the Arctic Refuge with those of proven fields. For all possible prospects on the refuge, the most likely estimates are well below most of the largest known fields. Yet the paragraph at the top right of the page (cited above) concludes that the area is one of the most outstanding prospects in the United States. This conclusion does not follow from the graph on which it is supposedly based. Rather, the graph indicates that there is a 95% chance to the contrary. The use of this bar graph and the statistics it claims to show are confusing and misleading.

III. Similarly, the statistical chart on page 50 (Table III-1) is ambiguous and potentially misleading. The caption states that the "figures do not reflect the risk that economically recoverable oil resources may not exist in the planning area." Does this mean that the risk (This refers to the 81% chance that there is no economically recoverable oil in the 1002 area at all, as discussed in the report.) ...is not calculated in to the figures presented for the 1002 area, or that the same risk is not calculated into the figures for all areas being compared? If the former is true, the comparison (the point of this chart) is invalid. If the latter is true, all relevant data (the conditional risks for the other areas) is not provided and the comparison is useless. Either invalid or incomplete, the "data" presented are confusing.

IV. A paragraph on page 106 discusses that studies have noted an increase in the Central Arctic Caribou Herd since the Prudhoe Bay oil field has been developed in their area. (Oil industry documents make frequent use of this fact.) However, the report correctly states on the same page that,

"Analogies comparing the effects of current oil development on the Central Arctic Herd and *effects of potential 1002 area development on the* Porcupine Caribou Herd must be drawn with caution. ...the PCH would interact with oil development much more extensively and intensively than the CAH has interacted with oil development in the Prudhoe Bay area."

The discussion of mitigation measures beginning on page 111, which admits that Resource Category 1 (no loss of habitat) is impossible should oil development take place, concludes that even with the mitigating stipulations, the population decline and change in distribution could be *as severe as from* 20-40% of the Porcupine Herd. (Paragraph 3, page 112; also summarized on page 144). In the same paragraph on page 112, the report states that the estimate is uncertain, due to the many variables involved, the lack of experience with this herd, and the difficulty in quantifying impacts.

The significance of this projection for the Porcupine Herd is not so much the figures themselves as another consideration: the Baseline Study reports for the Arctic National Wildlife Refuge, required by Section 1002 (c) of ANILCA, and upon which much of the wildlife data for the coastal plain report was to have been based, was not made final and distributed until the third week in January. It is difficult to make or evaluate population projections at all, and especially so without access to baseline studies. It is unclear how this projection of a possible 20-40% herd reduction or dislocation was computed, and without clarity on this point, the figure is worse than uncertain, it is meaningless. The impact of oil development on the Porcupine Caribou Herd could be significantly less than the 20-40% figure or it could be several times more severe.

Nowhere in the 1002 report is it acknowledged that projections of wildlife populations and the impacts upon them by industrial development are wildly unpredictable, and therefore, that suggested mitigation measures are merely theoretical constructs.

V. The narrative discussion of the contribution that the possible 1002 area oil would make toward reducing national dependence on imported oil states,

> "Production of oil from the 1002 can also help achieve this Nation's national economic and security objectives..." and

"Thus, the 1002 area's oil may be able to significantly reduce the economy's vulnerability to world oil market changes." (p. 164) and

"In summary, the 1002 area has a very significant potential to contribute to the national need for oil." (p. 166)

However, the data which support these statements is presented in Table VII-2 (p. 162) and the data there are unclear. Do these figures reflect the conditional probability regarding whether oil will be found in the 1002 area at all? If not, they are misleading. If so, do they reflect the high, optimistic projections of potential oil reserves? Or do they reflect the lower, conservative projections? Without this information, the use of the statistics as evidence for anything is ridiculous. The presentation of data is confusing and irresponsible.

VI. In the discussion of Alternative A and the impacts of this alternative on recreational uses of the areas, the report states that some hunted and trapped species might be displaced, thus lessening opportunities for these activites. The report continues,

"Because much of that displacement would be from the area in which firearms could not be discharged and access would be restricted, the net effect on hunters would be negligible." (p. 131)

The report writer has neglected to consider that "firearms could not be discharged and access would be restricted" when he concludes that the impact on hunting will be negligible. On the contrary, it appears that hunting would be prohibited. Where? Over how much of the 1002 area? Within all private lease holdings?

It is important to recall that although wilderness status and other conservation designations are charged with the alledged unfairness of a land "lock up", there is no greater "lock up" than private ownership or private management which precludes public access.

The statement regarding negligible impacts on hunting is misleading and is contradicted in the very paragraph which contains it.

VII. The discussion of Alternative B includes the statement that the impact of this alternative on the muskox population would be the same as under Alternative A (p. 134). Impacts of Alternative A are considered to be "major", with the possibility that the animals would be displaced from 71% of their high-use, year-round habitat (p. 114). Yet, the discussion of Alternative B and muskox concludes with, "Therefore, effects of limited development would be moderate." (p. 134) These statements are inconsistent. Would the impact be major or moderate ?

VIII. A final example of confusing and incomplete data follows: the report states that one exploratory well would require as much as 15 million gallons of water (p. 76). The report also states,

Specific locations and sources of water and gravel for exploration and development activities have not been identified; and it is understood that these resources, especially water, are not readily available on the 1002 area. (p. 75).

The report refers to this absence of the necessary water and gravel as an "engineering problem" (p. 76) but does not address that it is poses tremendous economic and environmental problems also. The report suggests possible scenarios which might locate "a suitable water source" but it does not settle on one solution over the others.

This omission calls into question all projections of economically recoverable oil since apparently the cost of "the major engineering problem" (p. 76) is not computed into the formula. Further, it calls into question all assessments of imapcts on wildlife and habitat since the report does not discuss answers about where the 15 million gallons of water per well will come from.

These are but a few examples, some critically important and some less so, of contradictory statements within the report and of the confused presentation of data and evidence. They suggest that the report was prepared with haste that jeopardizes its validity or that conclusions were drawn on the basis of something other than the research provided. Nowhere is this more graphically illustrated than by the following statements, when compared with the whole conclusion drawn by the report:

"If most of the Ellesmerian rocks are missing from most of the 1002 area, the assessment number would be greatly reduced. Drilling one or two wells in critical areas would resolve this question." (p. 54)

"Only actual exploration can provide the information needed to determine the extent and distribution of the resources, and, therefore, the potential benefit to the economy." (p. 166)

In the face of such clear recommendations in the text, the numerous admissions of inadequate evidence and uncertain projections, much confused data, and the option of a Management Alternative (Alternative C) which would respond explicitly to all three, the Interior Secretary's Recommendation is drafted instead in support of Alternative A, the full leasing to private development interests of the whole 1002 area. Why?

The report says clearly,

"The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America." (p. 45)

and: "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge." (p.46)

Despite these outstanding natural values and the acknowledgement of the serious, deleterious effects on them from industrial development, ("Oil and gas development will result in wide-spread, long-term changes in wildlife habitats, wilderness environment, and Native community activites." p.6) the Department of Interior recommends full leasing. The recommendation is supposedly on the basis of the "1002 report" the body of which, in fact, explicity recommends that more information is needed before we really know what oil potential exists.

The Secretary's recommendation is inconsistent with the data presented by the Fish and Wildlife Service and there is no rationale provided for the radically development-oriented recommendation made by the report.

INCOMPLETE COVERAGE

In addition to the biased overtones and in addition to confused and contradictory presentation of evidence, there is a third major area of concern about the "1002 report." This is the vacuum within which it seems to have been written and the lack of information provided to Congress regarding numerous relevant contexts. For example, the report :

1. leaves out discussion of the fact that pro-development and pro-conservation interests have negotiated extensively on Alaska's north slope acres already with the result that almost 90 per cent of the slope is open to oil and gas leasing. The expansion of the Arctic Refuge in 1980 (ANILCA) was a compromise position which reserved only 2 million acres of the North Slope for conservation. The "1002 report" should make this context clear and perhaps would have, had it not skimmed so rapidly over the legislative history of the area and the background of Congressional intent.

2. leaves out discussion of impacts on fish and wildlife habitat from oil and gas development within the 1002 area, given that the rest of the coastal plain is already available for development. I.e., the report suggests that the population decline and change in distribution of the Porcupine Caribou Herd could be as great as 20-40%, but this assumes there is remaining, similar, adjacent habitat for the animals to relocate to. Similarly, the report suggests that the muskox population could be displaced from 71% of their high-use, year-round habitat, and the assumption is that they would go somewhere else. Since the Arctic Refuge is the sole remaining land area on the north slope protected from oil and gas development, the report should have analysed impacts on wildlife given that the rest of the plain may also be developed.

3. leaves out discussion of the additional 24 million acres of nearshore (state) and offshore (federal OCS) lands available in the adjacent Beaufort Sea for oil and gas leasing. The current activity in this area, from the amounts of oil and gas available and amounts produced to impacts on north slope and offshore wildlife and habitat is pertinent to decisions regarding the 1002 area.

4. leaves out discussion of the oil resources available within the National Petroleum Reserve-Alaska , the 37,000 square mile reserve established by the Federal Government in 1923 due to its high oil potential. This national resource was specifically set aside to be

explored and developed in time of national need, but despite charts in the 1002 report which graph the alledged scarcity of reserves, this area (in as close proximity on the west to the Prudhoe Bay field as the Arctic Refuge is on the east) is omitted.

5. despite the many claims regarding our national need for petroleum resources, the report leaves out discussion of the 1986 National Appliance Energy Act. This legislation would have provided a no-risk, certain savings of millions of barrels of oil (not to mention billions of dollars on utility bills) which would have made development of the Arctic Refuge unnecessary. Passed overwhelmingly by both houses of Congress, President Reagan vetoed this bill. He has also opposed the establishment of fuel efficiency standards for automobiles and the continuance of the 55 mile/hour speed limit. Claims by the Department of Interior that the nation needs new oil loose their teeth when the Administration acts as if the nation doesn't. This and other similar energy-saving plans should have been discussed in Chapter VII: National Need for Domestic Sources.

6. leaves out discussion of the politically sensitive and highly secretive proposed land swaps between the federal goverment and Native corporations, whereby lands within the 1002 are to be traded into private ownership. Clearly, private inholdings in the area affect management plans, and these very controversial swaps are germane to the 1002 report. The swaps themselves undermine directives to DOI in ANILCA, and the lack of discussion regarding them in the 1002 report undermines the integrity of the report.

7. leaves out discussion of Chevron's test well drilled within the coastal plain (on private land) which produced significant information about the potential for oil and gas in the area. These proprietary data are available to only a few . Even the existence of these data, however, was omitted from the report.

8. leaves out discussion of research on environmental impacts of the Prudhoe Bay development on air and water quality, which would be extremely important information for any similar industrial development in similar country. Additional research and impact studies on wildlife populations, many of which were conducted within the boundaries of the 1002 area and done by FWS staff, were not reviewed in preparation of the report. A partial listing of pertinent studies on arctic oil development impacts is attached to this letter as Appendix A.

9. leaves out discussion of wilderness, for all practical purposes. The report includes five short paragraphs about potential wilderness status for the 1002 area, but neglects to mention the two formal wilderness studies that have been conducted for the 1002 area, including the USFWS (1973) study for the entire wildlife range and a second study (Thayer, 1982) conducted on the 1002 area specifically. Both studies found the 1002 area especially suitable for wilderness status, but none of this information is reflected in the five paragraphs of the present 1002 report which address wilderness.

The omission of a thorough wilderness review, which was mandated by ANILCA Section 1317 for all nonwilderness lands in the national parks and national wildlife refuges, is egregious. Furthermore, wilderness review for the 1002 area is specifically required by ANILCA Section 1004 as well. Wilderness status for the 1002 area is not being addressed in the Arctic Refuge Comprehensive Conservation Planning process because that process explicitly excludes the 1002 area. But the 1002 planning process has also shunned the wilderness review required by law.

RECOMMENDATION TO THE DEPARTMENT OF INTERIOR

Although, as indicated above, a reasonable conclusion from the text of the 1002 report as it is now written would be Alternative C, the report has serious omissions and biased emphases. Significantly, it failed to adequately address the Public Land Order which created the Arctic National Wildlife Range in 1960 and the purpose of that land stated there: "to preserve...unique wildlife, wilderness and recreational values." In 1980 when the passage of ANILCA changed the Arctic Range to the Arctic Refuge, the following explicit and primary purposes were added to the management directive:

1.to conserve fish and wildlife populations and habitats in their natural diversity;

2.to help the United States fulfill its international treaty obligations;

3.to provide opportunities for continued subsistence uses by local residents; and

4. to ensure the water quantity and quality of the natural area.

There is no interpretation of the 1002 report which does not admit to the fact that oil and gas exploration and development in the 1002 area will seriously affect the wildlife and wilderness values listed within the original legislation which created the Arctic Refuge. While there may be debate on whether portions of the wildlife can be maintained during oil development, it is incontrovertable that , as wilderness, the area will be destroyed. The coastal plain is flat. The air there is pristine, and crystal clear. Even small sounds carry easily and almost eerily over the undisturbed flatlands, and the presence, even ten miles in the distance, of oil wells, burning industrial wastes, and aircraft, would be a travesty.

Hence, Arctic Audubon joins with the National Audubon Society and the environmental community across the nation in recommending to Congress Alternative E for management of the 1002 area. Only true wilderness status is grand enough for this remaining area of untouched Arctic coastal plain. And only this choice is wise enough to protect this land in the name of current and future national interest.

Your consideration of our comments and recommendations is greatly appreciated.

Sincerely,

April E. Crosby, Conservation Committee Co-Chair
Arctic Audubon Society

Attachment

cc: Honorable Steve Cowper, Governor
Senator Frank Murkowski
Senator Ted Stevens
Representative Don Young
Representative Bennett Johnston

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Comments re.: Department of Interior
November 1986 Draft Arctic N.W.R.
Coastal Plain Resource Assessment

From: Martha K. Raynolds
1099 Farmers Loop
Fairbanks, AK 99709

I appreciate the opportunity to comment on the Draft ANWR Coastal Plain Resource Assessment, and sincerely hope that the deficiencies pointed out in my comments and others' will be addressed in the final document. I thought most of the report was well prepared, but found several problems with Chapter VI Environmental Consequences, and found the Executive Summary to be a very poor representation of the contents of the report. I also disagree with the Interior Department's conclusion that Alternative A, full leasing of the coastal plain, should be the recommended alternative.

1. Water and Gravel Resources
The problems caused by lack of water and gravel resources on the coastal plain are not adequately addressed. Although their scarcity is mentioned, the alternative measures which would be required to extract the gravel and water required for development are not fully described. Consequently, the impacts which would be caused by gravel and water extraction are not covered in Chapter VI.

2. Central Arctic Caribou Herd
The impacts of development on the Central Arctic Caribou Herd (CAH) are not adequately described. The discussion in Chapter VI does not include the impacts due to the pipeline and road which would be required to join the 1002 area to the Trans-Alaska Pipeline (TAPS). This east-west connecting corridor would be a prerequisite for development of the 1002 area. It would have a very significant impact on the CAH, by cutting across its summer habitat, used for calving and insect relief. The impacts of this pipeline and parallel road must be included in the discussion of the impacts of development of the 1002 area. The impacts to the Porcupine Caribou Herd are thoroughly addressed.

3. Petroleum Resource Potential
Chapter III states that there is a 19% chance of there being an economic size accumulation of oil and gas on the coastal plain. The Executive Summary does not even mention the 81% probability that NO economic oil or gas exists in the coastal plain. It only discusses the probable size of such an accumulation, should it occur. This is very misleading. The full probabilities of finding oil and gas should be presented very clearly in the summary.

4. Discussion of Impacts in Executive Summary
The Executive Summary glosses over the impacts of development as described in Chapter VI. The statement, "Most adverse effects would be minimized or eliminated through carefully applied mitigation....exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence it is reasonable to assume that development can proceed on the coastal plain and generate similar minimal effects.", is EXTREMELY misleading. First, the impacts to caribou, muskox, and snow geese, as described in Chapter VI are MAJOR impacts that cannot be mitigated. Secondly, development at Prudhoe Bay has had some very significant impacts on wildlife in the area. And thirdly, the Prudhoe Bay area is not directly comparable to the 1002 area. The ANWR coastal plain provides much more critical habitat for caribou, muskox and snow geese than Prudhoe Bay ever did. Most of the impacts of the recommended Alternative A are very clearly stated in Chapter VI, and should be included in the Executive Summary.

5. Recommended Alternative
Personally, I would recommend Alternative E. If and when oil and gas resources become so scarce and precious (as they are clearly NOT right now) that we should risk the wildlife and wilderness resources of the ANWR coastal plain, an act of Congress could allow drilling. Until such time, the coastal plain should be protected. If development interests are so strong that drilling cannot be prevented, why is Alternative C not adequate? The report states that even under Alternative A, considerable further exploration would have to be carried out before any companies would be interested in leasing. If preliminary exploration needs to be done, why not allow that and THEN review the data and assess the tradeoffs with more complete information to decide whether to open the 1002 area to leasing?

Signed _____
Martha K. Raynolds
Biologist

Date _____

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TESTIMONY

ON BEHALF OF THE

CONCERNING THE DRAFT

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

FOR A PUBLIC HEARING

IN ANCHORAGE, ALASKA

JANUARY 5, 1987

Arctic Audubon Society
P.O. Box 82098
Fairbanks, Alaska 99708

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I am presenting this statement on the draft report to Congress required by Section 1002 of the Alaska National Interest Lands Conservation Act on behalf of the Arctic Audubon Society. The Arctic Audubon Society is the most northerly chapter of the National Audubon Society. The chapter is composed of 320 members, mostly from the Fairbanks area. The chapter plans to submit more extensive written comments at a later date.

People of Fairbanks have historically been extremely interested in the Arctic National Wildlife Refuge from its beginning. Arctic Audubon Society members as well as other segments of the Fairbanks community were instrumental in originally establishing the refuge in 1960 as the Arctic National Wildlife Range to preserve its unique wilderness, wildlife, and recreational values.

Last year the Arctic Audubon Society adopted the Arctic Refuge under the National Audubon Society's Adopt-a-Refuge Program. The chapter has become actively involved with refuge management issues and intends to work closely with Arctic refuge staff in Fairbanks. Fairbanks is the closest major population center to the refuge and the second largest city in the state. For these reasons we feel that it is particularly irresponsible of the Interior Department to not hold a public hearing in Fairbanks on this important matter so crucial to the future of the Arctic Refuge and Alaska.

Another community where a public hearing should rightfully be held is Arctic Village. The draft report to Congress states that one of the major environmental impacts of full oil and gas leasing would likely be a population decline of the Porcupine Caribou Herd. The report also states that the people of Arctic Village and the village of Old Crow in Canada depend largely on this caribou herd for subsistence. By not holding a hearing in Arctic Village the Interior Department is effectively depriving residents of their most meaningful way of providing input to the report.

We have reviewed the draft report to Congress and find one of its major deficiencies to be that the conclusions and recommendations drawn are not supported by the report itself. The report states that there is only a 19 percent chance of finding an economically recoverable oil prospect on the coastal plain. The report further states that if recoverable oil is found, there is a 95 percent chance that it would produce no more than 600 million barrels of oil. For comparison, the Prudhoe Bay field is estimated to have originally contained about 9 billion barrels of recoverable oil, or 15 times as much oil.

According to the report, the chances of the Arctic Refuge producing a Prudhoe Bay equivalent oil reserve is only five percent. These figures and other information given in the report about the geology, in our opinion, do not support the report's conclusion that the area is "the most outstanding oil and gas frontier area in North America." If the report is right, then it leads also to the conclusion that instead of drilling for more oil in our few remaining large pristine wilderness areas, we need to instead search for alternative energy sources that will not run out nor require sacrificing the natural character of our last wilderness habitats.

The report also goes on to predict that if full leasing is implemented major negative impacts would likely occur on the Porcupine Caribou Herd, muskox, and snow geese. Less serious, but nonetheless detrimental, effects would occur to the Central Arctic caribou herd, wolf, brown bear, polar bear, and golden eagle. The report predicts that full leasing would also have a major adverse impact on subsistence in the region.

One of the most important major effects would be the loss of the last area on the North Slope of Alaska that we still have an opportunity to set aside as wilderness. The two million acre coastal plain represents a small fraction of the North Slope. The 23 million acre National Petroleum Reserve and millions of acres of state land in the Prudhoe Bay region have already been committed to oil and gas exploration and development. Additionally some 24 million acres of near and offshore lands are available for oil and gas leasing in the adjacent Beaufort Sea. The Arctic Refuge coastal plain is the only region on the North Slope that is not opened to oil and gas development. Must we grant access to the entire North Slope for the oil industry? Is

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this a fair balance in the eyes of the American people? We absoultely cannot afford to compromise the last virgin tract of Arctic coastal plain.

The 1002 area is the last stand for wilderness on the North Slope. Because of its remoteness and isolation from the rest of industrialized America it stands as a symbol of this country's pristine natural areas and the concept of true wilderness. If it is lost to development it will be a major statement by our society that we really aren't concerned about preserving undisturbed regions on the earth for future generations. It will mean that we are driven by our gluttony for cheap energy and the corporate dollar. It will mean that no place on earth is really sacrosanct from human development no matter how high our ideals.

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We believe that the Interior Department is not complying with ANILCA Sections 1004 and 1317 which both call for a wilderness review of the Arctic Refuge coastal plain. The report to Congress certainly does not, in our opinion, satisfy this requirement. Since the coastal plain is being left out of the refuge comprehensive conservation planning process, it will not receive the wilderness review that has been a normal part of that procedure for other refuges. We believe that it is wrong and premature for the Secretary to be making a recommendation for full leasing to Congress before complying with these wilderness review provisions of ANILCA, and we draw this to the attention of Congress.

Finally, we would like to bring one other aspect concerning the coastal plain to the attention of the Secretary and Congress. In recent months the Department of Interior has conducted land exchange negotiations involving the 1002 area. We believe it is premature for the Secretary to consider trading away the 1002 area prior to Congress reviewing the coastal plain resource assessment. We believe that the department is circumventing the intent of Section 1002 of ANILCA by taking such negotiation action, and funding such action with taxpayer dollars. We recommend that the department cease all land exchange negotiation work involving the coastal plain.

In closing, our view is that the coastal plain entirely meets the standards for classification and protection as wilderness, with the exception of two DEW line sites. The area area deserves full wilderness protection perhaps more than any other area in the United States today. We believe that once the Interior Department conducts a meaningful wilderness review it will discover this as well. We are unconvinced by the report to Congress that leasing the area for oil and gas is wise and in the national interest considering the balance between the area's wilderness and wildlife values and its potential oil and gas resources as stated in the report.

We urge the Secretary to conduct a thorough wilderness review as required under section 1317 and 1004 of ANILCA, and ultimately recommend that the coastal plain be designated as wilderness. Wilderness status will protect the coastal plain

from industrial development and provide an Arctic region which will remain undisturbed for future generations of mankind and wildlife. We hope the Secretary will have the foresight, insight and courage to take such action.

**REMARKS OF JACOB ADAMS ON
THE DEPARTMENT OF THE INTERIOR DRAFT REPORT
CONCERNING THE ARCTIC NATIONAL WILDLIFE REFUGE,
ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT**

**KAKTOVIK PUBLIC MEETING
January 6, 1987**

My name is Jacob Adams. I am an Inupiat Eskimo from Barrow, Alaska and President of the Arctic Slope Regional Corporation.

I am pleased to have the opportunity to comment this evening on the Secretary of the Interior's draft report concerning resource assessments and recommendations for the Arctic National Wildlife Refuge Coastal Plain.

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The North Slope of Alaska has been and continues to be our people's home. We use these lands to maintain our culture and traditional lifestyle, for a variety of subsistence uses and for other purposes. As users and residents of the North Slope's lands, we have for centuries faced the issues of using the land's resources while respecting and conserving that same land and its living resources. Our use of the land and its resources is a dynamic and changing process; it is not static preservation, but rather is something that must be lived and experienced.

More recently, the Inupiat Eskimo of my generation have had to balance the benefits of change and tradition in our culture.

We have learned to speak English while trying to preserve our Inupiat language. We have benefited from technology, but remain subsistence hunters. We have a cash economy, but we still highly value and rely on the Inupiat Eskimo tradition of sharing. We have

sought to combine the best elements of a cash and subsistence lifestyle in a manner that gives us, the Inupiat residents of the Arctic, the opportunity to participate in the chance location of mineral resources while ensuring the continued vitality of our living resources.

My people and the shareholders of ASRC have major cultural, subsistence and economic interests in the decisions that will be made based on the Coastal Plain Resource Assessment Report. As the Report rightfully points out, the Inupiat Eskimo Village at Kaktovik has survived as a community because of "strong family cultural ties, ties to the land, and economic opportunity for both jobs and subsistence."

Our people have traditionally used and continue to use today the ANWR and the Coastal Plain for subsistence, cultural and other traditional purposes. We are also beneficiaries of increased economic activity in the North Slope that has resulted from oil and gas development.

Today, ASRC and Kaktovik Inupiat Corporation are the owners of 92,000 acres of highly prospective private land located within ANWR and adjacent to and within the Coastal Plain area.

Our interests in the Coastal Plain area, as its residents and stewards, and as shareholders of ASRC, are unique and balanced. As President of ASRC, I think it essential that our views on the future of the Coastal Plain be given careful consideration so that my people's interests will be protected by Congress' decisions concerning uses of the Coastal Plain.

I would like to say, generally, that we support the Report's proposed Alternative A and agree with the recommendation by the Secretary of the Interior to fully lease the Coastal Plain to develop oil and gas resources, provided that appropriate measures are taken to protect continuation of and access to wildlife resources and ensure coordinated and efficient oil and gas

activities. We think that the Secretary's recommendation is consistent with our people's desire for a balanced approach to the use and conservation of all of the land's resources. We do not feel that any of the other alternatives would accomplish our objectives; in particular, I would note that we find the wilderness designation alternative most objectionable to meaningful use of the area by our shareholders.

Simply stated, we favor development of the Coastal Plain in a manner that is compatible with our long-term interests in protecting the environment, the fish and wildlife and human values of the residents of the North Slope.

As residents and stewards of the North Slope lands, my people have watched oil development over the past 20 years at Prudhoe Bay and Kuparuk.

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Because of our interests in the effect of this development on the environment and wildlife that is central to our way of living, we have followed these developments with some skepticism. Nevertheless, we have been very impressed with the energy industry's gains in planning, in technology and in operating projects in the Arctic environment - particularly those on shore.

We have read with interest the Report's conclusions concerning the projected effect of development on the wildlife that is important to our people's subsistence. The report notes that the full leasing program of the proposed Alternative A would have minor effects on fish, waterfowl and bowhead whales--species that are important to our subsistence needs and traditions.

The Report also notes that the impact of a full leasing program could be greatest on the caribou, a resource which is important to our people, especially those here at Kaktovik.

We question the Report's conclusion that oil and gas development would result in a major population decline of the Porcupine Caribou herd. We believe that this conclusion is erroneous for two reasons.

First, we do not believe that development necessarily will result in increased harvests. Though Kaktovik residents will continue to hunt caribou to meet their subsistence needs, non-subsistence hunting should be severly limited to prevent significant reductions of the herd.

Second, we do not think that development activities, of themselves, will threaten the caribou. Even the Report acknowledges that there is insufficient experience to support the conclusion that development will necessarily result in a significant decline in the number of Porcupine Caribou. In fact, all the relevant experience to date indicates that caribou and the oil industry can and do successfully coexist.

The coexistence of caribou and development is a concern we have faced before when the Prudhoe Bay oil field was developed in the mid-1970s. Many of the same questions that were asked then about the effect of development on the Central Arctic Caribou Herd are being asked now about the Porcupine Caribou Herd.

Will they be diverted by traffic, roads or pipelines? Will their calving habits be changed?

Scientific studies and our own experience show that the Arctic Caribou Herd has not been weakened or reduced by development at Prudhoe Bay, Kuparuk and Milne Point. Oil industry operations within those general regions do not appear to have affected the calving success of the caribou.

In fact, the Central Arctic Herd has increased at a rate of 12-18 percent per year during the past decade.

We are convinced that experience gained by the exploration and development of energy sources within the last 20 years will lead to the development of new energy production facilities that can be operated very compatibly with the caribou and other living resources of the Coastal Plain. We know that it will require careful regulation and will increase project costs, but we believe a productive balance can be achieved.

Our own local governments and companies have brought their experience and knowledge to bear on the energy development process, resulting in sensitive and effective decisions. The lands we own within ANWR were cooperatively placed under a regulatory scheme and set of stipulations that has demonstrated the compatibility of living resources and energy development.

As a people reliant on our land and its resources, we are sensitive to the long-term significance that development of the ANWR Coastal Plain may represent. We think that sound environmental studies and mitigation measures have been and will be successful in limiting the adverse effects of development. We are also confident that the existing and improving technologies can ensure the integrity of the environment during oil and gas operations.

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We agree with the Report's recommendation that leasing in the "core calving" areas of the caribou in the southeastern corner of the Coastal Plain be done in the final phase of exploration and development. This phased leasing would allow for ongoing evaluation of development impacts so that appropriate mitigation measures could be developed for the more sensitive environmental areas. This will also ensure adequate opportunity to monitor and ensure continued viability of the Procupine Caribou Herd and access to the caribou for subsistence use by residents of Kaktovik.

In addition to being residents of affected lands and the lands that are adjacent to the Coastal Plain, we wish, as Americans, to express our concern about these significant land use decisions that will be made soon.

No one disputes that the Coastal Plain of ANWR represents the best on-shore prospects for oil and gas in the United States today. Widely accepted studies show that current North Slope oil production will decline significantly in the next 15 years.

Without the development of new and best prospects such as that which is apparant in the ANWR Coastal Plain, our country places itself in a more perilous position as a hostage to foreign supplies of oil.

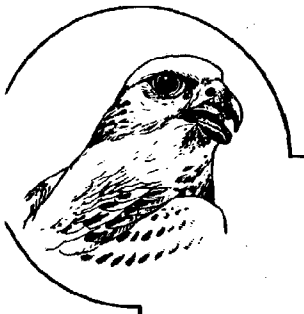
Exploration and development of Arctic Oil and gas usually takes more than ten years from the initial discovery to first production. To anticipate this country's future needs and to reduce the dependence on foreign sources of oil, we as Americans, believe it important that decisions be made today to explore and develop the oil resources of the ANWR Coastal Plain.

We do not believe that the issue of development in the ANWR Coastal Plain requires an "either/or" decision with respect to conservation of important fish and wildlife resources. Though diverse goals are presented by petroleum development and conservation of these resources, the record of prior petroleum development on the North Slope supports our belief that these goals are not mutually exclusive.

These goals can be successfully reconciled to ensure the continued availability of our subsistence resources, meet the need for this country's additional, dependable energy supplies and preserve the wilderness of nearby lands.

We support the recommendation of the Secretary of Interior in the draft Coastal Plain resource assessment. We are confident that a balanced program of development and conservation can be implemented. We look forward to continued participation in the implementation process.

Thank you.



ANCHORAGE
Audubon Society, Inc.
A CHAPTER OF THE NATIONAL AUDUBON SOCIETY

Office Box 101161
Anchorage, Alaska
99510

January 23, 1987

U.S. Fish and Wildlife Service
Attention: Division of Refuge Management
2343 Main Interior Building
18th & C Street, N.W.
Washington, D.C. 20240

Re: Comments of Anchorage Audubon Society on the Draft Arctic National Wildlife Refuge Coastal Plain Assessment

Dear Sir or Madam:

The Board of Directors of Anchorage Audubon Society on behalf of its 1400 members urge that leasing or land exchanges on the coastal plain of the ANWR be deferred at this time. Based on the information in the 1002 report we believe that it is not in the long-term conservation, economic or national security interests of the US to open the coastal plain to leasing now. We recommend that additional information be gathered to better assess the hydrocarbon potential of the coastal plain, the wildlife and ecosystem values before making a leasing decision. Further, a national energy policy must be established which provides real alternatives to the exploitation of our remaining wilderness lands.

The Anchorage Audubon Board agrees with the finding of National Audubon Society's Alaska Regional office that the Department has left us no reasonable alternative but to oppose its recommendations because of the serious shortcomings in its resource assessment process for the coastal plain of the ANWR outlined in the Testimony on the 1002 Report given by David R. Cline on January 5, 1987. We find the report deficient in essential information, particularly on oil and gas potential, the national need for developing this oil and compromises already made to Arctic wilderness values.

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ANWR was established to preserve for all time the spectacular wilderness ecosystem of northeastern Alaska. Major compromises have already been made on Alaska's North Slope between development and conservation interests. These compromises have resulted in current land jurisdictions that essentially make almost 90 percent of the Slope potentially available for oil and gas leasing. Additionally, 24 million acres of nearshore (state) and offshore (federal OCS) lands are also available for leasing in the Beaufort Sea. These policies lead us to question if any public wilderness lands along the Arctic coast of Alaska will be considered sacrosanct.

Despite the outstanding natural values pointed out in the draft assessment report and the fact that the chance for discovery of an economically recoverable oil field is only 19 percent, the Department of Interior is recommending that the entire coastal plain be made available for leasing to the oil industry. Meanwhile, officials of the Department are conducting negotiations in secret to trade away refuge lands on the coastal plain to private interests. This action subverts the entire assessment report process, preempts Congresional options, and could lead to privatization of the refuge. Apparently, little was learned by the Department of Interior from their St. Matthew Island experience where a federal judge ruled that Interior officials made serious errors in judgement in their attempt to trade away wilderness lands to oil interests, and that the land trade was not in the public interest.

It is difficult to accept the premise that oil resources of the Arctic Refuge are critical to fulfilling growing national energy needs, when there is no national energy plan in place and since President Reagan recently vetoed the National Appliance Energy Act of 1986. This act, supported by both houses of Congress, would have saved the nation both millions of barrels of oil and billions of dollars on utility bills by the year 2000, thus making exploitation of the Refuge totally unnecessary.

The Audubon Energy Plan which National Audubon Society has developed with input from energy experts, industry, government and the academic community provides a practical, step-by-step alternative to the Administration's energy policy of opening up the remaining wilderness lands in the United States for leasing. The plan shows that proper planning and policy development at the federal level will enable the U.S. to produce more goods and services while actually improving the environment.

We urge the Administration to take reasonable administrative and legislative action to promote cost-effective conservation. The adoption of a well thought out National Energy Plan will preclude the leasing of our last remaining pristine areas.

The Administration practice of offering tens of millions of acres of public lands each year at a time when oil prices are at their lowest level raises serious question about whether the entire federal leasing program amounts to a giveaway to the oil industry. This flood of lease offerings is helping drive down the price of leases and bringing an unfair return to the taxpayers for use of non-renewable public resource.

Less than 6 percent of oil resources in Alaska are estimated to lie beneath designated or potential wilderness lands. In the lower 48, only 4% of the wilderness heritage remains. Unless the nation maintains the sanctity of designated and potential wilderness areas, even that small percentage will disappear. The Audubon Energy Plan demonstrates that there are practical alternatives to exploiting the last of our wilderness areas. The U.S. can leave wilderness alone and still solve its oil import problem. The total amount of oil and gas under wilderness lands is too small to justify the abandonment of the nation's remaining wilderness heritage.

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The Anchorage Audubon Society is not an anti-development group. We expect that more than 95 percent of oil and gas resources on federal lands will eventually be tapped. Howeve, we believe that leasing on the coastal plain should be deferred until there is more information about the oil and gas potential and the impacts on wildlife and ecosystems.

Your consideration of our comments and recommendations is greatly appreciated.

Sincerely,

Sandra Cosentino
President

cc: David R. Cline, Regional Vice President, National Audubon Society
Alaska Congressional Delegation, Washington, D.C.

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name DAVID R. CLINE

Mailing Address [redacted] 308 G ST. PH 219

ANCHORAGE, AK. 99501

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☒ I am speaking for NATIONAL AUDUBON SOCIETY
(please enter name of organization you represent)

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National Audubon Society

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TESTIMONY

ON BEHALF OF THE

NATIONAL AUDUBON SOCIETY

AT A PUBLIC HEARING ON THE

DRAFT

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

BY

DAVID R. CLINE
REGIONAL VICE PRESIDENT FOR ALASKA
NATIONAL AUDUBON SOCIETY

Anchorage, Alaska
January 5, 1987

My name is Dave Cline, and I am the Alaska Regional Vice President for the National Audubon Society. I am testifying today on behalf of the Society including its 2,600 members in Alaska.

After carefully examining the "Resource Assessment Report" for the coastal plain of the Arctic National Wildlife Refuge, we are convinced it is not in the long-term conservation, economic or national security interests of the United States to open the coastal plain to leasing at this time. We urge, therefore, that no leasing or land exchanges be permitted by Congress, and that the U.S. Fish and Wildlife Service be directed to protect and manage the entire Arctic National Wildlife Refuge consistent with the conservation purposes for which it was originally established by Congress.

We wish to commend the many dedicated resource professionals in the U.S. Fish and Wildlife Service, U.S. Geological Survey and Bureau of Land Management who gathered information for the assessment report, often at great personal risk and sacrifice. Because of their many contributions, the outstanding wildlife and wilderness values of the coastal plain have been reconfirmed and understood better than ever before.

As one of the oldest and largest conservation organizations in the United States, the National Audubon Society has a long history of involvement in the Arctic National Wildlife Refuge. We recognize it as a very special national treasure. Dedicated friends in conservation, including Olaus and Margaret Murie, worked long and hard for its establishment in 1960 to preserve a portion of the eastern Brooks Range of arctic Alaska for its outstanding wilderness values. Thus, unlike many other refuges in the system, the Arctic Refuge was established not out of a singular need to conserve wildlife, but to preserve for all time the spectacular wilderness ecosystem of

northeastern Alaska as a whole. Audubon strongly supported this far-sighted action, and so too enlargement of the refuge in the Alaska National Interest Lands Act of 1980 (ANILCA). Over the years we have worked with other conservationists to protect the refuge from a series of threats from development interests.

In this debate over the future of the Arctic Refuge and its coastal plain, it is vitally important to realize that major compromises have already been made on Alaska's North Slope between development and conservation interests. These compromises have resulted in current land jurisdictions that essentially make almost 90 percent of the slope potentially available for oil and gas leasing. This is not to mention the additional 24 million acres of nearshore (state) and offshore (federal OCS) lands available in the adjacent Beaufort Sea. A mere 2 million acres of of the entire North Slope has been committed to conservation purposes in the Arctic Refuge. Now most of that is under siege by development interests. The questions must be asked: Where will the compromising stop? Aren't there any public wilderness lands along the Arctic coast of Alaska that should be considered sacrosanct?

It is also important to note that this 18 million-acre refuge is the second largest unit in the National Wildlife Refuge System, and the largest and most spectacular arctic wilderness sanctuary for wildlife in the world. Wildlife species of particular national and international concern include the 180-thousand-member Porcupine caribou herd (whose calving ground is on the refuge coastal plain), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, and Arctic char and grayling.

When considered in conjunction with the North Yukon National Park that adjoins it on the east, the Arctic Refuge

constitutes an international commitment to the protection of nature. Major industrial developments on either of these units is clearly incompatible with their purposes.

We agree with the Department of the Interior (on page 45 of the draft assessment report) that:

> "The Arctic Refuge is the only conservation system unit the protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America."

and (on page 46) that:

> "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge. Caribou migrating to and from the 1002 area and the post-calving caribou aggregation offer an unparalleled spectacle."

Despite these outstanding natural values, and the fact that the chance for discovery of an economically recoverable oil field is only 19 percent, the Department of the Interior is recommending that the entire coastal plain be made available for leasing to the oil industry. The Department has left us no reasonable alternative but to oppose its recommendations because of the following serious shortcomings in its resource assessment process for the coastal plain:

1) Failure to point out that the compromise to establish the Arctic Refuge in 1960 to preserve its unique wildlife, wilderness and recreation values resulted in the remainder of Alaska's vast North Slope and adjacent offshore waters being made available for oil exploration.

2) Failure to release for public review and comment geologic information critical to the 1002 assessment process. This gives those who could profit from exploiting refuge resources advantage over those who actually own those resources--the American people.

3) Failure to reveal its proposed land trades with various Alaska Native corporations and the State of Alaska, and to demonstrate how such trades will serve in the public interest.

4) Failure to justify full leasing when prospects for discovery of even one major economically recoverable oil field on the coastal plain is only 19 percent (pages 49 and 68), and with the market value of leases depressed because of the world oversupply of oil.

5) Failure to conduct a comprehensive economic analysis to show how the benefits to the Alaska and national economies can be optimized from leasing, both in the short and long term.

6) Failure to provide evidence that the Department will ensure that air and water quality will be protected from toxic chemicals and other pollutants such as those creating problems in the Prudhoe Bay oilfield.

7) Failure to explain how adequate water and gravel supplies will be obtained after finding that "...specific locations and sources of water and gravel for exploration and development activities have not been identified; it is understood that these resources, especially water, are not readily available on the 1002 area," (page 75.)

8) Failure to explain why it wouldn't be in the strategic

interests of the United States to purchase more foreign oil at current low prices for addition to our nation's "Strategic Petroleum Reserve" rather than lose income to the federal treasury by further flooding a depressed lease market through opening the Arctic Refuge.

9) Failure to evaluate cumulative impacts on the Arctic Refuge from oil and gas lease sales on more than a million acres of adjacent state lands (Camden Bay, Demarcation Point and Prudhoe Bay uplands) and 21.2 million acres of OCS leases (Sale 97) in the Beaufort Sea scheduled for July 1987. The latter sale, just off the refuge coast, is the largest oil and gas lease sale ever held in the Arctic Ocean.

10) Failure to thoroughly discuss alternative energy policies that if implemented could make the nation energy secure without exploiting the Arctic Refuge.

11) Failure to assure that scarce refuge staff and funds will not be diverted from refuge conservation programs to monitor and regulate industrial activities on the coastal plain. (Since the coastal plain resource assessment was initiated in 1982, more than 90 percent of the refuge budget has been devoted to the 1002 assessment process, resulting in the almost total neglect of the overall refuge conservation program.)

12) Failure to recognize that a North Yukon National Park adjoins the Arctic Refuge and that the United States has responsibilities to cooperate with Canada in protecting shared wildlife resources.

13) Failure to address the need for cooperative management of the Porcupine caribou herd with Canada through the

international management agreement that has been negotiated over the past several years.

14) Failure to hold public hearings in all Alaskan communities that will be directly affected by the proposed action, and to make an adequate number of copies of the assessment report available in a timely manner.

Unfortunately, a series of citizens' lawsuits proved necessary during the assessment process to assure that the law was followed, and citizen monitoring of government activities was required as well to learn of industry activities taking place on the Arctic refuge. And, despite the magnitude of resources at stake and the seriousness of the consequences of the decision on people both in Alaska and throughout the nation, the Department of the Interior chose not to make this report available for public review and comment. A citizen lawsuit was necessary to make the report available. Then, after being forced to release the report for public review, the Department abbreviated the comment period to 60 days over the Christmas holiday period. This is not the way a democracy like ours should work.

In addition to Audubon's long history of involvement in wildlife conservation, another major priority goal of the Society is to "promote national strategies for energy development and use, stressing conservation and renewable energy resources." In an effort to achieve this goal, we have developed an energy plan with input from energy experts in industry, government and the academic community. This was done in the realization that energy is a major factor in determining the quality of human life. It furthers the production of goods and services, but its production and use can seriously impact the quality of the environment.

The Audubon Energy Plan is a practical, step-by-step alternative to the Administration's energy policy of exploiting the last remaining wilderness lands in the United States. It shows that proper planning and policy development at the federal level will enable the United States to produce more goods and services while actually improving the environment. The environmental pay-off will be cleaner air, purer water, and less pressure to exploit wilderness lands and wildlife habitat such as that in the Arctic Refuge.

True, the Audubon Plan requires the introduction of regulatory measures that correct imperfections in the marketplace, such as efficiency standards for home appliances and fuel economy standards for automobiles. Such reliance in our Plan on modest measures to promote cost-effective conservation stands in contrast to the approach taken by the Administration, which holds that conservation should be left solely to the marketplace, no matter how far economists tell us individual markets are operating from the cost minimum, no matter how much energy is being wasted as a result. When this blindspot toward energy conservation is combined with the Administration's skepticism towards environmental protection, it is perhaps not surprising that the Administration makes drilling in wilderness areas one of the pillars of its energy policy. Fortunately, the recent bipartisan show of support in Congress for appliance efficiency standards indicates that the Administration is out of touch with the country when it comes to tolerance of modest conservation regulations. We are confident that a Presidential veto of the appliance bill in the upcoming session will be overridden by Congress. We are also confident that, when the choice is clearly put, Congress will decide to enact additional conservation legislation in order to preserve our national treasures such as the Arctic Refuge (as well as to save consumers money.)

In the meantime, and as long as this Administration refuses to take reasonable administrative and legislative action to promote cost-effective energy conservation, we will have no choice but to oppose attempts to open the Arctic Refuge to oil and gas development. Audubon has worked hard, particularly at the state level, to get appliance efficiency standards enacted. In New York, we initiated the process that led Governor Cuomo to introduce a tough efficiency standards bill last year. Massachusetts Audubon played a similar role in getting a bill introduced (and passed) in Massachusetts. Audubon members are well aware that preservation of wildlife and protection of the human environment requires wise husbanding of our energy resources.

Audubon has been actively involved in efforts to develop a long-range comprehensive management plan for the Arctic Refuge. However, we have not been party to any actions that would preempt a thorough review of the mandated assessment report, waiting to judge it on its merits, waiting to see if there were a few key areas in which drilling could be allowed without risking serious interference with wildlife and the wilderness quality of the land. Instead of a complete and objective report with viable management options, we found the 1002 report biased, contradictory, and lacking essential information. The only possible excuse for this report is that Interior must not really be serious, but is floating a totally unreasonable position in the hopes of maximizing its bargaining power in Congress. If so, the tactic is likely to backfire by completely alienating those organizations willing to keep an open mind on resource exploitation in the Arctic Refuge. Certainly, this has been the effect on the National Audubon Society.

The major undiscovered deposits of oil and gas on federal land holdings are thought to lie off the coast of the lower 48 states and Alaska. Thus, in the next two decades, as known

onshore reserves are depleted, offshore development will become more important. Relatively little offshore land is currently off-limits to energy development. Most of these deposits will eventually be tapped.

The fact that all federal lands have not yet been leased does not mean that development is proceeding too slowly. These leases will be much more valuable ten to twenty years from now. If the government were to lease all these lands at once, it would get an unfair economic return for the taxpayers.

Judged in this context, the Reagan Administration is making a serious mistake in rushing to lease virtually the entire U.S. Outer Continental Shelf (OCS)--almost a billion acres--and onshore prospects as well. The practice of offering tens of millions of acres of public lands each year at a time when oil prices are depressed raises very serious questions about whether the entire federal leasing program is amounting to a giveaway to the oil industry.

By flooding the market with lease offerings, it is clear that the administration is helping to drive the price of leases down, thereby providing the oil industry with an opportunity to lease large acreages at bargain-basement prices. Evidence of this downward pressure on lease prices in overwhelming:

* The average bid per acre under the Reagan Administration's 5-year program has been less than half that under the Carter program ($1,092 per acre versus $2,381 per acre), (Washington Post, November 8, 1983.) Before Interior went to area-wide leasing in 1982, the average price per acre for OCS lease bids in Alaska was $2,794. After area-wide leasing was initiated, OCS lease sales in Alaska netted an average of only $1,229/acre, (OCS Report, MMS 86-0067, September 1986.)

* The General Accounting Office found that the number of bids per tract declined from of 2.44 bids to 1.65 bids under the area-wide program.

* GAO estimated that "the federal government received about $7 billion (or a discounted value of $5.4 billion in 1984 dollars) less than it would have received if the same acreage were under the tract selection program," (GAO Report, RCED-85-66, 1985, p.i.v.)

* Even the industry recognizes the lease price depression caused by area-wide leasing--the Oil and Gas Journal reports that "offshore producers agree that acreage costs on area-wide lease sales are lower than under the previous nominated tract concept because more acreage is offered at one time." (Washington Post, November 8, 1983.)

Aside from the economic arguments against leasing so much so fast when oil prices are depressed, there is a compelling conservation argument. Huge lease offerings involving tens of millions of acres make it impossible to do meaningful environmental impact analyses. Additionally, they make it extremely difficult for states like Alaska to conduct rational development planning.

In Alaska, less than 6 percent of oil resources are estimated to lie beneath designated or potential wilderness lands, including those in the Arctic National Wildlife Refuge. Clearly, Congress and the federal government have made sure that lands with the vast majority of highest potential for oil and gas have been excluded from consideration as potential wilderness.

Relatively little oil and gas is estimated to lie under wilderness lands. When this country was first settled by

Europeans, 100 percent of the land area corresponding to the 48 states was wilderness and teeming with wildlife. The unrestrained pressure of civilization has steadily eroded wilderness areas to a small percentage of the total--4 percent in the lower 48 states. To those who assign value to wilderness, it is incomprehensible that anyone would object to protecting the nation's last remaining fragments. Unless the nation maintains the sanctity of designated and potential wilderness areas, even that small percentage will disappear.

There will always be proposals to use wilderness and critical habitats for other purposes, particularly energy and mineral development. But little wilderness will be left if the engineers are allowed to scour the land for the next thirty years and beyond--building new roads and drill sites, returning for a closer look each time the price of energy or minerals jumps, and returning whenever a new technology allowing recovery of formerly inaccessible resources is developed.

The National Audubon Society believes that a nation like ours with a 200-year history should look at the wilderness preservation issue in a time frame that spans hundreds of years rather than decades. Only with such perspective can the nation pass on to succeeding generations the wilderness resources that are still intact.

The fact is that wilderness such as that on the Arctic Refuge coastal plain serves a variety of valuable, noncommercial uses: wildlife habitat, watershed protection, scientific study, fishing, hunting, camping, hiking, and most other forms of dispersed, low density outdoor recreation. Such wilderness lands offer also the spiritual lift of peaceful, truly natural settings.

Although not every oil industry organization takes the

limited view on wilderness protection espoused by such organizations as the American Petroleum Institute, there is obviously a clash in values between advocates of exploitation and those whose favor preservation--a dispute that must continuously be settled through the political process. The Audubon Energy Plan has been developed with this dispute in mind. The Plan demonstrates that there are practical alternatives to exploiting the last of our wilderness areas. The United States can leave wilderness alone and still solve its oil import problem. The total amount of oil and gas on wilderness is too small to justify the abandonment of the nation's remaining wilderness heritage.

Under the Audubon Energy Plan, the mean risked estimate of 1.6 billion barrels of oil and the 1.6 billion barrel equivalent of natural gas estimated to lie under land already legally designated as wilderness would remain underground forever. The same would be true for the 2.3 billion barrels of oil and the 2.5 billion barrel equivalent of natural gas estimated to lie under wilderness land that has yet to be formally designated as wilderness, (A. Stege and J. Beyea, "Oil and Gas Resources on Special Federal Lands: Wilderness and Wildlife Refuges," Annual Review of Energy, Vol. 11, 1986, pp. 143-161.) Because wilderness land would never be exploited under the Audubon Plan, there would be no need for exploration.

The estimates for oil in wilderness lands given above assume a mean risked estimate of 600 million recoverable barrels of oil for the Arctic Refuge. In contrast, the Draft Coastal Plain Resource Assessment mentions a figure of 3.2 billion barrels, without clearly specifying whether or not the estimate is "risked." (We suspect it is not.) Clarification on this point is needed from Interior. If the 3.2 billion figure is risked, that is, already incorporates the risk of finding no oil (81%), Interior would be claiming that there are 2.5 billion

more barrels of oil likely to be found in wilderness lands than in the estimates we have been using. Nevertheless, even an additional 2.5 billion barrels would not change the fact that a very small percentage of U.S. oil is in potential and designated wilderness lands. The percentage of U.S. oil resources on these lands would rise from 3.5% to 5.8%.

Certainly, any exploration that may eventually be permitted on these areas should be made by nonintrusive methods, such as satellite survey. Nonintrusive methods are currently inadequate for confirming existing Interior estimates, but the situation will no doubt change in the future. Fifty years from now, technologies for identifying natural resources will have surpassed the crude methods available to energy companies today. With such a small percentage of U.S. land remaining as wilderness, it would seem wise for the nation to be patient in confirming Interior's estimates.

As has been indicated, the National Audubon Society is not blindly opposed to resource extraction on federal lands. We expect that more than 95 percent of oil and gas resources on federal lands will eventually be tapped. The Society stands ready to work with oil and gas companies to help them develop environmentally sound methods of exploration and extraction that are suitable for the great percentage of land, both public and private, on which such activities need not be prohibited completely. Audubon will continue to insist, however, that exploitation of resources on public lands be carried out carefully in a manner that protects the environment and wildlife. Audubon will continue to oppose oil and gas exploration in any situation where government agencies or energy companies move hastily, without fully assessing the environmental and economic effects of activities or providing adequate safeguards for their implementation. This appears to be one of those cases.

It is argued by industry that the coastal plain of the Arctic Refuge must be leased now because it will take at least fifteen years to develop any oil fields discovered there. It must be remembered that following discovery of oil at Prudhoe Bay in 1968, oil was flowing through the 800-mile-long Trans Alaska Pipeline (TAPS) by June of 1977, a period of only 9 years. All that would be needed should oil production be permitted on the Arctic Refuge would be a 100 to 150-mile-long pipeline spur (at maximum) to tie into TAPS. Our guess is that industry could bring an oilfield on line in the refuge within 5 years should it someday prove in the national interest to do so.

It is an illusion to believe that leasing on the coastal plain of the Arctic Refuge will solve the economic problems of the North. After all, its whole purpose is to deliver northern oil to homes and industries in the South--or perhaps the Orient. Indeed, rather than solving the North's economic problems, it may accentuate them. For evidence of this, we need look no further than the situation in Alaska today. With the Trans Alaska Pipeline carrying oil at near full capacity, the state is going through one of the most serious economic recessions in its history. The result in many cases is lost dreams and destroyed careers.

The situation on the Arctic Refuge obviously calls for bold and courageous political leadership at both the state and national levels. For politicians to be holding out the promise that yet another great oil bonanza lies beneath the Arctic tundra just waiting to be exploited only postpones the day when all Americans must begin to live within their means by implementing cost-effective conservation measures.

On page 6 of its assessment report, Interior states:

"Oil and gas development will result in widespread,

long-term changes in wildlife habitats, wilderness environment, and Native community activities. Changes could include displacement and reduction in the Porcupine caribou herd."

We agree but do not believe that it is in the best strategic, economic or conservation interests of the United States to recommend making such sacrifices on the finest Arctic wildlife and wilderness sanctuary in the world at a time of a world oversupply of oil and with hundreds of millions of acres of other federal and state lands available for exploration.

It has been said by many that we are now at our Last Frontier in Alaska. This has different meaning to different people. To some it offers opportunity for resource development and the jobs and material benefits delivered. To others, it is wildlife and wildland spectacles which constitute a heritage to be preserved for generations of Americans. The decisions we make on the Arctic Refuge therefore are not simply about oil fields and caribou herds. They are decisions that strike to our very deepest concerns as a nation.

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The National Audubon Society feels the Department of the Interior is making a serious mistake in recommending that the coastal plain of the Arctic Refuge be sacrificed to industrial development. The facts convince us that America can achieve energy security without exploiting the last great arctic coastal wilderness in the United States.

We believe that U.S. Senators Howard Metzenbaum and Paul Tsongas were right when in the 1979 debate on the Alaska Lands Act they stated:

"It appears as if the "forbidden fruit" syndrome is operating with regard to the Arctic National Wildlife

Range. Regardless of how bitter that fruit may be, there are some oil and gas companies which will want to invade this last stretch of north slope arctic land unimpacted by man. What the Congress does with regard to this fragile area will be an indication of how wisely we are going to conserve the nation's natural resources in the future. We can afford to make this Range the "last place to go" in the search for energy and we should. We urge the Senate to study the arguments on both sides of this issue, for we believe strongly that aside from high emotions which have surrounded the debate on this issue, the facts support protection for the Range at this time..." (Report of the Committee on Energy and Natural Resources, United States Senate, No. 96-413, November 14, 1979, page 421.)

The National Audubon Society therefore strongly opposes leasing of the coastal plain for oil and gas development at this time, and recommends that the U.S. Fish and Wildlife Service be directed to manage the entire Arctic Refuge consistent with the conservation purposes for which it was established.

Your consideration of our comments and recommendations is greatly appreciated.

CANADIAN WILDLIFE FEDERATION / LA FÉDÉRATION CANADIENNE DE LA FAUNE

PATRON
Her Excellency the Right Honourable
Jeanne Sauvé, P.C., C.C., C.M.M., C.D.
Governor General of Canada

PATRON
Son Excellence la très honorable
Jeanne Sauvé, C.P., C.C., C.M.M., C.D.
Gouverneur général du Canada

February 5, 1987

U.S. Fish and Wildlife Service,
Attention: Division of Refuge
Management,
2343 Main Interior Building,
18th and C Streets, N.W.,
Washington, D.C.
20240 U.S.A.

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Dear Sir/Madam:

Please find enclosed the submission of the Canadian Wildlife Federation on the issue as to whether or not the 1002 area on the Arctic Refuge Coastal Plain in northeastern Alaska should be opened up for oil and gas activity.

Yours sincerely,

Stephen Hazell,
Counsel.

SH/sb
Encl.

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SUBMISSION OF THE
CANADIAN WILDLIFE FEDERATION
TO THE U.S. DEPARTMENT OF THE INTERIOR
REGARDING THE
DRAFT ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
COASTAL PLAIN RESOURCE ASSESSMENT

Who We Are

The Canadian Wildlife Federation (CWF) is Canada's largest non-governmental conservation organization with over 500,000 members and supporters, as well as affiliates in each of the twelve provinces and territories of Canada. Since the 1960s, CWF has closely monitored northern wildlife and conservation issues with special emphasis on petroleum development. The Federation was instrumental in the establishment of the Task Force on Northern Development, and the establishment of the Canadian Arctic Resources Committee in 1971.

The Canadian Wildlife Federation was involved in proceedings surrounding the proposed Mackenzie Valley Pipeline in the Canadian Northwest Territories, which was to transport oil from the Canadian Arctic along the Mackenzie Valley to Alberta. CWF action included participation in both sets of National Energy Board hearings on the Mackenzie Valley Pipeline, the creation of the Public Interest Coalition and the maintenance of an on-going secretariat to coordinate action during the hearings. The CWF also intervened in a 1971 lawsuit in U.S. courts concerning the construction of the Trans-Alaska Pipeline to represent the interests of Canadian wildlife.

Summary

The Canadian Wildlife Federation wishes to express to the Government of the United States our deep concern about the draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment (the 1002 Report), and our profound disagreement with the draft Recommendation of the Secretary of the Interior (chapter VIII) that the Congress enact legislation making the entire 1002 area of the Arctic Refuge available for oil and gas leasing.

The CWF has three major concerns about the draft Recommendation of the Secretary and the 1002 Report. First, the Recommendation of the Secretary of Interior contradicts to the point of misrepresentation statements about the impacts of petroleum development on wildlife and the environment in preceeding chapters of the 1002 Report.

Second, the 1002 Report neglects that migratory and itinerant wildlife species of Alaska/Yukon such as caribou, polar bear, lesser snow geese, fish and marine mammals are shared by the United States and Canada. Development of the 1002 area will have significant adverse impacts on such transboundary species shared by the two nations, not to mention the traditional use of those species by Canadian aboriginal people.

Third, acceptance and implementation of the draft Recommendation by the Government of the United States would be a clear signal to Canada and Canadians that the United States does not view bilateral efforts to conserve shared natural resources, such as the Porcupine caribou, to be of great importance.

The Canadian Wildlife Federation urges the Government of the United States to protect the 1002 area by establishing it as a wilderness under Alternative E.

Secretary's Recommendation

The CWF is distressed by the contradictions between the draft Recommendation of the Secretary of Interior and other chapters of the 1002 Report. The Recommendation ignores or glosses over statements identifying serious environmental impacts on wildlife and concludes--contrary to the evidence of the 1002 Report--that "the Prudhoe Bay experience leads one to be optimistic about the ability to explore and develop the hydrocarbon potential of the 1002 area without significant deleterious effects on the unit's wildlife resources." These conflicts are discussed in detail in the Government of Canada's position paper on the 1002 Report, but a few of the more striking are summarized here.

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The Recommendation states that "Development would proceed with the goal of no net loss of habitat quality" (p. 170), whereas the Report concludes this goal is impossible in that an unavoidable impact of Alternative A would be "Loss of habitat values on approximately 78,000 acres of caribou calving habitat..." (p. 131-32).

The Recommendation states that "most adverse environmental effects would be minimized or eliminated through mitigation..." This is not a fair or reasonable interpretation of the 1002 Report; mitigation measures are not possible or were not proposed for three species that would be most heavily affected by development -- Porcupine caribou, lesser snow geese and polar bear (p. 111).

The Recommendation declares that adverse impacts on the Porcupine caribou herd (PCH) can be mitigated using the lessons learned at Prudhoe Bay, noting that the "Central Arctic caribou herd has increased substantially during the period that development has occurred within the heart of its range (p. 169). This statement is belied by the 1002 Report: "because of the greater density of PCH on their calving grounds, the PCH would interact with oil development much more extensively and intensively than the CAH (Central Arctic herd) has interacted with oil development in the Prudhoe Bay area. Analogies comparing the events of current development on the CAH and effects of potential 1002 area development on the PCH must be drawn with caution" (p. 106).

The factual contradictions between the Recommendation and the remainder of the 1002 Report are so numerous as to lead the CWF to suspect that the serious adverse impacts on wildlife described in the Report were purposefully downplayed in order to enhance the arguments for the full development option, Alternative A.

Shared Resources

An uninformed reader of the Secretary's Recommendation could be forgiven for wondering what possible interest Canada and Canadians have in a domestic U.S. issue about whether or not a potential Alaska oilfield should be explored and developed. For the Recommendation does not make even a passing reference to the fact that the United States and Canada share many of the wildlife resources of the North Slope. Aboriginal Canadians harvest 80% of the annual take of Porcupine caribou; these Canadians will bear the brunt of an American decision to develop the 1002 lands. According to the 1002 Report, the full-scale leasing and development of the 1002 lands will lead to a major Porcupine caribou population decline and change in distribution of 20 to 40%.

Unfortunately, the draft 1002 Report itself ignores or underestimates the impacts of petroleum development on the Canadian aboriginal communities of the Mackenzie river and northern Yukon regions. The wildlife, especially the caribou, are critical to the largely subsistence economy of these aboriginal communities; a significant decrease in abundance of transboundary species could have catastophic economic and social effects, and might result in overexploitation of other species.

The International Porcupine Caribou Agreement

There is growing awareness in Canada, the United States and other nations that sovereign rights to develop and use shared natural resources must be tempered and limited by international measures that ensure the conservation of such resources in perpetuity. Canada and the U.S. were the first nations to agree in the Boundary Waters Treaty of 1911 to limit their exploitation of transboundary water resources for mutual benefit. The Migratory Birds Convention of 1916 and also the Great Lakes Water Quality Agreements of 1972 and 1978 are striking examples of the success that can be achieved by international cooperation in conservation.

The as yet unsigned International Porcupine Caribou Agreement (initialled by chief negotiators of Canada and U.S. on December 3, 1986) is the most recent example of the clear understanding in both nations that bilateral cooperation is the key to conserving the shared natural resources of the two nations. The proposed Agreement recognizes that the Porcupine caribou are a unique and irreplaceable resource that must be conserved for the use of future generations. The proposed Agreement would establish a joint board to advise U.S. and Canadian governments on conservation measures that should be implemented to conserve the caribou.

It need hardly be stated that the proposed Agreement and the draft Recommendation are irreconcilable.

The acception and implementation by the United States of the Secretary of Interior's draft Recommendation would be a clear signal to Canada and Canadians that the United States does not view the proposed Agreement and bilateral efforts to conserve shared natural resources to be of great importance.

The Canadian Wildlife Federation trusts that this is not the case. We urge the United States Government to designate the 1002 area as wilderness.

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name JAMES ALLEN

Mailing Address 22 NISUTLIN DRIVE

WHITEHORSE, YUKON TERR.

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☑ I am speaking for Council of Yukon Indians
(please enter name of organization you represent)

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PRESENTATION TO THE
PUBLIC HEARINGS
ON THE ANILCA SECTION 1002 REPORT

Anchorage, Alaska
January 5, 1987

by

[redacted] ALLEN

Vice-Chairman
Economic Development Department

Council for Yukon Indians

(MR/MS CHAIRMAN/PERSON, DEAR PANEL MEMBERS):

IT IS WITH A GREAT DEAL OF ANTICIPATION THAT I HAVE BEEN LOOKING FORWARD TO SPEAK, ON BEHALF OF THE COUNCIL FOR YUKON INDIANS, BEFORE THIS PUBLIC HEARING TODAY.

ALLOW ME, FIRST OF ALL, TO COMMEND THE UNITED STATES INTERIOR DEPARTMENT FOR THE IMPORTANT FORUM IT HAS PROVIDED HERE.

FOR YOUR INFORMATION, THE COUNCIL FOR YUKON INDIANS IS AN UMBRELLA ORGANIZATION REPRESENTING APPROXIMATELY 6,000 YUKON INDIANS, WHO ARE CURRENTLY NEGOTIATING, WITH THE GOVERNMENT OF CANADA, A COMPREHENSIVE LAND CLAIM SETTLEMENT IN THE YUKON.

MY REASON FOR BEING SO ANXIOUS TO MEET THIS PANEL TODAY, IS NOT ONLY BECAUSE MANY OF MY PEOPLE IN THE YUKON SHARE FAMILY TIES WITH MANY OF OUR ABORIGINAL ALASKAN NEIGHBOURS, BUT ALSO BECAUSE WE FREQUENTLY SHARE THE SAME RESOURCES.

BY THIS I MEAN CERTAIN WILDLIFE RESOURCES - WILDLIFE WHICH DOESN'T KNOW OF BOUNDARIES BUT FREELY CROSSES BETWEEN ALASKA AND THE YUKON, SUCH AS THE MIGRATING PORCUPINE CARIBOU HERD, BECAUSE IT REQUIRES A LARGE HABITAT TO SURVIVE.

AMONG THE MUTUAL PROBLEMS OF ABORIGINAL PEOPLE ON BOTH SIDES OF OUR BORDER, I AM CERTAIN, PERHAPS THE MOST COMMON IS THAT IN THE RECENT PAST WE OFTEN HAD TO REFUTE ARGUMENTS FROM OUR GOVERNMENTS AND INDUSTRY THAT WE NO LONGER NEED OR USE OUR TRADITIONAL WILDLIFE RESOURCES AS WE ONCE DID ...

LET ME ASSURE YOU, THIS IS SIMPLY NOT SO. HUNTING, FISHING AND TRAPPING BY NATIVE NORTHERNERS ARE FAR FROM BEING THE HISTORIC RELICS OR CULTURAL LEGACIES SOME CRITICS TRY TO MAKE THEM.

QUITE TO THE CONTRARY, OUR HARVEST OF WILDLIFE RESOURCES IS AN ON-GOING, LEGITIMATE ECONOMIC ACTIVITY. TRANSLATED INTO HARD CASH - (IF WE MUST PUT A PRICE TAG ON IT) - THE WORTH OF THE ANNUAL SUBSISTENCE ECONOMY TO THE YUKON AMOUNTS TO MILLIONS OF DOLLARS. WHILE ITS SOCIAL VALUE CANNOT BE PUT INTO MONETARY TERMS, OUR SUBSISTENCE ECONOMY HAS REMAINED CENTRAL TO THE YUKON INDIAN WAY OF LIFE.

IN PARTICULAR, THE IMPORTANCE OF THE PORCUPINE CARIBOU HERD TO NORTHERNERS HAS BECOME EVIDENT TO ALL THOSE WHO HAPPEN TO LIVE IN COMMUNITIES WHOSE ABORIGINAL RESIDENTS DERIVE THEIR NUTRITION FROM THE SEASONAL HARVEST OF THE HERD.

ONE OF THE KEY ELEMENTS TO THE SUCCESSFUL SETTLEMENT OF THE YUKON INDIAN LAND CLAIM IS MY PEOPLE'S GUARANTEED ACCESS TO WILDLIFE, BOTH IN TERMS OF HARVEST AND MANAGEMENT RIGHTS. THE GOVERNMENTS OF CANADA AND YUKON RECOGNIZE THIS FACT.

TO THE COMMUNITIES IN THE NORTHERN YUKON, BUT FIRST AND FOREMOST TO OLD CROW, THE SURVIVAL OF THE 150,000-STRONG PORCUPINE CARIBOU HERD IS, OF COURSE, JUST AS CRUCIAL.

REGARDING THE PORCUPINE CARIBOU, WE CAN REPORT SIGNIFICANT RESULTS.

THE FIRST MILESTONE (BY OCTOBER 1985) WAS A 'MADE IN CANADA' PORCUPINE CARIBOU HERD AGREEMENT. IT WAS STRUCK BETWEEN THE YUKON AND NORTHWEST TERRITORIES, AND BETWEEN THREE LEVELS OF GOVERNMENT AND THREE NATIVE ORGANIZATIONS.

WITH THE SIGNING OF THIS AGREEMENT, THE ABORIGINAL PEOPLE OF THE TWO CANADIAN TERRITORIES ACHIEVED A MAJOR ROLE IN TERMS OF THE MANAGEMENT OF THE HERD. THIS PROGRESSIVE EVENT, WE KNOW, WILL ENSURE THAT THE HERD WILL SURVIVE FOR MANY GENERATIONS TO COME.

THE SECOND MILESTONE (BY DECEMBER 1986) WAS THE SIGNING OF THE TENTATIVE DRAFT OF A CANADA - UNITED STATES AGREEMENT FOR THE INTERNATIONAL MANAGEMENT OF THE PORCUPINE CARIBOU HERD.

I AM PERSONALLY CONCERNED, HOWEVER, THAT THE LATTER AGREEMENT DOESN'T INCLUDE PROVISIONS PERTAINING TO THE UNITED STATES' PROPOSALS TO OPEN UP THE ALASKAN COASTAL PLAIN FOR OIL AND GAS DEVELOPMENT.

AND THIS BRINGS ME TO THE PURPOSE OF THIS HEARING.

THE PORCUPINE CARIBOU CALVING GROUNDS, AS WE ARE WELL AWARE, FALL INTO THAT FAIRLY NARROW AND ECOLOGICALLY FRAGILE STRIP OF COASTAL PLAIN BETWEEN THE BRITISH MOUNTAINS AND THE BEAUFORT SEA ... WHEREBY THE LARGER PORTION OF THE HERD'S CALVING GROUNDS LIE IN THE ALASKAN ARCTIC WILDLIFE REFUGE.

THE 'UNITED STATES RESOURCE ASSESSMENT' IN FRONT OF ME, LADIES AND GENTLEMEN, PROPOSES FULL LEASING ... OR, WITH OTHER WORDS ... THE OPENING OF THE ALASKAN COASTAL PLAIN FOR OIL AND GAS EXPLORATION AND PRODUCTION ACTIVITIES.

IN MY MIND, THIS MEANS THAT A LOT OF NORTHERN PEOPLE WILL SUFFER - VERY MUCH SO, I AM AFRAID, SINCE THE REPORT GOES ON TO ADMIT TO THE REAL POSSIBILTIES OF NEGATIVE IMPACTS ON THE PORCUPINE CARIBOU HERD AND OTHER WILDLIFE RESOURCES.

MORE SPECIFICALLY, I UNDERSTAND THE REPORT TO SAY THAT OIL AND GAS DEVELOPMENTS MAY AFFECT 78% OF THE TOTAL ALASKAN PORCUPINE CARIBOU CALVING GROUNDS ... (I URGE YOU TO EXAMINE THIS PERCENTAGE FIGURE IN VIEW OF NO, OR AT LEAST VERY LITTLE, OTHER AVAILABLE REPLACEMENT HABITAT).

WITH RESPECT TO A PROJECTION OF CARIBOU POPULATION DECREASE, I FURTHER UNDERSTAND THE REPORT TO SAY, THAT BETWEEN 10% AND 40% OF THE HERD MAY POSSIBLY BE AFFECTED.

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BEYOND THE IMPACTS ON CARIBOU, ADVERSE IMPACTS, WE ARE TOLD, CAN BE ANTICIPATED FOR WATER FOWL, MUSKOX AND POLAR BEARS.

IN PLAIN LANGUAGE, THE REPORT TELLS THAT THE PORCUPINE CARIBOU HERD, FOR ONE, IS IN SERIOUS DANGER OF BEING DRASTICALLY REDUCED.

PERHAPS AS ALARMING ... THE HERD, IF DISTURBED, MAY CHANGE ITS MIGRATORY PATTERNS. THIS MEANS, THAT THE HERD COULD BYPASS THE COMMUNITY OF OLD CROW, AND TO DO SO AT SUCH A DISTANCE THAT IT WOULD HAVE THE SAME RESULT AS A REDUCTION OF THE HERD ITSELF.

FOR OLD CROW IN THE NORTHERN YUKON, CARIBOU IS AND HAS BEEN, SINCE THOUSANDS OF YEARS, MY PEOPLE'S LIVELIHOOD. FOR YUKON INDIANS ANY DISTURBANCE TO THE PORCUPINE CARIBOU HERD IS THEREFORE UNACCEPTABLE.

FOR THE RECORD, LET ME MAKE MYSELF PERFECTLY CLEAR: OIL AND GAS LEASES GRANTED ON THE ALASKAN COASTAL PLAIN, AND WITHIN THE HERD'S CALVING GROUNDS, ARE EQUALLY UNACCEPTABLE TO US.

I SPOKE EARLIER OF THE SHARING, BY ALASKAN AND YUKON ABORIGINAL PEOPLE ALIKE, OF MIGRATORY WILDLIFE RESOURCES. WHAT WE ARE REALLY TALKING ABOUT, ARE OUR INTERNATIONAL WILDLIFE RESOURCES.

IN THIS SENSE, MY PERHAPS MOST IMPORTANT POINT IS THAT THE 'UNITED STATES RESOURCE ASSESSMENT' REPORT HAS FAILED TO EXAMINE THE TRANSBOUNDARY EFFECTS OF ALASKAN OIL AND GAS ACTIVITIES. ON THIS LAST ACCOUNT, AS WELL, THE REPORT ITSELF IS UNACCEPTABLE TO US.

LET ME CLOSE BY SAYING, THAT PRIOR TO ARRIVING HERE AS AN INTERVENOR BEFORE THIS PANEL, I HAVE SCRUTINIZED MY ARGUMENTS AND MOTIVES CAREFULLY.

IF YOU WILL, ALASKA AND THE YUKON ARE NEIGHBOURS SHARING THE SAME BACKYARD. I THEREFORE APPEAL TO YOU, AND ON BEHALF OF YOUR YUKON INDIAN NEIGHBOURS, TO GIVE OUR CONCERNS THE ATTENTION THEY DESERVE. I APPEAL TO YOU TO ACKNOWLEDGE US AS YOUR CANADIAN PARTNERS IN THE MANAGEMENT AND PRESERVATION OF OUR WILDLIFE RESOURCES ON WHICH, WHETHER YOU LIKE IT OR NOT, WE DEPEND ON BOTH SIDES OF THE BORDER.

I FULLY BELIEVE THIS TO BE AN ATTAINABLE OBJECTIVE.

THANK YOU.

Defenders OF WILDLIFE

January 23, 1987

Mr. William Horn, Assistant Secretary
Department of the Interior
18th and C Sts., NW
Washington, D.C. 20240

Re: Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment and Legislative Environmental Impact Statement

Dear Mr. Horn:

A careful review of the Resource Assessment confirms Defenders of Wildlife's position that the wisest and best use of the Arctic National Wildlife Refuge coastal plain is to protect the outstanding wildlife and wilderness values of this area. In the long run it is not in the conservation, economic or national security interests of the United States to develop this area; in fact just the opposit is true. We strongly recommend that this area be placed in the National Wilderness Preservation System.

These comments are submitted on behalf of Defenders of Wildlife and the Fund for Animals. Defenders is a national, non-profit organization dedicated to protecting, conserving, and enhancing this country's rich abundance and diversity of wildlife and wildlife habitat. On behalf of its over 80,000 members Defenders is pleased to submit these comments on the Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment and Legislative Environmental Impact Statement (draft assessment).

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We commend the dedicated professionals of the Fish and Wildlife Service (FWS), Bureau of Land Management (BLM), and U.S. Geological Survey (USGS) for their efforts in preparing this draft assessment.

Furthermore, as evidenced by our participation in the suit brought by conservation organizations to ensure the opportunity for meaningful pubic comment on this draft, we appreciate the opportunity for public participation in the planning process and believe that it is critical to the development of a final document.

Unfortunately, Freedom of Information Act requests had to be filed to find out what the Department of the Interior was doing with regard to the future of the Arctic Refuge, and several lawsuits (some of which are still ongoing) were necessary to ensure that the Alaska National Interest Lands Conservation Act (ANILCA) and the National Environmental Policy Act (NEPA) were followed.

To date, environmental organizations have won all the suits filed against the Department of the Interior (DOI) regarding the Arctic National Wildlife Refuge. The major results of this litigation includes: (1) FWS's primary jurisdiction over the

study (rather than USGS) was reaffirmed; (2) some information which would otherwise not be available was made public; and, (3) this draft assessment was released for public comment, hearings, and review.

Following the court ordered release of the draft resource Assessment for public comment with a very short comment period of 60 days over the Thanksgiving and Christmas/Channuka holiday season, Defenders and several other goups requested that the public comment deadline be extended. The comment deadline was subsequently extended to early February 1987.

Recently, the Department of the Interior, in yet a further attempt to block meaningful public input on the draft assessment, requested the Appeals Court to review its December 24 decision in favor of public participation and DOI's responsibility to respond to comments. The actions by the Department of the Interior are inconstructive, strike at the roots of our democratic system, and give everyone including conservationists a reason to be skeptical of the Reagan administration's position regarding the need to lease and develop the coastal plain of the Arctic National Wildlife Refuge.

This skepticism is only increased by the Administration's pocket veto of the National Appliance Energy Act of 1986 (passed overwhelmingly by both houses of Congress), and its opposition to establishing fuel efficiency standards for automobiles and continuing the 55 mile per hour speed limit. Futhermore, Department of the Interior officials are conducting secret negoiations to trade away the subsurface of the refuge coastal plain to private interests and DOI's subsurface geologic information is available to everyone except the public. All in all, the Department of the Interior's actions do not describe an open administration, putting their cards on the table for public review. Rather, secrecy appears to be the byword of the administration.

The Arctic National Wildlife Refuge, the second largest refuge in the National Wildlife Refuge System, is the most outstanding wildlife sanctuary in the world. It is truly the crown jewel of the National Wildlife Refuge System. In conjunction with the adjacent Norther Yukon National Park, this international wilderness and wildlife area is truly outstanding: a priceless international treasure to present and future generations. These attributes of the refuge are clearly put forward in the Resources Assessment which states:

> The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America (p. 45).

Criticisms of Secretary's Recommendations

Although some important aspects and issues of the draft assessment need clarification and others are completely unsubstantiated, many of its shortcomings center on what was left unsaid.

One of the most serious problems of the draft report that needs to be corrected is that the Secretary's Recommendation (Chapter VIII) to lease the entire coastal plain of the Arctic National Wildlife Refuge for oil and gas development is unsubstantiated and makes a mockery of the work that went into the body of the draft assessment. Specifically, the statement in the Secretary's Recommendation that "development of its potential oil and gas resources could make a significant contribution to the economy and security of the Nation. and could be done in an environmentally responsible manner based on lessons learned at Prudhoe Bay, on the 1002 area...and elsewhere" rings hollow when one reads the entire report. In fact, the report contradicts this statement.

First. the recommendation to lease the area for development relies heavily on the argument that it will significantly improve our nation's national security. However, the report fails to analyse this statement and lacks any facts to back up the statement. Chapter VII states that if any oil is found in the 1002 area, at its high point of production (the year 2005). it will satisfy only four percent of U.S. oil demand. That leaves roughly 96 percent of oil consumed by the U.S. coming from elsewhere. Thus the draft report fails to demonstrate that development of the Arctic Refuge coastal plain will either make the U.S. energy self-sufficient. or be able to "significantly reduce the economy's vulnerability to world oil market changes" as stated on page 164. These false statements must be corrected to reflect the report itself.

Furthermore. the draft report fails to look at any comprehensive planned approach to U.S. energy needs. Such an approach would rely on conservation and alternatives to oil and gas that will make the United States less vulnerable to world oil market changes. Even the National Energy Policy Plan developed by the Department of Energy in 1985 states that energy conservation "has proven to be the most expeditious way to reduce the need for new or imported energy resources; and in fact it now contributes more to balancing our national energy ledger than does any single fuel source." Defenders believes that measures to increase energy conservation, such as the recently vetoed bill that would have reduced energy consumption by major appliances need to be implemented and examined in this report as an alternative to achieving energy security before one begins to cry wolf about the national need to develop the Artic Refuge.

The draft suggests that the only way to fill the U.S. need for energy resources is to develop the coastal plain of the Arctic Refuge. The refuge is put forward as a virtual panacea for

the problem of American dependence on oil imports and need for energy resources. However. this conclusion is an illusion. and misleads the American public rather than dealing with the long term problem. Significantly. the draft fails to look at alternatives for meeting U.S. energy needs in the future. The final report should correct these problems.

The second part of the Secretary's recommendation. that development. "could be done in an environmentally responsible manner based on lessons learned at Prudhoe Bay. on the 1002 area...and elsewhere" is contradicted by the draft assessment's discussion of environmental consequences that leasing the entire 1002 area and will have on the wildlife that inhabit this pristine wilderness.

Specifically. page 106 cautions against comparing the experiences of the Central Arctic caribou herd and Prudhoe Bay development with the Porcupine caribou herd and possible 1002 development. The density, dynamics, movement. and traditions of the herds are different as is clearly pointed ut in the document. Page 112 states that the "changes in habitat availability and value from development. combined with increased harvest, could result in a major population decline..." of the Porcupine caribou herd.

The report points out the adverse affects that leasing the entire area will have on other wildlife:

1. Muskoxen - nearly 75% of high use calving habitat could be lost and could result in a major decline of the herd (p. 113). And, major negative effects on muskoxen population could occur (25-50% of population may decline or change distribution (p.114).

2. Polar Bears - because of the small number of bears the population can sustain little mortality. Moderate impacts can be expected. The study notes that development is not likely to effect the overall survival of the species so long as similar intensive development does not occur along the entire north coast of Alaska and Canada. However, the study fails to analyse cumulative impacts of development in arctic Alaska and Canada.

3. Snow geese - major reduction or change in distribution from loss of habitat and loss of feeding areas. Number of geese staging in 1002 area is expected to reduce by 50%.

These impacts on the wildlife, described in the draft assessment, are significant. The report also fails to demonstrate how development could take place in an "environmentally responsible manner" with regard to water and gravel resouces and air and water pollution. In fact. again. just the opposite is true: the report demonstrates that one would not be acting in an environmentally responsible manner if they agreed to this type of development on the refuges's coastal plain.

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Other Criticisms of the Draft Assessment

Besides this considerable lack of support in the assessment for the Secretary's recommendation for full-scale leasing and development of these refuge lands. there are several other serious shortcomings in the resource assessment for the coastal plain of the Arctic National Wildlife Refuge:

1. Failure to look at alternative energy policies and other ways to achieve national energy security. The National Environmental Policy Act demands that alternative ways to meet objectives (meeting the national need for energy appears to be the goal of this environmental impact statement) should be examined. A thorough analysis of alternative energy programs and policies that would make development of these lands unnecessary is needed.

2. Failure to justify leasing the area in light of there only being a 19% chance of discovering oil and gas.

3. Failure to develop a comprehensive and rigorous economic analysis, including how leasing and development during a time of depressed market value for leases and oil due to an oversupply of oil, will benefit the national economy.

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4. Failure to develop a realistic assessment of the marginal probability of economically recoverable oil and gas being found on the coastal plain of the refuge. This failure results in an overestimate of the Net National Economic Benefit. The (NNEB is based on several assumption including the minimum field size likely to be economically produced, and the future oil price.) In the most likely scenairo. the draft assumes that by the year 2000 the price of oil will be $33.00 per barrel (p. 72) in 1984 dollars. To reach this value the price would have to grow at an average rate of 4% per year (starting from an oil price of about $18 per barrel).

The Mineral Management Service of the Department of the Interior uses three oil price growth rates in calculating the margional probability of economically recoverable oil being found in OCS areas: 0, 1, and 2 percent per year (MMS - Proposed Program 5-Year Outer Continental Shelf Oil and Gas Leasing Program for January 1987- December 1991, Detailed Decision Document. Feb. 1986. Appendix F). The 4 percent growth rate used by DOI in this draft assessment is twice the highest growth rate assumed by the MMS. (Using the optimistic assumption of an oil price of $40.00 per barrel means that the yearly growth rate is approximately 4.9 percent.) Why has the Department of the Interior used growth rates in this draft assessment which are higher than that used by the MMS? Defenders recognizes the uncertainty of estimating future prices of oil, but believes that this assessment should follow the standard proceedure used by the MMS.

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Furthermore. instead of just giving the 19% and 26% figures the draft assessment should show that these percents are simply two possible financial and economic scenarios. The assessment should provide a spectrum of percentages in order to give a full analysis of the situation. For example, the draft assessment should include a probability distribution for prices and costs as well as field sizes.

The effect of the high oil price assumptions by DOI is to project a much higher profitability rate for the oil-producing projects than would be the case for an oil price estimate in keeping with MMS projected growth rates.

5. According to the draft assessment (p. 165) the value of the Net National Economic Benefit from the average field size of 3.2 billion barrels is likely to be $14.6 billion. The 95th percentile shows that the NNEB (with optimistic economic assumptions from a field size of 9.2 billion barrels will be $9.4 billion. To get the total expected value of the NNEB from these field sizes. the DOI should have multiplied by the marginal probability (19 percent), to yield values of $2.8 and $1.8 billion respectively for the NNEB. These are the values that should be used to estimate the monetary benefits that are derived from oil and gas production in the 1002 area. Furthermore. keeping in mind the point made in #3, if the NNEB is calculated using an oil price estimate that is too high. the benefits of producing oil will be over-estimated, and the resulting balancing of the costs and benefits of the project will be misleading.

6. Failure to explain why the United States should develop and expend its oil resources during an oil glut (when prices are low and oil readily available). Furthermore, the assessment should explain why. with the current low oil price the U.S. wouldn't better serve its national security interests by purchasing more oil for the nation's Strategic Petroleum Reserve. and saving U.S. oil.

7. Failure to release for public review geologic data critical to determining the possible resources of the 1002 area. The federal government. state of Alaska. and oil industry have the information, only the American public does not have the same advantage.

8. Failure to address the effects of. and ensure the control of air and water pollution and other toxic chemicals (drilling muds. and oil spills), such as those found at Prudhoe Bay. on the wildlife population of the refuge if it was developed.

9. Failure to demonstrate how water and gravel supplies will be obtained without damaging the environment. In light of the following statement found on page 75 the water and gravel issues need to be much more fully analysed: "...specific locations and sources of water and gravel for exploration and development activities have not been identified; it is understood that these resources. especially water. are not readily available on the

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1002 area."

10. Failure to analyse the cumulative impacts of development from oil and gas leases, including: Beaufort Sea OCS (Sale 97) - 21.2 million acres; adjacent state lands - over one million acres; and, lands in Canada. These cumulative impacts must be addressed in the environmental impact statement.

11. Failure to deal comprehensively with the Native villages that will be affected by development. Although. Raktovik is discussed in some detail, Arctic Village and Venetie in Alaska, and Old Crow and other villages in Canada are hardly mentioned. except to say that effects on them will be secondary and therefore are not discussed in the assessment. Furthermore, the list of contributers to the report lacks either an anthropologist or a sociologist.

12. Failure to explain why it will take 10-15 years to bring the 1002 area on line when Prudhoe only took nine years.

13. Failure to discuss the proposed land trades. the effects this will have on the area; why the Department of the Interior believes that this would be the best route to go if the area were opened, and what other options DOI has looked at or is considering.

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14. Failure to discuss the Northern Yukon National Park, and the international treaties applicable to the wildlife from this area.

15. Failure to consult with the Canadian government before releasing the draft document, even though Section 1005 of ANILCA expressly requires consultation.

16. Failure to discuss the Porcupine caribou herd agreement with Canada currently being considered and the need to cooperatively manage this international wildlife.

17. Failure to analyse when Prudhoe Bay reserves will deminish. given that West Sac and Milne Point other known reserves are not being developed at this time.

18. Failure to mention that in Alaska. less than 6 percent of U.S. oil reserves are estimated to be under designated or potential wilderness areas. including the Arctic National Wildlife Refuge. Congress made sure that those lands with the greatest potential for oil were excluded from wilderness designation or potential designation.

Conclusion:

Oil development in this crown jewel of the National Wildlife Refuge System will result in the loss of its wilderness character and in the decline of its wildlife. Defenders of Wildlife believes that the crux of this issue is not to see how much

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wildlife could be saved if it moved elsewhere or adapted to the development. Rather the wildlife must be saved in its wilderness setting. This refuge is not the place to see if we can manage the wildlife and keep up its numbers while development occurs. the rest of the north slope has already been devoted to that course. The refuge was established to protect wildlife in wildlands and that continues to be its greatest value to this and future generations.

We agree with the Interior Department's statement that:

> "Oil and gas development will result in widespread, long-term changes in wildlife habitats. wilderness environment. and Native community activities. Changes could include displacement and reduction in the Porcupine caribou herd." (p. 6)

However, this statement only points out more clearly that development of this area should not occur. we should not "change" the wildlife habitat or the wilderness environment of this area. Furthermore, Defenders believes that there is no need for further exploration of the area. because this area should not be developed, and if practices to conserve energy and find alterntives are implemented -- it may never have to be developed. Defenders of Wildlife therefore strongly urges the Department of the Interior to recommend that the entire 1.5 million acre area of the Arctic National Wildife Refuge be designated as part of the National Wilderness Preservation System.

We greatly appreciate your consideratio of these comments.

Sincerely.

Amy Skilbred
Alaska Specialist

AS:dlt

Commments of Amy Skilbred, Alaska Specialist for Defenders of Wildlife before the U.S. Department of the Interior, Regarding the Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment, January 9, 1987.

Good day. I am Amy Skilbred, Alaska Specialist for Defenders of Wildlife. Given the time constraints on oral statements for this hearing, I will briefly summarize Defenders main concerns with the Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. Defenders will be submitting more detailed written comments by the January 23 deadline.

Before getting into our concerns I commend the staff of the Fish and Wildlife Service, Bureau of Land Management, US Geological Service, and Mineral Management Service for the considerable time and effort they have put in developingthis draft assessment.

One of the ~~major~~ blatant problems with the report is that it does not substantiate the Secretary's Recommendation (Chapter VIII) to lease the entire coastal plain of the Arctic National Wildlife Refuge for oil and gas development.

Specifically, the statement in the Secretary's Recommendation that "Development of its [the 1002 area's] potentail oil and gas resources could make a **significant contribution to the economy and security** of this Nation, and could be done in **an environemental ly responsible manner** based on lessons learned at Prudhoe Bay, on the 1002 area...and elsewhere" rings hollow to someone who has read the entire report.

The recommendation to lease the area relies heavily onthe argument that it will significantly improve our nation's national security. Let's look at exactly how significant the report says the contribution to the economy and security of this Nation" will be if development proceeds. Chapter VII shows that if any oil is found in the 1002 area, at its high point of production (2005), it will only satisfy 4.1 percent of U.S. oil demand. That leaves roughly 96 percent of oil consumed by the US coming from elsewhere. To say that this would be a significant contribution to the economy, or that it would contribute significantly to National security is highly subjective, at best.

Certainly, any additional barrel of oil produced may reduce U.S. dependence on a barrel offoreign imports but development of the coastal plain of the Arctic National Wildlife Refuge will not make the U.S. energy self-sufficient, nor will it be able to "significantly reduce the economy's vulnerability to world oil market changes" as stated on page 164.

To tell the American public that this is the case is misleading. Only a comprehensive and planned approach to U.S. energy needs emphasizing conservation and alternatives to oil and gas will make the United States less vulnerable to world oil market changes.

It is interesting to note the references that are made to the National Energy Policy Plan developed by the Department of Energy in 1985. This Plan states that energy conservation "has proven to be the most expeditious way to reduce the need for new or imported energy resources; and in fact it now contributes more to balancing our national energy ledger than does any single fuel source."

Conservation of oil resources should be the cornerstone to any national energy policy. However, the conclusion of the report does not mention the role conservation would play rather it stresses the overriding national need and national security interests in developing the 1002 area and puts forward the coastal plain of the refuge as a virtual panacea to the problem of American dependence on imports. Development of the Arctic Refuge will not solve national security questions which arise because of the U.S. dependence on imports.

Defenders believes that measures to increase energy conservation, such as the recently vetoed bill that would have reduced energy consumption by major appliances (saving approximately 1 billion barrels of oil by the year 2000) need to be implemented before one begins to cry wolf about the national need to develop the Arctic Refuge.

The second part of the Secretary's recommendation states that development "Could be done in an environmentally responsible manner based on lessons learned at Prudhoe Baly, on the 1002 area...and elsewhere" and goes on to say that "although, circumstances within the 1002 area may be somewhat different, the evidence derived from the Prudhoe Bay experience leads one to be quite optimistic about the ability to explore for and develop the hydrocarbon potential of the 1002 area without significnat deleterious effects on the unit's wildlife resources. These statements again fail to reflect anyone who has read the report that s... Porcupine Caribou **will not be greatly affected by development.in**. In fact, the statement is contradicted by the discussion of environmental consequences of leasing the entire 1002 area (page 110) which states that "These changes in habitat

availability and value from development, combined with increased harvest, could result in a major population decline..." of the PCH.

The same chapter also goes to lenghts to make it clear to the reader that the dynamics, and density differences between the PCA and the CAH (page 106) caution against one drawing any conclusions about the effects leasing the entire 1002 area will have on PCH, from CAH's experiences at Prudhoe Bas, as appears to be done in the Secretary's Recommendation.

The draft chapter of the Secretary's Recommendation appears almost to have been developed separately from the assessment itself.

Besides the lack of support for the conclusion in the assessment itself, there are several other omissions and inadequacies in the report. Including:

1. Cumulative impacts of development are not addressed. Several places in the assessment mention possible off shore development in the Beaufort Sea and the probability of additional State and private development if the refuge is opened to leasing. According to the National Environmental Policy Act these cumulative impacts mus be addressed in an environmental impact statement.

2 The draft fails to include the "risked" estimates throughout the chapter assessing the oil and gas potential of the 1002 area. The assessment cites a document by the Mineral Management Service called Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources for the Outer Continental Shelf as of July 1984. This MMS document consistently gives the "marginal probability of hydrocarbons" along with the "Risked mean" when comparing areas that have yet to be developed. The draft assessment fails to do this in Figure III-2, and Table III-1 thus skewing the information.

One of the most sailant points about any possible development in the 1002 area is that there is less than a one in five chance of finding anything. This point is underplayed throughout the document and not even mentioned in the executive summary or the Secretary's Recommendation. Only if this condition is met will any oil be recovered from the refuge's coastal plain. The odds are one in five, a crap shoot that industry may well be willing to take, but not necessarily a gamble with a unique national treasure that should be allowed.

By factoring in this 19 percent marginal probability the "risked probability" is reached showing that the mean estimate [illegible]

sharply reduced from 3.2 billion barrels to 0.6 billion barrels (barely two months worth of oil at present rates of U S consumption).

3. THE MOST LIKELY, AND OPTIMISTIC ECONOMIC SCENARIOS FOR DEVELOPMENT ARE BASED ON CRUDE OIL MARKET PRICE OF $33 AND $40 PER BARREL IN THE YEAR 2000. GIVEN TODAY'S PRICE OF $18 PER BARREL AND USING THE MINERAL MANAGEMENT SERVICE'S GREATEST ESTIMATE OF GROWTH (INCREASE IN BARREL PRICE), 2%, $33.00 PER BARREL WILL NOT BE REACHED UNTIL THE YEAR 2023. IN FACT DOI HAS USED AN ESTIMATE OF 5.1% AND 5.9$ GROWTH PER YEAR, RESPECTIVELY, CONTRARY TO MMS'S CUSTOMARY PRACTICE OF USING 0, 1 AND 2% GROWTH.

4. The draft assessment fails to deal comprehensively with the Native villages that will be affected by development. Although, Kaktovik is discussed in some detail, Arctic Village and, Venetie in Alaska, and Old Crow in Canada are hardly mentioned, except to say that effects on them will be secondary and therefore not discussed in this assessment. We believe that this critical factor in assessing the impacts of developing the coastal plain of the refuge needs to be discussed. Furthermore, the list of contributers to the report does not include either an anthropolgist or a sociologist, leaving one to question the importance placed on the effect development may have on subsistence.

5. Besides the effects on the caribou, already mentioned and the thorough job done in the report, muskoxen and snow geese and polar bears in the 1002 area stand to be aversely affected by development.

Based on a thorough review of the report and other information Defenders of Wildlife believes that the 1002 area of the Arctic National Wildlife Refuge should be recommended for inclusion in the National Wilderness Preservation System, as its highest and best value is for the wildlife found in this pristine and unique arctic ecosystem.

January 19, 1987

Sandy O'Brien
Conservation Chairperson
Dunes Calumet-
Audubon Society
5603 Mississippi St.
Hobart, IN 46342

U. S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Building
18 and C Streets NW
Washington, D.C. 20240

Dear Sirs and Madams:

This letter pertains to the draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. The Dunes Calumet Audubon Society has a number of concerns about the oil and gas leasing and this draft report.

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"The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge" and virtually the entire 1002 area would qualify as wilderness under the Wilderness Act the draft report states on page 46. Although the mean conditional estimate of economically recoverable oil is an impressive 3.2 billion barrels, there is an 80 percent chance that no economically recoverable oil will be found. Even under the 3.2 billion barrel full leasing estimate, only 4.17 percent of national oil demand is projected to be filled by the 1002 area during its peak of production in the year 2005. The 1002 area is projected to provide only 0.91 percent of national demand in the year 2000. While it could be helpful, the 1002 area can hardly free the U.S. from the economic and national security hazards of foreign oil dependence. While the mitigation recommendations in the draft report seem very thoughtful, we feel the 1002 area is too valuable to risk in gas and oil development. The Arctic Refuge has just one coastal plain. Other areas such as the Alaskan state lands west of the Canning River could be found to be productive and able to take over when the Prudhoe Bay fields decline.

The draft report does not mention much of the effects of natural gas development other than the effects would not be much greater than oil alone since gas was not expected to be economically recoverable in the next 30 years. Congress should have more information than that if it is to decide if gas leasing should occur with the oil leasing process.

The effect of the inevitable accidental spills of crude oil and refined petroleum products is minimized in the report. The 1978 spill of 658,000 gallons and the 1979 spill of over 200,000 gallons must have at least killed a great deal of vegetation. The consequences to the abundant coastal marine fish, birds, and wildlife of a spill there would be major. The 50,000 barrel maximum spill design of the valve locations on TAPS still allows for a large spill. Detecting and trying to clean up a spill would be very difficult during the frequent fog, blowing snow, and whiteouts of the 1002 climate.

The Native Inupiat Eskimos in Kaktovik would suffer the loss of their traditional subsistance way of life with the oil development of the 1002 area. Although they have recently entered partly into cash economy, they can still pursue their traditional culture and subsistance without oil development. The monetary benefits to those individuals who get jobs during the development could easily be outweighed by the loss of the traditional life of the group, including the aesthetics of the wilderness they now use. The Inupiat of Canada who depend on the Porcupine Caribou herd would be affected too.

Major to moderately severe effects from oil development on caribou, muskoxen, wolves, wolverines, brown bears, polar bears, snow geese, golden eagles, and on vegetation, wetlands, and terrain types as described in the report are too great of a price to pay for the benefits of oil from the 1002 area of the Arctic Refuge. The scientific value of having undisturbed arctic ecosystem to study would be lost as well.

The draft report, although it acknowledged the importance of vegetation and briefly described 17 cover types and 6 terrain types, did not mention anything about the botanical diversity of the 1002 area. Only about six vascular plants were mentioned specifically, and five of these were by common name. It is difficult to convey the biological worth of the 1002 area without adequate description of the flora in the report.

Thank you for noting our comments on the draft report and opposition to oil and gas leasing.

Very sincerely yours,

Sandy O'Brien
Conservation Chairperson
Dunes Calumet Audubon Society
5603 Mississippi St.
Hobart, IN 46342

ENVIRONMENTAL DEFENSE FUND

444 Park Avenue South
New York, NY 10016
(212) 686-4191

February 3, 1987

U.S. Fish and Wildlife Service
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Attn: Division of Refuge Management

Gentlemen:

Enclosed are the comments of the Environmental Defense Fund on the Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment.

Sincerely,

Michael Oppenheimer
Senior Scientist

MO/la

Enclosure

O-213

COMMENTS OF THE ENVIRONMENTAL DEFENSE FUND

on

DRAFT ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT,

November 1986

These comments of the Environmental Defense Fund on the proposed Draft ANWR Coastal Plain Resource Assessment are limited to discussion of potential impacts of development on air quality, acid deposition, and the consequences thereof. We shall argue that air quality-related impacts are potentially significant. The Assessment is characterized by a near total absence of discussion of such impacts, and reports no air quality modeling. It is thus seriously deficient.

1. The Draft Assessment is virtually devoid of discussion of potential impacts of development on air quality.

The Assessment is seriously deficient in this regard. In particular, there is no discussion of the possible consequences for biota of low levels of air pollution below the NAAQS. Nor is there any discussion of the size or consequences of the deposition of these pollutants into the terrestrial environment. Nor is there any discussion of potential impacts of such deposition on aquatic ecosystems. Nor is there discussion of mitigating alternatives involving monitoring or technological control of emissions.

2. Potential ambient levels of ozone (O_3) are significant in terms of impacts on terrestrial ecosystems.

Ozone is a well known phytotoxin. Although studies of ozone effects on plant species common to ANWR area are lacking, it may be assumed that the effects of ozone noted for a wide range of other species, both annual and perrenial, will occur. These effects include reduction in photosynthesis and visible leaf damage. It is suspected that ozone contributes to long term growth reductions observed broadly for forests in the eastern U.S.[1/]

3. Projected concentrations of ozone are significant in this context.

NO_x, hydrocarbon and carbon monoxide emissions from development activities may be expected to increase ozone concentrations. Annual mean ozone measurements during 1979-80 at Prudhoe Bay indicate an increase of 3-4 ug/m^3 due to activity at the site with total annual means exceeding 50 ug/m^3 (about 25 ppb). ANWR development may be smaller than that at Prudhoe Bay; an air emissions ratio of 1/3 is estimated for the two sites. A rough estimate suggests that incremental O_3 concentrations near the ANWR site may be larger than 1 ug/m^3 above background values. The effects of such increases are not considered in the Assessment. Nor is any air quality modeling presented for the specific site involved. Furthermore, the measured values characterize a period of low activity at Prudhoe Bay. Air quality modeling based on 1986-87 activity levels at Prudhoe Bay indicate factor-of-10 increases for NO_x compared to 1979 measured values. Although models are conservative, and NO_x increases cannot be translated easily into concommitant O_3 changes, much higher NO_x concentrations may mean much higher O_3, both at the site and downwind.

Even incremental increases of 1 ug/m^3 must be considered as significant since no damage threshold for plants due to ozone has been developed. In addition, the observed background values at Prudhoe Bay, as elsewhere, are large, so that biological consequences may occur for small pollutant concentration increases. For instance, observed damage to some plants in much less extreme environments has been observed for total ozone levels as low as 40 ppb in regions where background levels may be considerably higher than those in the Arctic.[2/] Thus, relatively small anthropogenic ozone increments may cause biological change.

4. The Assessment contains no air quality modeling of the downwind increases in ozone.

Ozone is a secondary pollutant which forms in pollutant plumes as transport occurs away from the source. Maximum incremental ozone concentrations may occur tens or hundreds of miles downwind. In this case, such concentrations could occur on the north slope of the Brooks Range.

5. Potential impacts of NO_2 concentrations and related acid deposition are significant in terms of impacts of terrestrial and aquatic systems.

Large increases in local acid deposition may occur due to NO_2 emissions at the site. NO_2 is a known phytotoxin as well as a source of precipitation and surface water acidification. Based on the Prudhoe Bay measurements, NO_2 increments on site of 0.5-1.0 ug/m^3 in annual mean concentration may be

expected. Using a dry deposition velocity of 1 cms^{-1} this increase can be converted to an incremental deposition value of up to 3 kg NO_2/ha-yr. NO_2 will be largely converted to nitric acid before deposition to soils and in surface water. Wet deposition of NO_3 from these emissions will also contribute to acid deposition. Based on the Prudhoe Bay measurements, total acid deposition at ANWR may be equivalent to as much as 5.0 kg/ha-yr sulfuric acid deposition. These values are somewhat below thresholds for episodic total acidification of lakes in sensitive drainage basins (~9 kg/ha-yr). However, if model values of NO_x concentrations from 1986-87 operations at Prudhoe Bay are scaled to the ANWR site, dry deposition alone far exceeds threshold values for acidification of surface waters on an annual or episodic basis. In the Arctic, transient pools of meltwater may be important environments for some animals, and sources of food for others. Since food chain disruptions occur when pH drops to only about 6.0, even partial acidification from these emissions may have substantial environmental impacts. NO_2 is a relatively important source of acidification in such environments because snowmelt occurs in periods of low biotic activity when soils are frozen. Thus, the NO_2 emissions expected at the ANWR site must be considered significant. Again, no modeling is available for downwind concentrations. Based on the Prudhoe Bay model values, some acidification also may occur for waters at higher altitudes on the North Slope. Since no modeling is presented, no quantitative conclusion is possible.[3/]

With respect to terrestrial ecosystems, negative impacts have been noted for NO_2 in specific, and acid pollutants in general, for a variety of

terrestrial species including lichens. For low concentrations and Arctic species, considerable uncertainty exists on potential impacts.[4/] Again, local plume impaction as well as downwind effects may be important. No air quality modeling or discussion of downwind impacts is presented.

6. In summary, the Assessment contains almost no discussion of and no quantitative assessment of acid deposition and air quality related impacts. These impacts are potentially very significant.

O-215

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FRIENDS OF THE EARTH

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(202) 543-4312

COMMENTS AND TESTIMONY OF

FRIENDS OF THE EARTH

REGARDING THE U.S. DEPARTMENT OF INTERIOR'S

DRAFT ARCTIC NATIONAL WILDLIFE REFUGE
COASTAL PLAIN RESOURCE ASSESSMENT
AND REPORT TO CONGRESS

O-217

PRESENTED BY

CYNTHIA E. WILSON
EXECUTIVE DIRECTOR OF
FRIENDS OF THE EARTH

AT THE

U.S. DEPARTMENT OF INTERIOR

WASHINGTON DC

JANUARY 9, 1987

Committed to the preservation, restoration, and rational use of the ecosphere

Testimony on Draft Coastal Plain Resource Assessment

January 9, 1987

My name is Cynthia E. Wilson. I am the Executive Director of Friends of the Earth. By way of background, I was an Assistant to Interior Secretary Cecil D. Andrus during the Carter administration and coordinated all of the Department's work on the Alaska lands issue. The Arctic Wildlife Range was one of the areas which received an enormous amount of attention, and after careful consideration President Carter and Secretary Andrus recommended that the entire area be designated wilderness.

Prior to that, during eight years as the Washington representative of the National Audubon Society, I worked on the various Alaska related issues -- the TAPS pipeline, the proposals for the gas pipeline, and the Alaska Native Claims Settlement Act -- which arose during that period.

I have read the draft Coastal Plain Resource Assessment and frankly was not in the least surprised to find that full scale development is recommended despite the speculative nature of the information about potential oil and gas. Let me state our position clearly. Having read the information presented in the assessment, we remain opposed to development in the Arctic National Wildlife Refuge.

The report attempts to minimize the potential impact of development on the Porcupine caribou herd by claiming that the TAPS pipeline project had "minimal impact on wildlife resources," and projecting that experience to the Porcupine herd. As a matter of fact, displacement of the Central Arctic herd from traditional calving grounds as a result of oil development at Prudhoe has been well documented. (1) Most of the caribou who pose for pictures along the pipeline are bachelor bulls, whose behavior and requirements are quite different from cows with calves.

Even if you accept the characterization of "minimal" impact--which is subject to dispute--this a classic case of comparing apples and oranges. The fact is that the Porcupine herd is migratory, while the Central Arctic herd is not. The coastal plain in ANWR is relatively narrow and bounded by the Brooks Range on one side and the Beaufort Sea on the other. The concentration of caribou on the ANWR calving grounds is fourteen times greater than the concentration of caribou on the calving grounds of the Central Arctic herd. In a classic understatement, the report on page 112 states, "Given the geography of the calving areas and the current densities (of the Porcupine herd) in those areas, the availability of suitable alternative habitats is not apparent."

Although the calving grounds are only a fraction of the herd's

entire range, they are clearly the most crucial fraction. If this area is disrupted, the impacts could be severe. Calving grounds are selected because they offer a unique combination of conditions that favor survival. These include early snow melt, early growth of new plants, closeness to insect relief habitat and lack of predators. These conditions are not present in many parts of the Refuge.

The 1002 report does not show the complete calving grounds of the Porcupine herd, which includes the entire 1002 area. However, it does show the high use of the area between the Hulahula and Aichilik rivers. The places of concentrated calving activity vary from year to year and in some years, there are no "concentrated" areas.

During years when snowmelt is early, calving takes place north of the foothills, out onto the coastal plain. The conflicts with oil development in those years would be extreme. Since calf survival rates are higher when calving takes place north of the foothills (2), the impact of oil development on the caribou population would be higher in these years. This does not appear to have been considered in the 1002 report.

Right after calving, the caribou cow's energy reserves are at their lowest. At the same time, millions of mosquitoes hatch out and become a severe problem. Their harassment drives small "nursery bands" of caribou cows with calves into huge aggregates in an attempt to escape. In some years, tens of thousands of cows with calves gather near the coast south of Camden Bay--one of the proposed drilling sites.

To escape the insects, caribou move almost continually. Access to forage and habitat which provides relief from insects is crucial at this time, and insects contribute to the high death rate for calves. Research at Prudhoe Bay has demonstrated that large mosquito harassed groups of caribou do not readily cross beneath eleveated pipelines.(3) Disturbance from oil exploration and development activities would add stress at a point in the caribou's life cycle when additional stress cannot be tolerated.

We believe the proposal to lease the 1002 area, but delay work on the area described as "concentrated calving grounds" is simply a sop for public relations purposes. Once development begins in the Refuge, the impacts on the herd will likely be irreversible. Who will enforce the stipulations that are supposed to mitigate the impact -- where is the army of enforcement personnel which would be required and--just as important--once the oil companies have started work in the refuge, how will the Interior department resist the pressure to lease the concentrated calving area? Given how little we really know despite the years of information gathering, it seems unlikely that any firm conclusions can be drawn in the few years it will take to develop the bulk of the coastal plain.

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In addition to the effects of the oil exploration and development on the wildlife rsources, we are concerned about the effects on traditional subsistence users dependent on the caribou. The indigenous people of Alaska and Canada have an ancient relationship with the caribou which is expressed by the Athabascan people as, "Every caribou has a bit of the human heart in him and every human has a bit of caribou heart."(4)

Oil development would reduce access to subsistence areas used by the village of Kaktovik, including loss of hunting opportunities in approximately one half of the 1002 area. Closure of a 5-mile corridor on either side of roads, pipelines and developed areas was recommended in a workshop of caribou biologists sponsored by the Fish and Wildlfie Service. Further restricting the caribou's hunting season was also recommended. (5)

I would also like to touch on one of the most glaring flaws in the 1002 report -- the use of a price per barrel of $33 and $40 in making calculations. Although we realize that by the time the Refuge could be developed, it is posible that prices will rise from today's $18 per barrel. But the fact that the viability of this proposal is premised on these prices shows the bias of this administration. Actually, when you look at the probability figures, and the industry's track record in predicting where giant fields will be found, you realize that the outcome is really a gamble.

The Reagan administration has vetoed legislation which would set energy efficient standards for appliances and dismantled virtually every energy conservation program, and then has the gall to tell us that we need to open up America's premier wilderness area because of national security. Baloney. If the administration is serious about reducing dependence on foreign oil, then it would be seriously working to promote energy conservation--instead of dismantling the solar collectors on the White House roof with great fanfare.

In the mid-seventies, we heard the same national security arguments when the energy industry attempted to stampede Congress into ramming a gas pipeline through the Arctic Wildlife Range. A coalition of environmental groups and leaders from the midwest managed to stem the hysteria and ultimately legislation was passed which set up a process for carefully selecting another route. But the irony is, ten years later that pipeline still hasn't been built and yet somehow we have managed to survive.

I have had the exhilarating experience of flying over the Arctic Refuge and seeing the vast herds of caribou. It is a sight I will never forget, and one which I hope future generations will have the opportunity to enjoy. It makes absolutely no sense to tear up this wilderness area on the chance that it may contain economically recoverable quantities of oil--especially when according to the report (p.50) fields in East Texas and elsewhere still have greater reserves which would be far easier to extract.

The American people are willing and able to practice conservation if our leaders show the way. Until alternative forms of energy are given more priority and an energy conservation program is in place, the only real reason to open the Arctic Refuge is greed.

References:

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4. Slobodin, R., 1981, "Kutchin," in North American Handbook: Smithsonian Institution.

5. Report of the Caribou Impact Analysis Workshop, Arctic National Wildlife Refuge, November 19-20, 1985, U. S. FWS, Fairbanks, 1986.

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attached article for the record

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Cindy Lowry

Mailing Address P.O. Box 104432
Anchorage AK 99510

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☑ I am speaking for Greenpeace
(please enter name of organization you represent)

O-220

GREENPEACE U.S.A.

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TESTIMONY OF

CINDY LOWRY
ALASKA FIELD REPRESENTATIVE
GREENPEACE

BEFORE THE

FISH AND WILDLIFE SERVICE

HEARING ON THE

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT AND
DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

JANUARY 5, 1987

My name is Cindy Lowry and I am the Alaska Field Representative for Greenpeace, an international environmental organization dedicated to the protection of the natural environment and marine ecosystems. Our organization has offices in 17 countries and a membership of over 600,000 in the United States alone, including 1600 Alaskans. I am pleased to have this opportunity to present Greenpeace's comments on the Draft 1002 report and recommendation to Congress regarding the coastal plain of the Arctic National Wildlife Refuge.

Greenpeace is opposed to oil and gas development in environmentally sensitive areas, a category in which the arctic coastal plain certainly belongs. The report's recommendation to lease the entire coastal plain is absurd in that it fails to adequately address the detrimental impacts of oil development to the ecosystem as a whole. Not only is the onshore area at risk due to the inherent adverse environmental affects associated with development, but also the sensitive marine ecosystem offshore is placed in jeopardy as well. In addition, the report is lax in evaluating the cumulative effects of oil and gas development of offshore lease sale areas in both federal and state waters. We are also concerned that development of the coastal plain could accelerate the lease sale process in Outer Continental Shelf (OCS) waters.

As an example of the report's inadequacy, we make reference to its description of environmental consequences to marine mammals found on page 119. One sentence is allowed for "mitigation" of environmental impacts for seals and whales which states "No mitigation beyond that already outlined for other species." We find it highly unlikely that all marine species react alike to oil exploration activities. It is evident by this section alone that not enough is known about the effects of oil development on marine species that inhabit both the nearshore waters and the coastal plain itself.

O-221

Experience has shown that oil development brings with it a type of onshore industrialization that communities are just beginning to understand. Oil refineries and transfer facilities deplete fresh water supplies and encroach on coastal wetlands and wildlife habitats. These facilities as well as offshore operations themselves have also become major contributors to steadily worsening air quality conditions. What is known and what remains uncertain both point to an inevitable decline and possible annihiliation of the subsistence lifestyle of the Inupiat.

In summary, the costs and risks to the environment inherent in oil and gas development outweigh any potential gains from the production of oil and gas on the coastal plain. The possibility of a few days of oil resources for the country simply do not warrant the risk of destroying this unique, fragile arctic environment and the adjacent sensitive marine ecosystem.

The U.S. government needs to develop a national energy plan. To continue using the ploy of national security and defense as a means of exploiting environmentally sensitive areas is unconscionable. Clearly, if the government does not perceive the necessity to develop a national energy policy whereby the efficient use of existing reserves is promoted and alternative technologies to reduce the need for oil are developed, then they should not object to the public demanding that environmentally sensitive areas be excluded from oil development. We urge that the unique arctic coastal plain be given the fullest protection in that of federal wilderness designation.

INTERNATIONAL PORCUPINE CARIBOU COMMISSION - ALASKA
P.O. Box 200908
Anchorage, Alaska 99520

February 6, 1987

U.S. Fish & Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, DC 20240

SUBJECT: Comments on Draft 1002 Report to Congress

Gentlemen:

Thank you for the opportunity to review your Draft Report to Congress on the Arctic National Wildlife Refuge Coastal Plain Resource Assessment.

The IPCC's responsibility is to speak for the interests of those people in northeast Alaska and northwest Canada who rely upon the Porcupine Caribou Herd for subsistence.

First, you must know that our people are really angry about this report. It is unacceptable as written. We hope that our comments will help the Department do a better job in its Final Report to Congress. At this time the IPCC does not have a position for or against any alternative in the report. Our only purpose is to encourage you to meet your responsibilities to deal in good faith with the Native people of northeast Alaska and to help Congress and the general public to understand the importance of these decisions on our peoples. Our specific comments and recommendation follow:

1. With the exception of Kaktovik, your report fails to recognize or analyze the importance of Porcupine caribou to the many other villages of Alaska and of northwest Canada who utilize the PCH for subsistence.

   We believe it is essential that your final report describes the full range of use of Porcupine caribou by local communities. For those communities with a substantial dependence upon Porcupine caribou for subsistence (e.g., Arctic Village, Old Crow and Venetie), you should fully describe their use of and dependence upon Porcupine caribou, and how they would be affected if the herd declined or shifted its movement patterns away from village hunting areas.

   The report must analyze the possible effects each alternative could have on our culture, on alcoholism, and on the future of our communities. This should include all the alternatives, including what effects the Wilderness alternative might have on

   subsistence access - like the problems in Anaktuvuk Pass and Noatak.

2. Your analysis failed to define the critical calving and post-calving grounds of the Porcupine Caribou Herd. This is essential information and must be addressed. In fact, by mapping just your "core" calving areas as "Resource 1" lands, you're hiding from people the truth about what lands are essential habitat for Porcupine caribou. Instead, you should define those lands used by the Porcupine Caribou Herd for calving and post-calving activities which together are critical to the future health and survival of this herd. From what our old people tell us and also from your own Fish and Wildlife Service studies, this essential habitat is much larger than the "core" calving area you defined in your map and report. You must address this issue honestly if people are to believe your reports.

3. For many years, your Department has rejected or failed to act on many Native allotments within the Arctic National Wildlife Refuge. You are recommending to open some of the most sensitive areas of this Refuge to exploration and possible development activities while still many, many allotments have not been granted yet. This shows again the disregard that your Department has held for the Native people who live in this region. We strongly recommend that the Department of Interior favorably adjudicate any outstanding Native allotment applications within the Arctic National Wildlife Refuge. In addition, allotment applications which were not accepted or which were rejected because of conflicts with the Wildlife Refuge should be re-adjudicated so that the Native people of the region may make a fair claim on those lands to which they would be entitled if it had not been a refuge.

4. Please expand the discussion of no-hunting corridors around development areas, including (a) a map of the areas that would be affected if these unwarranted no hunting zones were approved; and (b) a fuller discussion of why the Department feels justified in restricting Native subsistence hunting activities near oil developments in ANWR while permitting many more people to hunt near oil developments on the Kenai Wildlife Refuge.

5. How would the numbers for "economically recoverable oil resources" be affected if the price of oil did not go up as much as $33 (say $24 to $28)?

6. Under "standard for environmental protection" (p12), you say that development will be "conducted in a responsible manner that results in no unnecessary adverse affects." Does this change in any way your existing requirements that activities be "compatible" with the purposes of the ANWR including conserving the Porcupine Caribou Herd? The IPCC strongly believes that any activity within the range of the Porcupine Caribou Herd should

be compatible with the health and producivity of the herd and the subsistence needs of local people.

Thank you for the opportunity to comment. The IPCC will carefully look at your final report to Congress. It will be a big help to our people if it evidences an understanding of all the issues involved in this decision before it is discussed in Congress.

Sincerely,

for Jonathon Solomon, Chair
International Porcupine Caribou Commission

O-223

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name LONNIE D. BROOKS

Mailing Address 6381 PIONEER DR

ANCHORAGE AK 99504

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☑ I am speaking for INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRATORS
(please enter name of organization you represent)

O-224

ARCTIC NATIONAL WILDLIFE REFUGE

DECISIONS FOR TODAY--RESOURCES FOR TOMORROW

Testimony Given

to

UNITED STATES FISH AND WILDLIFE SERVICE

by

[redacted]

of

GEOPHYSICAL SERVICE INC.

5801 Silverado Way

Anchorage, Alaska 99518

on behalf of

INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS

In

Anchorage, Alaska

on

05 January 1987

ANWR

DECISIONS FOR TODAY--RESOURCES FOR TOMORROW

I am Lonnie D. Brooks, Marketing Manager of Western U.S. for Geophysical Service Inc., the company that conducted most of the geophysical field work that formed the base for the petroleum resource evaluation included in the 1002(h) report. I am a geophysicist, registered in the State of California. I appear before you today testifying on behalf of the International Association of Geophysical Contractors, better known as the IAGC. The IAGC is an association whose members do virtually all the geophysical exploration for oil and gas in the free world.

O-225

The IAGC is strongly supportive of the recommendation of Assistant Secretary Horn concerning the development of oil and gas in Alaska's Arctic National Wildlife Refuge and commends that recommendation to Secretary Hodel for inclusion in the final version of the ANILCA 1002(h) report that will be sent to Congress. We believe that recommendation to be required by the evidence presented in the report. Without question the 1002 area of the Refuge is one of the best places left in the world to look for oil and gas. We are very fortunate that it is located in the United States and should not pass up this gift with which we have been provided.

We agree with the writers of the report when they say that any adverse environmental effects of additional geological and geophysical exploration would be negligible. On page 99 the report says those effects could be expected to be the same as during the 1984 and 1985 seismic surveys, and on page 111 it says the effects from those surveys were negligible. The summer following those surveys, the USFWS ANWR Assistant Manager, along with two other persons, hiked across the Coastal Plain with a map of the seismic lines in hand. The hikers crossed 15 of the seismic lines and were able to detect visually only 7 of them.

The stage is being set for a very emotion charged public debate about the 1002 study area. Because of that it is likely that not all of the discussion about the Department's 1002(h) report will be based on the evidence. In 1971 J.E. Senungetuk published a book called Give or Take a Century in which the following statement appeared: "There has been a great outcry from the oil company combine, that the proposed pipeline, which would destroy Alaska's environmental integrity, is needed in order to make jobs available for the native people." This statement was made during the heat of the debate over whether or not to build a pipeline to carry crude oil from Alaska's North Slope to an ice free port in South Central Alaska. It was quite typical of the kind of emotional outpouring that occurred during that process from many good people of good will. The Trans Alaska Pipeline was destined to make the development of the oil fields of North Alaska possible, and Mr. Senungetuk's forecast was that it would destroy

Alaska's environment. But forecasts such as that of catastrophic consequences of the construction of the pipeline proved inaccurate.

We are likely to hear a great deal of the same kind of rhetoric during the debate over whether or not to open the Coastal Plain of Alaska's Arctic National Wildlife Refuge to additional exploration for and development of petroleum resources. Quite likely much of that rhetoric will be emotional in nature and extremely exaggerated with respect to possible negative consequences. Ironically, one of the principal causes of concern among professional environmentalists during the debate over the construction of the pipeline and the associated development of the oilfield at Prudhoe was the caribou that use the region, principally the Central Arctic Herd. Ironic because another caribou herd, this time the Porcupine Caribou Herd, is the focus of most concern and because not only did a decline in the range and size of the Central Arctic Herd not occur as a result of Prudhoe development, but the herd has more than doubled in size since that development. In the second paragraph of page 108 of the 1002(h) report, the authors go to some length to attempt to explain why the Central Arctic Herd did not decline following development, ignoring the fact that the problem for the antidevelopment enthusiasts is not to explain a lack of a decline, but to explain why the herd grew from 6000 animals to 14,000 between 1978 and the present. In protesting projections of Central Arctic Herd experience into the future of the Porcupine Herd in a development scenario, the authors of the report have stated in the first paragraph of page 106 the following: "Because of the greater density of PCH [Porcupine Caribou Herd] on their calving grounds, the PCH would interact with oil development much more extensively and intensively than the CAH has interacted with oil development in the Prudhoe Bay area." Even if one were to assume that such a statement is true, the link between that hypothesis and a negative impact on the animals of the PCH is very tenuous, because there has been no demonstration that a herd's interaction with facilities or anything else has any impact on the behavior of individuals in that herd. The authors make it seem as though they were talking about ants, not large mammals.

That habitat losses will occur is probably correct. That those losses will be major in the unqualified sense of paragraph 3 of page 107 of the report is not supported by the evidence accumulated during the years of interaction between the Central Arctic Herd and the development facilities at Prudhoe Bay and the Trans Alaska Pipeline. Even less supportable is the conclusion in paragraph 4 of page 112 that the loss of habitat will possibly lead to decline or displacement of the Porcupine Herd on the order of 20 to 40 percent. That projection needs to be understood as a possibility that is only minutely probable in the mathematical sense when reasonably projected from the data available. That also is the case with the statement in the second paragraph on page 112 which says that "the availability of suitable alternative habitats is not apparent." That statement is in stark contrast to

the data in the report. The map of Plate 2A shows the major insect relief areas either to be in the Brooks Range foothills out of the area proposed for development or, on the coast where proposed mitigation measures would limit development operations to those that are absolutely essential such as port facilities. Additionally that map shows large portions of high use calving areas not to be where facilities are proposed and significant portions of those calving grounds to be completely outside the 1002 area. Therefore, a fraction of the habitat of a fraction of the PCH would be affected, for which there are alternative habitats within the PCH range!

The so called core calving area is called that because it has been used for calving in only 5 out of the last 14 years. But that same figure necessarily implies that 64% of the time the caribou have preferred to calve somewhere else. That completely destroys any contention that that area is irreplaceable in the life cycle of the herd. To support a claim that caribou can only calve one place one must be able to show they do not calve other places, and that obviously is not the case. The same rigors of the scientific method are applicable to the biological sciences that are applicable to the physical sciences. When one subjects less rigor and objective analysis to the living renewable surface resources, that are more easily observed and measured, than one does for the non-renewable subsurface resources, that are less easily observed and measured, then a bias results that fuels the irrational emotionalism. From the data displays in the 1002(h) report, and

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the documented evidence of the experience of the CAH, one should conclude that the PCH would not be expected to be significantly adversely impacted by a petroleum development scenario with appropriate mitigation measures, including monitoring of the PCH interactions with petroleum activities.

We support the testimony presented by the Alaska Oil and Gas Association, and further hold that it would be a national tragedy to forego the benefits that would accrue directly and indirectly to all Americans from the development of the oil and gas resources that may underlie the 1002 study area of the Coastal Plain of the Arctic National Wildlife Refuge. The benefits to so many should take their proper place when weighed in contrast to benefits to a few who oppose development in favor of preserving the privilege of an elite few who have the time and resources to invest in obtaining recreational access to an extremely remote region of Alaska's northland and want to enjoy that area without seeing any signs of development. Development of the 1002 study area of the Coastal Plain will involve a minuscule amount of the total area of ANWR, leaving an area bigger than the state of West Virginia for the special use of elitist outdoor recreationists.

Respectfully submitted,

INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS

Lonnie D. Brooks, Chairman
Alaska Regional Governmental Affairs Committee

National Audubon Society

National Capital Office 801 Pennsylvania Avenue, S.E. Washington, D.C. 20003 (202) 547-9009

January 23, 1987

Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, DC 20240

Dear Sirs:

On January 9th, Mr. Peter A.A. Berle, President of the National Audubon Society, testified in the Department of Interior auditorium on the subject of the Draft Arctic National Wildlife Refuge Coastal Plain Resource Assessment. At the time of his testimony, he made a motion to submit to the formal record of these proceedings a research paper prepared by staff scientists for the National Audubon Society, titled "Oil and Gas Resources on Special Federal Lands: Wilderness and Wildlife Refuges," as published in the Annual Review of Energy 1986, Volume II, pages 143-61.

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Mr. Berle's motion was accepted by the hearing officer, and therefore, on behalf of Mr. Berle and the National Audubon Society, I hereby enclose a copy of that paper with, again, our formal request that it be incorporated into the full record of these proceedings as if read by Mr. Berle.

This is not a lengthy document, but it is extremely significant in the context of the escalating debate about whether it is appropriate to open the Coastal Plain of ANWR to limited or full exploitation for potential oil and gas resources. As Dr. Beyea shows, less than six percent of Alaska's oil is projected to lie within all Alaska wilderness, designated and potential -- including the coastal plain of the Arctic National Wildlife Refuge. President Berle emphasized this and related research findings in our formal statement, and noted that Audubon has prepared a National Energy Plan which points out our energy needs for the future can easily be met without further exploitation of any protected or potential wilderness, or other protected areas, such as National Wildlife Refuges.

100% Recycled Paper

It is because this paper, which has stood the test of peer review, is so significant, that we feel it must be incorporated into the record of these proceedings to assist the appropriate officials as they make recommendations for a final decision and position on this issue of vital concern to all of us.

Thank you for your consideration.

Sincerely,

Brock Evans
Vice President for
National Issues

1011F
Enc.

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OIL AND GAS RESOURCES ON SPECIAL FEDERAL LANDS: WILDERNESS AND WILDLIFE REFUGES

Alex Stege[1] *and Jan Beyea*

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Of all federal lands in the United States, wilderness and wildlife refuges are where pressures for resource exploitation most often conflict with environmental and conservationist objectives. Arguments in favor of federal leasing of these areas to energy developers have been bolstered by improvements in exploration methods, major oil price increases in the 1970s, the need to alleviate US dependence on foreign oil, and the expectation that previously unexplored federal lands would contain large oil and gas reserves. Advocates of energy exploitation, critical of increases in the amount of restricted land, have claimed that environmental restrictions on federal lands "lock up" significant energy reserves.

The following discussion critically examines this claim in light of recent reports indicating that very small amounts of oil and gas are located in regions where development is prohibited or severely restricted due to environmental regulations. We compare the significance of the environmental effects of oil and gas activities with the smallness of the recoverable oil and gas resources estimated to lie in wilderness lands, wildlife refuges, and other special, federally owned areas.

In order to describe the sensitive federal lands which are of primary concern in this paper and to clarify uncertainties arising from overlapping land categories, we begin with a few definitions.

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DESIGNATED WILDERNESS

The Wilderness Act was established by Congress on September 3, 1964,

> to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition (1).

This Act, along with the Federal Land Policy and Management Act of 1976, initiated the National Wilderness Preservation System. The wilderness system consists today of 88.5 million acres of land that the federal government has formally designated as wilderness[2] (see Table 1). Designated wilderness, most of which is in Alaska, covers only 3.8% of the total US land area, including 17% of all National Forest land, 49% of all National Park land, 21% of all National Wildlife Refuge System land, and 0.1% of all Bureau of Land Management land. (See Appendix E in Stege & Beyea (2) for listings of acreages of designated and potential wilderness under the jurisdiction of each of the four agencies.)

Wilderness includes much of the country's most beautiful, biologically complex, unique, and primitive lands. Though sometimes labeled "single use" federal lands, wilderness areas in fact serve the public in many ways. The protection afforded wilderness lands is vital for many fish and wildlife habitats, watershed protection areas, historic preservation sites, and scientific study areas. Wilderness areas are also used for hiking, fishing, camping, and canoeing, and they offer the spiritual lift of peaceful surroundings. Public use of wilderness lands has increased dramatically; awareness of the fragility of these areas and concern for their protection have heightened correspondingly.

On designated wilderness, surface exploration (no drill holes) is allowed "if such activity is carried on in a manner compatible with the preservation of the wilderness environment" (3), as determined by the appropriate government agency (National Forest Service or Department of the Interior). Designated wilderness is also open to energy development in

[2]As defined by the Wilderness Act (1), wilderness is "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which 1. generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; 2. has outstanding opportunities for solitude or a primitive and unconfined type of recreation; 3. has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and 4. may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

areas where mineral rights are held by private owners and in areas leased from the federal government before the December 31, 1983, leasing deadline established by the Wilderness Act. Otherwise, designated wilderness is now closed to oil and gas activities by statute.

POTENTIAL WILDERNESS

As a part of the wilderness review process set up by the Wilderness Act and the Federal Land Policy and Management Act (17), the Departments of Interior and Agriculture must review certain roadless lands under their jurisdictions and report to the President on each area's "suitability or nonsuitability for preservation as wilderness" (18). These lands, under various stages of review, are grouped into the classification "potential wilderness." They include several federal land categories that have been identified as having wilderness qualities, but have yet to be formally designated as wilderness by Congress. Table 1 shows that there are about 129 million acres of potential wilderness in the United States (80 million in Alaska), or 5.5% of the total US land area.

According to the Wilderness Act, the wilderness qualities of potential wilderness must be protected to allow for possible future designation. The legislation establishing certain National Park Service, National Wildlife Refuge System, Bureau of Land Management, and National Forest Service lands that are listed as potential wilderness usually has similar requirements. How these restrictions on energy development are interpreted by the agency officials depends largely on the land management policies of the existing administration. The current policies of the Departments of Interior and Agriculture allow, within the guidelines of their interpretation of the mandated restrictions, oil and gas leasing, exploration, and possible development on potential wilderness lands that are not closed by other legislation.

For a more complete definition of potential wilderness broken down by federal agency, as well as a description of regulations and policies restricting oil and gas activities in each of the potential wilderness land categories, see Appendix A in (2).

NONWILDERNESS WILDLIFE REFUGES AND OTHER SPECIAL NONWILDERNESS LANDS

Although 90% of all National Wildlife Refuge System lands are designated or potential wilderness, 9.0 million acres of the refuge system in the contiguous 48 states are not (19). Created by a series of acts culminating with the 1966 National Wildlife Refuge System Administration Act (20), the National Wildlife Refuge System was designed "primarily" to protect fish

Table 1 Onshore US acreage, with a breakdown of federal land categories showing acreage for each category and percentages of the total lower 48, Alaska, and US land areas

Onshore US land category	Lower 48 states (millions of acres)	Alaska (millions of acres)	Total United States (millions of acres)
Federal land (that is now, or may be in the future, severely restricted[a]	99.9 (5.1%)	139.1 (37.1%)	239.0 (10.2%)
Designated wilderness[b]	32.05 (1.6%)	56. 48 (15.1%)	88.53 (3.8%)
Potential wilderness[c]	48.9 (2.5%)	80.2 (21.4%)	129.1 (5.5%)
Special nonwilderness closed by statute[d]	8.0 (0.4%)	0.2 (0.1%)	8.2 (0.3%)
Special nonwilderness available subject to agency approval[e]	11.0 (0.6%)	2.2 (0.6%)	13.2 (0.6%)
Other federal land[f]	362.1 (18.3%)	187.9 (50.1%)	550.0 (23.4%)
Non-federal land[g]	1515 (76.6%)	48 (12.8%)	1563 (66.5%)
Total US land[h]	1977 (100%)	375 (100%)	2352 (100%)

[a] Tabulated from separate acreage totals for the National Park System (NPS), National Forest System (NFS), National Wildlife Refuge System (NWRS), and Bureau of Land Management (BLM). Three million acres (all in the lower 48 states) with water supply and reclamation as their dominant use (5) were subtracted from the total for all federally owned NPS acreage (4). NWRS acreage included 88.05 million acres of wildlife refuges and 2.1 million acres of waterfowl production and coordination areas (6).

[b] Designated wilderness acreages are current as of the designations of the 98th Congress (November, 1984) (6, 7).

[c] Potential wilderness acreage, broken down by governing agency, includes: NPS: Wilderness recommendations in Congress and wilderness studies in progress (8). Note that all NPS land in Alaska not designated as wilderness is listed as potential wilderness. NFS: Congressional wilderness study areas, pending recommended wilderness, and RARE II lands remaining in further planning (7). NWRS: Wilderness study areas and wilderness recommendations in Congress (Ross Fowler, US Fish and Wildlife Service, private communication, Nov. 16, 1984). All NWRS land in Alaska that was not designated as wilderness is listed above as potential wilderness, since these areas must be reviewed for wilderness suitability by December 2, 1985 (10). BLM: Wilderness study areas and instant study areas (Terry Woosley, US Bureau of Land Management, private communication, Dec. 17, 1984).

[d] Special nonwilderness restricted areas include: 1. all federally owned nonwilderness NWRS lands that were not purchased or acquired through gifts from private owners ("non-acquired withdrawn" lands) (12); 2. all federally owned nonwilderness National Park System lands except for 3.0 million acres with water supply and reclamation as their dominant use and 0.2 million acres in two National Recreation Areas in Washington (5); 3. 0.2 million acres of NFS National Monuments and 0.9 million acres of NFS National Recreation Areas (5).

[e] Special nonwilderness nonrestricted areas include: 1. all remaining nonwilderness NWRS acreage (approximately 4 million acres), which consists of lands acquired through purchase or gifts, and privately owned lands that NWRS is allowed to use through easement or lease. The mineral rights to these lands may or may not be owned by the federal government (Dunn Cuccone, US Fish and Wildlife Service, private communication, Feb. 27, 1985); 2. 0.2 million acres in Lake Chelan and Ross Lake National Recreation Areas, Washington (5); 3. 0.3 million acres of NFS National Recreation Areas (5); 4. 6.5 million acres of the California Desert National Recreation Area (5), and the White Mountain National Recreation Area and the Steese National Conservation Area (14).

[f] Other federal land acreage includes remaining onshore federal lands. Total onshore federal acreage derived from (15).

[g] Total US and Alaska land areas were taken from (16). Federal land acreage was subtracted from total US acreage to yield nonfederal acreage.

and wildlife resources. The system is under the jurisdiction of the Fish and Wildlife Service (Department of the Interior) and consists of just over 90 million acres, 77 million of which are in Alaska.

On about 5 million of the 9 million acres of National Wildlife Refuge System land outside of designated and potential wilderness, oil and gas leasing is prohibited by statute (12). Leasing of the remaining 4 million acres is not prohibited by statute, according to current Interior Department interpretation, although the Secretary of the Interior must first determine "that such uses are compatible with the major purposes for which such areas were established" (21). Nevertheless, the Department of Interior continues to follow its policy, established in 1958, prohibiting oil and gas leasing on wildlife refuge land in the lower 48 states (22).

Unlike the Wilderness Act, which specifies that wilderness must be roadless and undeveloped, the legislation establishing the National Wildlife Refuge System does not define how to determine the "compatibility" of oil and gas development with the purposes of the refuge. This lack of definition gives the Secretary of the Interior considerable leeway in deciding what activities should be allowed in nonwilderness wildlife refuges.

Other environmentally sensitive federal lands that are of concern in this paper include the nonwilderness parts of the National Park System (5.3 million acres), Forest Service National Monuments and National Recreational Areas (1.6 million acres), and Bureau of Land Management (BLM) National Recreation and National Conservation Areas (8.7 million acres). Of these 15.6 million acres, 3.2 million are restricted by statute and 3.2 million have water supply and control as the dominant use (5). The remaining 9.2 million acres are apparently available for oil and gas leasing subject to compatibility with their dominant use.

Another special federal land category that has restrictions on development is the Wild and Scenic Rivers System. Because it covers such a small area, largely within areas that fall in other federal land categories, the Wild and Scenic River System is not included in the tables or remaining analysis.

For a more complete description of nonwilderness wildlife refuges and other special nonwilderness lands, including regulations and policies restricting oil and gas development, see Appendix A in (2).

ENVIRONMENTAL IMPACTS OF OIL AND GAS EXPLORATION AND DEVELOPMENT

The following discussion attests to the need for stringent environmental regulations restricting energy development on wilderness, wildlife refuges, and other special federal lands. By evaluating the environmental effects of oil and gas activities, we will bring to light some of the social costs of

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bypassing these regulations (that is, the loss of special values for which these lands were set aside).

Some of the immediate, short-term environmental impacts of oil and gas exploration on wilderness and other special federal land include:

1. increased soil erosion and siltation of streams (from deforestation, road construction, off-road vehicle travel, and landslides triggered by explosions used in seismic exploration),
2. disruption of surface and groundwater flow (by surface compaction, well drilling, and the extraction of large amounts of water for drilling activities) (24),
3. persistent loud noises (e.g. from networks of seismic exploration sites, where there often are continuous detonations of small explosions) (25).

In addition to the above impacts, the production of oil and gas causes air and water pollution from (*a*) oil, grease, and other contaminants left on the ground surface, (*b*) well blowouts and subsequent evaporation or burning of the oil, (*c*) mudpit flooding or leaching, and (*d*) pipeline ruptures or leaks (23).

Although brief in duration, many of these effects can nevertheless cause long-lasting or permanent destruction of wildlife habitat, depending on the success of reclamation. Overall, roads may be the single most destructive features of development. They make up a significant percentage of the area around oil and gas fields and greatly augment erosion. Roads also create dust and noise, fragment wildlife habitat, including hunting and migration routes, make possible wildlife injury or death from vehicular collisions, and increase uncontrolled human access to adjacent areas (26).

As an alternative to road construction, the use of helicopters for transporting equipment necessary for oil and gas exploration into remote or sensitive areas can be less environmentally destructive. Helicopter access is expensive, especially when heavy drill-rig equipment is needed for larger well sizes, and road access almost always becomes necessary during the development and production stages (25). This low-impact alternative to road access may become more viable with future improvements in helicopter technology.

The sensitivity of wildlife to human interference and habitat destruction depends to some extent on the timing and duration of the interference, and the species of wildlife involved. Some species have unusually narrow requirements for particular food, water, or cover. Many species with such narrow "niches" are unable to adapt to changes in the environment, particularly changes that occur during nesting, reproduction, or other sensitive periods. In addition, minor disturbances that occur continuously or repetitively may allow insufficient time for recovery. Periodic habitat destruction from repeated human encroachment, made possible by new

roads and stimulated every time the price of energy resources increases, can permanently scar an area and cause wildlife to disappear from it.

Disturbances that occur over a long period of time or cover a large area are usually caused by the "secondary effects" of expanding human populations attracted by energy development. Often overlooked, these secondary effects can cause greater detrimental impact than the more short-lived, intensive disturbances from the energy facilities themselves. Some of the effects of bringing large numbers of people into previously undeveloped lands include an increase in urbanization, consumption of limited water supplies, use of off-road vehicles, and construction of additional roads, power lines, and other utility corridors (27).

The effects wrought by influxes of people into areas where energy or minerals are being extracted have been an important part of the historic process of rapid, unplanned development that has resulted in the permanent loss of wilderness quality in over 95% of the land area in the lower 48 states.

The remaining lands with wilderness qualitities are particularly sensitive to the effects of oil and gas development, because they are generally found in remote areas with extreme climates, unstable hillslopes, and fragile vegetation. These conditions not only make wilderness lands more susceptible to surface disturbance but also often create insurmountable difficulties in reclamation. For example, landslides and other landscape scars often cannot be revegetated because the initial slope failure enhances continued downhill movement of soil. The disturbed hillslope becomes a conveyor belt of material that eventually reaches streams and fills in gravel beds vital for fish spawning. Revegetation is particularly difficult in arctic, alpine, and desert areas because plant recolonization and regrowth is extremely slow—sometimes taking hundreds of years or more. In some areas where soils have taken thousands of years to form in balance with the coexisting plant life and climatic conditions, soil layers lost by erosion cannot redevelop.

The destruction of wildlife refuge and wilderness qualities by oil and gas activities would last far longer than the short-term energy supply that, as will be shown below, might be extracted from these regions. Furthermore, the importance of wilderness and wildlife refuges and the demand for their use are expected to increase with time for a number of reasons. First of all, technological growth and expanding populations in this country will undoubtedly result in the continued exploitation of less-developed areas outside the remaining islands of protected federal lands. Such growth will decrease the area offering services similar to those of wilderness and wildlife refuges. As the availability of land suitable for wildlife habitat diminishes, many animals will die out since the carrying capacity of protected areas cannot increase to accommodate large influxes of animal populations

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from surrounding lands. In addition, increasing human populations and urbanization will result in greater numbers seeking solitude and primitive experience through recreational use of wilderness lands. Finally, growing human populations will also bring increased demand for soil and water conservation. All these considerations heighten the value of remaining undeveloped, unpolluted land.

The importance of setting aside some federal lands as a safety valve against development was recognized by the Congressional leaders who passed the acts establishing the Wilderness and Wildlife Refuge Systems. However, the conflict between exploitation and preservation of wilderness and wildlife refuges continues. This conflict has been upheld by a polarity of values and by notions that the United States must choose between energy and environment. A close look at recent studies by the US Geological Survey (USGS) and others, giving energy resource estimates for onshore and offshore holdings, however, dispels the idea that such a choice must be made.

OIL AND GAS RESOURCES ON WILDERNESS LANDS

Consider the case of oil and gas resources on wilderness lands (both designated and potential). Table 2 shows an estimate of the amount of known and projected oil and gas located in the lower 48 states. This table and other resource estimates in this paper are based primarily on figures traceable to 1980 data gathered by the USGS during its last complete assessment of US resources (28). These 1980 figures have been updated to account for production losses subsequent to 1980. In the case of offshore resources, additional revisions have been made to account for recent (reduced) estimates of undiscovered oil and gas on the outer continental shelf made by the Minerals Management Service (29). All adjustments are described in Appendix B of (2).

The breakdown of the total onshore oil and gas estimates according to wilderness and other federal land categories was derived primarily from a study prepared for The Wilderness Society by Economic Associates Inc. (30).[3] The results of The Wilderness Society's study of onshore resources are consistent with a draft study prepared by the Scientists' Institute for Public Information (32).

To account for changes in wilderness acreage by the 98th Congress since

[3] The separate figures presented by The Wilderness Society for the western states in the lower 48 can be compared in an approximate way with a recent specialized USGS report on the oil and gas potential of wilderness lands in eleven western states (31). Agreement between the two sets of figures appears to be good, with the USGS report projecting lower resource estimates for both designated and potential wilderness lands. Although a direct comparison between the two studies cannot be made because different numbers of states were included

Table 2 Quads of US oil and gas resources estimated to lie on or off the shores of the lower 48 states[a]

	Petroleum	Natural gas
Onshore areas		
Federal land		
Designated wilderness[b]		
(32 million acres)	6 (1.2%)	5 (0.7%)
Potential wilderness[b]	8 (1.7%)	8 (1.1%)
(49 million acres)		
Other onshore federal land[b,c]	77 (16.0%)	
(381 million acres)		69 (9.5%)
Nonfederal land[b,c]	320 (66.7%)	511 (70.1%)
Offshore areas[c,d]	69 (14.4%)	136 (18.6%)
Total	480 (100%)	729 (100%)

[a]Includes economically recoverable reserves and potential (undiscovered) resources. Mean estimates. Acreages are taken from Table 1. Oil and gas figures were converted to quads using the following conversion factors: 5.6 quads per billion barrels of oil, 1.03 quads per trillion cubic feet of natural gas.

[b]Source: Economic Associates, Inc. (30), modified and updated to account for lower 48 states wilderness acreage changes during the 98th Congress. Adjustments to The Wilderness Society's oil and gas estimates for wilderness are discussed in Appendix B of (2).

[c]Estimates for total onshore and offshore energy resources are based primarily on reference (28). These estimates have been decremented to account for production since 1980. Additional adjustments to the offshore estimates were made using recent estimates for undiscovered recoverable federal offshore oil and gas resources (29). Both adjustments are described in Appendix B of (2).

[d]Includes offshore resources in both federal and state waters.

The Wilderness Society's study was published, adjustments have been made to the federal resource estimates given by them [see Appendix B of (2)].

As can be concluded from Table 2, designated and potential wilderness areas together hold only 2.9% of the oil and 1.8% of the natural gas resources in the lower 48 states. This comes as no surprise since wilderness areas cover only 4.1% of the land area in those states (see Table 1). The map in Figure 1, which shows designated and potential wilderness areas

in the definition of "West," the differences in projections are probably due to different methodologies [see Appendix C of (2)]. Had the USGS wilderness study been more complete, or had the area it covered matched geographically the areas examined in the study by The Wilderness Society, its figures could have been used directly in Table 2. Nevertheless, the approximate agreement found for the West in the two studies suggests that the methodology used by The Wilderness Society can reasonably be expected to give valid results for wilderness areas outside the states analyzed by USGS.

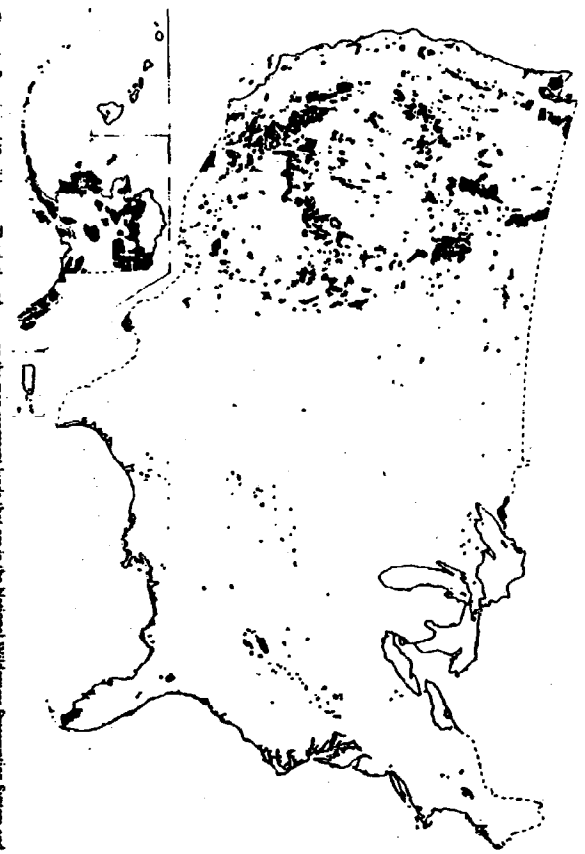

Figure 1 Remaining US wilderness. The darkened areas on the map represent lands that are in the National Wilderness Preservation System and other roadless areas under study for inclusion in the wilderness system. Copyright 1983 National Audubon Society.

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in black, makes plain the confinement of wilderness to a small fraction of the lower 48 states land area [see Appendix C of (2) for a discussion of the methodology used to create the map].

The most recent energy/wilderness controversy in the lower 48 states concerns a relatively small amount of energy in the "Overthrust Belt" that cuts through Idaho, Montana, Wyoming, and Utah. Despite implications to the contrary by some energy companies, the total likely amount of energy resources in designated and potential wilderness parts of this region is almost certainly trivial from a national security perspective. It amounts to less than 3 "quads"[4] of oil and 5 quads of natural gas, according to another study commissioned by The Wilderness Society (33).[5] Three quads of oil represents about a five-week supply at current US oil consumption rates (34). The amount of oil and gas estimated to lie under designated wilderness land in the overthrust belt is, of course, even smaller.

Table 3 gives estimates of both known and projected energy resources in Alaska. Even there, only 5.6 and 8.6% of oil and gas resources, respectively, are estimated to lie in designated or potential wilderness lands, including the Arctic National Wildlife Refuge. Although the percentage of Alaska's land remaining as wilderness is large, the small percentage of oil and gas in these areas suggests that most Alaska wilderness lies outside of known or potential oil- and gas-producing areas.

Table 4 combines the figures for the lower 48 and Alaska and gives the oil and gas estimates for the entire United States. It can be seen from this table that the amount of oil estimated to be recoverable on all land designated as wilderness is 9 quads out of a total of 624 quads—that is 1.4% of the total. Nine quads of oil is less than a four-month supply for the United States. The situation for natural gas is similar; 1.1% of the total US supply is estimated to be located on lands designated as wilderness, an amount that equals a six-month supply at current consumption rates (34).

On a per-million-acre basis, the amount of oil and gas located on land designated as wilderness is projected to be only 41% of that of an average area in the United States.[6] This is not coincidental, since there are strong pressures, in choosing federal wilderness areas, to exclude land that appears highly promising from an energy standpoint.

[4] A quad is a unit of energy equal to 1 quadrillion Btu's (British thermal units), equivalent to about 5.6 billion barrels of oil, or 1.03 trillion cubic feet of natural gas.

[5] This study is somewhat out of date but the combined estimates for resources in designated and potential wilderness acreage should still be approximately correct.

[6] There are 2,352 million acres of onshore land in the United States (16). Table 4 indicates that 1175 quads of oil and gas are located on this land, i.e. 0.5 quads per million acres. In contrast, only 0.2 quads of oil and gas per million acres are projected to lie on designated wilderness land.

Table 3 Quads of US oil and gas resources estimated to lie on or off the shores of Alaska[a]

	Petroleum	Natural gas
Onshore areas		
Federal land		
Designated wilderness[b] (56.5 million acres)	3 (2.1%)	4 (3.4%)
Potential wilderness[b] (80 million acres)	5 (3.5%)	6 (5.2%)
Other onshore federal land[b,c] (191 million acres)	29 (20.1%)	22 (19.0%)
Nonfederal land[b,c]	61 (42.4%)	41 (35.3%)
Offshore areas[c,d]	46 (31.9%)	43 (37.1%)
Total	144 (100%)	116 (100%)

[a] Includes economically recoverable reserves and potential (undiscovered) resources. Mean estimates. Acreages are taken from Table 1. Oil and gas figures were converted to quads using the following conversion factors: 5.6 quads per billion barrels of oil, 1.03 quads per trillion cubic feet of natural gas.

[b] Source: Economic Associates, Inc. (30). Since no wilderness acreage changes have occurred in Alaska since 1980, no adjustments to The Wilderness Society's oil and gas estimates for Alaskan wilderness were necessary.

[c] Estimates for total onshore and offshore energy resources are based primarily on reference (28). These estimates have been decremented to account for production since 1980. Additional adjustments to the offshore estimates were made using recent estimates for undiscovered recoverable federal offshore oil and gas resources (29). Both adjustments are described in Appendix B of (2).

[d] Includes offshore resources in both federal and state waters.

Table 4 Total quads of US estimated oil and gas resources[a]

	Petroleum	Natural gas
Onshore areas		
Federal land		
Designated wilderness (88.5 million acres)	9 (1.4%)	9 (1.1%)
Potential wilderness (128 million acres)	13 (2.1%)	14 (1.6%)
Other onshore federal land (573 million acres)	106 (17.0%)	91 (10.8%)
Nonfederal land	381 (61.1%)	552 (65.3%)
Offshore areas	115 (18.4%)	179 (21.2%)
Total	624 (100%)	845 (100%)

[a] Includes economically recoverable reserves and potential (undiscovered) resources. Mean estimates. Includes Alaska. Oil and gas estimates are the sum of numbers from Tables 2 and 3. Acreages are taken from Table 1.

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Should all the land under study as potential wilderness be designated formally as protected wilderness, the total energy resources lost to the nation would be trivial from a national perspective. The amount of oil and gas on wilderness land per million acres would still be only 42% of the average amount located on other US land. The total amount of oil and gas "locked up" would amount to 3% of projected US resources, not even enough for a 10-month supply of oil or a 16-month supply of gas at current consumption rates. Clearly, the nation would lose a small fraction of its energy if it were to complete the Wilderness Preservation System and permanently prohibit oil and gas leasing on potential wilderness.

From an economic perspective, oil companies would be foregoing about $500 per acre in oil and gas wealth to keep designated and potential wilderness wild for all time (assuming energy prices equivalent to $50 per barrel of oil).[7]

As has been shown in Tables 2 through 4, relatively little oil and gas is estimated to lie under wilderness lands. Because the strength of the conservationist argument hinges on the low oil and gas figures, the obvious counterargument is that the estimates could be low and that exploration should be allowed in order to check the USGS estimates. It is our contention that any exploration of these areas should be made by nonintrusive methods, without heavy equipment. Requirements for resource assessment are considerably less demanding than those for actually locating specific oil and gas reserves. Examples include satellite survey, aerial photography, geological sampling, geochemical surveys, and certain forms of geophysical surveys (e.g. gravity meters). Nonintrusive methods are currently inadequate for confirming existing USGS estimates, but that situation will no doubt change in the future. Fifty years from now, technologies for identifying natural resources will have surpassed the crude methods available to energy companies today.[8] With such a small percentage of US land remaining as wilderness, it would seem wise for the nation to be patient in confirming the USGS estimates.

If the USGS reports show such a small percentage of energy resources estimated to be on wilderness lands, how has the wilderness "lockup" misconception gained credence? One reason is that wilderness, nonwilderness, and offshore locations are not always distinguished when figures are cited on the large oil and gas resources estimated to lie on all federal lands.

[7] The discounted, net present value would be less than $500 per acre. In making this calculation, we define the economic value of the oil and gas to equal its market value minus the cost of production. We assume that it will cost, on average, 70% of the market price to locate and extract oil and gas in wilderness regions. The market price of natural gas is assumed to be 70% of the price of oil on a purely thermal basis.

[8] For instance, Nobel Prize–winning physicist Sheldon Glashow has proposed that neutrinos, which can penetrate deep into the earth, might be used to locate resources (35).

It can be seen from Table 4 that the amount of resources on federal lands is large, totaling over one-third of all projected US oil and gas resources. If the comparison is restricted to potential (undiscovered) resources, the projected percentage on federal lands turns out to be even higher. But to infer that wilderness restrictions will prevent these resources from being tapped is unreasonable. As can be calculated from Table 4, wilderness restrictions to energy exploration, leasing and development will prevent extraction of less than 10% of the oil and gas resources controlled by the federal government. Arguments that the United States must, for energy security, trade away the quality of its last wilderness lands have no basis.

Thus, barring the highly unlikely event that the total USGS estimates prove significantly inaccurate,[9] the evidence presented clearly supports the position that the 9 quads of oil and 9 quads of natural gas estimated to lie under land already legally designated as wilderness can remain underground forever without significant loss of US energy supply. The same reasoning holds true for the 13 quads of oil and 14 quads of natural gas estimated to lie under wilderness land that has yet to be formally designated as wilderness. The tens to hundreds of years required for surface restoration of developed land overwhelmingly dwarf the very brief time scale over which the United States could be supplied by energy extracted from wilderness lands.

When this country was first settled by Europeans, almost all of the land area corresponding to the 48 states was wilderness and teemed with wildlife. The unrestrained pressure of civilization has steadily eroded wilderness areas to a small percentage of the total—4.1% in the lower 48 states. Although development has consumed forever almost all of the lower 48, our wilderness resources can still be preserved in Alaska (where nearly 37% of the land area remains as wilderness). To those who value wilderness, it is critical that the nation's last remaining fragments are safeguarded from development. Unless the nation maintains the sanctity of all wilderness areas by completing the wilderness system and giving potential wilderness the same protection now enjoyed by designated wilderness, much of that small percentage will disappear.

[9] It is true that the estimates for any one wilderness area are uncertain. (The 95% confidence upper limit for a given area may be a factor of two to three higher than the average estimate.) But it is highly unlikely that all the individual estimates would be uniformly low. Thus, the percentage error in the total wilderness figures will be smaller than the percentage error in estimates for individual wilderness areas.

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OIL AND GAS RESOURCES ON SPECIAL NONWILDERNESS LANDS

There are 8.2 million acres of special nonwilderness lands, administered by the National Wildlife Refuge System, the Forest Service, and the Park Service, that are closed to oil and gas activities by statute. On another 13.2 million acres, including 8.7 million acres of BLM land, leasing is allowed whenever the Secretary of the Interior or Agriculture determines that the oil and gas activities are compatible with the purposes of the area [see Appendix A of (2)]. In practice, a large percentage of these 13.2 million acres could be ruled out for energy activity indefinitely, by administrative policy or future legislation or court decisions.

Consequently, it is of interest to estimate the amount of energy resources involved in all 21.4 million acres of these special nonwilderness lands. Although separate estimates of oil and gas for this acreage are not available, it is reasonable to expect that land excluded by Congress, or restricted by the Department of the Interior or the Department of Agriculture will contain less oil and gas per million acres than does average US land. If this is the case, then less than 5 quads of oil (two months' supply) and less than 6 quads of natural gas (approximately four months' supply) will be at stake.

OIL AND GAS RESOURCES IN OTHER FEDERAL LAND (ONSHORE)

Most of the federally controlled onshore oil and gas resources are estimated to lie within the category "other onshore federal land" in the tables. The bulk of this land is open to energy development, although some of the area may be subject to environmental requirements that increase the cost of exploring and drilling for oil and gas resources. This increase in cost due to environmental regulations may delay extraction until such times as the overall economics become more profitable. Eventually, lowered costs due to improvements in exploration technologies and production processes, coupled with increases in energy prices, will offset the cost of environmental regulations and allow development to continue. We expect that virtually all 101 quads of oil and 85 quads of gas remaining in this nonspecial land category will eventually be available to energy companies.

OIL AND GAS RESOURCES IN OFFSHORE AREAS

More total oil and gas resources are estimated to lie in offshore holdings than in all the other federal land categories combined. At present, the only

offshore areas that are permanently off limits to energy development by statute are 1.9 million acres within two National Marine Sanctuaries off the coast of California (36). We anticipate that, subject to lease stipulations to protect biological and other nonenergy resources, the vast majority of offshore areas will eventually be explored and developed for energy purposes.

At present, there is no offshore biological resources inventory and critical areas review process analogous to the wilderness review process for determining areas that should be placed permanently off limits to oil and gas development. The National Marine Sanctuaries Act (37) does not prohibit leasing in marine sanctuaries or require periodic review of offshore areas for inclusion in the sanctuary system. [See Appendix A of (2).] Until such a review process is established, it would be prudent to proceed with offshore leasing slowly enough for site-specific environmental impact assessments to determine what valuable nonenergy resources might be jeopardized by oil and gas development, and where leasing should be delayed or prohibited. Delaying offshore leasing would not be costly to the government in the long run. In fact, since off-shore leases are expected to become much more valuable over the next few decades, such delays should result in significantly more money for the government when these areas are eventually leased.

There are compelling environmental reasons for delaying offshore development in areas with extreme climates, such as "pack-ice" regions of Alaska. Here, drifting ice creates such a hostile setting for workers and equipment that current oil extraction, transportation, and spill control technologies are unable to ensure reasonable protection of the environment from oil spills. The authors of one major study state, "We doubt that there will ever be a completely satisfactory response to cleaning up an arctic offshore oil spill other than preventing it from occurring" (38).

The effects of both large oil spills and chronic low-level discharges from normal drilling and production operations on the sensitive and economically valuable biota inhabiting arctic and subarctic regions are largely unknown. The same is true of other so-called frontier areas. One option is to proceed only after sufficient research has been performed to allow an informed assessment of the risks and benefits of oil exploration and development. For the moment, exploration in frontier areas could be restricted to places close to deposits that have already been located, and where demonstrated oil spill containment and cleanup capability exists.

Despite the argument for gradual, site-specific leasing of offshore areas (with stipulations to ensure adequate environmental protection), the federal government has been attempting to lease virtually the entire US Outer Continental Shelf—almost a billion acres—by 1992. In response to the

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Reagan administration's policy of large-scale, area-wide leasing, Congress has passed temporary moratoria on oil and gas leasing off much of the California coast, around Georges Bank off the coast of Massachusetts, and along a buffer strip off Florida's Gulf coast.

Nevertheless, temporary moratoria will not be extended forever and should give way to permanent prohibitions on oil and gas leasing in sites identified by a critical offshore areas review process. Even without a comprehensive review process, sufficient evidence already available indicates that certain offshore regions should never be leased because of their importance as fisheries or because of their proximity to vulnerable coastal ecosystems—coastal marshes, coral communities, and pristine beaches. For instance, Bristol Bay in Alaska and Georges Bank supply a significant portion of the world's fish protein and are prime candidates for being put off limits to oil and gas leasing by statute.

As a result of excluding 1. Bristol Bay and Georges Bank, 2. certain regions off the California coast, and 3. miscellaneous other sites that might be identified by an offshore areas review process, we estimate that perhaps 13 quads of oil and 10 quads of natural gas will be permanently unavailable for development (or about 11% of offshore oil and 6% of offshore gas resources, or 1.6% of total US oil and gas resources). Thus, if permanent restrictions come out of an offshore review process they are likely to be modest.

CONCLUSION

Based on the analysis presented in this paper, we expect that more than 94% of US oil and gas resources will eventually be available to energy companies (see Table 5).[10] This does not, however, mean that energy exploitation can be given free rein in areas that are open for development. The ease with which ecosystems can be damaged by development necessitates careful vigilance over the environmental impacts of energy activities in all areas. Laudable progress has been made in the past decade by some of the larger oil companies that have accepted the need to seriously pursue mitigation methods. Nevertheless, oil and gas companies would be wise to expand their efforts to develop environmentally sound methods of exploration and extraction that are suitable for the great percentage of land, both public and private, on which such activities need not, or will not, be prohibited completely.

[10] Although not shown directly in Table 5, percentage resource availabilities can be calculated for land categories other than total US resources using figures given in earlier tables. The results indicate that (*a*) 92% of all offshore resources, (*b*) 76% of onshore federal lands, and (*c*) 83% of all federal resources should eventually be available to energy companies.

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There will always be proposals to use environmentally valuable land such as wilderness and wildlife refuges for energy and mineral development. The pressure of proposals for development in these areas cannot be relieved by granting one-time access. Each time the price of energy or minerals jumps, or whenever a new technology allowing recovery of formerly inaccessible resources is developed, engineers have an incentive to return to an area for a closer look. Plans for development in environmentally sensitive areas, shelved due to economic or technological constraints, may be revived decades later. Only statutory protection, such as that granted by inclusion in the wilderness system, can provide long-term protection.

A nation, like ours, with a 200-year history should look at the wilderness and wildlife preservation issue in a time frame that spans hundreds of years, not mere decades. Only with such a perspective can we pass on to succeeding generations these living laboratories of natural history that are still intact. Wilderness Society chairman Gaylord Nelson has said, "The ultimate test of man's conscience may be his willingness to sacrifice something today for future generations whose words of thanks will not be heard" (39).

Table 5 Summary of long-term availability of US oil and gas resources (if permanent restrictions to development were placed on designated and potential wilderness, special nonwilderness onshore lands, and critical offshore areas)

	Oil (quads)		Gas (quads)	
Areas that are or may be restricted				
Designated and potential wilderness[a]	22		23	
Special nonwilderness[a,b]	6		7	
Critical offshore areas[c]	13		10	
Total	41	(6.6%)	40	(4.7%)
All other areas[a,c]	583	(93.4%)	805	(95.3%)
Total estimated US resources	624	(100%)	845	(100%)

[a] Source: Economic Associates, Inc. (30), modified and updated as described in Appendix B in (2).

[b] Special nonwilderness areas include 21.4 million acres, most of which (62%) have no statutory restrictions on oil and gas development (5). Energy resources for this acreage were (over-) estimated using a ratio, derived from reference (30), for oil and gas resources per million acres of total US land.

[c] These figures are based on our estimate of offshore areas that need to be placed permanently off limits to development, using the most recent estimates available for undiscovered federal offshore oil and gas resources (29). 23 quads represents 7.8% of all estimated offshore oil and gas resources.

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National Audubon Society

TESTIMONY ON BEHALF OF THE
NATIONAL AUDUBON SOCIETY

AT A PUBLIC HEARING ON THE

DRAFT ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
COASTAL PLAIN RESOURCE ASSESSMENT

BY

PETER A.A. BERLE
PRESIDENT

WASHINGTON, D.C.
JANUARY 9, 1987

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AMERICANS COMMITTED TO CONSERVATION

My name is Peter A.A. Berle, and I am the President of the National Audubon Society. I am testifying on behalf of the Society, including its 550,000 members nationwide, 2,600 of whom are in Alaska.

After carefully examining the "Resource Assessment Report" for the coastal plain of the Arctic National Wildlife Refuge, we are convinced it is not in the long-term conservation, economic or national security interests of the United States to open the coastal plain to leasing at this time. We urge, therefore, that no leasing or land exchanges be permitted by Congress, and that the U.S. Fish and Wildlife Service be directed to protect and manage the entire Arctic National Wildlife Refuge consitent with the conservation purposes, including wilderness protection, for which it was originally established by Congress.

We wish to commend the many dedicated resource professionals in the U.S. Fish and Wildlife Service, U.S. Geological Survey and Bureau of Land Management who gathered information for the assessment report, often at great personal risk and sacrifice. Because of their many contributions, the outstanding wildlife and wilderness values of the coastal plain have been reconfirmed and understood better than ever before.

As one of the oldest and largest conservation organizations in the United States, the National Audubon Society has a long history of involvement in the Arctic National Wildlife Refuge. We recognize it as a very special national

treasure. Dedicated friends in conservation, including Olaus and Margaret Murie, worked long and hard for its establishment in 1960 to preserve a portion of the eastern Brooks Range of arctic Alaska for its outstanding wilderness values. Thus, unlike many other refuges in the system, the Arctic Refuge was established not out of a singular need to conserve wildlife, but to preserve for all time the spectacular wilderness ecosystem of northeastern Alaska as a whole. Audubon strongly supported this far-sighted action, and so too enlargement of the refuge in the Alaska National Interest Lands Act of 1980 (ANILCA). Over the years we have worked with other conservationists to protect the refuge from a series of threats from development interests; for example, we opposed construction of an oil pipeline across the coastal plain in 1968-73, and opposed construction of a gas pipeline in the same place in the years 1974-77.

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In this debate over the future of the Arctic Refuge and its coastal plain, it is vitally important to realize that major compromises have already been made on Alaska's North Slope between development and conservation interests. These compromises have resulted in current land jurisdictions that essentially make almost 90 percent of the slope potentially available for oil and gas leasing. This is not to mention the additional 24 million acres of nearshore (state) and offshore (federal OCS) lands available in the adjacent Beaufort Sea. A mere 2 million acres of the entire North Slope has been committed to conservation purposes in the Arctic Refuge. Now most of that is under siege

by development interests. The questions must be asked: Where will the compromising stop? Aren't there any public wilderness lands along the arctic coast of Alaska that should be considered sacrosanct?

It is also important to note that this 18 million-acre refuge is the second largest unit in the National Wildlife Refuge System, and the largest and most spectacular arctic wilderness sanctuary for wildlife in the world. Wildlife species of particular national and international concern include the 180-thousand-member Porcupine caribou herd (whose calving ground is on the refuge coastal plain), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, and arctic char and grayling.

When considered in conjunction with the North Yukon National Park that adjoins it on the east, the Arctic Refuge constitutes an international commitment to the protection of wild nature. Major industrial developments on either of these units is clearly incompatible with their purposes.

We agree with the Department of the Interior (on page 45 of the draft assessment report) that:

> "The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America."

and (on page 46) that:

"The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge. Caribou migrating to and from the 1002 area and the post-calving caribou aggregation offer an unparalleled spectacle."

Despite these outstanding natural values, and the fact that the chance for discovery of an economically recoverable oil field is only 19 percent, the Department of the Interior is recommending that the entire coastal plain be made available for leasing to the oil industry. The department has left us no reasonable alternative but to oppose its recommendations because of the following serious shortcomings in its resource assessment process for the coastal plain:

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1. Failure to point out that the compromise to establish the Arctic Refuge in 1960 to preserve its unique wildlife, wilderness and recreation values resulted in the remainder of Alaska's vast North Slope and adjacent offshore waters being made available for oil exploration.

2. Failure to release for public review and comment geologic information critical to the 1002 assessment process. This gives those who could profit from exploiting refuge resources adavantage over those who actually own those resources -- the American people.

3. Failure to reveal its proposed land trades with various Alaska Native corporations and the State of Alaska, and to demonstrate how such trades will serve in the public interest.

4. Failure to justify full leasing when prospects for discovery of even one major economically recoverable oil field on the coastal plain is only 19 percent (pages 49 and 68), and with the market value of leases depressed because of the world oversupply of oil.

5. Failure to conduct a comprehensive economic analysis to show how the benefits to the Alaska and national economies can be optimized from leasing, both in the short and long term.

6. Failure to provide evidence that the Department will ensure that air and water quality wll be protected from toxic chemicals and other pollutants such as those creating problems in the Prudhoe Bay oilfield.

7. Failure to explain how adequate water and gravel supplies will be obtained after finding that " specific locations and sources of water and gravel for exploration and development activities have not been identified; it is understood that these resources, especially water, are not readily available on the 1002 area," (page 75).

8. Failure to explain why it wouldn't be in the strategic interests of the United states to purchase more foreign oil at current low prices for addition to our nation's "Strategic Petroleum Reserve" rather than lose income to the federal treasury by further flooding a depressed lease market through opening the Arctic Refuge.

9. Failure to evaluate cumulative impacts on the Arctic Refuge from oil and gas lease sales on more than a million acres of adjacent state lands (Camden Bay, Demarcation Point and Prudhoe Bay uplands) and 21.2 million acres of OCS leases (Sale 97) in the Beaufort Sea scheduled for July 1987. The latter sale, just off the refuge coast, is the largest oil and gas lease sale ever held in the Artic Ocean.

10. Failure to thoroughly discuss alternative energy policies that if implemented could make the nation energy secure without exploiting the Arctic Refuge.

11. Failure to assure that scarce refuge staff and funds will not be diverted from refuge conservation programs to monitor and regulate industrial activities on the coastal plain. (Since the coastal plain resource assessment was initiated in 1982, more than 90 percent of the refuge budget has been devoted to the 1002 assessment process, resulting in the almost total neglect of the overall refuge conservation program.)

12. Failure to recognize that a North Yukon National Park adjoins the Arctic Refuge and that the United States has responsibilities to cooperate with Canada in protecting shared wildlife resources.

13. Failure to address the need for cooperative management of the Porcupine caribou herd with Canada through the international management agreement that has been negotiated over the past several years.

14. Failure to hold public hearings in all Alaskan communities that will be directly affected by the proposed action, and to make an adequate number of copies of the assessment report available in a timely manner.

Unfortunately, a series of citizens' lawsuits proved necessary during the assessment process to assure that the law was followed, and citizen monitoring of government activities was required as well to learn of industry activities taking place on the Arctic Refuge. And, despite the magnitude of resources at stake and the seriousness of the consequences of the decision on people both in Alaska and throughout the nation, the Department of the Interior chose not to make this report available for public review and comment. A citizen lawsuit was necessary to make the report available. Then, after being forced to release the report for public review, the Department abbreviated the comment period to 60 days over the Christmas holiday period. This is not the way a democracy like ours should work.

In fact, it is clear to us that the Department of Interior has already shown such a bias on this sensitive matter that it is hard to believe that these hearings are anything more than pro forma proceedings. One example of this strong and obvious prejudgement of the issue is an article written by Assistant Secretary Horn for the December issue of Alaska Constuction and Oil magazine. This article, obviously prepared well before the public release of the report in late November, explains to the oil industry and others how to influence the Congress to vote to open up the Refuge.

Further evidence of bias is not necessary -- but unfortunately it exists -- in the form of an extraordinary and unprecedented "press release" of the "Alaska Support Industry Alliance." This document appeared on the same table as the Department of Interior press release on the report, just outside the briefing room inside the Interior Building, where Mr. Horn was allegedly presenting the report to the public for the first time. Such a release prepared by a presumably non-governmental body, wholeheartedly indorsing an allegedly secret report that no one had yet seen, is clear evidence to us that the oil industry and its supporters had been carefully consulted and coordinated with long before the report was shown to the rest of the American people.

In addition to Audubon's long history of involvement in wildlife conservation, another major priority goal of the Society is to "promote national strategies for energy development and use, stressing conservation and renewable energy resources." In an effort to achieve this goal, we have developed an energy plan with input from energy experts in industry, government and the academic community. This was done in the realization that energy is a major factor in determining the quality of human life. It furthers the production of goods and services, but its production and use can seriously impact the quality of the environment.

The Audubon Energy Plan is a practical, step-by-step alternative to the Administration's energy policy of exploiting the last remaining wilderness

lands in the United States. It shows that proper planning and policy development at the federal level will enable the United States to produce more goods and services while actually improving the environment. The environmental pay-off will be cleaner air, purer water, and less pressure to exploit wilderness lands and wildlife habitat such as that in the Artic Refuge.

True, the Audubon Plan requires the introduction of regulatory measures that correct imperfections in the marketplace, such as efficiency standards for home appliances and fuel economy standards for automobiles. Such reliance in our Plan on modest measures to promote cost-effective conservation stands in contrast to the approach taken by the Administration, which holds that conservation should be left solely to the marketplace, no matter how far economists tell us individual markets are operating from the cost minimum, no matter how much energy is being wasted as a result. When this blindspot toward energy conservation is combined with the Administration's skepticism towards environmental protection, it is perhaps not surprising that the Administration makes drilling in wilderness areas one of the pillars of its energy policy. Fortunately, the recent bipartisan show of support in Congress for appliance efficiency standards indicates that the Adminstration is out of touch with the country when it comes to tolerance of modest conservation regulations. We are confident that a Presidential veto of the appliance bill in the upcoming session will be overridden by Congress. We are also confident that, when the choice is clearly put, Congress will decide to enact additional conservation legislation in order to preserve our national treasures such as the Arctic Refuge (as well as to save consumers money).

In the meantime, and as long as this Administration refuses to take reasonable administrative and legislative action to promote cost-effective energy conservation, we will have no choice but to oppose attempts to open the Arctic Refuge to oil and gas development. Audubon has worked hard, particularly at the state level, to get appliance efficiency standards enacted. In New York, we initiated the process that led Governor Cuomo to introduce a tough efficiency standards bill last year. Massachusetts Audubon played a similar role in getting a bill introduced (and passed) in Massachusetts. Audubon members are well aware that preservation of wildlife and protection of the human environment requires wise husbanding of our energy resources.

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Audubon has been actively involved in efforts to develop a long-range comprehensive management plan for the Arctic Refuge. However, we have not been party to any actions that would preempt a thorough review of the mandated assessment report, waiting to judge it on its merits, waiting to see if there might be any places where exploratory drilling could be allowed without risking serious interference with wildlife and the wilderness quality of the land. However, instead of a complete and objective report with viable management options, we found the 1002 report biased, contradictory, and lacking essential information. The only possible excuse for this report is that Interior must not really be serious, but is floating a totally unreasonable position in the hopes of maximizing its bargaining power in

Congress. If so, the tactic is likely to backfire by completely alienating those organizations willing to not prejudge the matter in advance. Certainly, this has been the effect on the National Audubon Society.

The major undiscovered deposits of oil and gas on federal land holdings are thought to lie off the coast of the lower 48 states and Alaska. Thus, in the next two decades, as known onshore reserves are depleted, offshore development will become more important. Relatively little offshore land is permanently off-limits to energy development.

The fact that all federal lands have not yet been leased does not mean that development is proceeding too slowly. These leases will be much more valuable ten to twenty years from now. If the government were to lease all these lands at once, flooding the market, it would get an unfairly low economic return for the taxpayers.

Judged in this context, the Reagan Administration is making a serious mistake in rushing to lease virtually the entire U.S. Outer Continental Shelf (OCS) -- almost a billion acres -- and onshore prospects as well. The practice of offering tens of millions of acres of public lands each year at a time when oil prices are depressed raises very serious questions about whether the entire federal leasing program is amounting to a giveaway to the oil industry.

By flooding the market with lease offerings, it is clear that the administration is helping to drive the price of leases down, thereby providing

the oil industry with an opportunity to lease large acreages at bargain-basement prices. Evidence of this downward pressure on lease prices is overwhelming:

* The average bid per acre under the Reagan Administration's 5-year program has been less than half that under the Carter program ($1,092 per acre versus $2,381 per acre), (Washington Post, November 8, 1983.) Before Interior went to area-wide leasing in 1982, the average price per acre for OCS lease bids in Alaska was $2,794. After area-wide leasing was initiated, OCS lease sales in Alaska netted an average of only $1,229 per acre, (OCS Report, MMS 86-0067, September 1986.)

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Aside from the economic arguments against leasing so much so fast when oil prices are depressed, there is a compelling conservation argument. Huge lease offerings involving tens of millions of acres make it impossible to do

meaningful environmental impact analyses. Additionally, they make it extremely difficult for states like Alaska to conduct rational development planning.

In Alaska, less than 6 percent of oil resources are estimated to lie beneath designated or potential wilderness lands, including those in the Arctic National Wildlife Refuge. Clearly, Congress and the federal government have already made sure that lands with the vast majority of highest potential for oil and gas have been excluded from consideration as potential wilderness.

Relatively little oil and gas is estimated to lie under wilderness lands. When this country was first settled by Europeans, 100 percent of the land area corresponding to the 48 states was wilderness and teeming with wildlife. The unrestrained pressure of civilization has steadily eroded wilderness areas to a small percentage of the total -- 4 percent in the lower 48 states. To those who assign value to wilderness, it is incomprehensible that anyone would object to protecting the nation's last remaining fragments. Unless the nation maintains the sanctity of designated and potential wilderness areas, even that small percentage will disappear.

There will always be proposals to use wilderness and critical habitats for other purposes, particularly energy and mineral development. But little wilderness will be left if the engineers are allowed to scour the land for the next thirty years and beyond -- building new roads and drill sites, returning

for a closer look each time the price of energy or minerals jumps, and returning whenever a new technology allowing recovery of formerly inaccessible resources is developed.

The National Audubon Society believes that a nation like ours with a 200-year history should look at the wilderness preservation issue in a time frame that spans hundreds of years rather than decades. Only with such perspective can the nation pass on to succeeding generations the wilderness resources that are still intact. Indeed, on numerous occasions in our national life, our leaders have consciously decided to forgo the sacrifice of wilderness and wildlife resources for the sake of others. The creation of Olympic National Park with its large amount of commercial forest, or the recent refusal to permit oil and gas exploration in the Bob Marshall Wilderness come immediately to mind.

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The fact is that wilderness such as that on the Arctic Refuge coastal plain serves a variety of valuable, noncommercial uses: wildlife habitat, watershed protection, scientific study, fishing, hunting, camping, hiking, and most other forms of dispersed, low density outdoor recreation. Such wilderness lands offer also the spiritual lift of peaceful, truly natural settings.

Although not every oil industry organization takes the limited view on wilderness protection espoused by such organizations as the American Petroleum

Institute, there is obviously a clash in values between advocates of exploitation and those who favor preservation -- a dispute that must continuously be settled through the political process. The Audubon Energy Plan has been developed with this dispute in mind. The Plan demonstrates that there are practical alternatives to exploiting the last of our wilderness areas. The United States can leave wilderness alone and still solve its need for a safe and assured supply of oil. The total amount of oil and gas that may be found in wilderness is simply too small to justify the abandonment of the nation's remaining wilderness heritage.

Under the Audubon Energy Plan, the mean risked estimate of 1.6 billion barrels of oil and the 1.6 billion barrel equivalent of natural gas estimated to lie under land already legally designated as wilderness would remain underground forever. The same would be true for the 2.3 billion barrels of oil and the 2.5 billion barrel equivalent of natural gas estimated to lie under wilderness land that has yet to be formally designated as wilderness, (A. Stege and J. Beyea, "Oil and Gas Resources on Special Federal Lands: Wilderness and Wildlife Refuge," Annual Review of Energy, Vol. 11, 1986, pp. 143-161.) Because wilderness land would never be exploited under the Audubon Plan, there would be no need for exploration.

The estimates for oil in wilderness lands given above assume a mean risked estimate of 600 million recoverable barrels of oil for the Arctic Refuge. In contrast, the Draft Coastal Plain Resource Assessment mentions a figure of 3.2

billion barrels, without clearly specifying whether or not the estimate is "risked." (We suspect it is not.) Clarification on this point is needed from Interior. If the 3.2 billion figure is risked, that is, already incorporates the risk of finding no oil (91%), Interior would be claiming that there are 2.5 billion more barrels of oil likely to be found in wilderness lands than in the estimates we have been using. Nevertheless, even an additional 2.5 billion barrels would not change the fact that a very small percentage of U.S. oil is in potential and designated wilderness lands. The percentage of U.S. oil resources on these lands would rise from 3.5 percent to 5.8 percent.

The only type of exploration that we could ever consider, especially given the fragile nature of the arctic wilderness, would be that conducted by nonintrusive methods, such as satellite survey. Nonintrusive methods are currently inadequate for confirming existing Interior estimates, but the situation will no doubt change in the future. Fifty years from now, technologies for identifying natural resources will have surpassed the crude methods available to energy companies today. With such a small percentage of U.S. land remaining as wilderness, it would seem wise for the nation to be patient in confirming Interior's etimates. Surely, Mr. Chairman, the wilderness of the High Arctic -- our Serengeti -- is one place where we can afford to wait.

As has been indicated, the National Audubon Society is not opposed to any resource extraction on federal lands. We expect that more than 95 percent of

oil and gas resources on federal lands will eventually be tapped. The Society stands ready to work with oil and gas companies to help them develop environmentally sound methods of exploration and extraction that are suitable for the great percentage of land, both public and private, on which such activities need not be prohibited completely. Audubon will continue to insist, however, that exploitation of resources on public lands be carried out carefully in a manner that protects the environment and wildlife. Audubon will continue to oppose oil and gas exploration in any situation where government agencies or energy companies move hastily, without fully assessing the environmental and economic effects of activities or providing adequate safeguards for their implementation. This appears to be one of those cases.

It is argued by industry that the coastal plain of the Arctic Refuge must be leased now becasue it will take at least 15 years to develop any oil fields discovered there. We strongly doubt that. It must be remembered that following discovery of oil at Prudhoe Bay in 1968, oil was flowing through the 800-mile-long Trans Alaska Pipeline (TAPS) by June of 1977, a period of only 9 years. All that would be needed, should oil production be permitted on the Arctic Refuge, would be a 100 to 150-mile-long pipeline spur (at maximum) to tie into TAPS. Our guess is that industry could bring an oilfield on line in the refuge within five years, should it someday prove in the national interest to do so.

It is an illusion to believe that leasing on the coastal plain of the Arctic Refuge will solve the economic problems of the North. After all, its

whole purpose is to deliver northern oil to homes and industries in the South -- or perhaps the Orient. Indeed, rather than solving the North's economic problems, it may accentuate them. For evidence of this, we need look no further than the situation in Alaska today. With the Trans Alaska Pipeline carrying oil at near full capacity, the state is going through one of the most serious economic recessions in its history. The result in many cases is lost dreams and destroyed careers.

The situation on the Arctic Refuge obviously calls for bold and courageous political leadership at both the state and national levels. For politicians to be holding out the promise that yet another great oil bonanza lies beneath the arctic tundra just waiting to be exploited only postpones the day when all Americans must begin to live within their means by implementing cost-effective conservation measures.

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On page 6 of its assessmewnt report, Interior states:

> "Oil and gas development will result in widespread, long-term changes in wildlife habitats, wilderness environment, and Native community activities. Changes could include displacement and reduction in the Porcupine caribou heard."

We agree, and this only reinforces our belief that it is not in the best strategic, economic or conservation interests of the United States to recommend making such sacrifices on the finest arctic wildlife and wilderness

sanctuary in the world, at a time of a world oversupply of oil and with hundreds of millions of acres of other federal and state lands available for exploration.

It has been said by many that we are now at our Last Frontier in Alaska. This has different meaning to different people. To some it offers opportunity for resource development and the jobs and material benefits delivered. To others, it is wildlife and wilderness spectacles, which constitute a heritage to be preserved for generations of Americans. The decisions we make on the Arctic Refuge, therefore, are not simply about oil fields and caribou herds. They are decisions that touch our very deepest values as a nation, and as a people.

The National Audubon Society feels the Department of the Interior is making a serious mistake in recommending that the coastal plain of the Arctic Refuge be sacrificed to industrial development. The facts convince us that America can achieve energy security without exploiting the last great arctic coastal wilderness in the United States.

We believe that U.S. Senators Howard Metzenbaum and Paul Tsongas were right when in the 1979 debate on the Alaska Lands Act they stated:

> "It appears as if the 'forbidden fruit' syndrome is operating with regard to the Arctic National Wildlife Range. Regardless of how bitter that fruit may be, there are some oil and gas companies which

will want to invade this last stretch of north slope arctic land unimpacted by man. What the Congress does with regard to this fragile area will be an indication of how wisely we are going to conserve the nation's natural resources in the future. We can afford to make this Range the 'last place to go' in the search for energy and we should. We urge the Senate to study the arguments on both sides of this issue, for we believe strongly that aside from high emotions which have surrounded the debate on this issue, the facts support protection for the Range at this time . . . " (Report of the Committee on Energy and Natural Resources, United States Senate, No. 96-413, November 14, 1979, page 421.)

The National Audubon Society, therefore, strongly opposes leasing of the coastal plain for oil and gas development at this time, and recommends that the U.S. Fish and Wildlife Service be directed to manage the entire Arctic Refuge consistent with the conservation purposes, including protection of its unique wilderness, for which it was established.

Your consideration of our comments and recommendations is greatly appreciated.

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National Audubon Society
ALASKA REGIONAL OFFICE
308 G STREET, SUITE 219, ANCHORAGE, AK 99501 (907) 276-7034

February 6, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Streets NW
Washington, D.C. 20240

Dear Sirs:

These are the final written comments of the National Audubon Society on the Department of the Interior's Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment released for public review November 23, 1986.

After carefully examining the "Resource Assessment Report" for the coastal plain of the Arctic National Wildlife Refuge, we are convinced it is not in the long-term conservation, economic or national security interests of the United States to open the coastal plain to leasing at this time. We urge, therefore, that no leasing or land exchanges be permitted by Congress, and that the U.S. Fish and Wildlife Service be directed to protect and manage the entire Arctic National Wildlife Refuge consistent with the conservation purposes for which it was originally established by Congress.

The National Audubon Society believes that wilderness designation is the best way to permanently protect the entire Arctic National Wildlife Refuge, including the coastal plain. We therefore support Alternative E, the wilderness alternative. The Society believes that Congress should proceed with wilderness designation unless assessment by the National Academy of Sciences confirms the importance of the Arctic National Wildlife Refuge to the nation's immediate and long-term energy needs, and demonstrates that petroleum extraction can be made compatible with protection of the refuge's fragile ecosystem, including its internationally significant wildlife values. In the interim, the National Audubon Society believes that the entire Arctic Refuge should be managed as wilderness in close cooperation with adjoining North Yukon National Park.

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We wish to commend the many dedicated resource professionals in the U.S. Fish and Wildlife Service, U.S. Geological Survey and Bureau of Land Management who gathered information for the assessment report, often at great personal risk and sacrifice. Because of their many contributions, the outstanding resource values of the coastal plain have been reconfirmed and understood better than ever before.

As one of the oldest and largest conservation organizations in the United States, the National Audubon Society has a long history of involvement in the Arctic National Wildlife Refuge. We recognize it as a very special national treasure. Dedicated friends in conservation, including Olaus and Margaret Murie, worked long and hard for its establishment in 1960 to preserve a portion of the eastern Brooks Range of arctic Alaska for its outstanding wilderness values. Thus, unlike many other refuges in the system, the Arctic Refuge was established not out of a singular need to conserve wildlife, but to preserve for all time the spectacular wilderness ecosystem of northeastern Alaska as a whole. Audubon strongly supported this far-sighted action, and so too enlargement of the refuge in the Alaska National Interest Lands Act of 1980 (ANILCA). Over the years we have worked with other conservationists to protect the refuge from a series of threats from development interests.

Conservationists in Alaska and throughout the nation are becoming increasingly concerned about the ulterior motives of these development interests (including the Reagan Administration) who claim that the oil resources of the Arctic Refuge are critical to fulfilling growing national energy needs, particularly since President Reagan recently vetoed the National Appliance Energy Act of 1986. Passed overwhelmingly by both houses of Congress, this act would have saved the nation millions of barrels of oil and billions of dollars on utility bills by the year 2000, thus making exploitation of the Arctic Refuge totally unnecessary. In addition, the Reagan Administration has opposed establishment of fuel efficiency standards for automobiles and continuance of the 55 mile/hour speed limit.

In this debate over the future of the Arctic Refuge and its coastal plain, it is vitally important to realize that major compromises have already been made on Alaska's North Slope between development and conservation interests. These compromises have resulted in current land jurisdictions that essentially make almost 90 percent of the slope potentially available for oil and gas leasing. This is not to mention the additional 24 million acres of nearshore (state) and offshore (federal OCS) lands available in the adjacent Beaufort Sea. A mere 2 million acres of of the entire North Slope has been

committed to conservation purposes in the Arctic Refuge. Now most of that is under siege by development interests. The questions must be asked: Where will the compromising stop? Aren't there any public wilderness lands along the Arctic coast of Alaska that should be considered sacrosanct?

It is also important to note that this 18 million-acre refuge is the second largest unit in the National Wildlife Refuge System, and the largest and most spectacular arctic wilderness sanctuary for wildlife in the world. Wildlife species of particular national and international concern include the 180-thousand-member Porcupine caribou herd (whose calving ground is on the refuge coastal plain), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, and Arctic char and grayling.

When considered in conjunction with the North Yukon National Park that adjoins it on the east, the Arctic Refuge constitutes an international commitment to the protection of nature.

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We agree with the Department of the Interior (on page 45 of the draft assessment report) that:

> "The Arctic Refuge is the only conservation system unit the protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America."

and (on page 46) that:

> "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge. Caribou migrating to and from the 1002 area and the post-calving caribou aggregation offer an unparalleled spectacle."

Despite these outstanding natural values, and the fact that the chance for discovery of an economically recoverable oil field is only 19 percent, the Department of the Interior is recommending that the entire coastal plain be made available for leasing to the oil industry. Meanwhile, officials of the Department are conducting negotiations in secret to trade away refuge lands on the coastal plain to private interests. This subverts the entire assessment report process preempts congressional options, and could lead to privatization of the refuge. Many of the individuals involved in these land trades are the same ones who attempted to trade away wilderness lands on St. Matthew Island to oil interests in 1984. In that

case, a federal judge ruled that Interior officials made serious errors in judgement, and that the land trade was not in the public interest. Now they are designing another refuge land trade scheme on an even larger scale. Apparently, little was learned by Interior from their St. Matthew experience.

The Department has left us no reasonable alternative but to oppose its recommendations because of the following serious shortcomings in its resource assessment process for the coastal plain of the Arctic National Wildlife Refuge:

1) Failure to point out that the establishment of the Arctic Refuge in 1960 to preserve its unique wildlife, wilderness and recreation values resulted in the remainder of Alaska's vast North Slope and adjacent offshore waters being made available for oil exploration;

2) Failure to release for public review and comment geologic information critical to the 1002 assessment process. This gives those who could profit from exploiting refuge resources advantage over those who actually own those resources--the American people;

3) Failure to reveal its proposed land trades with various Alaska Native corporations and the State of Alaska, and to demonstrate how such trades will serve the public interest;

4) Failure to justify full leasing when prospects for discovery of even one major economically recoverable oil field on the coastal plain is only 19 percent (pages 49 and 68), and with the market value of leases depressed because of the world oversupply of oil;

5) Failure to conduct a comprehensive economic analysis to show how the benefits to the Alaska and national economies can be optimized from leasing, both in the short and long term;

6) Failure to provide evidence that the Department will ensure that air and water quality will be protected from toxic chemicals and other pollutants such as those creating problems in the Prudhoe Bay oilfield;

7) Failure to explain how adequate water and gravel supplies will be obtained after finding that "...specific locations and sources of water and gravel for exploration and development activities have not been identified; it is understood that these resources, especially water, are not readily available on the 1002 area," (page 75);

8) Failure to explain why it wouldn't be in the national security interests of the United States to purchase more foreign oil at current low prices for addition to our nation's "Strategic Petroleum Reserve" rather than lose income to the federal treasury by further flooding a depressed lease market through opening the Arctic Refuge;

9) Failure to evaluate cumulative impacts on the Arctic Refuge from oil and gas lease sales on more than a million acres of adjacent state lands (Camden Bay, Demarcation Point and Prudhoe Bay uplands) and 21.2 million acres of OCS leases (Sale 97) in the Beaufort Sea scheduled for July 1987. The latter sale, just off the refuge coast, is the largest oil and gas lease sale ever held in the Arctic Ocean;

10) Failure to thoroughly discuss alternative energy policies that if implemented could make the nation energy secure without exploiting the Arctic Refuge;

11) Failure to assure that scarce refuge staff and funds will not be diverted from refuge conservation programs to monitor and regulate industrial activities on the coastal plain. (Since the coastal plain resource assessment was initiated in 1982, more than 90 percent of the refuge budget has been devoted to the 1002 assessment process, resulting in the almost total neglect of the overall refuge conservation program);

12) Failure to recognize that a North Yukon National Park adjoins the Arctic Refuge and that the United States has responsibilities to cooperate with Canada in protecting shared wildlife resources;

13) Failure to address the need for cooperative management of the Porcupine caribou herd with Canada through the international management agreement that has been negotiated over the past several years;

14) Failure to consult with the appropriate agencies of the Government of Canada as directed in Section 1005 of ANILCA; and

15) Failure to hold public hearings in all Alaskan communities that will be directly affected by the proposed action, and to make an adequate number of copies of the assessment report available in a timely manner.

Unfortunately, a series of citizens' lawsuits proved necessary during the assessment process to assure that the law

was followed. Furthermore, citizen monitoring of government activities was required as well to learn of industry activities taking place on the Arctic Refuge. And, despite the magnitude of resources at stake and the seriousness of the consequences of the decision on people both in Alaska and throughout the nation, the Department of the Interior chose not to make this report available to the public. Then, after being placed under court order to do so, the Department abbreviated the comment period to 60 days over the Christmas holiday period. This is not the way a democracy like ours works best.

In addition to Audubon's long history of involvement in wildlife conservation, another major priority goal of the Society is to "promote national strategies for energy development and use, stressing conservation and renewable energy resources." In an effort to achieve this goal, we have developed an "Audubon Energy Plan" with input from energy experts in industry, government and the academic community. This was done in the realization that energy is a major factor in determining the quality of human life. It furthers the production of goods and services, but its production and use can seriously impact the quality of the environment.

The Audubon Energy Plan is a practical, step-by-step alternative to the Administration's energy policy of exploiting the last remaining wilderness lands in the United States. It shows that proper planning and policy development at the federal level will enable the United States to produce more goods and services while actually improving the environment. The environmental pay-off will be cleaner air, purer water, and less pressure to exploit wilderness lands and wildlife habitat such as that in the Arctic Refuge.

True, Audubon's Energy Plan requires the introduction of regulatory measures that correct imperfections in the marketplace, such as efficiency standards for home appliances and fuel economy standards for automobiles. Such reliance in our Plan on modest measures to promote cost-effective conservation stands in contrast to the approach taken by the Administration, which holds that conservation should be left solely to the marketplace, no matter how far economists tell us individual markets are operating from the cost minimum, no matter how much energy is being wasted as a result. When this blindspot toward energy conservation is combined with the Administration's skepticism towards environmental protection, it is perhaps not surprising that the Administration makes drilling in wilderness areas one of the pillars of its energy policy.

Fortunately, the recent bipartisan show of support in Congress for appliance efficiency standards indicates that the

Administration is out of touch with the country when it comes to tolerance of modest conservation regulations. We are confident that a Presidential veto of the appliance bill in the upcoming session will be overridden by Congress. We are also confident that, when the choice is clearly put, Congress will decide to enact additional conservation legislation in order to preserve our national treasures such as the Arctic Refuge (as well as to save consumers money.)

In the meantime, and as long as this Administration refuses to take reasonable administrative and legislative action to promote cost-effective energy conservation, we will have no choice but to oppose attempts to open the Arctic Refuge to oil and gas development. Audubon has worked hard, particularly at the state level, to get appliance efficiency standards enacted. In New York, we initiated the process that led Governor Cuomo to introduce a tough efficiency standards bill last year. Massachusetts Audubon played a similar role in getting a bill introduced (and passed) in Massachusetts. Audubon members are well aware that preservation of wildlife and protection of the human environment requires wise husbanding of our energy resources.

Audubon continues to be actively involved in efforts to develop a long-range "Comprehensive Conservation Plan" for the Arctic Refuge. However, we have not been party to any actions that would preempt a thorough review of the mandated resource assessment report for the refuge's coastal plain, waiting to judge the report on its merits, waiting to see if there were a few key areas in which exploration could be allowed without risking serious interference with wildlife and wilderness resources. Instead of a complete and objective report with viable management options, we find the assessment report biased, contradictory, and lacking essential information. The only possible excuse for this is that Interior must not really be serious, but is floating a totally unreasonable position in the hopes of maximizing its bargaining power in Congress. If so, the tactic is likely to backfire by completely alienating those organizations willing to keep an open mind regarding multiple resource values on the coastal plain. Certainly, this has been the effect on the National Audubon Society.

The major undiscovered deposits of oil and gas on federal land holdings are thought to lie off the coast of the lower 48 states and Alaska. Thus, in the next two decades, as known onshore reserves are depleted, offshore development will become more important. Relatively little offshore land is currently off-limits to energy development. Most of these deposits will eventually be tapped.

The fact that all federal lands have not yet been leased does not mean that development is proceeding too slowly. These leases will be much more valuable ten to twenty years from now. If the government were to lease all these lands at once, it would derive an unfair economic return for the taxpayers.

Judged in this context, the Reagan Administration is making a serious mistake in rushing to lease virtually the entire U.S. Outer Continental Shelf (OCS)--almost a billion acres--and onshore prospects as well. The practice of offering tens of millions of acres of public lands each year at a time when oil prices are depressed raises very serious questions about whether the entire federal leasing program is amounting to a giveaway to the oil industry.

By flooding the market with lease offerings, it is clear that the Administration is helping to drive the price of leases down, thereby providing the oil industry with an opportunity to lease large acreages at bargain-basement prices. Evidence of this downward pressure on lease prices in overwhelming:

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Although not every oil industry organization takes the limited view on wilderness protection espoused by such organizations as the American Petroleum Institute, there is obviously a clash in values between advocates of exploitation and those whose favor preservation--a dispute that must continuously be settled through the political process. The Audubon Energy Plan has been developed with this dispute in mind. The Plan demonstrates that there are practical alternatives to exploiting the last of our wilderness areas. The United States can leave wilderness alone and still solve its oil import problem. The total amount of oil and gas under wilderness lands is too small to justify the abandonment of the nation's remaining wilderness heritage.

Under the Audubon Energy Plan, the mean risked estimate of 1.6 billion barrels of oil and the 1.6 billion barrel equivalent of natural gas estimated to lie under land already legally designated as wilderness would remain underground forever. The same would be true for the 2.3 billion barrels of oil and the 2.5 billion barrel equivalent of natural gas estimated to lie under wilderness land that has yet to be formally designated as wilderness, (A. Stege and J. Beyea, "Oil and Gas Resources on Special Federal Lands: Wilderness and Wildlife Refuges," Annual Review of Energy, Vol. 11, 1986, pp. 143-161.) Because wilderness land would never be exploited under the Audubon Plan, there would be no need for exploration.

The estimates for oil in wilderness lands given above assume a mean risked estimate of 600 million recoverable barrels of oil for the Arctic Refuge. In contrast, the Draft Coastal Plain Resource Assessment mentions a figure of 3.2 billion barrels, without clearly specifying whether or not the estimate is "risked." (We suspect it is not.) Clarification on this point is needed from Interior. If the 3.2 billion figure is risked, that is, already incorporates the risk of finding no oil (81%), Interior would be claiming that there are 2.6 billion more barrels of oil likely to be found in wilderness lands than in the estimates we have been using. Nevertheless, even an additional 2.6 billion barrels would not change the fact that a very small percentage of U.S. oil is in potential and designated wilderness lands. The percentage of U.S. oil resources on these lands would rise from 3.5% to 5.8%.

Certainly, any exploration that may eventually be permitted on these areas should be made by nonintrusive methods, such as satellite survey. Nonintrusive methods are currently inadequate for confirming existing Interior estimates, but the situation will no doubt change in the future. Fifty years from now, technologies for identifying natural resources will have surpassed the crude methods available to energy companies

today. With such a small percentage of U.S. land remaining as wilderness, it would seem wise for the nation to be patient in confirming Interior's estimates.

As has been indicated, the National Audubon Society is not blindly opposed to resource extraction on public lands. We expect that more than 95 percent of oil and gas resources on federal lands will eventually be tapped. The Society stands ready to work with oil and gas companies to help them develop environmentally sound methods of exploration and extraction that are suitable for the great percentage of land, both public and private, on which such activities need not be prohibited completely. Audubon will continue to insist, however, that exploitation of resources on public lands be carried out carefully in a manner that protects the environment and wildlife. Audubon will continue to oppose oil and gas exploration in any situation where government agencies or energy companies move hastily, without fully assessing the environmental and economic effects of activities or providing adequate safeguards for their implementation. This appears to be one of those cases.

It is argued by industry that the coastal plain of the Arctic Refuge must be leased now because it will take at least fifteen years to develop any oil fields discovered there. It must be remembered that following discovery of oil at Prudhoe Bay in 1968, oil was flowing through the 800-mile-long Trans Alaska Pipeline (TAPS) by June of 1977, a period of only 9 years. All that would be needed should oil production be permitted on the Arctic Refuge would be a 100 to 150-mile-long pipeline spur (at maximum) to tie into TAPS. Our guess is that industry could bring an oilfield on line in the refuge within 5 years should it someday prove in the national interest to do so.

It is an illusion to believe that leasing on the coastal plain of the Arctic Refuge will solve the economic problems of the North. After all, its whole purpose is to deliver northern oil to homes and industries in the South--or perhaps the Orient. Indeed, rather than solving the North's economic problems, it may accentuate them. For evidence of this, we need look no further than the situation in Alaska today. With the Trans Alaska Pipeline carrying oil at near full capacity, the state is going through one of the most serious economic recessions in its history.

The situation on the Arctic Refuge obviously calls for bold and courageous political leadership at both the state and national levels. For politicians to be holding out the promise that yet another great oil bonanza lies beneath the Arctic tundra just waiting to be exploited only postpones the day when

all Americans must begin to live within their means by implementing cost-effective conservation measures.

On page 6 of its assessment report, Interior states:

> "Oil and gas development will result in widespread, long-term changes in wildlife habitats, wilderness environment, and Native community activities. Changes could include displacement and reduction in the Porcupine caribou herd."

We agree, and therefore do not believe the long-term conservation, economic, or national security interests of the United States will be served by recommending that such sacrifices be made on the finest Arctic wildlife and wilderness sanctuary in the world at a time of a world oversupply of oil, and with hundreds of millions of acres of other federal and state lands available for exploration.

It has been said by many that we are now at our Last Frontier in Alaska. This has different meaning to different people. To some it offers opportunity for resource development and the jobs and material benefits delivered. To others, it is wildlife and wildland spectacles which constitute a heritage to be preserved for generations of Americans. The decisions we make on the Arctic Refuge therefore are not simply about oil fields and caribou herds. They are decisions that strike to our very deepest concerns as a nation.

The National Audubon Society feels the Department of the Interior is making a serious mistake in recommending that the coastal plain of the Arctic Refuge be opened to full leasing. The facts convince us that America can achieve energy security without exploiting the last great arctic coastal wilderness in the United States.

We believe that U.S. Senators Howard Metzenbaum and Paul Tsongas were right when in the 1979 debate on the Alaska Lands Act they stated:

> "It appears as if the "forbidden fruit" syndrome is operating with regard to the Arctic National Wildlife Range. Regardless of how bitter that fruit may be, there are some oil and gas companies which will want to invade this last stretch of north slope arctic land unimpacted by man. What the Congress does with regard to this fragile area will be an indication of how wisely we are going to conserve the nation's natural resources in the future. We can afford to make this Range the "last place to go" in the search for energy and we should. We urge the Senate

to study the arguments on both sides of this issue, for we believe strongly that aside from high emotions which have surrounded the debate on this issue, the facts support protection for the Range at this time..." (Report of the Committee on Energy and Natural Resources, United States Senate, No. 96-413, November 14, 1979, page 421.)

To reiterate our position on this issue, the National Audubon Society believes that wilderness designation is the best way to permanently protect the entire Arctic National Wildlife Refuge, including the coastal plain. We therefore support Alternative E, the wilderness alternative. The Society believes that Congress should proceed with wilderness designation unless assessment by the National Academy of Sciences confirms the importance of the Arctic National Wildlife Refuge to the nation's immediate and long-term energy needs, and demonstrates that petroleum extraction can be made compatible with protection of the refuge's fragile ecosystem, including its internationally significant wildlife values. In the interim, the National Audubon Society believes that the entire Arctic Refuge should be managed as wilderness in close cooperation with adjoining North Yukon National Park.

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Your consideration of our comments and recommendations is greatly appreciated.

Sincerely,

David R. Cline

David R. Cline
Regional Vice President

February 3,1987

U.S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Building
18 and C Streets NW
Washington, D. C. 20240

RE: Draft 1002 Report for the Arctic Coastal Plain

Dear Sirs/Madams:

Here are the comments of the National Park and Conservation Association on the Draft 1002 Report for the Coastal Plain of the Arctic National Wildlife Refuge.

The National Park and Conservation Association, founded in 1919, is the only non-profit, private organization devoted to protecting and improving all of our Nation's National Parks. At present the Association has over 50,000 members (300 in Alaska). While the Association is primarly concerned with management of National Parks it has concerns for the health and welfare of the environment nation-wide.

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It has been long recognized (first by Robert Marshall and then by Olaus Murie) that there is a need to preserve a portion of the Brooks Range and Artic Alaska for its great wilderness values. This was the origional purpose to establish the Arctic Range. It was a concern for the unique wilderness ecosystem that formed the purpose of the the Arctic National Wildlife Refuge when Congress established the area. The Refuge is a national wilderness treasure entrusted to the U.S. Fish and Wildlife Service by the people to protect those unique wilderness values. Also, many of the components of this ecosystem extend into Canada, and ultimately decisions that we make for the Arctic Refuge will effect Canada.

With this as a background, we commend the Service for its statement on page 45 of the draft report that states: "The Arctic Refuge is the only conservation system unit that protects, in an undesturbed condition, a complete spectrum of the various arctic ecosystems in North America." We also agree with page 46 that: "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activit. on the refuge." Given these statements, we find no justification for the Department's preferred alternitive to make the entire costal plain available for leasing to industry.

National Parks and Conservation Association
1015 Thirty-First Street, N.W., Washington, D.C. 20007
Telephone (202) 944-8530

The report has several shortcommings in its resource assessment of the coastal plain.

1) There were no hydrologists, ecologists, soils scientists, or recreation planners on the planning team.

2) The report cites outdated data to make various points. For example, the statement that the North Slope air is generally of good quality (Burro, 1973).

3) The report states that water resources in the 1002 area are very limited, but does not describe practical, economic ways that industry must deal with this problem and still protect resource values.

4) Large and obvious animals were selected for "evaluation species" which may not reflect resource development impacts of consequence to all of the relevant ecosystems. For example the arctic fox, small mammals, Lapland longspurs, and pectoral sandpipers could be used as indicators of environmental quality.

5) The cultural importance of bowhead whales to the people of kaktovik has been inadequately addressed. The 1979-1985 bowhead whale studies (Ljung-blad et al. 1986, Richardson 1986 and Miles et al. 1986) are important to consideration of the Pokok port site and annual sealift activities.

6) Baseline data reports show a tendency to duplicate efforts or to establish habitat classification systems independently of other investigators. A concerted effort should be made to standardize a habitat classification applicable to most studies to expedite comparisons between habitats, areas, and populations over time and regions.

7) Very little use was made of the substantial data on terrestrial bird populations of the Refuge that have been collected over 4 years. As of 1985, 127 10-hectare plots in 7 habitat types in 10 study areas of the 1002 area have been established and surveyed in various years. A more consistant study design should be conducted that addresses the need to obtain information on biotic resources of the Refuge prior to further exploration, development, and production of oil and gas resources. Results to date do not support the statements of importance of rock and willow ptarmigan compared to other terrestrial species.

8) No mention is made of the documents: Gravel Removal Studies in Arctic and Subarctic Floodplains in AK (FWS/OBS-80/08) and Gravel Removal Guidelines Manual for Arctic and Subarctic Floodplains (FWS/OBS-80/09).

9) While culvert design is addressed tending them is not. Evaluations along the Trans Alaska Pipeline and the Dalton Highway show that metal culverts remain frozen after spring breakup begins causing significant ponding of surface water, to such an extent that vegetation is drastically altered, animal populations changed, and washout of roads and workpads occurs. Substantial areas of the North Slope have been altered by non-functional culverts in runoff conditions.

10) Based on studies alonf the Trans Alaska Pipeline in 1980 and other years, snow drifting may be 5 to 6 times that indicated in the report (100 ft.). This coupled with impounding of runoff from roads and workpads will account for several hundred more acres of nesting habitat effected than is indicated in the report.

11) Based on studies during 1976-81 along the Dalton Highway, dust shadows can result in a 55% reduction of nesting bird densities and extend about 800-1000 feet down wind. The report states only 250 ft. for a total of 7,000 acres will be effected by development. The actual effect of development may be more than 4 times what the report suggests.

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12) Increased snow drifting, accelerated snow melt due to dust, and impounding of sheet flow by roads and workpads can combine to produce significant environmental impacts over a larger area than the report states.

13) Ongoing studies od the Lisburne Terrestrial Monitoring Program-1985 & 1986 have provided current data of direct import to this area. Considerable insight as to consequences of development activities can be added to the assessment by including these data with the referenced material.

14) Ptarmigan were one of the minor residents on the area's study plots. Tundra-nesting birds (other than ptarmigan) and small mammals will probably incur greater losses than ptarmigan, and they are important foods for larger predators.

15) Regulations that deal with oil spill prevention, containment, and cleanup should be noted in the report.

16) Caribou herds are an enigmatic group of individuals, often unpredictable in response to natural and unnatural phenomena, and are a unique resource? The report does not contain sufficient data to assess the potential inpact of development on this species.

17) The scenarios presented for the various alternatives for the petroleum potential are pure conjecture until the resources are defined.

18) The report looks at the 1002 area in isolation, rather than examining in detail the cumulative effects of oil and gas development on adjacent state and federal leases and offshore on the outer continental shelf.

19) The disposal of hazardous wastes associated with oil development presents a serious long term problem that is not adequately addressed and are not fully understood in the Arctic.

20) The report does not consider energy conservation and creating viable alternative energy sources that can better provide for future needs than can the Arctic Refuge.

21) The report does not deal with the value to the people of establishing the 1002 area as part of the National Wilderness Preservation System. In fact the report, page 93, states that; "No further study or public review is necessary for the Congress to designate the 1002 area as wilderness." It also states that a wilderness review was conducted in the early 1970's pursuant to the provisiona of the Wilderness Act, but the draft report was never made final nor was puplic coment obtained. The Wilderness Act of 1964 directed federal agencies to study areas to determine their suitability as Wilderness. As part of this process, Agencies were directed to hold public hearings. Hearings were never held and the report was never finalized for this area, although Congress directed the Secretary to do so.

22)The Department seems anxious to pursue development. It has disregarded the purpose for designating the area for future generations of Americans. It wants to make all the decisions here and now and not leave any options for the future. The Department has taken every measure to prevent the public from commenting on this report. It took a court case to direct the Department to allow comment on this report.

In view of these findings and others that we have not cited we can not agree with the Departments recommendation of "full leasing of the Coastal plain." We feel that the unique wilderness resource of this area is important to the nation as well as Canada. Therefore, we urge that no further development or land trade in the 1002 study area take place and that the area be added to the National Wilderness Preservation system.

Thank you for complying with the court for the opportunity to comment.

Sincerely,

William J. Holman
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Working for the Nature of Tomorrow

NATIONAL WILDLIFE FEDERATION, 1412 Sixteenth Street, N.W., Washington, D.C. 20036-2266 (202) 797-6800
Office of the Executive Vice President

February 4, 1987

The Honorable Donald Paul Hodel
Secretary
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Secretary:

The National Wildlife Federation (NWF) has always viewed the Coastal Plain of the Arctic National Wildlife Refuge as a magnificent natural resource. It provides critical habitat for an incomparable array of arctic wildlife, including caribou, polar bears, grizzly bears, musk oxen, and snow geese. It is truly a world-class wildlife area and a national treasure. However, the Federation has long recognized that if significant deposits of oil and gas are present in this area, the question of their development and production will have to be addressed.

The National Wildlife Federation has reviewed the Draft Coastal Plain Resource Assessment, the so-called 1002 Report, which examines several questions surrounding the potential oil and gas resources of the Arctic Coastal Plain. Federation staff, knowledgeable leaders from our state affiliate in Alaska (The Wildlife Federation of Alaska), and our consulting geologist have examined the report and have provided me with detailed comments. Also, along with two other senior staff members, I traveled to Alaska in mid-January to meet personally with representatives of the major state and federal agencies, oil and gas companies, and environmental interests concerned about the future of these lands.

Since the outset, I have had reservations about the process the Department of the Interior used in producing this report. Public interest groups had to resort to litigation to obtain access to the assessment process and the opportunity to comment on this draft. Then, Assistant Secretary Horn publicly unveiled a strategy for industry to

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lobby Congress to open the Arctic Refuge to oil and gas development (December 1986 issue of Alaska Construction and Oil). And, of course, concurrent with all of this are the secret negotiations the Department of the Interior has underway with Native corporations to trade away the public's interest in the subsurface rights to oil and gas resources of the 1002 area.

The course of action recommended by Assistant Secretary Horn and the direction that seems to be coming from the Interior Department give us concern about your commitment to be guided by the oath of public trust to which you have pledged yourself.

The Federation, however, attempted to review the report objectively. Our review has been extensive, and involved a critical analysis of all major aspects of the available information.

Our first problem with the report is that it does not comply with the mandate of Congress in several important respects. One of the most glaring oversights is that, despite the specific requirements of the law for a baseline study of fish and wildlife resources, there are significant shortcomings in the biological data upon which the report is premised. For example, one of the most important questions to resolve before any recommendations can be made about future development in the 1002 area is to define the critical calving habitat for the Porcupine Caribou Herd. Yet, leading caribou biologists agree that the biological data is insufficient to define the ecological attributes of critical calving areas.

Another oversight is the Department's failure to consult in a timely manner with the Government of Canada. Despite the explicit mandate of the law, no consultation occurred before the report was released. This is a significant omission, given that the Porcupine Caribou Herd is an international resource and the Government of Canada has recently established the North Yukon National Park immediately adjacent to the Arctic Refuge. At the minimum, this is an arrogant disregard for one of the United States' most important allies.

Beyond such omissions, the analysis presented in the report is seriously flawed. For example:

- there is little support for the apparent conclusion of the Executive Summary that impacts upon fish and wildlife resources can be mitigated effectively; in fact, this assertion appears to be contradicted later by the report when it states, for example, that mitigating the loss of caribou core calving habitat "is not possible";

- the cumulative environmental impacts of developing millions of acres of adjacent on-shore and off-shore lands -- which are planned for leasing -- are ignored; and,

- the report concludes that providing the fresh water necessary to drill even one exploratory well is a significant and unresolved problem and then simply fails to address the question of providing the water necessary for any level of future development.

These are only a few examples of the problems which are evident with the assessment of the potential impacts of development of the 1002 area. In general, the shortcomings of the fish and wildlife impact analysis are matched only by the zeal with which the Department wraps its "lease-everything" recommendation in the flag of national security.

Together, the conduct and content of the report, make it clear that the Department has already decided what it will recommend to Congress regarding the future of the Arctic National Wildlife Refuge. As a result, the critical questions posed by Congress in enacting ANILCA remain unanswered. It is regrettable that instead of responding to the mandate of Congress the Department has embarked upon a course of action which can only add to the polarization of this controversy and cloud the very issues which it was asked to resolve.

Therefore, the National Wildlife Federation does not believe that its submission of detailed comments on the Draft Coastal Plain Resource Assessment to the Department of the Interior would be constructive. The comments submitted by our state affiliate, the Wildlife Federation of Alaska, adequately represent our views.

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Instead, in an effort to make a more positive and constructive contribution to the resolution of this controversy, the National Wildlife Federation will submit a comprehensive report regarding the future of the Coastal Plain of the Arctic National Wildlife Refuge to the Congress shortly.

We will be pleased to make copies of that report available to you, Assistant Secretary Horn, Director Dunkle, and representatives of other interests when it is released to Congress and the public.

Thank you.

Sincerely,

Jay D. Hair

JAY D. HAIR

JDH:kg

cc: Assistant Secretary Horn
Director Frank Dunkle

National Wildlife Refuge Association

16096 Creekwood Road
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January 15, 1987

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Dedicated to the preservation and perpetuation of the National Wildlife Refuge System.

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Mr. William P. Horn
Assistant Secretary for Fish and
Wildlife and Parks
U. S. Department of the Interior
Fish and Wildlife Service
18th & C Streets, N.W.
Washington, D.C. 20240

Attn: Division of Refuge Management

Dear Mr. Horn:

This expresses the concerns and views of the National Wildlife Refuge Association (NWRA) on the draft Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment report released for public review November 24, 1986. As a nationwide citizens' organization dedicated to the preservation and perpetuation of the National Wildlife Refuge System, we appreciate this opportunity to review and comment on the draft 1002 report document. Many of our members have had extensive experience in managing National Wildlife Refuges and in administering oil and gas operations, including related developments on Alaskan refuges.

Unlike some conservation groups, NWRA has deferred taking a position on this controversial issue until we could review the Interior Department 1002 report. Despite the inevitable environmental damage of oil and gas extraction to dedicated conservation lands, we believe that such development could be sanctioned if a national emergency or crucial need positively existed and if other energy development alternatives were impractical to pursue. We recognize that properly-directed oil and gas developments can be condoned as an acceptable use of federal lands, including wildlife refuge units where habitat manipulation is a standard management practice. We also recognize and appreciate instances where direct or indirect contributions of the oil industry have benefited some refuges. Oil and gas leasing on the coastal plain of the Arctic National Wildlife Refuge is, however, a horse with a different color.

The Arctic Refuge was not the creation of a government bureaucracy. A review of the extensive and detailed files of the establishment of the original wildlife range reveals that this magnificent reserve exists because of the exhaustive efforts of citizens throughout the Nation. For a 10-year period, major conservation organizations, sportsmen's groups, civic organizations and renowned naturalists, including Olaus and Margaret Murie, studied the area and supported its establishment. The arctic reserve concept was brought forward for executive confirmation by individual citizens and conservation

leaders in Alaska and throughout the Nation. It exists today because people cared enough to have it established. Its status will be vigorously defended because people care even more about its protection now in a world rapidly running out of virgin wildlands and their associated wildlife. The Arctic Refuge is unquestionably one of the last outstanding natural treasures in the entire world.

Since the inception of our organization in 1975, we have strongly supported the maintenance of the wildland character of the arctic and the expansion of the Arctic Refuge under the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). We have worked with conservation groups over the years to protect refuge values from various detrimental threats, and our efforts to preserve this internationally important arctic reserve will prevail until it can be unequivocally demonstrated to be in the national interest to do otherwise. With respect to the recommendation for full leasing of the coastal plain, our position is that an action of this magnitude at this time is not in the long-term economic, national security, or conservation interest of our Nation.

We find many inadequacies in the 1002 assessment report. We find the report to be seriously incomplete in vital information areas and woefully inadequate in analyzing and discussing alternatives, as well as the biological, social and economic impact of full scale leasing. A bias toward development is noted and we suspect that this is intended to influence public sentiment under the guise that the 1002 area is "clearly the most outstanding oil and gas frontier remaining in the United States", and full leasing would "contribute substantially to national economic and security interests." Unfortunately, these statements, in the absence of supportive information, may be viewed as contentions rather than facts. An action of this magnitude and its potential environmental and social consequence must be based on fact, not mere contentions.

If it is in the national interest to develop oil and gas resources, industry should look first to developing the numerous leases already in its possession throughout the United States, including onshore and offshore lease areas situated along the breadth of the arctic coastal plain, and keep this part of the refuge's coastal plain intact, at least during the immediate future. Development of the 1002 area should be a last resort, predicated on a clearly demonstrated national need. We hasten to note that major compromises have already been made on Alaska's North Slope by both development and conservation interests. These resulted in making 90 percent of the arctic coastal plain available to industry in addition to some 24 million acres of state-controlled nearshore and federal offshore areas along the Beaufort Sea.

The problem of report completeness poses a major concern to our organization. Aside from the need to provide supportive information on full leasing, we believe that the report is remiss in not

describing the process and rationale leading to the establishment of the original arctic wildlife range. The draft report (page 45) states that "the Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America." This statement would be more meaningful if reviewers had a better insight to the exhaustive efforts, and the reasons for these efforts, that culminated in a mandate to preserve the natural integrity of this special ecosystem. Development now or in the future is clearly in conflict with the original purpose of establishment. The 1002 report does not adequately address the wildland values of the coastal plain and how these values will be changed by large scale oil and gas developments.

The report is conspicuously void of any discussion of commitments of the United States to the international community. It should recognize, among others, the following treaties and legislative mandates:

1. The Migratory Bird Treaty with Canada, Mexico and Japan as concerns the possible impact on the continental snow goose populations, produced in Canada and tranditionally using the 1002 area for feeding and staging prior to migration.

2. The agreement for the Conservation of Polar Bear (1973) with Canada, Denmark, Norway, and the U.S.S.R., which states that each contracting party shall take appropriate action to protect the ecosystems with special attention to protecting denning and feeding sites and migration patterns. Development in the 1002 area would adversely affect known polar bear denning areas.

3. Agreement calling for cooperation in the field of environmental protection between the U.S.A. and the U.S.S.R. (1972)

4. The 1976 convention between the U.S.A. and U.S.S.R. concerning the Conservation of Migratory Birds and their Environment (impact on birds migrating along the northern part of the continent).

5. Impact on the ANILCA directive requiring consultation with the Canadian government involving oil development along the refuge coastal plain adjacent to Canada's Northern Yukon National Park. Canadian officials had not been consulted before the 1002 report was released November 24.

6. Impact on on-going discussions with Canada concerning the establishment of an international Porcupine caribou treaty. Development would adversely affect this herd and subsistence activities associated with Arctic Village, Kaktovik, and the Canadian village of Old Crow.

These issues should have been presented and discussed in a separate, clearly-defined section of the 1002 report.

We find the alternatives to be both narrow in scope and superficially discussed. This may be by design to facilitate support of the preferred alternative of opening the entire 1002 area to full leasing. Due emphasis should be placed on greater objectivity in selecting alternatives and discussing their implications in the final document. We note that the 1002 report makes reference to structuring a leasing program to protect the southeast part (242,000 acres) used as a caribou calving area so this would be the last part to be developed. This type of rationale should be the key to all development alternatives. The manner in which alternatives have been drafted induces our organization to oppose full scale leasing and to support the no action alternative.

Because of the inadequacies which we perceive in this document, the NWRA strongly opposes oil and gas leasing along the coastal plain area of the Arctic Refuge. We urge the Interior Department to manage this unique area--the refuge in its entirety--consistent with the purposes for which it was founded, lest this unique arctic reserve be sacrificed on the altar of economic dogma.

In conclusion, you should know that we strongly object to the secretive efforts of the Interior Department to negotiate land exchanges with Native organizations. These negotiations are obviously aimed toward influencing congressional decision making. While we agree with land exchanges in principle, we strongly oppose the manner in which current negotiations behind closed doors are being conducted. This approach may lead to costly litigation on essentially the same grounds that the St. Matthew Island land exchange was contested and ruled an illegal action by the Federal Court. The Arctic National Wildlife Refuge was established by the American people for the American people and they should have an opportunity to voice their opinions whenever dedicated public lands are transferred to private ownership.

We will appreciate your careful consideration of the concerns which we have expressed.

Sincerely,

Forrest A. Carpenter
President
National Wildlife Refuge Association

U. S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior
18th & C Sts. N.W. Wash DC 20240

Comments
Draft
Arctic National Wildlife Refuge, Alaska,
Coastal Plain Resource Assessment

By
The National Wildlife Refuge Association
Washington Representative - Marcus C. Nelson
4216 Downing St. Annandale, Va. 22003

The Interior Department's recommendation to the Congress, in its "Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment" pits the protection of a pristine National Wildlife Refuge enviornment of unparalleled ecological value against the exploration and development of those lands for the unproven production of oil.

The Arctic National Wildlife Refuge (ANWR) was set aside to protect, in an undisturbed condition, a complete spectrum of various arctic ecosystems, which together with Canada's adjoining Yukon National Park, constitute the most spectacular arctic sanctuary found anywhere in the world. The-18-million acre arctic NWR provides internationally important calving and rearing grounds for the 180 thousand head porcupine caribou herd as well as natural habitats for polar bears, grizzly bears, musk ox, dall sheep, wolves, wolverine, peregrine falcons, snow geese and other important migratory birds.

Because the coastal plain area reputedly contained major oil and gas resources, Congress, in Section 1002 of ANILKA, identified 1.5 million acres of the 2.0 million acre coastal plain for study and required a comprehensive assessment of resource values, including petroleum resources through a Government-guided oil exploration program by means other than actual drilling.

This past November, the U. S. Fish and Wildlife Service (USFWS) released the required draft resource assessment for a 60-day public review period. The "so called" 1002 report recognized that the study area is the most biologically productive part of the Arctic NWR. Despite this and the knowledge that the development of economically recoverable oil is going to depend upon full exploration, gambling on production and constructing all necessary facilities, the Interior Department recommends that all indicated oil bearing areas within the 1002 portion of 1.5 million acres of the Arctic NWR coast be leased for development.

According to the 1002 report, the outstanding wilderness, wildlife habitat and fish and water qualities will be severely impacted by oil and gas leasing. The presence of oil development facilities would eliminate the wilderness character in development areas and cause intrusions into designated wilderness adjacent to the 1002 area. Development would cause widespread, long-term changes in wildlife habitats and interfere with native subsistence activities.

The National Wildlife Refuge Association (NWRA) has strongly supported the expansion of the Arctic refuge unit and the maintenance of its wilderness qualities early in the deliberations of the Alaska National Lands issue. The NWRA and conservation organizations worked during succeeding years to protect the Arctic NWR from potential encroachments on the premise that the naturalness of the unique ecosystems of arctic Alaska should prevail when virtually the rest of the north slope and millions of acres of other Alaska lands and waters would be accessible to commercial interests.

In a separate action, the Department and Native Corporations have negotiated towards the exchange of privately owned lands for sub-surface rights on the coastal plain area of the Arctic NWR surrounding Kaktovik. This unofficially estimated 95,000 acres of presumed oil bearing lands, at least equal to the potential of other refuge lands, invites a major private development over which the Government would have little control.

The NWRAs position on the Arctic NWR development concerns serious inadequacies of the 1002 report. The report is flawed by an insufficient

analysis and discussion of alternatives other than opening the entire 1002 area to oil leasing. Another critical shortcoming concerns the distorted importance of the areas petroleum resources without providing a perspective of the cumulative benefits and impact from oil and gas lease sales already let and to be scheduled in other parts of arctic Alaska, including off shore areas. The NWRA believes that the 1002 report should be re-drafted to be more thorough and objective in content; otherwise, the review and decision making process will be woefully impaired.

Based on the known widespread, long-term changes in wildlife habitat and natural systems that will occur, weighed against the gamble of full exploration to develope what oil may be present under the locations that showed signs of promise will spread activity over most of the 1.5 million acres studied. This appears to be "over kill" and not in the best strategic, economic or conservation interests of the United States to recommend such sacrifices on the finest Arctic Wildlife Sanctuary in the world at a time of world oversupply of oil, and with millions of acres of other federal and state lands available.

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The National Wildlife Refuge Association appreciates this opportunity to comment on this most important proposal under consideration for the Arctic NWR.

dated 1-9-87

Natural Resources
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Comments

Of The

NATURAL RESOURCES DEFENSE COUNCIL

On The

DRAFT

ARCTIC NATIONAL WILDLIFE REFUGE

COASTAL PLAIN RESOURCE ASSESSMENT

Report And Recommendation

To The

Congress Of The United States

And Legislative Environmental Impact Statement

O-265

February 6, 1987

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The Natural Resources Defense Council (NRDC) is a national environmental organization dedicated to the protection and enhancement of the nation's natural resources. NRDC's membership totals approximately 60,000 members and supporters in the U.S. and Canada. NRDC has had a long standing interest and involvement in the federal government's oil and gas leasing programs; we therefore welcome the opportunity to comment on the Interior Department's draft Report to Congress and Legislative Environmental Impact Statement (LEIS) on oil development in the coastal plain of the Arctic National Wildlife Refuge. Our major comments can be summarized as follows:

1. The draft Report/LEIS fails to meet the requirements of NEPA and its implementing regulations because it does not adequately assess:

   a. cumulative impacts of oil and gas development in the Alaskan and Canadian arctic;

   b. reasonable alternatives to the proposed action;

   c. impacts of gas development;

   d. impacts of full leasing on water quantity and quality;

   e. impacts of full leasing on air quality;

   f. conflicts between the proposed action and the Alaska Coastal Management Program; and

   g. impacts on endangered and threatened species.

2. The draft Report/LEIS fails to comply with Section 810 of the Alaska National Interest Lands Conservation Act.

3. The Department's estimates of the amount of oil and associated economic benefits that would accrue to the nation from full leasing of the coastal plain of the Refuge are overstated as a result of the use of overly optimistic assumptions and methodologies that inflate the amount and value of projected oil reserves.

4. The Department's conclusions that the oil industry can operate in the arctic without significant environmental

consequences is unjustified and is contrary to evidence presented in the body of the draft Report.

I. Introduction

The 18 million acre Arctic National Wildlife Refuge is the second largest refuge in the National Wildlife Refuge System and the largest arctic wilderness sanctuary for wildlife in the world. The Refuge, which stretches from the southern foothills of the Brooks range to the Beaufort Sea in northeastern Alaska, supports one of the few remaining large caribou herds in North America, as well as polar bears, grizzly bears, moose, muskox, Dall Sheep, wolverines, snow geese, peregrine falcons and other species of arctic fish and wildlife. The coastal plain portion of the Arctic Refuge lies on the north slope of the Brooks Range and consists largely of pristine, extremely fragile tundra and wetlands. The coastal plain lies 60 miles to the east of the giant oil fields near Prudhoe Bay, and according to the Department's draft Report to Congress, there is a 19% chance that economically recoverable oil exists somewhere in this region of the Arctic Refuge.

The Alaska National Interest Lands Conservation Act of 1980 (ANILCA) placed roughly half of the Arctic Refuge under wilderness protection but deferred a decision to protect 1.5 million acres of the coastal plain as wilderness pending a comprehensive assessment of resident fish and wildlife, oil and gas potential and the impacts that oil development may have on the environment of the Refuge. ANILCA instructed the Secretary of the Interior to report his findings on these three topics to the Congress along with his

recommendations regarding whether oil and gas development in the coastal plain would be in the national interest.

On November 24, 1986, the Department issued a draft Report to Congress and Legislative Environmental Impact Statement (LEIS) recommending full leasing of the coastal plain to the oil industry. The decision to recommend full leasing was based on three considerations: the analysis of impacts presented in the draft Report, the national need for domestic sources of oil and gas, and "the ability of the industry to minimize damage to the North Slope environment as learned from oil and gas activities elsewhere in the Alaskan Arctic." Draft Report (hereafter, "D.R.") at iii.

As discussed in detail below, the Department's substantive analysis of these three considerations is seriously flawed. In addition, there are many legal deficiencies in the draft Report/LEIS. Taken together, these defects in the Department's analysis render the document fatally flawed and therefore not a suitable or adequate basis on which to make recommendations to Congress on leasing in the Arctic Refuge.

II. The Analysis of Environmental Impacts in the Draft Report to Congress/LEIS

A. The Conclusions Drawn in the Executive Summary are not supported by the Body of the Draft Report.

According to the draft Report, full leasing of the coastal plain could result in a 20-40% decline in the Porcupine caribou herd (D.R. at 112), a 20-50% reduction in the muskoxen population (which in 1985 numbered only 476) (id. at 114), a loss of half of the wolverine population (id. at 116), almost 50% of the snow

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geese that stage in the coastal plain (id. at 122), and a loss of subsistence hunting opportunities throughout approximately one half of the coastal plain (id. at 132). In light of these and other impacts projected by the draft Report, it is difficult to understand how the Department can conclude in the Executive Summary that oil development on the coastal plain can be expected to generate "minimal effects" (id. at 2).

The Executive Summary is the document most often read by decision-makers and others. It must accurately reflect the conclusions of the body of the Report so that a complete understanding of the implications of developing the Arctic Refuge may be had by all readers. The Executive Summary should be revised to explicitly state the losses of wildlife and habitat projected to result from full leasing.

B. Deficiencies in the NEPA Analysis

The purpose of an environmental impact statement is to provide a full and fair discussion of the significant environmental impacts of a proposal and to inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse effects on the environment. 40 C.F.R. §1500.2. The Council on Environmental Quality's regulations implementing NEPA specify that in order to achieve these goals, certain information must be presented in an EIS. Unfortunately, the draft Report to Congress/LEIS does not fulfill the informational requirements mandated by NEPA or its implementing regulations.

Omissions from the draft report/LEIS, discussed below, render the document so inadequate as to preclude meaningful analysis. The Department must therefore prepare and circulate a revised document, as provided for by 40 C.F.R. §1502.9(a).

1. Cumulative Impacts

Cumulative effects are those that result from the incremental impact of a proposed action when added to other past, present and reasonably foreseeable future actions (40 C.F.R. 1708.7). Nowhere in the draft Report/LEIS does the Department analyze in detail the cumulative impacts of oil and gas development projects throughout the Alaskan and nearby Canadian arctic, despite the fact that a large number of oil and gas development projects have been undertaken in or are planned for the region (e.g., Prudhoe Bay, the Lisburne Field, the Kuparak Field, the Endicott Project, Milne Point, Seal Island, the Naval Petroleum Reserve-Alaska and State, federal and Canadian waters of the Beaufort Sea).

There are a large number of wildlife species that stand to be significantly affected by the incremental impacts of all of the different oil and gas development projects in northern Alaska and Canada. For example, denning polar bears are extremely sensitive to human activities. D.R. at 117. The draft Report notes that oil development could produce a major reduction in the availability of denning habitat in the 1002 area. Id. at 118. Similar reductions in denning habitat can be expected to result from current and future oil development elsewhere in the arctic. It is

therefore critical that the Interior Department analyze the cumulative impacts of all those developments. Only by doing so will the Department be able to assess the extent to which development of the Refuge, in combination with similar developments elsewhere, will affect the overall health and survival of the regional polar bear population.

Another species sensitive to human disturbance is the snow goose. This species is highly sensitive to aircraft disturbance. Id. at 121. Studies have reported that snow geese flush in response to aircraft and helicopters passing by at distances of up to 9 miles. Id. The draft Report concludes that oil and gas activities in the Refuge could result in the displacement of these geese from up to 50% of their preferred staging habitat. Id. at 122. If this has occurred or is occurring in other areas of the Alaskan arctic subject to oil development, major impacts to the regional snow geese population could result. It is therefore extremely important that the Department evaluate the effect on snow geese of leasing in the Refuge in the context of larger impacts resulting from development activities across the region.

The Department has recognized the need to perform cumulative impact analyses for oil and gas development on federal land and routinely does so for federal OCS lease sales. For example, the draft environmental impact statement for Lease Sale 97 in the Beaufort Sea evaluates the cumulative effects of oil and gas operations throughout the Alaskan Arctic. (FEIS Sale 97 at 4-A-28). We note however, that the Sale 97 cumulative impact analysis assumes no development in the Arctic National Wildlife Refuge and

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fails to evaluate the effect of oil and gas activities in the Canadian Beaufort Sea. The Sale 97 cumulative impact analysis therefore could not be used in the final Report/LEIS on the Arctic Refuge.

We recommend that the Department prepare and circulate for public comment a draft cumulative impacts assessment prior to issuing the final report to Congress in accordance with 40 C.F.R. §1502.9.

2. Failure to Consider Reasonable Alternatives to the Proposed Action

One of the most important functions of the NEPA process to assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects on environmental quality. Indeed, the CEQ regulations call the analysis of alternatives "the heart of the environmental impact statement". 40 C.F.R. §1502.14.

According to the draft Report, energy independence and economic benefits appear to be the primary goals the Department hopes to achieve by opening the Refuge to oil development (e.g., D.R. at pages iii-8, 161-166, 169). Yet nowhere in the draft Report could we find any analysis of alternative methods of achieving these same goals.

Rather than evaluating alternatives for enhancing energy security and associated economic benefits, which together constitute the purpose for action, the Department improperly frames the alternatives in terms of forgoing such benefits in order to partially or completely protect the Refuge from oil and gas development. For example, the draft Report's discussion of the

wilderness alternative indicates that by designating the Refuge as wilderness, the nation must completely forgo the energy and economic benefits that will allegedly result from developing oil and gas in the Refuge.[1] This is not necessarily the case, as there are many other options for reducing the nation's dependence on foreign oil achieving related economic benefits.

The Report to Congress and accompanying Legislative EIS provide the opportunity to stand back and evaluate broad policy alternatives to promote national goals of energy independence and economic benefits. We believe that alternative energy sources should be discussed in the context of the "wilderness" and "no-action" alternatives so that ways of avoiding oil and gas development in the Arctic National Wildlife Refuge can be explored. For example, if President Reagan had signed the National Appliance Energy Conservation Act of 1986, the nation could have saved about 1.3 billion barrels of oil equivalent.[2] This represents more than twice the risked mean oil resources that the Department estimates underlies the Arctic Refuge.[3] The "wilderness" and "no action" alternatives should be structured so that comparisons of this sort can be readily made. This will permit the public to comment on

1. "A decision to designate the 1002 area as wilderness will maintain long term fish, wildlife, subsistence and wilderness values at a cost of a potential but unconfirmed 3.2 billion barrels of oil." Draft report at 144.

2. Howard Geller, American Council on an Energy Efficient Economy, 1986. Energy and Economic Savings Potential from Natural Appliance Efficiency Standards.

3. Mean estimate of conditional, economically recoverable oil (3.23 billion barrels) times marginal probability (19%) = 614 million barrels of oil.

the desirability of pursing one energy scenario over others. The following energy alternatives should be examined.

a. Improved automobile gas mileage standards

The Administration has rolled back fuel economy standards from 27.5 miles per gallon (mpg) mandated by Congress to 26 mpg for 1986, 1987 and 1988 model year automobiles. The decision not to enforce original fuel economy standards means that an extra 300 million barrels of oil will be used by 1987, 1987 and 1988 model year cars.

To put this number in perspective, the Department's draft Report to Congress estimates that the coastal plain portion of the Refuge contains an estimated risked mean of 614 million barrels of oil. Thus, by the single action of rolling back automobile efficiency standards for three years, the Administration will cause the equivalent of half of the oil projected to underlie the Arctic National Wildlife Refuge to be needlessly burned by less fuel efficient cars.

b. Appliance efficiency standards

The economic attractiveness of appliance efficiency standards was demonstrated in 1986 when the appliance industry and the conservation community jointly sponsored federal legislation to enact uniform appliance efficiency standards. As noted above, these standards would have saved an estimated 1.3 billion barrels of oil equivalent from gas savings in furnaces, water heaters, and ranges. Despite the swift passage of the legislation by overwhelming margins in the Congress, the President chose to forego these significant energy savings and vetoed the bill in November.

It is difficult to understand why the Administration feels so pressing a need to open the Refuge in light of its rejection of a far more effective method of assuring energy security.

c. Government funded conservation research

According to DOE,[4] federal investments in 18 major industrial/commercial energy saving technologies will be providing 521 million barrels per year in equivalent energy savings by the year 2010. These technologies have been introduced into the market in the 1978-1983 period and savings are based on expected market penetration by 2010. Despite the success of these technologies, the Administration is advocating a 50% cut in federal conservation technology research and development as part of its FY 1988 budget -- on top of a 50% cut from FY 1980 through FY 1987. These budget cuts will mean that potential further major savings in energy conservation will not be realized.

d. Incentive Programs for Building Retrofit

Some 3.5 million barrels of oil equivalent per day are used in the form of oil or gas for heating homes. Incentive-based retrofit insulation programs have the potential to save more than 1.5 million barrels per day at a cost of less than that of oil.[5] Pilot programs sponsored by utilities have shown that almost 90% of the potential savings can be achieved with a three year

4. FY 87 Energy Conservation Multi-Year Plan, July 1985, Office of Conservation, U.S. DOE.

5. SERI/Solar Conservation Study, A New Prosperity, Birck House Publishing, Andover, Massachusetts at 13.

implementation period,[6] yet the federal government has proposed no programs to help this process along. The only direct government involvement has been in solar and conservation tax credits. This program was terminated at the request of the Administration.

e. Mass Transit Expansion

Mass transit is more fuel efficient than automobiles and also allows a reduction in automobile travel miles in areas well served by mass transit. A 50% change in transit ridership up from current levels could save over 3 billion barrels of oil over the next twenty years.[7] Mass transit is generally a much lower cost option to the nation than automobile-based transportation systems, even excluding the benefits of their lower energy costs. Yet the Administration has consistently supported large cutbacks in federal mass transit funding and has withheld money that Congress directed to be invested in mass transit construction, despite the consequences on oil imports.

To comply with CEQ's regulations implementing NEPA, the Department must perform a comprehensive evaluation of these and other alternative mechanisms of meeting national energy needs and the effects of such alternatives on oil imports and the environ-

6. Eric Hirst and R. Goeltz, "Potential Versus Practice Installation of Retrofit Measures in the Hood River Conservation Project," Oak Ridge National Laboratory, ORNL/CON-189 1985, at 26-27.

7. David Goldstein, Senior Scientist, Natural Resources Defense Council, 1985. Testimony for House Appropriations Committee, Subcommittee on Transportation, on Appropriations for the Urban Mass Transit Administration, 2 May 1985.

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ment. Included in such a discussion should be a "least-cost" analysis of different energy sources.

Least-cost analyses are essential to economically rational or defensible decisions concerning the development of energy resources. Congress recognized the value of least cost planning as early as 1980, when the Pacific Northwest Electric Power Planning and Conservation Act authorized the creation of a new agency to plan for electricity use in the Northwest and charged it with acquiring electricity in a least cost fashion. The California Energy Commission has operated under at least cost principles for a decade under leadership from both political parties and now claims that those principles have saved that state's ratepayers billions of dollars. Before oil development in the Arctic National Wildlife Refuge can be justified on an economic basis, the Department must develop a least cost energy plan and see where development of the Refuge fits in. If it falls behind other options not being pursued, then the development of the Arctic National Wildlife Refuge should be postponed until other more attractive resources are exploited.

This analyses should be prepared and circulated for public comment prior to the issuance of the final Report in accordance with §1502.9(a) of the CEQ regulations.

3. Failure to Evaluate the Impacts of Gas Development

The CEQ regulations require that an Agency evaluate impacts of a proposed action. While the Department is proposing full

leasing of the coastal plain, the draft report fails to analyze the impacts of developing the gas resources of the coastal plain. The Department assumes that crude oil is the only potentially economic hydrocarbon which would attract leasing interest if the 1002 area were opened to leasing. D.R. at 75. Later in the draft Report, however, the Department notes that "it is expected that gas production from this area would also be economic within two to three decades." Id. at 143. The Department's failure to evaluate the impacts of gas recovery in the Refuge not only violates the CEQ regulations, but also section 1002(h)(3) of ANILCA, which requires the Department to evaluate the adverse effects of exploration, development and production of oil and gas within the coastal plain.

This is important because the impacts of gas development would not be limited simply to the construction of a gas pipeline for transportation of gas, as the draft Report implies. Rather, the development of gas will inevitably result in the increased demand for scarce supplies of water and gravel, new construction which will result in habitat loss, and other impacts associated with further development of the Refuge. In order to comply with both §1002(h)(3) of ANILCA and §1502.9(a) of the CEQ regulations, the Department must prepare and circulate a draft assessment of the impacts of both oil and gas development in the Arctic National Wildlife Refuge prior to issuing its final report to Congress.

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4. Failure to Adequately Evaluate Impacts on Water.

a. Water Quantity Issues

The list of preparers of the draft Report/LEIS does not include anyone with expertise in water. Yet the report describes very significant potential impacts on water. The result is a woefully inadequate analysis of water issues.

For example, the Report the Department acknowledges that "as much as 15 million gallons of water may be needed to drill one exploratory well. Taking this amount of water from the water-deficient 1002 area could have a major adverse effect." D.R. at 99. However, there is no discussion of what this effect may be in the chapter on environmental consequences. This is a major omission that must be corrected. In addition, in order to evaluate the overall demand for water, the Department should estimate the number of exploration and development wells that will be drilled in the Refuge. Since the Department routinely does this for OCS sales (see, e.g., Sale 97 DEIS at Table II-A-1), this should not be difficult.

b. Water Quality Issues

With respect to water quality, the Department fails to analyze the impacts of oil and contaminant spills, reserve pit fluid discharges and leaking reserve pits on the overall water quality of the region, even though the Department acknowledges that reserve pit fluid discharges into tundra ponds is resulting in a deterioration in water quality, and that the quality and quantity of organisms used as food by North Slope bird species may be decreasing as a result. D.R. at 100. This information needs

to be incorporated more thoroughly into the analysis of impacts. For example, what percentage of food sources will be affected by contamination from reserve pits? What percentage of the habitat area will be contaminated with pit fluid discharges?

In order to perform such an analysis, the Department must estimate how many tons of muds, cuttings and other wastes will be generated by oil and gas operations in the Refuge and disposed of in reserve pits. Calculations must them be made on the percentage of pits that leak and the amount of water that will be discharged into the tundra by pit de-watering operations. This will allow the Department to estimate the amount of habitat that will be contaminated by metals, hydrocarbons and other pollutants associated with pit fluid discharges. Since the Department routinely estimates the quantity of muds and cuttings generated as a result of OCS lease sales (see, e.g., Sale 97 DEIS at Table II-A-1). This should not be excessively difficult.

The Department must prepare and circulate a revised and expanded analysis of the impacts of the proposal (and alternatives) on water quality and quantity on the North Slope prior to issuing the final report to Congress in accordance with 40 C.F.R. §1502.9.

5. Failure to Evaluate Air Quality Impacts

The list of preparers of the draft Report includes no air quality specialists, and the draft Report itself contains no adequate discussion of the impacts of oil and gas development on the air quality of the North Slope. This is of considerable

concern due to the fact that large amounts of air pollutants are emitted by oil and gas operations elsewhere in the North Slope. For example, the approximately 20 state permits issued and pending for operations on the North Slope allow a total of between 80,000 and 100,000 tons of oxides of nitrogen (NO_x) to be emitted into the air annually. To put this number in perspective, the New York State Department of Environmental Protection reports that NO_x emissions in 1980 (the last year for which complete data is available) for the five boroughs of New York totaled 196,775 tons. SO_2, total suspended particulates, carbon monoxide and volatile organic compounds are other air pollutants of concern that are emitted in substantial amounts by oil and gas operations. (Sale 97 DEIS Table IV-B-5). DOI has concluded that a major potential consequence of increased air emissions is acidification of the local tundra. Id. at IV-B-126. Concerns have been raised with respect to the effects of SO_2 emissions on caribou forage.

The Department must prepare and circulate a draft assessment of the impacts of leasing the coastal plain on the air quality of the Alaskan and Canadian arctic, prior to issuing the final report to Congress in accordance with §1502.9 of the CEQ regulations.

6. Failure to Consider Conflicts Between the Proposed Action and the Alaska Coastal Management Program

Section 1502.16(c) of the CEQ regulations requires the Agency to discuss "possible conflicts between the proposed action and the objectives of federal, regional, state and local....land use plans, policies and controls for the area concerned." In

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addition, Section 1506.2(d) requires that EISs discuss any inconsistency of a proposed action with any approved state or local plan and laws whether or not federally sanctioned. Where an inconsistency exists, the EIS must describe the extent to which the Agency, in this case the Department, would reconcile its proposed action with the plan or law.

Despite this requirement, we could find no comprehensive discussion of possible conflicts between leasing of the coastal plain and the policies and standards of the Alaskan Coastal Management Program (ACMP) (6 AAC 80). This is a serious omission given that leasing and subsequent exploration and development will have significant direct impacts on the state's coastal zone.

Federal activities which result in an impact on a state's coastal zone must be consistent with that state's federally approved coastal zone management program. While federal land is excluded from the coastal zone, the coastal plain of the Refuge directly abuts non-federal land that is subject to the goals and policies of the Alaska Coastal Management Program as approved by the U.S. Department of Commerce. Oil and gas activities conducted on the coastal plain will affect these lands, and such activities must therefore be consistent with the standards of the ACMP. ACMP standards that must be considered in the EIS include the following.

a. Coastal Development (6 AAC.040). This standard governs the location of development, placement of structures, discharge of dredged material, and other activities affecting the coastal

zone. The Department must discuss means of conformance with this standard.

b. Geophysical Hazard Areas (6 AAC 80.050). Onshore development will cover extensive areas of permafrost. Portions of the main pipeline and haul road from the Refuge to the TAP would cross onshore areas and streams included within the coastal boundary. Development along the entire route could be subject to problems with permafrost. These hazards will constrain the pipeline route. The Department needs to identify means of conformance with this standard.

c. Energy Facilities (6 AAC 80.070). This standard includes 16 policies for siting energy related facilities, some of which would apply to development of the Arctic National Wildlife Refuge. For example, ACMP policies require that facilities be sited to 1) minimize adverse environmental and social effects while satisfying industrial requirements, and 2) be compatible with existing and subsequent uses (6 AAC 80.070[1],[2]). Other ACMP policies require that facilities be consolidated and sited in areas of least biological productivity, diversity and vulnerability. (6 AAC §80.070[3],[13]) Facilities must be designed to permit free passage and movement of fish and wildlife with due consideration for historic migratory patterns. (6 AAC §80.070[12]). This is particularly critical given the concerns raised in the draft Report concerning the reluctance of caribou to cross barriers such as roads and pipelines. D.R. at 108-109.

d. Transportation and Utilities (6 AAC §80.080) This standard requires that routes for transportation and utilities be sited inland from shorelines, among other things. Conformance measures must be spelled out.

e. Mining and Mineral Processing (6 AAC §80.110) ACMP standards require that mining and mineral processing be compatible with other standards, adjacent uses and activities, state and national needs and District Programs. 6 AAC §80.110[a]. Extraction of sand and gravel is a major concern on the North Slope. The Department estimates that several million cubic yards are required to develop an oil field. D.R. at 100. The sources of this gravel, the impacts of mining it, and means of conforming with the ACMP policies governing mining must be discussed.

f. Subsistence (6 AAC §80.120) State standards guarantee opportunity for subsistence use of coastal areas and resources. The draft Report notes that subsistence hunting will be precluded on up to half of the coastal plain. D.R. at 132. Given this impact, the Report must analyze means of conforming with ACMP standards on subsistence.

g. Habitats (6 AAC §80.130) The ACMP standard for all habitats in the coastal zone require that habitats "be managed so as to maintain or enhance the biological, physical and chemical characteristics of the habitat which contribute to its capacity to support living resources." 6 AAC §80.130[b]. Habitats of particular relevance include rivers, lakes, streams and wetlands. Most of the coastal plain is considered wetlands; onshore development would therefore need to be designed and constructed to avoid

adverse effects on natural drainage patterns, the destruction of important habitat, and the discharge of toxic substances. 6 AAC §80.130[c][3]. In addition, rivers, lakes and streams are managed to protect natural vegetation, water quality, important fish and wildlife habitat and natural water flow under the ACMP. 6 AAC §80.130[c][7]. Means of conforming to the ACMP habitat policies for all of these habitats must be examined.

h. Air, Land and Water Quality (6 AAC §80.140) The air, land and water quality standards of the ACMP incorporate by reference all the statutes pertaining to and regulations and procedures of the Alaska Department of Environmental Conservation. Conformance measures for each of these statutes and regulations must be discussed in the Report.

The Department must prepare a draft assessment that discusses possible conflicts between the proposed action (and alternatives) on the objectives, policies and controls of the Alaska Coastal Management Program prior to issuing the final report to Congress in accordance with 40 C.F.R. §1502.9. This is particularly important in light of the fact that the Department considers the Report the leasing EIS. D.R. at 13.

7. Failure to Adequately Evaluate Impacts on Endangered and Threatened Species

The evaluation of impacts on endangered and threatened species contained in the Report is totally inadequate. For example, the draft Report acknowledges that activity, noise, altered habitats and changes in availability of food sources from dredging and other operations may adversely effect seals and

whales, (D.R. at 136), but there is no discussion of specific impacts on endangered bowhead and grey whales, which inhabit the Beaufort Sea adjacent to the coastal plain. D.R. at 38. In addition, no consideration has been given to two species of plants currently designated as candidates for listing as threatened or endangered that occur within the coastal plain. Salix ovalifolia variety glacialis, a low growing willow, is found in sandy soils around the region. The other species, Thlaspi arcticum, is a mustard that occurs in northeastern Alaska on well drained sites such as dry ridges and low river terraces. Both plants could be affected by activities such as coastal vehicular traffic, onshore development or sand and gravel mining operations. The U.S. Fish and Wildlife Service has stated in connection with development of the Beaufort Sea that "agencies wherever possible will be interested in protecting such [threatened] species, thereby reducing the probability that they will require listing. We encourage you to consider them in your environmental planning." Sale 97 DEIS at J-1.

The Department must prepare and circulate a draft assessment of the impacts of the proposal and alternatives or endangered species that includes the omissions cited above prior to issuing the final report to Congress.

8. Failure to Adequately Analyze Archeological Impacts

Early man occupied the Beaufort Sea area during the past 18,000 years. Known archeological sites exist on the North Slope and others probably occur within the boundaries of ANWR. In preparation for Sales 97 and 87 in the Beaufort Seas, the

Department of Interior did an extensive assessment of the potential for archeological resources. Sale 97 DEIS at H-1-9. In contrast, the archeological analysis contained in the draft Report is totally inadequate, consisting of two sentences. A revised draft evaluation of archeological impacts should be prepared and circulated prior to issuing the final report to Congress.

C. Failure to Comply With the Alaska National Interest Lands Conservation Act (ANILCA)

1. Section 810

Section 810 of ANILCA requires that:

> (a) In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provisions of law authorizing such actions, the head of the Federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency --
>
> > (1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to section 3115 of this title;
> >
> > (2) gives notice of, and holds, a hearing in the vicinity of the area involved; and
> >
> > (3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.
>
> (b) If the Secretary is required to prepare an environmental impact statement pursuant to section 4332(2)(C) of Title 42, he shall provide the notice and hearing and include the findings required by subsection (a) of this section as part of such environmental impact statement.

While acknowledging that development of the 1002 area "will result in a major adverse effect on subsistence uses within the 1002 area" (D.R. at 129), the Department claims that it need not perform an 810 analysis until the actual lease sale:

> Overall a major effect (considered a significant restriction of subsistence uses under section 810 of ANILCA) could occur if alternative A was implemented. If the Congress enacts the legislation to authorize the Department of the Interior to lease the 1002 area, the Secretary of the Interior must, prior to the actual lease sale, determine the effects on subsistence of such disposition in compliance with section 810 of ANILCA unless the Congress were to exempt the Secretary from that requirement. Id.

This directly contravenes the explicit language of section 810(b), which states that if the Secretary is required to prepare an environmental impact statement, he shall include the findings regarding subsistence use required by subsection (a) in the environmental statement. If the draft Report to Congress/LEIS is to serve as a leasing EIS (D.R. at 13), (something which we believe is not appropriate), the Secretary must include the Section 810 analysis in the LEIS .

The findings required by §810 must therefore be made in a supplemental environmental impact statement that is prepared and circulated for public comment prior to the issuance of a final Report/LEIS. The discussion of alternatives to leasing the Refuge

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required by §810(a) should include an evaluation of energy alternatives described earlier in these comments.

2. Section 1005

ANILCA instructed the Department to "consult with the appropriate agencies of the government of Canada in evaluating ...impacts particularly with respect to the Porcupine caribou herd." This consultation is extremely important given that many of the species that stand to be affected by oil development in the Refuge migrate freely between the Refuge and the bordering Canadian National Park. According to testimony given by the Yukon Government on January 9, 1987,[8] the Department has so far failed to fulfill its obligations to consult with the Canadian government. NRDC shares the concern of the Yukon government and we strongly recommend that the Department begin consultations immediately.

III. The National Need for Oil and Gas is Inadequately Analyzed

The Department claims that full leasing of the coastal plain could help achieve national security and economic benefits. It claims that development of 3.2 billion barrels of oil could yield Net National Economic Benefits of $79.4 billion, based on an oil price of $33 per barrel. D.R. at 1. In addition, the draft Report asserts that leasing the coastal plain would reduce the

8. W.J. Klassen, Deputy Minister, Department of Renewable Resources, Government of the Yukon Territory. Statement in Response to the Draft Arctic Natural Wildlife Refuge Coastal Plain Resource Assessment at 6.

nation's dependence on foreign oil and enhance national security. D.R. at 162-165. However, each of these claims is based on flawed, misleading or insufficient evidence. In addition, nowhere in the Report is it acknowledged that there are other, far less environmentally damaging ways of securing far more energy than is thought to underlie the Arctic Refuge, such as these discussed in Section II.B.2. above.

A. The Department's Estimates of the Amount of Oil and Gas in the Arctic Refuge are Overstated

The Department's estimate of 3.2 billion barrels of oil in the Arctic Refuge is a "conditional" mean estimate. D.R. at 72. A conditional mean estimate is "the average amount you would expect to find if at least one of the prospects in an area contained economically recoverable accumulations of hydrocarbons and if all the prospects modelled were drilled."[9] Conditional resource estimates assume that hydrocarbons will be present in some of the prospects. They do not take into account the possibility that the area may not be hydrocarbon prone; this consideration is taken into account in determining the risked economically recoverable resources in a planning area.[10] A risked estimate is one where the conditional mean is multiplied by the marginal probability of finding hydrocarbons. In establishing the size, timing and location of leasing for the federal Outer Continental Shelf Oil

9. U.S. Department of the Interior, February 1986 5-Year Outer Continental Shelf Oil and Gas Leasing Program for January 1987-December 1991, Detailed Decision Documents at 29.

10. Id.

and Gas Leasing Program, the Department uses risked estimates.[11] In contrast, the oil estimates for the Refuge are conditional estimates. Inexplicably, the Department failed to risk the oil estimates in the way that it customarily does for OCS program. Since the marginal probability of finding hydrocarbons in the Arctic is only 19%, the total amount of risked mean economically recoverable oil underlying the Refuge is 614 million barrels, or one-fifth the amount of oil the Department claims is in the Refuge in the draft report, and there is 81% chance that no oil at all will be found. The failure to make this clear in the Executive Summary and in the body of the report is unjustfiable and must be corrected.

Furthermore, the estimates of both conditional and risked economically recoverable resources do not take into account costs incurred in searching for oil and gas, primarily exploration expenses. In order to factor in such expenses, which are important to a company's decision on whether or not to explore and develop a lease, the Department has developed estimates of "leasable resources" in the proposed 5-Year OCS Leasing Program. In determining the amount of leasable resources in an area, an assessment is conducted of each prospect to determine its risked economic value at the time of sale to both the lessee and the nation as a whole. If the private value (after-tax net present value), is found to be greater than zero, then the economically recoverable resources associated with the prospect are considered leasable. If the private value of the prospect is zero or less,

11. Id., Decision and Summary, at Table 2.

then the entire amount of the prospect's economically recoverable resources are deemed to be unleasable at the time of sale for given economic assumptions. Thus, the estimate of leasable resources in a planning area is the sum of economically recoverable resources associated with prospects calculated by the Department to be worth acquiring, i.e., they have positive private values.

It appears that the Department not only failed to risk its estimates of oil underlying the Refuge, but it also did not estimate the leasable resources as it typically does for the OCS program. Why are oil and gas estimates of the coastal plain for the Arctic National Wildlife Refuge assessed differently than oil and gas estimates of the federal Outer Continental Shelf?

B. The Department's Estimates of the Economic Benefits of Oil Development are Overstated

It is extremely difficult to tell how the Department came up with its net economic value estimates, in that no information is given on how the Department calculated the alleged revenues that will accrue from full leasing of the coastal plain. In the final Report, the Department's methodology must be completely explained.

It appears from what little information is presented that the Department's methodology for assessing new economic benefits is inconsistent with that used in the federal Outer Continental Shelf Oil and Gas Leasing Program. For example, estimates of net economic value in this OCS program are made for prospects containing leasable resources, which are risked estimates of oil that will bring positive net benefits to the lessees after deducting royalties, rentals and taxes. Had the Department based its net

economic benefit calculations on risked oil estimates, the economic value of full leasing would be 19% of that cited in the Draft report ($15.1 billion vs $79.4 billion). If the net economic benefit calculations were based on leasable resources, the economic benefits would be even lower. In addition, the Department bases its estimate of conditional economically recoverable oil resources on an oil price of $33 a barrel in 1984 dollars in the year 2000. In order for this value to be reached in the year 2000, the oil price would have to grow at an average rate of about 4% per year starting from the current oil price of about $18 a barrel. In contrast, MMS uses a real oil price increase of 1% per year in calculating the net economic value of leasing OCS areas.[12] Thus, the 4% growth rate used in the draft Report is more than four times the growth rate assumed by MMS. As a result, the draft Report projects a much higher net economic benefit than would have been the case if the MMS oil price increase rates were used. We recommend that the Department make its projections on oil prices consistent with those used by the Minerals Management Service.

NRDC has reviewed the economic analysis in the draft 5-Year Program and has provided the Department with major comments on it. Many of these comments are relevant to the economic analysis in the Arctic National Wildlife Refuge draft Report. For your convenience these comments are attached as Attachment 1.

12. 5-Year OCS Leasing Program January 1987-December 1991 Secretarial Issue Document, October 1985 at Table 2, Table 5, Table 6.

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IV. Impacts of Oil Development Elsewhere in the Alaskan Arctic

The draft Report notes very significant environmental problems that have resulted from oil and gas development elsewhere in the Alaskan Arctic. These problems indicate that, contrary to the Department's assertions, the oil industry in fact cannot operate in the arctic without severe environmental consequences.

For example, the Fish and Wildlife Service (FWS) has undertaken investigations into the effects of reserve pit fluid discharges on water quality and the freshwater macroinvertebrate community of tundra ponds. The aquatic invertebrates studied are known to be sensitive indicator organisms for a wide variety of environmental pollutants and an important food source to the approximately 150 species of water fowl, sea birds, shorebirds, raptors, and passerines using the North Slope for nesting, rearing, molting and feeding. D.R. at 100. Preliminary results of those studies show increases in heavy metals, including aluminum, barium, chromium, zinc and arsenic, hydrocarbons, pH, salinity, alkalinity, turbidity and sediment loads for ponds adjacent to reserve pits on the North Slope. Moreover there were concomitant decreases in oxygen levels, total taxa, taxa diversity and invertebrate abundance in tundra ponds associated with reserve pits. The results of these studies indicate that the disposal of drilling muds, cuttings and other wastes in reserve pits on the North Slope is resulting in substantial deterioration and water quality as a result of leaching, breaching or overtopping of the pits. Along with deteriorations in water quality, the quality and

quantity of organisms used as food by North Slope bird species may be decreasing. Id.

Another impact of existing oil operations on the North Slope is air pollution. Oxides of nitrogen (NO_x), sulfur dioxide (SO_2), total suspended and particulate matter, and carbon monoxide (CO) are the principle air pollutants generated by oil and gas activities in Prudhoe Bay. State permits issued or pending for gas fired turbines on the North Slope allow close to 100,000 tons of NO_x to be emitted annually. In contrast, the 5 boroughs of New York City emit approximately 197,000 tons of NO_x per year.

Permit limitations on carbon monoxide emissions on the North Slope have apparently been exceeded by older gas fired turbines. In addition, EPA is presently investigating whether or not permit exceedences for NO_x have occurred as a result of "downwash" in the vicinity of stacks. Questions have been raised about the impacts of air pollutants, particularly SO_x, on lichen and plant species which serve as caribou forage.

Other major air pollution problems include gas flaring, which generates smoke trails that have been tracked for 100 miles, incineration of oily and hazardous waste, and visibility impairment caused by smog. The draft Report deals with none of these issues.

Oil spills are another problem. Since 1972, some 23,000 spills of crude oil, gasoline and diesel have been reported to the Alaska Department of Environmental Conservation as a result of operations on the North Slope. 521 spills were reported in 1985 totalling 82,216 gallons. D.R. at 104. The impacts of oil spills

in the arctic environment are quite severe. Direct contact with oil or diesel often results in immediate mortality to the above-ground vegetation. Injury to the root system may not be immediately obvious and can cause a slow deterioration of plants and a high degree of winter kill in future years. Id. at 103. The draft Report cites a study that found that the site of a diesel spill in Northern Alaska showed little recovery after 30 years. Id. The ability of the industry to avoid these spills appears to be minimal: "[a]ccidental spills of crude oil and refined petroleum products an inevitable consequence of oil field development." Id. at 103.

To our knowledge, no one outside the oil industry has ever done a comprehensive evaluation of the environmental impacts that oil and gas development has had on the North Slope of Alaska. In addition, there has been very little monitoring of environmental parameters on the North Slope, particularly in the area of contamination from reserve pits. Given that knowledge about the environmental impacts of oil and gas development on the North Slope is so limited, the conclusion that the oil industry is capable of operating in North Alaska without causing extensive and long term damage is speculative and is insupportable. The limited evidence collected by state and federal officials indicates that air pollution, water pollution and habitat degradation are widespread. It is therefore irresponsible for the Department to base its decision to recommend full leasing of the coastal plain on the ability of the industry to limit environmental damage.

V. Conclusion

The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America. D.R. at 45. The Administration has a large number of options to reduce oil imports and enhance national energy security other than leasing the Arctic Refuge to the oil industry. Very few of these options have been pursued by the Administration. In fact, as noted above, the Administration policies frequently have undermined national energy security. If the Administration feels comfortable with pursuing such strategies, surely it should feel comfortable forgoing oil development in the Arctic National Wildlife Refuge.

Given the nationally significant natural values of the Refuge, the limited amount of economically recoverable oil and gas the Department projects to underlie the Refuge, the fact that alternative sources of energy are available, and that industrial development is clearly incompatible with the purposes of the Refuge, we believe the Refuge should be designated as wilderness in its entirety.

Thank you for considering these comments.

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COMMENTS
of the
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ENVIRONMENTAL POLICY INSTITUTE,
GREENPEACE, U.S.A.,
TRUSTEES FOR ALASKA,
and
OREGON NATURAL RESOURCES COUNCIL
on the
PROPOSED 5-YEAR
OUTER CONTINENTAL SHELF
OIL AND GAS LEASING PROGRAM
for January 1987 - December 1991
and
DRAFT ENVIRONMENTAL IMPACT STATEMENT

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ATTACHMENT II
COMMENTS ON DOI 5-YEAR LEASING PLAN[1]

MAY 8, 1986

I. INTRODUCTION

The economic analysis provided in the Department of Interior's [DOI's] 5-Year Outer Continental Shelf Oil and Gas Leasing Program for January 1987 - December 1991, dated February 1986, generally uses the same conceptual framework as the 1985 Draft 5-Year plan in justifying a rapid disposal of federal OCS properties. One noteworthy improvement in the new analysis is the extensive discussion of the appropriate discount rate for comparing present and future economic benefits from OCS development. The most glaring deficiency of the 5-Year plan is the use of oil price scenarios that are not appropriate in light of recent changes in world oil prices.

We have commented extensively on the previous DOI Draft 5-Year Plan.[2] These comments will address new issues raised in the

[1] James P. Love. I would like to acknowledge the contributions of Professor Joseph Stiglitz on an earlier draft of these comments.

[2] Joseph Stiglitz, "Economic Issues in Draft Five Year OCS Leasing Plan," included as Attachment 1 in "Comments of the Natural Resources Defense Council, Sierra Club, Environmental Policy Institute, Conservation Law Foundation of New England, and Friends of the Earth, on DOI's Draft Proposed OCS Oil and Gas Leasing Program," May 20, 1986. James Love and Joseph Stiglitz, "Comments on DOI's Draft 5-Year Leasing Plan: Revised July 1985 Appendix P," September 12, 1985. James Love, "Shortcomings of the U.S. Department of Interior Draft 5-Year OCS Leasing Plan," reprinted as "Prepared Statement of James P. Love," U.S. House of Representatives, Committee on Merchant Marine and Fisheries, Subcommittee on OCS and Panama Canal, Hearings on the Five-Year

current 5-Year plan and restate our previous objections to DOI's OCS leasing program. In particular, we believe the current DOI plan suffers from the following shortcomings:

1. DOI is using the wrong discount rate to evaluate the costs to the federal treasury of premature leasing.

2. The recent plunge in world oil prices has rendered DOI's quantitative cost benefit analysis obsolete.

3. The changed outlook on oil prices requires, according to DOI's own analytical framework, a radical modification of the OCS Leasing schedule.

4. DOI should change the 5-Year Plan to offer fewer tracts for sale. Leasing of high cost acreage should be deferred.

II THE RELEVANT DISCOUNT RATES

One of the central problems for DOI concerns the comparison of social and private benefits and costs over time. The method used to make that comparison in the 5-Year Plan is discounting for time. Public and private groups are held to have certain rates at which they "discount" future benefits and costs. These rates are used to determine the "present value" of different leasing options.

There are <u>three</u> important discount rates that DOI must consider in the 5-Year Plan. These include the private discount rate used by firms that bid on OCS resources, the discount rate which reflects the federal government's cost of borrowing money,

Draft Proposed Program for Oil and Gas Leasing on OCS, and the State Federal Consultation Process, SN 99-20, August 5, 1986, p. 280.

and the "social discount rate" that DOI uses to determine how society as a group compares benefits and costs over time.

The private discount rate is used to determine how much money private firms will pay today for the right to develop OCS resources over the term of a lease. The private discount rate is also used to determine the incentives that private firms will have to time the development of OCS resources, since prices for OCS resources, and the costs of developing those resources, are expected to change over time.

The federal government's cost of borrowing money should be used to compare the present value of lease payments [including bonus payments] that are expected to be collected, according to different leasing schedules. The lease schedule affects the present value of lease payments in two ways. First, bonus payments are made at the time of the auction, which is entirely a function of the lease schedule. Bonus payments are in turn a function of the discounted profits that the firm expects to earn. Second, the timing of the lease auction affects the timing of the development of OCS resources, and hence the timing and size of royalty and other lease payments.

The social rate of discount is used to determine how society as a whole values the future economic benefits and costs. The social discount rate is not so much an interest rate that is observed in the market, but rather a theoretical construct that reflects the opportunity costs faced by consumers and firms, and profound philosophical and ethical judgments. The social rate of

discount should be used to determine the present value of OCS development to society as a whole, given different leasing schedules. DOI proposes to use a social rate of discount to determine when OCS resources should be leased.

In the 5-Year plan DOI discusses some of the different methods of estimating the social discount rate, but does not identify the specific methodology that is appropriate for OCS development. Instead, DOI simply states that it will use a range of social discount rates between 6 and 8 percent, adjusted for inflation. In fact, DOI uses the 8 percent discount rate as its baseline assumption, with only limited sensitivity analysis of the 6 percent discount rate. The 8 percent real discount rate means that DOI places very little value on future OCS benefits. Economic benefits valued at one 1986 dollar [adjusted for inflation] that are received 25 years in the future are valued at less than 15 cents by DOI today. The same unit of benefits received 50 years in the future have a present value of 2.1 cents according to DOI.

DOI asserts that the private after-tax rate of discount falls within the 6 to 8 percent range used for the social discount rate. DOI also asserts that the real rate of interest on federal government bonds falls within this range. This would be a fortuitous coincidence for DOI, if it were true, because it would narrow much of the debate over the appropriate discount rate.

In fact, the real rate of interest on federal government

bonds is considerably lower than 6 to 8 percent. Our own interviews with oil industry personal suggest that the real after-tax private rate of discount is considerably higher than the 6 to 8 percent range. We believe that economic theory and empirical evidence support the notion that the three discount rates are different. In particular, the private rate of discount is considerably higher than interest rate on federal government bonds.

III THE RELEVANCE OF DIFFERENT DISCOUNT RATES

In designing a leasing program DOI must consider the impact of the plan on the timing of OCS development and the present value of expected federal government receipts from the sale of the resource.

DOI argues that the social discount rate should be used to determine the most efficient timing for development. By this, DOI means that development should occur on OCS properties as soon as the net social value [firm profits, plus taxes and royalties] is growing [the change in net value due to expected increases in price or decreases in development costs] at a rate that is less than the social rate of discount. This principle is referred to as the Hotelling Rule.

Maximizing the present value of government receipts from the sale of the resource is a related but conceptually distinct issue. An important component of federal lease receipts are the bonus payments that are paid at the time of the auction. The

bonus payments have an economic effect that is similar to that which would occur if the federal government, as the landowner, borrows money from the oil industry against future expected profits from development. When the interest rate on government bonds is significantly lower than the discount rate used by the private firms that bid on OCS resources, the taxpayers suffer a loss when OCS resources are sold prematurely. In effect, the federal government pays the oil industry discount rate to borrow money against future profits.

The present value of federal government receipts are affected by timing of development and the timing of lease receipts. The lease schedule influences the timing of development, and the timing of development influences the timing of lease receipts. But lease terms are flexible enough that different development timing scenarios can be accommodated under different lease schedules. This is particularly true for high cost frontier areas where primary lease terms are 10 years, and are subject to extension upon filing development plans. It is also true of areas where unitization allows several lease tracts to be grouped together to meet common diligence requirements, although actual development on some tracts may be delayed for years past the primary lease term. For example, on Alaska's North Slope several leases that were issued in 1969, some 17 years ago, are just now beginning production. A difference in the industry discount rate and the government bond rate of 5 percent, and a 10 year delay in development, would result in a

loss in present value of bonus payments of nearly 40 percent. A fifteen year delay and an 8 percent difference in discount rates would result in a loss or nearly 70 percent in the present value of bonus payments.

In the example given above, the federal government should delay leasing of the property until it is ready to be developed. The best timing for development may be based on DOI's estimate of a social discount rate, while the timing of the lease sale would be based on the government's borrowing rate. There are, however, important distributive reasons for DOI to consider using the federal government bond rate to determine both the timing of development and the timing of the lease auction.

The use of the social discount rate to time development makes sense if DOI is concerned only with maximizing the net gains to society as a whole, regardless of the distribution of benefits. If, on the other hand, the benefits of OCS development accrue largely to the private firms that develop the resources and the federal government through collection of lease receipts and taxes, and DOI places a smaller weight on the welfare of the private firms than on the U.S. citizens who own the resources in their role as taxpayers and beneficiaries of public services, it should use the federal government's bond rate to determine both when OCS resources should be developed and when lease auctions should be held. In the latter case, DOI should only consider the benefits from lease payments and taxes, and development should occur when these benefits are growing at a slower rate than the

government bond rate.

There are several reasons why DOI might place a smaller weight on the welfare of the private firms that develop OCS resources. First, it may believe that the shareholders of the firms are better off than the citizens of the U.S. as a whole, and that a redistribution of income is desirable. Second, DOI might decide to place a smaller weight on the welfare of the private firms because their shareholders are not all U.S. citizens. Indeed, most oil producing countries rely heavily upon firms that are owned by foreign shareholders, and design leasing programs with one objective in mind -- to capture economic rent for the government. While the United States has historically dominated the oil industry world wide, the ownership of the large oil companies is increasingly becoming international, and several large foreign firms control significant amounts of U.S. oil production. For example, half of the giant Prudhoe Bay oil reservoir is owned by Sohio, which in turn is controlled by British Petroleum. Many other large U.S. firms are owned in part by foreign shareholders, including members of the OPEC cartel.

IV MEASUREMENT OF DISCOUNT RATES

We do not believe DOI has accurately estimated various discount rates under discussion.

In the 1983 Draft 5-Year Plan DOI asserted that the real interest rate on long term government bonds was 8 percent. In

the new plan, DOI asserts that recent yields on government bonds are 6 to 8 percent in real terms. DOI arrived at the 8 percent number by taking a single year, 1983, and subtracting the current rate of inflation from the long term nominal interest on long term treasury bonds. By comparing the long term bond rate to the short term inflation rate DOI ignored the effects of anticipated inflation. The interest rate and inflation from that single period were not typical of other periods.[5] In previous comments we calculated real ex post yields on treasury bonds from 1950 to 1984 and anticipated yields on future bond offerings using CBO projections and estimated real interest rates of 2 to 4 percent.[6] The February 1986 CBO budget projections estimate nominal rates on short term treasury bonds falling to 5.4 percent by 1991, with real rates declining from the 1985 level of 3.4 percent to 1.1 percent by 1991.[7]

Recent movements in interest rates provide further evidence that an 8 percent real rate is too high. The yield for three month Treasury Bills was 6.04 percent on May 7, 1986. The same

[5] Using the DOI method, the real rate of interest on 10 year constant maturity Treasury Bills were 6.9 percent for 1982, 3.51 percent for 1981, minus 2.04 percent in 1980, minus 1.86 percent in 1979 and .71 percent in 1978.

[6] Love and Stiglitz, "Comments on the Department of Interior's Draft 5-Year Leasing Plan: Revised July 1985 Appendix P."

[7] The Economic and Budget Outlook: Fiscal Years 1987-1991, CBO, February 1986. p. xiv.

day yield for 30 year Treasury Bills was 7.51 percent. If the long term inflation rate is expected to be 3.5 to 5 percent the federal government's real borrowing cost would be in the neighborhood of 2.5 to 4 percent.

On an after tax basis, government interest rates are considerably lower. A 30 percent income tax rate would mean that an 6 percent nominal yield, accompanied by 4 percent inflation, would have a real pre-tax interest rate of 2 percent, but an after-tax interest rate of only .2 percent. Likewise, a nominal bond yield of 7.5 percent and an inflation rate of 5 percent would result in a pre-tax real yield of 2.5 percent, but an after-tax real interest rate of only .25 percent.

DOI has cited two studies that estimate a real after-tax industry discount rate of 7 percent. One of the studies is a survey of large oil and gas producers.[8] The second study estimated rates of return for Gulf of Mexico OCS leases from 1954 to 1975.[9] Thus, according to DOI, private firms bidding on OCS resources use a "hurtle rate" on new investment that is the same as the return that DOI says investors could obtain by purchasing treasury bonds. While we are not prepared to critique in detail either study, it is worth noting that the Mead study covered a

[8] H. Boyle and G. Scheinl, 1983, "Investment Analysis: U.S. Oil and Gas producers Score High in University Study," Journal of Petroleum Technology, Vol. 37, No. 4.

[9] W. Mead et. al., 1980, Studies of Competition and Performance in OCS Oil and Gas Sales, 1954-1975, Final Report, USGS Contract No. 14-08-0001-18078.

period when real yields on government bonds were close to zero and sometimes negative. Moreover, when we interview oil industry sources they claim to use a private after-tax real discount rate of 10 to 14 percent.

The pre-tax industry discount rate is higher than the after-tax rate. It is more difficult to make the adjustment for oil development projects than for bonds, due to provisions in the federal income tax laws that provide for deductions of interest expense, rapid depreciation, investment tax credits, expensing of intangible drilling expenses and dry hole drilling costs, depletion allowances, and other items. Industry income tax rates are not trivial, however, and average effective rates have climbed following the recent curtailment of the percentage depletion allowance.

When comparing the industry discount rate to the government bond rate, the appropriate comparison would be the pre-tax industry rate against the pre-tax bond rate, or the after-tax [net of corporate and personal income taxes] industry rate to the after-tax bond rate [net of personal income taxes].

We believe the industry discount rate is higher than the 7 percent figure estimated by DOI. Our interviews with industry sources suggest that the industry rate is relatively greater for the higher risk projects that have greater uncertainty regarding geology and oil prices.

Both types of uncertainty are more significant in frontier areas where there has been little exploration and where projects

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require longer lead times. DOI itself considers the oil industry to be averse to bearing such risks. DOI's recent analysis of minimum bid policy assumes that this risk aversion results in private firm's under assessing the value of frontier acreage.[a] Thus the difference between the government bond rate and the industry discount rate will be greater in those sales that are in frontier regions.

The social discount rate presents a unique set of measurement problems. DOI has provided a review of many of the important theoretical and ethical questions to be addressed in choosing a social discount rate.[b]

In traditional cost benefit analysis, economists have debated the relative merits of using the after-tax return to savers, the pre-tax return on private investment, or some weighted average of the two. In recent years there has been a growing recognition that the theoretical basis for one rate or another is very sensitive to the particular problem the discount rate is used to address, and to the constraints that are implicitly or explicitly assumed to limit the options of

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[a] Hartgen, Carol, and Marshall Rose, "Analysis of Minimum Bid Policies," Branch of Economic Studies, Offshore Resource Evaluation Division, DOI. June 7, 1985.

[b] Our previous comments on the proposed changes in minimum bid policy unfairly criticized the current 5-Year Plan's analysis of the discount rate for failing to recognize the ethical questions at stake. Love, "Comments on Proposed Minimum Bid Requirement." While that was true of the previous 5-Year Plan, the current 5-Year Plan provides a much richer discussion of such issues.

consumers, firms or policy makers.

DOI has discussed some of these issues. For example, DOI asserts that federal policy makers cannot make rational decisions to finance federal government operations from OCS receipts.[10]

The ethical question concerns the value we place on the welfare of future generations. OCS resources are exhaustible, and depletion today will preclude their development later. The new 5-Year Plan discusses arguments for increasing or lowering the discount rate due to perceived market failures that lead to systematic under or over valuation of the welfare of future generations, but offers few suggestions except to say that disputes over such issues are best resolved through the political process.[11]

After navigating its way through the thicket of ethical,

[10] DOI asserts that federal policy makers are not able to distinguish between current income and the depletion of a capital asset such as OCS oil and gas properties, and hence will change spending priorities based solely on when the money is received. If true, this would be an argument to avoid early liquidation of OCS assets, or to use a lower social discount rate.

[11] DOI cites a paper by Joseph Stiglitz to support the view that intertemporal equity is served by providing future generations with fewer natural resource endowments than present generations, because future generations will have a larger capital stock and better technology. J.E. Stiglitz, "A Neoclassical Analysis of the Economics of Natural Resources," in V.K. Smith, ed., Scarcity and Growth Reconsidered, Baltimore, Johns Hopkins Press. 1979. In recent years, however, the trend rate of growth in GNP has significantly decreased. Due largely to current federal government fiscal policies, the U.S. savings rate is also much lower today than the historic norm. Thus, policy makers do not have such assurances of improved welfare of future generations.

theoretical and empirical problems in estimation, DOI finally settles on a range of real social discount rates between 6- to 9-percent. Just how this range was chosen is unclear.

V THE SIGNIFICANCE OF CHANGED OIL PRICES

As noted above, DOI is relying upon the Hotelling rule to justify the pace and scope of the OCS leasing plan. According to this theory, exhaustible resources are expected to appreciate in value as low costs stocks are depleted. Increases in the resource price will lead to greater profits, as long as prices are increasing at a greater rate than costs. The problem for firms and resource planners is decide when the resources should be left in the ground to appreciate, and when stocks should be developed.

Hotelling proved that in a competitive market, firms have the incentive to defer development until the net benefits from production (price minus production costs) are appreciating at a slower rate than the rate of interest. Hotelling further argued that so long as there are no other market distortions, the incentives facing the firm were socially efficient.

As noted in the above discussion of discount rates, and in our previous comments, the markets for petroleum are not necessarily competitive, and substantial differences exist between the firm discount rate, the social discount rate, and the interest rate on government bonds. In particular, the firm's

discount rate is considerably higher than both the federal government bond rate and DOI's estimated social discount rate. Leases that require royalty payments and diligence requirements also change firm incentives in ways that are not reflected in a simple application of the Hotelling rule.

While a simple application of the Hotelling rule is impractical in today's world, an examination of the fundamental concept is important for understanding how the recent plunge in world oil prices has changed the economic analysis in the current 5-Year Plan. According to this rule, which is quoted and relied upon extensively throughout the 5-Year Plan, society should determine the rate of appreciation in the net value of OCS resources, and initiate development as soon as that rate of appreciation falls below the appropriate rate of discount. If the cost of oil is $25, and the price is $28 and appreciating in real terms at 1 percent per year, the net benefit of developing the oil today is $3, and $3.28 percent next year. The increase in net benefits is thus 9.3 percent. For oil with a production cost of $27, the net benefits would be $1 and $1.28 respectively, for a rate of appreciation in net benefits of 28 percent. If the social rate of discount is 6 percent, development should be deferred until the rate of appreciation of the resource stock falls below 6 percent.

Oil that cost $20 to develop would be evaluated in the same way. Produced today at a price of $28 it would yield net benefits

of $8.28, for a rate of appreciation of just 3.5 percent. Because the resource was appreciating at a rate which was less than the rate of discount, the $20 oil should be scheduled for development now.

Holding everything else equal, development should be delayed more, the higher the rate of increase in oil prices, the higher the cost of production, and the lower the beginning price of oil. As DOI has recognized in the 5-Year Plan, changes in expected oil prices require a reassessment of the OCS leasing schedule. In the Appendix F, DOI used three categories to describe potential oil resources:[18]

> A. Uneconomic deposits: those that are not economical under the prices expected during the upcoming production period. [Costs exceed price on these deposits.]
>
> B. Marginal deposits: those that are economical but whose net benefits are growing at a rate greater than the discount rate.
>
> C. Economic deposits: those that are economical and whose net benefits would increase at a rate less than the discount rate.

The following DOI discussion from the 5-Year plan is quoted extensively, as it describes in detail the modifications to the 5-Year plan that DOI anticipated would be necessarily for certain price contingencies:[19]

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[18] p. F-32.

[19] Ibid.

Because of the abrupt and unanticipated oil price changes of the last decade or so, it is worth examining how a manager using this sequencing rule [the Hotelling rule] would react to such price changes. Assuming the sequence of development prior to a price increase has followed the rule, the manager would have his inventory of non-producing oil and gas deposits divided into groups A, B, and C as described earlier. An abrupt and unanticipated increase in oil prices, assuming that it would raise prices throughout the upcoming production period but leave the rate of price increase during the period unchanged, would cause him to regroup his deposits. Numerous deposits would be shifted from group B to C because they now yield such great net benefits that future price increases would not increase them at a rate greater than the discount rate. . . . In addition, some of the uneconomic deposits in group A, those that were close to being economical before the price increase, would be shifted to group B. A large enough price increase could make some deposits that were uneconomic shift directly from group A to group C.

The effect of an abrupt and unanticipated oil price increase is thus to greatly increase the number of deposits economically ready for development and to substantially increase the net benefits which the economy can realize from the production of those deposits. The manager under these conditions would reasonably be expected to substantially increase the pace of development in order to realize these net benefits.

Other unanticipated changes in oil prices could occur. For example, some external factor could cause an increase in the long run rate of oil price growth. This would cause shifts in the grouping of oil and gas deposits similar to the abrupt price increase scenario, but the increase long-term price growth rate would reduce the extent of shifting from Group B to Group A and some from group B to group C. The deposits moved to group A would be those that were barely economical given the higher prices that were expected later in the production period. Without such continued increases, such deposits become uneconomical.

Recent price trends in the world oil markets show the possibility of a decrease in the rate of future oil price growth. If the OCS manager were confronted with an unanticipated leveling off of oil prices for the coming production period after expecting continued increases, he would find it necessary to regroup his inventory of deposits, moving some from group B to

group A and some from group B to group C. The deposits moved to group A would be those that were barely economical given the higher prices that were expected later in the production period. . .

On the other hand, some deposits that were increasing in value under previously expected price increases would be shifted to group C because there is no longer any increase in the economic benefits to be had by waiting for higher oil prices. Thus, an unanticipated leveling off in the rate of future price growth, like an abrupt, unanticipated increase in prices, could bring the OCS manager to order an increased number of deposits into production in order to achieve the greatest gain for the economy.

The DOI 5-Year plan was written prior to the recent plunge in world oil prices. The fact that the price decrease was unanticipated is evidenced by the fact that DOI used a base price of $24 dollars in 1984, increasing in real terms by 1 percent a year, with alternate price scenarios beginning at $19 and $28 in 1984 dollars. Moreover, the possibility of a dramatic drop in the beginning price of oil was one of the few alternatives not discussed in Appendix F.

World oil prices were falling in real terms since 1980, but at a gradual rate until early 1986. This pattern lead DOI on more than one occasion to suggest that prices will continue to fall slowly for several years prior to beginning an expected rebound by the end of the century. Within the analytical framework of the Hotelling rule, as applied by DOI, calculations were made of the economic benefits of leasing huge areas of OCS resources. The same logic which supported such an aggressive leasing program now requires DOI to radically scale back the leasing schedule.

There can be little doubt about the implications of the drop in world oil prices. First, the starting price of oil is far lower than predicted in the base case, and even lower than the lowest price used in the sensitivity analysis. Second, assuming that long term supply and demand predictions were reasonable, the expected future rate of growth in prices has increased. The combination of a lower starting price and a higher rate of increase in prices means DOI must return to the drawing board to reevaluate its leasing schedule.

In DOI's words, many deposits that were previously classified in group C should be placed in groups B and A. Likewise, many, if not all, deposits in group B should be placed in group A. Moreover, all the cost benefit calculations will have to be redone, to determine if the lower economic value of OCS resources still outweigh the costs of environmental damage and other negative externalities. Finally, the expected loses to the federal treasury from high private discount rates are expected to grow, as development will be deferred by the lower oil prices.

Recent oil prices have been unstable, but over the past two months have generally moved in a range of $10 to $15 per barrel. Crude oil deliveries from Alaska's North Slope are currently reporting a delivered price of $12.50, and a wellhead price of about $4.50. New oil production from the Milne Point field on Alaska's North Slope was recently estimated to have a wellhead value close to $1 per barrel, leading Conoco and other producers

to ask the Alaska State Legislature to lower royalty payments to prevent a shut down of the field.

COMMENTS

of the

NEW ENGLAND FUEL INSTITUTE ASSOCIATION
and the
INDEPENDENT FUEL TERMINAL OPERATORS ASSOCIATION

to the

U.S. DEPARTMENT OF THE INTERIOR

on the

REPORT AND RECOMMENDATION TO THE CONGRESS
CONCERNING ARTIC NATIONAL WILDLIFE REFUGE (ANWR)

O-292

Washington, D.C.
January 23, 1987

I. Introduction:

The New England Fuel Institute ("NEFI")[1] and the Independent Fuel Terminal Operators Association ("IFTOA") hereby submit comments to the Secretary of the Interior concerning the proposed leasing and development for petroleum production of the Section 1002 area within the Arctic National Wildlife Refuge ("ANWR"). NEFI is the association of home heating oil marketers serving the six New England states; IFTOA is the association of independent terminal operators marketing fuel oil and other petroleum products along the East Coast from Maine to Florida.

The Section 1002 area consists principally of the Coastal Plain at the Northern tip of the ANWR.[2] Preliminary surveys indicate that this area has the potential for containing one or more giant (more than 100 million barrels) or super giant (more than 500 million barrels) oil fields. ANWR recoverable resources could equal, or exceed, the enormous field developed on Alaska's North Slope ("ANS") at Prudhoe Bay.

The U.S. Fish and Wildlife Service of the Department of the Interior ("DOI") has prepared a draft Resource Assessment and Environmental Impact Statement regarding development of the Section 1002 area. In this report, DOI outlines five possible alternatives:

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[1] A description of IFTOA and NEFI is included as Attachment A.

[2] Draft, Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. Report and recommendations to the Congress of U.S. and legislative environmental impact statement; U.S. Department of the Interior (November 1986).

A. The full leasing of the Section 1002 area;

B. The partial leasing of the area excepting the core calving area of the porcupine caribou herd (PCH);

C. Further exploration of the area, including exploratory drilling;

D. No action;

E. Designation of the Section 1002 area as wilderness.

For the reasons discussed below, NEFI and IFTOA recommend adoption of Alternative A, and urge DOI to proceed promptly with development.

I. The U.S. Needs to Develop ANWR Reserves

A. Domestic Production Is Declining

Oil is the most important energy resource for the U.S. economy. Oil supplies almost 43 percent of total U.S. energy demand. Because of its relative worldwide abundance, and its ease of transportation and distribution, oil will remain America's most vital energy resource for at least several decades, and probably much longer. Oil is clean, portable and safe, and burns more efficiently than other fossil fuel resources.

Despite the enormous increases in the price of oil in the 1970's, it remained America's fuel of choice, never falling to less than 41 percent of total energy demand. When prices for petroleum were high, incentives for maintaining and increasing U.S. production were adequate. U.S. production remained virtually steady from 1973 to 1985, in large part because of the

enormous contribution to domestic production from ANS reserves, which began production in 1977 and has already produced about 4.6 billion barrels.

However, the 1985 decline in the price of oil has abruptly ended the extraordinary private incentives to maintain domestic production. Production declined in 1986, and barring unforeseen events, will continue to decline. Moreover, ANS production cannot be sustained at current levels beyond 1988, and will decline significantly in the 1990's. The National Petroleum Council ("NPC") predicts that U.S. crude oil production will fall from 8.9 million barrels a day ("MBD") in 1986 to 8.0 MBD in 1990, and to 7.0 MBD in 1995.[3/] To a large extent, this decline is inevitable and unavoidable; much of this declining production is totally independent of price, particularly the projected decline in Alaska North Slope production. Now, more than ever, new incentives are needed.

B. Maintenance of Domestic Production is Essential

The maintenance of domestic oil production, or limiting the decline in production, is important to the nation's economic and military security. No price support or artificial, protectionist measures could maintain domestic production as effectively as prompt development of ANWR.

3/ See American Petroleum Institute, Domestic Petroleum Production and National Security (December 30, 1986).

Maintenance of domestic production reduces the likelihood of a supply disruption and lessens the costs of such a disruption to the economy, should one occur. Increased domestic production benefits the national economy most significantly by generating billions of dollars in income and related taxes; conversely, the added domestic production eliminates a comparable level of imports that would further enlarge the U.S. trade imbalance. In the light of these considerations, a major opportunity to increase domestic oil production significantly should be pursued vigorously. Development of ANWR is such an opportunity with virtually no adverse economic costs.

C. ANWR Development Will Moderate the Level of Imports

The second consequence of the decline in the price of oil is rising import levels. The U.S. imported 24 percent more oil in 1986 than in 1985. The NPC predicts increases in imports from 4.3 MBD in 1985 to 6.2 MBD by 1990, possibly reaching 50 percent of consumption, and to 7.9 MBD in 1995.4/

Development of ANWR will significantly reduce the likelihood of reaching these projected levels of imports. Unnecessary reliance on imports weakens the economy by costing jobs, income and taxes that would otherwise be generated through domestic production. It has a serious impact on the U.S. trade deficit. In 1984, crude oil and petroleum product imports were more than $59 billion, almost 50 percent of the trade deficit.

4/ See API, Domestic Petroleum Production and National Security (December 30, 1986).

Because of the 10 year lead time needed for Arctic petroleum development, it is essential to commence development of ANWR now. ANWR is the single most potent weapon currently available to the U.S. in its battle to prevent OPEC from regaining control over world oil prices and supply.

D. Production from ANWR Will Have a Major Impact

The DOI states in its draft report: "The [Section 1002] area is clearly the most outstanding oil and gas frontier remaining in the United States and could contribute substantially to our domestic energy supplies." The mean estimate for economically recoverable oil in the 1002 area is 3.2 billion barrels ("BB"). There is a 5 percent chance that 9.2 BB of economically recoverable oil lies within the area. The mean estimate of 3.2 BB is 11.35 percent of the total current U.S. proved reserves of oil. Further, if U.S. reserves decline as is now projected,5/ ANWR could provide more than 25 percent of total U.S. proved reserves by 2000.

In addition, output from the oil fields at Prudhoe Bay currently constitutes about 20 percent of domestic production. However, this production has peaked at about 1.8 million barrels per day, and is expected to decline by 1988; it is estimated that Alaska North Slope production will decline to only 500,000 barrels per day by 2000. However, if ANWR is leased and developed promptly, oil production from ANWR could offset the decline in

5/ The DOI report estimates that by the year 2000 the U.S. proved reserves could drop to 11.6 BB.

production from Prudhoe Bay. Thus, much of the transportation and distribution facilities developed for ANS crude could be utilized for ANWR production.

III. Benefits of Development of ANWR to U.S. and Alaska Economy

The development of ANWR will significantly benefit the U.S. economy. "The net national economic benefit ("NNEB") is the expected net value of oil production, or the difference between revenues from the sale of oil and the costs of exploration, development, production and transportation." The DOI draft report estimates the NNEB from development of ANWR could range from $79.4 billion to $325 billion, depending upon the price of crude oil. In addition, primarily by creating new jobs, development of ANWR can decrease unemployment in the depressed oil production and services industries, where 878,000 jobs have been lost.6/ Furthermore, the more favorable balance of trade created by development of ANWR will significantly alleviate one of the most troublesome and intractible problems facing America today.

Development of ANWR also will benefit the native landholders of the area. The testimonies of various resident corporations and Inupiat Eskimos at the hearing conducted by DOI in Kaktovic, Alaska, the one major village in the 1002 area, reveal the strong native support for opening ANWR to oil production. In fact, the Inupiat representative said: "The North Slope of Alaska is Inupiat land ... we should not be denied the opportunity to

6/ National Defense Council Foundation, "The Hidden Oil Crisis," 1986.

develop oil and gas underneath the lands which were granted us."7/ The direct financial benefits of development from Inupiat lands will go to these landholders. Furthermore, employment opportunities will be created where few exist; and severance tax payments to the State of Alaska will generate further income to the State.

IV. Mitigation of Environmental Impact Mitigation

Development should not occur if it inflicts significant and permanent damage on the environment. Fortunately, oil development in the Section 1002 area can be achieved successfully with little or no impact to the environment. Alaska is a vast land; oil development and wildlife preservation goals can be achieved side by side. The successful development of Prudhoe Bay provides convincing evidence that mitigation of adverse environmental effects is possible.

One example of the favorable environment consequences of ANS development is the increase in numbers of the Central Arctic Herd ("CAH") of caribou. Many felt this herd would be threatened by development of Prudhoe Bay and the Trans-Alaska Pipeline System; the Trans-Alaska Pipeline System ("TAPS"), Dalton Highway corridor and Prudhoe Bay-Kuparuk oil fields all lie within the CAH's range. Nevertheless, due to careful engineering of facilities and extraordinary precautions, the CAH has continued to co-exist with the development. In fact, the CAH has

7/ Testimony of Oliver Leavitt, Elected Assemblyman from the North Slope Borough.

increased from 3000 in 1972 to more than 13,000 presently living near Prudhoe Bay. In addition, water fowl that were deemed extremely vulnerable, continue to nest and rear their broods within the developed area. This demonstrates that wildlife in Alaska can thrive if oil development is undertaken carefully and with mitigation of environmental effects as a principal goal.

A comparable situation exists in the ANWR, and can be resolved similarly. The core calving area of the Porcupine Caribou Herd (PCH) is centered in the Section 1002 area of ANWR. This zone is particularly important as an identifiable habitat that the PCH has repeatedly used during critical life stages. NEFI and IFTOA recommend that DOI seek authority to lease this area last, in order to apply to this critical region the experience learned through prior development of other Section 1002 land.

The planning and construction of transportation facilities can also be done in a way that minimizes the adverse economic impact. As indicated, if the Section 1002 area is fully leased, oil production from ANWR is expected to grow as production at Prudhoe Bay declines. Thus, existing pipeline capacity will be available to transport ANWR crude oil most of the distance to Valdez.

Not only will this eliminate the need for construction of a major new pipeline, it will also prevent the deterioration and premature abandonment of the existing TAPS facility. If TAPS capacity is inadequate, it would be possible to increase capacity

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by looping or improving pipeline hydraulics. Furthermore, any connecting pipeline from ANWR to TAPS can be elevated to protect the permafrost and allow free passage to the caribou. Consequently, the transportation facilities needed to bring ANWR crude to market are largely in place, and supplemental facilities can be built with no adverse environmental effect.

In countless other ways oil can be produced in the Section 1002 area with little or no adverse impact on the environment. Consolidating production facilities to the maximum extent will minimize effects on vegetation; insect relief habitat for the caribou can be protected by limiting surface occupancy in that particular zone; federal performance and design standards can be enforced to meet environmental and safety requirements. In short, environmental protection is not a sound basis for preventing or deferring development of ANWR.

V. Conclusion

The Section 1002 area of ANWR is the outstanding oil and gas frontier in North America. Declining domestic production and the inherent dangers to U.S. economic and national security resulting from such declining production makes development of this vast domestic resource imperative. Mitigation of adverse environmental impacts is clearly possible, as demonstrated by the previous development of Prudhoe Bay Moreover, by leasing the core calving area of the Porcupine Caribou Herd last, further experience in mitigation can be applied to development. In light

of these considerations, NEFI and IFTOA strongly recommend that the entire Section 1002 area be leased promptly for exploration and petroleum production.

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Northern Alaska Environmental Center

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February 4, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, NW
Washington, DC 20240

Dear U.S. Fish and Wildlife Service:

This letter constitutes the comments, views and opinions of the Northern Alaska Environmental Center (NAEC) on the draft Arctic National Wildlife Refuge, Alaska, coastal plain resource assessment, report and recommendation to the Congress of the United States and legislative environmental impact statement, as solicited in the draft report. This report was prepared to fulfill the requirements of Section 1002(h) of the Alaska National Interest Lands Conservation Act (ANILCA) and will hereafter be referred to as the 1002 report or simply the report. To facilitate your review of our comments, we have consolidated them into broad categories according to subject.

For reasons outlined below, the Northern Alaska Environmental Center recommends the adoption of Alternative E, Wilderness Designation, as being the most prudent and responsible course for management of the Arctic Refuge coastal plain. Due to the many oversights, misstatements, and problems in the draft 1002 report, we also feel that a near total rewrite of this document will be necessary before it can be presented to Congress in a useful form.

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ADMINISTRATIVE IRREGULARITIES

Public Comment

The NAEC is composed of over 700 members in Alaska and most of the other states. It is the only environmental conservation advocacy organization that is entirely devoted to maintaining the environmental quality and promoting sustained, intelligent, long-term use of the natural resources of Arctic Alaska. It was, therefore, with particular displeasure that we observed that our organization had been left off of the original distribution list at the back of the report. We had to call the U.S. Fish and Wildlife Service (FWS) regional office in Anchorage to request our copy, and then had to wait many days after the report was released (organizations on the list had already received theirs) to receive it. We would like to think that this was merely an oversight, but leaving a key group like NAEC off the distribution list seems rather a deliberate omission on the part of the FWS or top Department of the Interior (DOI) officials, who we realize are really responsible for the report.

The other blatant omission that was even more puzzling and just as serious was the village of Kaktovik. The very village that would be changed and

affected most significantly by the actions recommended in the report was not on the list to receive a copy. We understand that members of the Arctic National Wildlife Refuge staff had to intercede and have copies sent to the village, though not without some difficulty since such a limited number of the reports were initially printed. The village almost had to wait until the second printing (three weeks later) to receive theirs.

The DOI made it quite clear that it did not want public review of the report through its appeal of a District Court decision mandating public comment. This is bad enough for a public agency in our democracy. However, once the report was released, its limited availability was another serious shortcoming. So few reports were initially printed that the FWS was being extremely selective as to who received the reports during the first few weeks of its availability. Considering the short time period available to review such an important and complex document, not having it available to the public-at-large in a timely manner was a serious and obvious effort to limit the extent of the report's circulation and comments on it. This demonstrates to us that the DOI is still not really interested in public review of the report, but allowed the draft report to be reviewed merely to comply with the letter of the court decision. If review of the report had been delayed until after the Christmas holidays or if a longer comment period had been provided (at least 90 days), we seriously doubt whether Congress would have minded all that much, considering that the report was already almost three months late.

A member of our staff was informed by DOI's Susan Reece in a phone conversation on December 11 that hearings on the draft 1002 report were being held only as a "courtesy" extended to the public by DOI. This seems preposterous in view of the court decision mandating public involvement. It is noteworthy that public comment periods held by FWS in Alaska on refuge draft Comprehensive Conservation Plans (CCP), which are decidedly less controversial and complex documents than the 1002 report, are a standard 90 days in length. The number of public hearings held on these plans is also typically far greater than the number that were afforded for the 1002 report. If FWS can provide double the minimum 45 day comment period (stipulated in Council on Environmental Quality Regulations) for draft CCP's, why could it not do so for the draft 1002 report, as the public requested? The fact that there will be opportunity for lobbying after the matter reaches Congress does not relieve the DOI from its responsibilities as an agency within a democratic governmental system, especially when such an important recommendation is to be made to the legislature. The agency's attempts to prevent and later limit and stifle public involvement in the report are a terrible miscarriage of its responsibilities to the people of the United States.

The fact that only three public hearings were held on the report represents a significant shortcoming relative to DOI's public involvement process. The hearings were held in Kaktovik and Anchorage, Alaska, and in Washington, D.C. The following groups or organizations have requested public hearings in Fairbanks and/or Arctic Village, Alaska: Greater Fairbanks Chamber of Commerce, Fairbanks North Star Borough, Arctic Audubon Society, Citizens' Advisory Commission on Federal Areas, National Audubon Society, the Northern Alaska Environmental Center, and the people of Arctic Village. There can be no doubt that Fairbanks and Arctic Village will be two Alaskan communities greatly affected by decisions relating to the Arctic Refuge coastal plain.

There can also be no doubt that, while written comments are supposed to be equivalent to verbal ones, many people are more comfortable speaking than writing. Public hearings afford the opportunity for FWS to make a verbal presentation concerning the contents of the 1002 report. With its 172-page length, technical jargon, and lack of availability, the 1002 report represents a formidable document to most lay people. Public hearings in Fairbanks and Arctic Village, which were desired and requested by the public, would have helped alleviate these problems.

Baseline Report Availability and Adequacy

The 1002(h) report was released prior to finalization and publication of the 1985 update and final baseline study reports that were required by Section 1002(c) of ANILCA. Since the 1002 report was partially based upon information gathered in these studies, how could it have been written in compliance with ANILCA without the benefit of these reports? Just as importantly, these reports should have been available to reviewers of the draft 1002 report during the entire review period for an adequate evaluation. The final baseline study report was not distributed until late December 1986. At 695 pages in length, it is not a document that can be quickly perused. Under these cirumstaces, it is not surprising that very little information from the baseline reports is included in the 1002 report. The 1985 update report is still not available at the end of the review period.

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A further apparent irregularity is the availability of the final baseline report before completion of the 1985 update report. We understand that some of the 1985 data were still being analyzed and the report was still being written at the time that the 1002 report to Congress was released. It also seems that the 1985 update report should logically have been completed prior to the final, since the final report is supposedly based upon information in the 1985 update. This irregularity raises serious questions concerning the validity of the final baseline study report as well as the 1002 report to Congress.

We further believe that the ANILCA 1002(c) studies were themselves deficient. Subsection 1002(c)(D) requires that the Secretary of the Interior "analyze the potential impacts of oil and gas exploration, development, and production on. . ." the wildlife and habitats of the ANILCA Section 1002 study area. Few of the great number of research projects that constituted the baseline studies included work with the expressed objective of determining the impacts of such activities. These were the study of seismic exploration impacts on muskoxen and limited work on the effects of aircraft disturbance to staging snow geese. All of the studies focused on the 1002 area itself. We believe that certain key studies should have been conducted in the Prudhoe Bay oilfield 80 miles to the west. These studies could have significantly helped in analyzing the potential impacts of oil and gas development on the coastal plain of the Arctic NWR. For the reasons stated above, we believe that the FWS and the DOI did not comply with Congress' intent relative to preparation of the 1002(c) reports.

Information unavailable to public or presented in a biased manner

Yet another shortcoming is the non-availability of the geological data that the projections of oil and gas resources in the 1002 report are based upon.

The resources in question belong to the American people. These data should be publicly available in order for the report to be adequately evaluated. The fact that the data were collected by private entities should not be used as an excuse for keeping the data secret. This is a matter that the FWS should have recognized and dealt with long ago, prior to the data being collected. We think that greater creativity could have been used in satisfying this important concern. It is interesting to note that Alternative C, further exploration, contains no stipulations to avoid such problems in the future.

Although the 1002 report purports to be an objective document, it is in fact biased in many ways so that it favors support of full oil and gas leasing of the coastal plain. One of these subtle biases is reflected in the report's imbalance in its descriptions of the resources of the 1002 area. A total of 24 pages was devoted to describing the area's geologic and oil and gas resources. However, only 11 pages were devoted to describing the area's fish and wildlife resources, which we think are equally, if not more important, especially considering that the area is supposed to be a wildlife refuge. The area's living resources are just as complex as the area's geology, so that can't be used as an excuse. The report makes only minimal attempts to describe the complex ecological processes and relationships in this Arctic area, which we believe are important in understanding what the long-term effects of oil and gas development might be. Other biases in the report will be illustrated elsewhere in our comments.

LACK OF BACKGROUND INFORMATION

The introduction in Chapter 1 (page 9) does not include enough background information on the history and actions leading to the establishment of the Arctic National Wildlife Range, which later became the Arctic National Wildlife Refuge. This information is important in understanding the purposes for which this conservation system unit was established. This is especially important in light of the fact that many people reviewing the report, most importantly members of Congress, may not know that creation of the wildlife range was the culmination of many years of hard work by conservationists in Alaska and other parts of the country.

The original inspiration and idea for estsblishment of a conservation unit in Arctic Alaska is attributed to Robert Marshall, who journeyed through what is now Gates of the Arctic National Park between 1929 and 1939 (Spencer et al. 1979). Marshall proposed the idea that large portions of Alaska should be protected as wilderness, since most original landscapes and ecosystems were disappearing rapidly in the rest of the United States. He early recognized the importance of keeping significant areas of the earth free of human domination.

The first attempt to act upon Marshall's ideas occurred in 1949 when the National Park Service (NPS) conducted a survey to determine areas in Alaska that deserved formal protection as conservation units. Two NPS workers, George Collins and Lowell Sumner, spent two summers exploring and studying the eastern Brooks Range in this survey. They wrote a report proposing that the northeast corner of Alaska and adjacent portions of Canada be protected as a unique ecosystem (Collins and Sumner 1953).

The report's recommendation soon attracted the attention of the conservation community and concerned citizens nationwide, who began promoting the report's findings and lobbying the DOI to establish a park or wildlife range in the area. Notable leaders in this effort included Olaus and Margaret Murie, who made several trips into the area that later became the refuge. Olaus Murie had worked as a biologist for the Bureau of Biological Survey (FWS predecessor) studying caribou in various parts of Alaska (Murie 1978). Murie was also a co-founder of the Wilderness Society, which played a key role in establishing the wildlife range. These and other conservationists worked extensively during the 1950's to get a conservation system unit established in the area.

As stated in the report, their efforts finally resulted in establishment of the Arctic National Wildlife Range by Public Land Order in 1960. The purposes stated were to preserve "...unique wildlife, wilderness and recreational values." To the extent that these purposes do not conflict with those stated in ANILCA Section 303(2)(B), which re-established the range as the Arctic NWR, these same purposes still apply today. The report should be reviewed in light of this fact.

WILDERNESS REVIEW

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We believe that the DOI has not complied with the provisions of ANILCA Section 1004 which calls for a wilderness study and report on the 1002 study area. This study should be completed before the final report is submitted to Congress. A blatant shortcoming of the 1002 report is the fact that there is only one-half page of text describing the area's wilderness and aesthetic values. We acknowledge that describing the oil and gas resources could rightly be more complicated and thus might require more text than the wilderness resources description. However, we believe that the wilderness values should have been described at least as thoroughly as the oil and gas resources. As the report is written, it barely does justice to this important aspect of the area. The area's wilderness resources are indeed the crux of the current controversy surrounding this issue. We note on page 46, first paragraph, that the report states that the area "could" meet the criteria for wilderness status as described in the Wilderness Act. We believe that the area DOES meet these criteria.

This lack of detail concerning wilderness values is an obvious attempt to downplay the significance of the area's wilderness resources, and is an important omission in terms of report review by persons who are not already familiar with the area. We will therefore provide below augmentation to the report's meager description of the area's wilderness values.

At least two formal wilderness reviews have been conducted for the 1002 area. One of these considered the wilderness qualities of the entire wildlife range (USFWS 1973). Though this study was never finalized, the preliminary draft concluded that the entire wildlife range was suitable for wilderness designation, except for the two abandoned DEW Line sites on the coast, the Barter Island military withdrawal, and the Kaktovik Inupiat Corporation land selections. The reason this study was never finalized and submitted to Congress for action was that the area was being considered as

an alternative route for the Arctic Gas Pipeline and because of the Alaska Native Claims Settlement Act (ANCSA) Section 17(d)(2) debates in Congress which culminated with passage of ANILCA in 1980. The Arctic Gas Pipeline proposal died in 1976. Early House versions of ANILCA, passed overwhelmingly, would have designated the 1002 area as wilderness along with the rest of the original wildlife range, but the question of oil and gas potential prevented that. The final version resulted in the 1002 area being excluded from wilderness designation, with the requirement for the present report incorporated therein.

The second wilderness review was specific to the 1002 area as designated in ANILCA. That study (Thayer 1982) also concluded that the entire area, except for the abandoned DEW Line stations, was suitable for wilderness designation.

The area exceeds the 5000-acre minimum size specified in the Wilderness Act. With few exceptions the area is in near pristine condition. It is currently the most pristine large segment of Arctic tundra remaining in the United States that is protected from human development. The entire balance (over 90%) of the Alaskan North Slope is currently open to oil and gas development. The same is largely true for the Canadian Arctic as well, the exception being the new Northern Yukon National Park, which protects a very small segment of the Canadian North Slope. These factors drastically increase the wilderness significance of the 1002 area.

The 1002 area is primeval land and provides excellent opportunity for solitude. This factor is further enhanced by the wilderness status of the lands immediately to the south and east. There are no roads or designated trails for travel; most travel occurs along the river courses. Visitors to the area can experience true solitude and wilderness equaled in few other places on earth. The area's present relative inaccessibility is a major reason for this. Travel across the area by primitive means is reminiscent of the hardships, challenge, drama and peril faced by early American people, but which is becoming increasingly difficult to experience today. There are few signs of human presence, these mostly being archeological sites and scattered artifacts. Occassionally one may see or hear an aircraft. Many people spend days without seeing a single sign of human existence.

The area provides unexcelled opportunity for primitive and unconfined recreation. The special features of the area that contribute to this are its openness and feeling of unconfinement. The close proximity of the mountains and the Arctic coast in the 1002 area presents a unique wilderness situation in the North American Arctic, offering the wilderness recreationist the opportunity to experience, in a comparatively contracted zone, a variety of habitat and terrain types whether traveling by foot or river. A visitor can, within the span of a few days, go from the alpine zone of ice, snow and rock, to alpine meadows, to arctic tundra valleys, to tussock tundra foothills, to braided river floodplains, to rolling tundra plain, to flat thaw lake plain, to the coastal zone of wetlands, lagoons, barrier islands, and the ocean. This recreational variety is unavailable within such a short distance anywhere else on the Alaskan North Slope.

The shallow valleys of the numerous streams that flow across the area to the Arctic Ocean provide good camping sites. Gravel outcrops on the plain above the rivers provide camp sites with broad views. The streams in the area are

not navigable by conventional power boat, and most are not easily navigable by canoe. Rafts or kayaks provide the best crafts for river running.

In terms of scenic quality, the Arctic NWR coastal plain is splendid and varied. To a person situated midway between the Brooks Range and the ocean, the mountains dominate the southern skyline. Mounts Isto, Chamberlin, and Michelson, the three tallest peaks in the Brooks Range, are always snow-clad and are impressive when viewed from the coastal plain, their grays and whites contrasting with the greens and browns of the tundra. To the east and west, one sees the vast expanse of treeless tundra rolling into the distance creating the illusion of limitless wilderness in both directions. If one is situated in the right place and given the right weather conditions it is also possible to see to the north the coastal lagoons, the ocean and the permanent pack ice beyond. Because vegetation is mostly very low, only a few centimeters tall over most of the area, both visitor and wildlife are conspicuous. Animals are easily visible and, because of the relative lack of human presence, are often unwary or even curious when confronted by humans.

The Arctic coast, with the Arctic Ocean to the north and the broad coastal plain to the south and the general absence of man's work offer extensive primitive and unconfined camping and wilderness enjoyment opportunities.

The Arctic NWR is one of the most primitive and isolated wild regions left on earth protected as a conservation area. The 1002 area is an integral part of the wilderness ecosystems encompassed by the Arctic NWR, as most of the major wildlife species occurring on the refuge (caribou, moose, grizzly bears, wolverines, wolves, muskox, polar bears, numerous species of birds) utilize the coastal plain habitats for all or critical portions of their life cycles (i.e., calving, denning, nesting, breeding, staging).

Seasonal abundance of wildlife on the coastal plain is high. Many species of migratory birds utilize the coastal plain wilderness for nesting and rearing young. These species travel far beyond the boundaries of the refuge. The report correctly states that the coastal plain is the most biologically productive part of the entire Arctic NWR and is the center of wildlife activity on the refuge (USFWS 1978).

The biological diversity and uniqueness of the Arctic NWR has been recognized by many scientists. A symposium was held concerning the wildlife range at the 12th Alaska Science Conference at the University of Alaska in 1961 (Dahlgren 1962). At this symposium, many scientists went on record stating the importance of the wildlife range to science. This importance was attributed to the relatively undisturbed condition of the area and the ecological diversity found within such a contracted zone. It was stated that the area could serve as a control against which we can measure the effects of land-use practices elsewhere in the Alaskan Arctic, an opportunity that has been forgone for most other North American ecosystems. The range's combination of habitat and species variety was compared to that of Africa's Serengeti Park and it was thought that the area could "... provide topics for an untold number of scientific publications."

In originally recommending the area for preservation, Collins and Sumner (1953) wrote:

> The region offers science the best opportunity of any place in Alaska, if not in the whole of North America, for studying the processes by which these and other Arctic animals maintain their numbers through the natural checks and balances of climate, food supply, and predation.
>
> The whole field of cyclic population fluctuations, so characteristic of the smaller animals in the Arctic, can be studied here with no interference by agricultural or other human activities. Such research possibilities are of outstanding importance to various applied sciences such as game, fur and fish management, and human survival techniques.
>
> Ecologists recognize that research in an Arctic wilderness study area has special usefulness beyond the confines of the region because the comparative simplicity of environmental factors in the Arctic makes them easier to isolate and analyze.

If these statements were true in 1953, their truth and relevancy in 1987 cannot be doubted; there are far fewer acres of such wild richness today than there were then.

In 1969 the Tundra Biome Section of the International Biological Program (IBP) passed a resolution urging that all or a major portion of the Arctic NWR be included in the National Wilderness Preservation System, and that scientific research be recognized as a priority use of the range (USFWS 1973). The resolution also called for minimizing man-induced physical and biological change in the area. A major purpose of the IBP was to study natural ecosystems to predict the consequences of natural or man-induced environmental changes or stresses.

The Arctic NWR is the only conservation system in North America and perhaps in the world that protects a complete spectrum of the various arctic ecosystems in an undisturbed condition, and the 1002 area is an integral part of that spectrum. The area presents unique opportunities for scientific study of an undisturbed ecosystem. The area also presents excellent opportunity for wilderness environmental education.

The 1002 area is the only portion of Arctic coastal plain in Alaska that has not been committed to man's development activities, except for a tiny stretch from the Aichilik River to the Canadian border. As such it has extremely high values as a remaining example of the natural coastal Arctic ecosystem. Its ecological, scientific and educational values as such an example are incomparable.

The 1002 area in its present state has outstanding wilderness qualities, and completely meets the definition of wilderness contained in the Wilderness Act. The area has been described as being de facto wilderness (HR Rep. No. 95-1045, Part I, 95th Congr., 2d Sess. 151, 1978; HR Rep. No. 96-97, Part I, 96th Congr., 1st Sess. 483 and 487, 1979). In fact, the Arctic NWR is regarded by many as epitomizing the

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values intended to be preserved by formal wilderness designation (S. Rep. No. 96-413, 96th Congr., 1st Sess. 376, 1979).

A number of publications have described the wilderness qualities of the Arctic NWR and the 1002 area. Some of these are Abbey (1984), Brower (1971), Chadwick (1979), Kerasote (1984), Laycock (1976), Milton (1969), Sumner (1956), and Tall (1959).

EXECUTIVE SUMMARY

Impacts of Oil and Gas Production in the Arctic

The Executive Summary portion of the report does not accurately reflect material contained in the body of the report. This section contains major flaws, one of which is self-contradiction. On page 2, we read: "Most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at Prudhoe Bay and from construction of the Trans-Alaska Pipeline System (TAPS)." Later, on page 6, we read: "Long-term losses in fish and wildife resources, subsistence uses, and wilderness values would be the inevitable consequences of a long-term commitment to oil and gas development, production, and transportation." How can long-term losses occur if most adverse effects are minimized or eliminated? The two statements quoted above are mutually exclusive. In view of the evidence compiled to date (some of which is presented in the 1002 report), the latter statement is eminently believable while the former is not.

On page 2 of the Executive Summary we also read: "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources." This statement is totally insupportable. Perhaps the authors of the Executive Summary should have read the final baseline study report prepared pursuant to ANILCA Section 1002(c), before making such statements. "On the north slope oil fields, new facilities are presently being built, and successful rehabilitation techniques have not yet been developed." (USFWS, 1986, p. 563). It is too early to determine many of the long-term impacts that fish and wildlife resources (i.e. populations and habitats) have suffered or will suffer at Prudhoe Bay. In most cases, baseline studies of fish and wildlife resources were not conducted at Prudhoe Bay prior to oil development activities there. This makes it nearly impossible to tell what kinds of changes have occurred to date.

The December 1986 final baseline study report devotes many pages to consideration of some of the adverse environmental impacts of oil development, production, and transportation. Here is a partial list of the causes of some of the impacts: human activity (including aircraft overflights, traffic, and increased legal and illegal harvest

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levels), vehicle trails, gravel cover, erosion and sedimentation, impoundments, gravel spray, dust, snow drifts, thermokarst (permafrost degradation), fuel spills, drilling muds and reserve pits, and seawater spills. Some of the adverse impacts due to the above-mentioned causes: permanent changes in species composition and distribution, severe loss of vegetative cover, exposure of peat and mineral soil, thaw settlement, changes in moisture regime and drainage patterns, slumping, early snow melt, and delayed plant phenology.

Although some causes and effects have been documented, there have not been many studies done that quantify impacts to fish and wildlife populations and habitats from oil development activities. For example, "Few studies have been done on the effects of drilling muds and reserve pit fluids on tundra vegetation, and the long-term effects are essentially unknown" (USFWS, 1986, p. 560). From page 34 of the same report: "Little information is available on the distribution of ground ice in the study area and the extent and origin of massive ice beds. The amount of ground ice is an important factor in determining the effects of oil exploration and development on surface stability." As indicated repeatedly in both the 1002 report and the final baseline study report, many types of adverse impacts are inevitable consequences of development, even using current technology and mitigation procedures. The logical conclusions to be drawn from this information are that devlopment in the arctic cannot be conducted with only minimal impacts, and that it is presently unknown whether or not developed areas can be rehabilitated to their original state.

The 1002 area's estimated oil and gas potential

What isn't provided anywhere in the executive summary is the fact that there is only a 19% chance that an economic size field exists in the 1002 area. In the introduction to the executive summary it is stated, "The area is clearly the most outstanding oil and gas frontier remaining in the United States, and could contribute substantially to our domestic energy supplies". In support of this statement, the in-place estimates for oil and gas are given. The amounts of economically recoverable oil and gas, the really significant estimates, are provided obscurely in a single paragraph on the second to last page of the 7-page summary. We see this as a deliberate deception, which must be rectified in the final report.

The high oil and gas potential for the area that is described in the executive summary and in the Secretary of the Interior's recommendation is not supported by the text of the report. Our reasons for this observation are elaborated below.

1. On pages 49, 68, and 72, the report states that there is only a 19% chance of there being at least one economically recoverable oil deposit in the 1002 area. We do not see this 1 in 5 chance as being very encouraging from the standpoint of discovering oil. Where did this figure come from? The derivation of this estimate should be provided, as should estimates for each of the prospects 1-26 that are shown in Figure III-1. Also, what is the chance of finding other prospects not mapped?

2. On page 50, Figure III-2 compares the conditional resources of oil on the refuge with the recoverable reserves of proven fields. These data are not comparable, although the manner in which they are presented makes it seem that they are. It would be more appropriate for the estimated recoverable reserves in the 1002 area to be portrayed here. Conditional resources should be portrayed elsewhere and identified by number (1-26) for the eight largest prospects. Even if these data were comparable, for all possible prospects on the refuge, the most likely (95% probability) resource estimates are well below the estimated reserves of most of the largest known fields. Yet in the paragraph at the top right of this page the report concludes that the area is one of the most outstanding prospects in the United States. This conclusion does not logically follow from the data presented.

3. Table III-1 on page 50 is ambiguous. The caption states that the data do not reflect the risk that economically recoverable oil may not exist in the "planning area". Does this mean that this risk is not reflected only for the 1002 area, or for all of the areas compared? If the former is true, then this table does not represent a valid comparison of data.

4(a). In several places in the report, the proximity of the area to Prudhoe Bay is cited as an encouraging factor in the 1002 area being highly prospective for oil and gas. On page 54 the report states that most of the Prudhoe Bay production is from Ledge Sandstone rocks of the Ellesmerian Sequence. Yet it is also stated that these rocks are likely non-existent in the 1002 area. On page 54 the report also states that if Ledge Sandstone rocks are not present, then the chances of oil being present in the area are much reduced. These rocks are cited as being the major possible source rocks for oil and gas production in the area, but their existence in the area is uncertain. Other possible source rocks are given on page 55 as being the Shublik Formation and the Kingak Shale. However, the existence of these rocks in the area is uncertain. On page 62 the report indicates that these source rocks are probably gas-prone in the 1002 area, and further that "these rocks may not be present in much of the 1002 area." Page 54 contains the vague statement that "drilling one or two wells in critical areas would help resolve this question" of the presence or absence of Ellesmerian rocks. This statement should be supplemented with a map showing where these "one or two wells" would be placed. If it is indeed true that drilling one or two wells would resolve this important queston, please explain why the draft report recommends full oil and gas leasing rather than exploratory drilling. This does not seem logical and prudent considering the predicted environmental consequences of full leasing.

(b) Also, on page 62 the report states that analyses of oil from the Hue Shale in the 1002 area (natural oil seeps) show that this oil is not chemically similar to oil from the same formation in the Prudhoe Bay area.

5. On page 58 the report states that the extremely complex geology of the southeastern half of the 1002 area makes location of structural traps and possible source rock in the Brookian sequence very

problematical. Hue Shale is stated as the only possible source rock in the Brookian Sequence. The report states that no prospects were discovered in Brookian Sequence rock. Please indicate how this information helps support the conclusion stated in the Executive Summary and on page 50 that "the 1002 area is clearly one of the most outstanding prospective oil and gas areas remaining in the United States."

6. On page 66 the report states that the two largest prospects (18 and 19) account for the majority (50%) of the estimated in-place oil. Yet it is also stated that these prospects, which are in the Folded Ellesmerian / Pre-Mississippian Play, are dependent on the presence of Ellesmerian rocks as reservoirs and also on Hue Shale as the most probable source rock. The report also states that the former rocks are likely not present in the area and that the Hue Shale is only possibly present. Again, this information seems to indicate conclusions contrary to those drawn in the Executive Summary and elsewhere in this report.

7. On page 68, Figure III-6 should show the mean estimates of in-place oil and gas by prospect, not by resource block.

8. Page 70: It seems that for the PRESTO model a 1 in 20 risk level would more closely coincide with what was reported, particularly for the very large prospects. The geologic risk section on this page needs to be clarified so that the lay person can understand the assumptions upon which the estimates are based.

9. The report uses the mean estimate as the most reasonable estimate for in-place oil. Yet the probability associated with this estimate is only 40%. It seems that a more meaningful estimate would be that at the 50% level (1 in 2 chance of occurrence). The amount of in-place oil at this probability level is somewhat less, 11.9 billion barrels of oil (BBO), compared with 13.8 BBO, the figure used in the report. However, the most reliable and most probable estimate would be that at the 95% probability level, which we note is only 4.8 BBO.

10. The most likely or expected amount of economically recoverable oil is given in the report as the mean value (3.23 BBO). As with the in-place estimate we question the meaningfulness of this value. It seems that a more reasonable estimate would be that associated with the 50% probability. That estimate would be 2.21 BBO. As with the in-place estimate, the most probable or reliable figure would be that at the 95% probability level -- 0.59 BBO. We note that this is only slightly more than the minimum economic field size for the 1002 area given on page 71 as 0.44 BBO.

11. The evaluations of economically recoverable oil are made with an assumed oil price of $33 per barrel. The current oil price is less than $18 per barrel. The report makes no predictions of the future price of oil. Considering the recent drop in world oil prices, the $33 per barrel figure sounds unrealistically high. The report should have provided an evaluation of future expected oil prices. Otherwise, reviewers have no basis to judge whether the economic assumptions are realistic. It should be noted that lower oil prices would result in

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larger minimum economic fields. At current oil prices the predicted most likely amount of recoverable oil in the 1002 area would probably be well below the minimum economic field size.

12. It should not be "expected that this LEIS will suffice for initial leasing" (page 13). This statement shows a blatant disregard for the provisions of the National Environmental Policy Act (NEPA).

EXISTING ENVIRONMENT

1. A section on water quality should be added.

2. The section on air quality is totally inadequate. All references cited predate development at Prudhoe Bay and in no way represent current conditions. Monitoring data collected in the late 1970's should be cited. Ambient air quality monitoring at Prudhoe Bay began in late 1986. Permitted discharge for nitrogen oxides is currently 100,000 tons annually. Until results are available from this research, effects must be considered unknown and warrant further evaluation. Some attention should be given to emissions from start-up and upset flaring. Measures must be established to ensure that appropriate monitoring is conducted. Stipulations and operational procedures should be based on real data rather than supposition, in order to be effective.

3. It should be mentioned on page 17 that average snowfall on the Arctic NWR is significantly less than in the Prudhoe Bay area.

4. On page 26 the Sadlerochit Spring area was mentioned as having been nominated as a National Natural Landmark. However, the report failed to mention another site that was likewise nominated. This is the Beaufort Lagoon-Demarcation Bay area (Bliss and Gustafson 1981). Another site that was nominated for inclusion in a State system of ecological reserves is the Jago River drainage. This site was described by Stenmark and Schoeder (1974) to contain "a complete array of tundra and floodplain vegetative and animal types typical of the North Slope." The Secretary's recommendation would allow oil development over the entire extent of this proposed ecological reserve. Yet it was not mentioned at all in the report!

5. The goals of the State's Coastal Zone Management Plan are mentioned frequently in the report (pages 27, 42, and 43). We note that most of these goals point toward the maintenance of a natural environment on the North Slope. The Secretary's recommendations should have addressed this.

6. On page 34, specific information is lacking for loons. Plate 3A implies that waterfowl and loons only nest in the shaded areas. This is inaccurate. The map should also depict the important staging/molting areas for oldsquaw and other waterbirds in the coastal lagoons. More detailed habitat use data should be provided for all migratory bird species.

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7. An explanation of what the Kaktovik Inupiat Corporation (KIC) lands are, their ownership history and future, should be provided. Some mention is made of these lands on pages 13, 15, and 42, yet no detailed explanation is ever provided. Mention should be made of what effect the "1991" provisions of the Alaska Native Claims Settlement Act (ANCSA) might have in terms of land ownership in the 1002 area, and the significance of ANCSA Section 22(g) relative to these lands. The fact that a land exchange in 1983 allowed private entities to drill an exploratory well inside refuge boundaries is significant. The trunk oil pipeline proposed under Alternative A "will transport oil from Federal leases and from any private lands in the 1002 area to Pump Station 1" (p.89). The report's failure to address the additional impacts that might occur from leasing and production on these private lands is another of its many flaws.

8. On page 37 sport fishing is mentioned as being minimal in the 1002 area. Although we acknowledge that sport fishing is not a primary reason why people visit the area, it is an activity that is engaged in by almost everyone who does visit the coastal plain.

9. On page 41 in the last paragraph in reference to Kaktovik whaling, what is the definition of "historic" period? The next sentence appears to contradict the statement that no whaling took place at Kaktovik during the historic period.

10. On pages 75-76 the lack of water and gravel resources are highlighted as major engineering problems. We see these as major environmental problems as well if oil and gas leasing is authorized. The report's failure to adequately address these problems is one of its major flaws.

11. Beginning on page 84 and becoming more common from there on the word "will" is used in places where the word "would" seems more appropriate. This implies a presumption on the part of the authors that development "will" take place, rather than "might" take place.

12. Assumption 7 on page 89 states that additional geophysical exploration would be allowed prior to lease sales. We believe that additional exploration of any kind should be allowed only following a lease sale.

13. The exclusion of the 1002 area from the operation of the comprehensive conservation planning (CCP) process is a perversion of Congress' intent in setting up that process. The CCP should proceed independently of the 1002 process, for the entire refuge. Congress will have the ultimate decision concerning any lease sale authority or wilderness designation. We see this as another example of the Department's attempt to limit public comment and involvement in decisions concerning the 1002 area.

14. No exact boundaries were presented in the report as to the area or areas that would be excluded from leasing under the limited leasing alternative. The boundary of the core calving area for the Porcupine caribou herd is inexact. What rationale was used in deciding to exclude only the core calving area from leasing under Alternative B?

Why not exclude the entire concentrated calving area? Apparently the basis for the difference between full and limited leasing relates entirely to caribou. Other resource values, of at least equal significance, are not even mentioned. Why?

ENVIRONMENTAL CONSEQUENCES

This chapter focuses primarily on wildlife and habitat issues. We found several problems with this section (Chapter VI). These problems are detailed below.

1. A major omission in the 1002 report is its failure to consider the impacts of possible development associated with gas production. Please provide concrete substantiation for the statement on page 95 that "no appreciable increase in environmental impacts is anticipated" due to gas production. Referring to gas in the 1002 area, the 1002 report states on page 143 that "...it is expected that gas production from this area would also be economic within two to three decades." It seems likely that there would indeed be impacts associated with gas production that would be additional to those associated with oil production. The largest gas production facility in the world recently began operation on Alaska's North Slope, and DOI is currently processing an application to build the Trans-Alaska Gas System (TAGS). For these reasons, we feel that a detailed discussion of additional facilities and impacts associated with gas production would be suitable for inclusion in the final 1002 report.

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2. In paragraph 4, the process for consultation and coordination should be formalized so that each party is aware of their specific responsibilities.

3(a). On page 97 most of the discussion sounds good in theory, but we see this as being wishful thinking on the part of the authors. The demonstrated environmental track record of the oil industry and the success (or lack of it) of the regulatory agencies in enforcing mitigation procedures, does not give us much confidence that proposed mitigation provisions are realistic expectatons. The chapter on environmental consequences should have been written with the assumption of realistic mitigating measures. To do otherwise would be misleading.

(b) The Fish and Wildlife Service is primarily a land management agency, not a regulatory agency. While general suggestions sound fine, it would be more appropriate to propose specific additional regulations to be added to the Code of Federal Regulations. Such regulations could be designed to increase the Fish and Wildlife Service's ability to promulgate effective and enforceable mitigation procedures. In the past, the oil industry has frequently balked at implementing mitigation procedures thought to be too expensive, regardless of their demonstrated effectiveness. An example of this is industry's steadfast opposition to timing restrictions designed to protect goose nesting and brood-rearing.

(c) Another way to ensure the use of effective mitigation measures would be the inclusion of stipulations for such measures in lease sale authorizations. This would likely be much more effective than the use of FWS special use permits or other authorizations.

(d) In light of the above, Assumptions 2 and 3 used in assessing environmental impacts as stated on page 98 are invalid.

4. Page 98 - Assumption 4 - these standards and stipulations cannot be assumed to be adequate for the entire 1002 area nor should standards and stipulations used for exploration be considered acceptable for development. We are concerned that the excessive issuance of variances and special permits could render all of these standards and stipulations irrelevant.

5. We question the statements on page 99 that ice roads on NPR-A had "virtually no effect" on the tundra and that ice airstrips can be used on the tundra in the same place for more than one year without any effects. We would like to see documentation for these statements. Also, are we to infer from this information that the same would be true in the 1002 area? Differences in microsite characteristics between NPR-A and the 1002 area are liable to be significant.

6. The discussion of reserve pits on pages 99-100 is inadequate. There needs to be a review of practices used to date, and needed improvements. "Approach 1." - leaving reserve pits open is NOT ACCEPTABLE! Page 100 is the ideal location for discussing alternatives to using reserve pits for exploratory drilling. Recycling, backhaul, annular injection, and incineration are alternative methods that merit detailed discussion, given the problems with reserve pit fluid discharges.

7(a). On page 101, further explanation of the "possible creation of 20-30 elongated deep pools" would be germane to the discussion of probable water sources. We recommend that you describe the size (length and width) required, and show probable sites on a map, along with gravel borrow pits.

(b) The discussion of unavoidable effects on the physical environment, also found on page 101, is incomplete. Additional unavoidable effects to address include: construction of a minimum of 50 miles of road from Prudhoe Bay to the Canning River, thermokarsting of tundra, and flooding due to impoundment. Also, a significant difference between Prudhoe Bay and the 1002 area is that oil development in the 1002 area will require many more crossings of major river drainages than were necessary at Prudhoe Bay. This is important, as experience at Prudhoe Bay and Kuparuk has shown that industry favors the use of culvert crossings over bridge construction. Culverts are frequently ineffective for providing cross drainage of water.

8. On page 102 it should be noted that changes in plant species composition result from seismic survey activity.

9. Page 103 should include information on the number and size of reported fuel spills which have occurred along the TAPS corridor, both during construction and production. This might also be a good place to indicate the number and size of unreported spills for which fines or other punitive action has been levied.

10. On page 105, the probability of a catastrophic oil spill should be determined. Cumulative impacts of offshore development, as well as 1002 area development alone, should be considered.

11.(a) Plain English should be used throughout the report. On page 108, the statement "The lack of observable adverse effects from displacement exhibited by the CAH would be unlikely for the PCH" should be changed to "Observable adverse effects from displacement are likely for the PCH."

(b) According to the second to last paragraph on page 108, the Secretary's recommendation directly violates the FWS mitigation policy. Full oil and gas leasing would ensure the projected displacement from preferred calving habitat of the Porcupine Caribou Herd. This displacement represents a complete loss of habitat values from at least part of an area which is designated as Resource Category 1 habitat. The mitigation goal for Resource Category 1 habitat is no loss of existing habitat value. What is the justification for a wildlife protection agency violating its own goals?

12. The negative stimulus conditioning for caribou described on page 110 would have the additional negative effect of reducing the quality of wildlife viewing opportunities on the Arctic NWR. This activity is a major recreational use of the refuge.

13. On page 111 under Mitigation, Item 9 states that additional mitigation measures would be implemented after the Porcupine Caribou Herd started to decline. We believe it would be too late at that time. Also the discussion of additonal mitigation measures is very general and nebulous. We would like to see some elaboration and clarification of what these additional measures might be. What does "state-of-the-art" mean in this context?

14. The conclusion on page 114 about negligible effects on Dall sheep is flawed. We think that the increased human population in the area would have at least a moderate if not a major effect on the Dall sheep population of the northern Brooks Range. The report assumes more restrictive hunting regulations. However, unless enforcement activities were concurrently increased, the more restrictive regulations would be largely ineffective. Currently, law enforcement on the Arctic NWR is negligible. Can we assume that things would be different in the future? What sort of budget increase is proposed for the refuge to ensure effective enforcement?

15. On page 116, the statement "Measures designed for prey species such as caribou, muskox, and moose will also benefit wolverines" is misleading. The word "will" should be replaced by "could" or "might".

16. The conclusion of moderate impacts on the wolf population stated on page 115 is overly optimistic, again relying on adequate enforcement. Past experience with this species has shown that where it comes into direct contact with humans, it tends to be diminished. It is a species that requires true wilderness to survive. We believe that most wolves would be eliminated from the area as has happened in the Central Arctic as a result of oil development activities (see 1002 report, p. 108).

17.(a) The conclusions concerning brown bear stated on pages 116-117 are likewise flawed. The same concerns expressed above for the wolf can generally also be stated for brown bear. In particular, the statement that

"Brown bears are not readily displaced by human activity" is highly questionable. "If the petroleum development program results in a decline in use of the area by PH caribou, a corresponding decline in brown bear population will be expected." (USFWS, 1986, p. 603). A population decline or distribution change for 20-40 percent of the Porcupine Caribou Herd is projected in the 1002 report.

(b) Brown bears are also likely to suffer the adverse impact of increased man-caused mortality if full oil and gas leasing of the coastal plain occurs. Under the summary of unavoidable impacts, Alternative A (p. 132), it is predicted that development would cause the loss of one brown bear per year in the 1002 area. Upon what is this prediction based? The final baseline study report says "Brown bears have historically not abandoned previously occupied areas when those areas were developed by man. Instead bears continue to use the newly occupied areas and eventually are eliminated by killing because they pose a threat to human safety. The mortality rate of these encounters are unknown." (USFWS, 1986, p. 603). The same report indicates that increased access has the potential for increasing the hunting mortality of brown bears, citing other studies showing that this occurred during the construction of TAPS. In view of the above, it seems reasonable to propose that death is another, and perhaps the ultimate, form of displacement.

(c) Once again, proposed mitigation measures sound good on paper but in reality are likely to be ineffective in their present form. Strict enforcement and active monitoring programs cost lots of money. What level of increase is proposed for the annual refuge budget, in order to fund these programs? It seems probable that under a full leasing program brown bears would suffer a major decline in the 1002 area.

18(a). The conclusion with regard to possible development impacts on polar bears (page 118) is flawed. This section states that development in the 1002 area causing "...exclusion and decline in natality would likely not affect the species' overall survival, so long as similar intensive developments did not occur along the entire northern coast of Alaska and Canada." In fact, similar intensive developments have already occurred in these coastal areas, and more are proposed both on and off shore. Thus it appears likely that polar bears in the Beaufort Sea region will be adversely affected by the cumulative impacts of industrialization of the area. The 1002 report's failure to address these undeniable cumulative effects is one of its major flaws.

(b) The conclusion section goes on to state that annual mortality is approximately equal to annual natality for the Beaufort Sea population of polar bears. Under the mitigation section, it is proposed that polar bear den areas be documented so that "oil-development activities avoid them to the maximum extent possible." That has been shown to be ineffective in the past, as the den abandoned by the suspected pregnant female polar bear in 1985 had been well documented (the bear was radio-collared). The cause of abandonment in this case was strongly suspected to be repeated disturbance by motorized exploration support equipment. It was also thought that this bear aborted her pregnancy.

(c) In the general section on polar bears, the 1002 report tells us that "preserving undisturbed onshore denning habitat each year is very important

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for the 12 to 13 percent of females denning on land rather than offshore ice. Moreover, if there is an especially significant area for denning on land in Alaska, it is on and adjacent to the 1002 area." Yet we also learn from the report that oil development would require the citing of facilities, such as the Pokok port site, in the exact areas where polar bear denning has been documented to occur. Furthermore, the report indicates that the construction of onshore facilities in polar bear habitat will probably help increase development activities offshore in polar bear habitat.

(d) Given the above, please indicate why the Secretary's recommendation is for full oil and gas leasing of the 1002 area. Please also indicate how this recommendation augments the purposes for which the Arctic NWR was established under ANILCA. Specifically, how will full leasing help "to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats" (ANILCA Section 303(2)(B)(ii))? According to page 33 of the 1002 report, "Polar bears are protected under the provisions of the Marine Mammal Protection Act of 1972." How will full leasing supplement the provisions of this Act? Also on page 33, we read that the U.S. and four other countries ratified an agreement for the conservation of polar bears in 1976. "Article II requires that appropriate actions be taken to protect ecosystems of which polar bears are a part, especially denning and feeding sites." In our view, protection of the delicately balanced Beaufort Sea population of polar bears and their habitat is one of the strongest reasons for prohibiting oil and gas development activities in the 1002 area.

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19. In the discussion of marine mammals on page 119, the additional impacts of contaminants, including both chronic and catastrophic spill possibilities, should be considered. Again, this discussion is deficient in light of the indication, found elsewhere in the report, that port facilities built for production in the 1002 area would facilitate development of offshore oil and gas leases. These probable cumulative impacts should be discussed in detail.

20(a). "The judicious placement of transportation corridors south of coastal nesting areas would be particularly important for tundra swans", according to the mitigation section on page 121. How can this be accomplished? What areas would not be leased in order to accomodate nesting swans? It seems likely that impacts to tundra swans in the 1002 area could be moderate to major considering the cumulative impacts that would result from development of KIC lands and state submerged lands offshore. Swans nest in areas with the most lakes. The huge demand for water out of those lakes would likely preempt attempts to keep development away from them.

(b) We agree with the statement on page 121 that "Reserve pit fluid discharges and other contaminants should be adequately controlled." In what specific ways will this be accomplished? As stated before, the effects of these discharges on arctic tundra and wetland ecosystems are not yet fully understood. Perhaps reserve pits should not be used at all if the 1002 area is developed.

(c) The discussion of the effects of various kinds of disturbance on snow geese is inadequate in that it does not consider possible indirect effects such as contaminants from reserve pits, and fuel and seawater spills. The high mobility of staging snow geese is irrelevant, as data has shown their

preference for staging in the 1002 area. Under the proposed full leasing program, the entire area would be subjected to development activities. The protection of internationally important migratory bird resources is another outstanding reason for the prohibition of development of the 1002 area.

21. The conclusions stated on page 123 about impacts to seabird and shorebird populations are vague. This section should document the high potential for moderate to major effects that would result from development in riparian zones and coastal wetland systems. The potential effects of a catastrophic oil spill on birds need to be predicted and discussed.

22.(a) On pages 125-126 the discussion of impacts on fish does not consider the effects of water withdrawal from streams. Unless specific regulations are formulated to the contrary, these impacts would be inevitable if the 1002 area was opened to full leasing. "Water withdrawal in critical areas and/or during critical time periods, and gravel removal from fish-bearing stream systems would not be permitted", claims the 1002 report. Two paragrphs later: "Development in Block A would require both water and gravel. If these materials were taken from the Tamayariak River, moderate adverse effects on grayling would result." No alternative to the Tamayariak is mentioned here for gravel and water sources. This makes it obvious that, even before Congressonal consideration of the coastal plain issue, plans are already being made to withdraw water and gravel from fish-bearing stream systems. Dewatering of fish overwintering pools at Prudhoe Bay has been documented to result in fish kills. "Large reservoirs excavated in "dead arms" of rivers, perhaps in conjunction with gravel removal, may be the only viable option to provide the large quantities of water needed to develop oil reserves at the more inland areas of the ANWR coastal plain" (USFWS, 1986, p. 609).

(b) The cumulative effects on fish populations and habitats of docks and causeways from offshore development are not given adequate consideration. "Impacts can include: impedence of normal fish and prey organism movements; alteration of water temperature, salinities, and current patterns; and changes in disposition of sediments" (USFWS, 1986, p.610). This is important because industry has continually refused to accept causeway and dock designs other than solid-fill with inadequate breaching.

23. At the top of page 127 we read that "Rehabilitation of the entire coastal plain ... could require as many as 1,500 people for several years." This statement implies that rehabilitation can actually be achieved, and therefore is contrary to information contained in the final baseline study report. The discussion of employment also implies that local residents would derive great benefits, when in reality most of the oilfield workers would come in from somewhere else. Any benefits that did accrue to Kaktovik residents would necessarily be as long- or short-lived as the oilfield itself, whereas subsistence from the land has sustained the Inupiat people for 10,000 years.

24. One of the major impacts on subsistence is likely to be the reduced availability of the Porcupine Caribou Herd to the people of Arctic Village and Old Crow if the herd population is reduced. Those villages depend principally on the Porcupine herd for subsistence. Yet the report on page 127 only mentions the possible effects on these villages in passing. We think that these effects should be dealt with more thoroughly.

25. Proposed land exchanges in the 1002 area, between the federal government and other corporate and government entities, could have major environmental and socioeconomic impacts. One of the most glaring major items that the 1002 report fails to address is the so-called "Megatrade" negotiations and their possible effects relative to FWS environmental regulation as well as on state, local, and federal economic systems. These exchanges have the potential to seriously impair the ability of FWS to regulate oil exploration and development activities in the 1002 area. Page 130 would have been the ideal place for a discussion of possible economic impacts of land trades. It is imperative that the above items be addressed in detail in the final 1002 report to Congress.

26.(a) On page 131 under the section on "Recreation, Wilderness, and Esthetics", the first sentence states, "Most recreationists . . . might perceive the existence of oil facilities in the area as lessening the quality of that experience." We think that the word "might" should be replaced with "would."

(b) Concerning impacts on hunting, the report states that hunting would not be allowed and access would be restricted in the oilfield area. Yet the analysis on page 131 goes on to conclude that the effect on hunting would be negligible. This conclusion is ridiculous. If hunting is not allowed within an area, that in itself is a major impact on the activity. It is *also patently ridiculous to imply that roads built in the 1002 area to* facilitate oil and gas production will improve public access for recreation. Because of tight oilfield security, access would effectively be denied to the general public. Even if it were not, the restrictions on the discharge of firearms would effectively preclude any hunting throughout most of the 1002 area under full leasing. This in turn would cause increased hunting impacts on lands outside the 1002 area.

27. The summary of unavoidable impacts, Alternative A, should also include the following: direct loss of at least 12,000 acres of shorebird, passerine, waterfowl, and other migratory bird nesting and staging habitat.

28. On pages 105 and 133, we think that the effects on Sadlerochit Spring would be greater than negligible. Effects would likely be at least moderate. Again, the report is relying on more effective enforcement than we believe is realistic.

29. On page 134 the conclusion concerning effects on muskox from limited leasing is inconsistent. The conclusion begins by stating that effects would be the same as for full leasing. Those effects were given on page 114 as major. Yet, the discussion on page 134 goes on to state those effects as being moderate. Which is it? Since the concept of limited leasing appears to be totally guided by concerns relative to caribou, it seems likely that effects on muskox would still be major.

30. We think that the effects on Dall sheep from limited leasing (page 135) would be nearly as great as for full leasing because the increase in hunting by oilfield workers would probably be the same. These effects would probably be moderate to major.

31. We believe that the effects on the wolf and brown bear would likely be

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nearly as great for limited as for full leasing (pages 135-136).

32. On page 138 the reduction in economic benefits from limited leasing as compared to full leasing would probably not be quite as great as described (one third). The portion of the coastal plain that apparently would be excluded from leasing would only contribute about 25% of the economically recoverable oil, based on the estimates given.

33. On page 139 the effects of limited leasing on wilderness values were described as not destroying the wilderness qualities of the southeastern portion of the coastal plain. However, on the flat coastal plain, the visual and aural effects of an oilfield would extend much farther than the 5 miles given in the report as being a mitigating buffer distance.

34(a). On page 141 the description of socioeconomic effects of no action deceptively implies that the only chance for economic development in Kaktovik would be from oil development in the area. This is not necessarily true. It is possible for economic change from sources such as tourism (currently an annual industry of over $700 million in Alaska) or other industry. Furthermore, it is incorrect to state that under Alternative E "production of the estimated 3.2 billion barrels of recoverable oil would be forgone." Production of the oil, if it is there, could be postponed indefinitely, but the oil itself would remain.

(b) On page 141 it is stated that under the no action alternative the entire coastal plain within the refuge, including the KIC land would be closed to oil and gas development. That is not necessarily true. It is conceivable that Congress could allow oil development on the Native land without opening up the refuge lands.

(c) Also in relation to the above, on page 141 it is stated that if Congress took no action then the 1002 area would then come under the CCP process. Can the Secretary force Congress' hand? When would it be determined that Congress had taken no action? The day after the report is submitted? One year? Ten years? Never? What happens to the 1002 area in the meantime? It is still part of the refuge.

35(a). On page 142 in the discussion of Irreversible and Irretrievable Commitments of Resources the report fails to consider the possible changes in fish migration patterns and use of lagoon areas that could result from construction of docks and causeways.

(b) Also in this section, wilderness deserves a separate category, for once it is destroyed, wilderness is surely irretrievable. It should be clearly stated that air access for traditional uses is allowed by fixed-wing aircraft only. Helicopter use requires a special use permit on the refuge.

36(a). The recommended mitigation measures listed on pp. 145-147 are inadequate for an area as important as the Arctic NWR coastal plain. Many of the proposed measures have been unsuccessful in the past, or have been totally unacceptable to industry. For example, efforts by the Alaska Department of Fish and Game to restrict oilfield activities during caribou calving at the Kuparuk fields were not completely successful. In this case, so many variances were issued that the original restrictions might as well have never existed. The feeding of Arctic Foxes continues in the Prudhoe

and Kuparuk areas even though prohibited.

(b) Proposed mitigation measures should be made much more specific. For example, under number 13, key species should be listed: caribou (PCH and CAH), polar bears, brown bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, arctic char and grayling, and other species. Number 14 should show closed areas on a map, where no activity is permitted. Numbers 30 and 31 are extremely vague and rudimentary. Applicable laws and regulations should be cited. Number 32 should define specifically the process whereby the suggestions will occur.

(c) We also recommend additional stipulations. Number 33: lease sale stipulations shall prohibit any permanent facilities until a field has been delineated and a complete development plan approved. Number 34: Prohibit gravel extraction or gravel fill in drained lake basins, river deltas and riparian areas to protect important shorebird and waterfowl habitats. A map of these areas should be provided. Further measures, such as the implementation of stream setbacks for all facilities, should be considered. As stated previously, most of the proposed measures are likely to be ineffective without adequate enforcement.

37. Throughout the 1002 report, and particularly in the Environmental Consequences section, there is a marked failure to include predictions of impacts associated with service and support industries and facilities. Oil production has never occurred without these industries in the past, nor is it likely to in the future. This oversight lessens the predicted extent and level of impacts, and serves to undermine the usefulness of the 1002 report as an instrument for determining what those impacts might be.

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38. Disposal of each solid waste and liquid waste stream should be individually addressed. The treatment of drilling muds in this report is woefully inadequate. The state of Alaska is working on drilling mud regulations and these efforts should be taken into account.

39(a). No discussion of hazardous waste management is included in this report. Of the 99,000 metric tons of waste generated in Alaska in 1984, the oil and gas industry is responsible for managing 97,300 metric tons. Further growth is expected from exisiting production areas and this will increase demand for disposal. The state is in the process taking over hazardous waste management from the EPA and is working on hazardous waste siting facility regulations. These efforts will have direct bearing on any development in the 1002 area and must be addressed.

(b) Given the importance of the 1002 area to refuge wildlife populations, and the possible effects of wastes on populations and habitats, it might be appropriate to lift the oil and gas industry exemptions extended under the Resource Conservation and Recovery Act. If so, such a recommendation should be made to Congress. Hazardous waste presents another problem under other federal legislation, the Comprehensive Environmental Response Compensation Liability Act (CERCLA). If a hazardous waste spill were to occur in the 1002 area, it could significantly increase the federal government's liability under CERCLA. The potential for such a spill, and the resultant economic impacts to the federal government, should be addressed in the final 1002 report.

NATIONAL ENERGY NEEDS AND THE 1002 AREA'S POTENTIAL CONTRIBUTION

It is difficult to imagine what the actual basis is for justifying the opening of the 1002 area to full oil and gas leasing. It seems obvious that private corporations will benefit the most from a full leasing program, if economically recoverable oil deposits exist. As private entities benefit, the public will lose as lands set aside in the national interest have their surface permanently modified. Considering the arguments below, there seems to be nothing substantive to support claims that oil from the coastal plain is needed for national security. Nor would it seem that such oil, if it exists, could make enough of a contribution to domestic oil production to significantly reduce our nation's dependence on foreign oil.

We do not agree with the conclusions reached in Chapter VII. The fact that no national energy conservation policy is either implemented or proposed indicates to us that there is no serious desire to address energy problems in this country. Furthermore, it is difficult to support invading a wildlife refuge for non-renewable energy resources while at the same time providing no support for the development of renewable energy resources. Workable techniques and technologies currently exist in this country for both energy conservation and alternative energy, yet there is no national leadership to foster either of these long-term solutions to our energy problems. Instead, as the next paragraph graphically illustrates, the public is continually asked to believe that it is in the nation's best interest to sacrifice environmental values in favor of developing non-renewable resources so that they can be wasted.

According to some estimates, the recently vetoed National Appliance Energy Efficiency Act, passed by both the House and the Senate, would have saved the equivalent of over 1.5 billion barrels of oil over the next 20 years. That amount of oil constitutes almost half of the mean conditional resource estimate for the coastal plain (3.2 BBO) used in the 1002 report. There are also moves afoot to repeal the federal 55 mph speed limit. It is estimated that a national speed limit of 70 mph could increase daily U.S. energy consumption by as much as 1%. According to the 1002 report, if mean resource estimates prove correct for the coastal plain that area will contribute only 4.17% of U.S. oil demand by 2005. Recent recommendations from the Regulatory Review Task Force chaired by Vice President George Bush have supported the repeal of fuel economy standards for American cars. Thus, it would seem that more than 25% of the oil from the coastal plain would be used to enable Americans to go faster in their gas-guzzlers. This flagrant waste certainly does not constitute a "national need for domestic sources of oil."

Significant questions remain unanswered relative to the need to lease the coastal plain at this time, as is recommended. Right now on the North Slope, producing oil fields and fields with proven reserves are shutting down or going undeveloped. Examples of this are at Milne Point and the West Sak fields. This indicates that economic factors, not the national interest, are the true motivating forces behind oil exploration and development.

Chapter VII does not go far enough in evaluating the nation's total energy

needs and the development of energy sources other than fossil fuels. We realize that this would have been beyond what was technically required by ANILCA Section 1002, but it is certainly not precluded by that Act. We think that the assessment would have been more meaningful if this had been done. Our specific problems are as follows.

1. Throughout this chapter the analyses presented use the mean conditional, economically-recoverable estimate of 3.23 BBO. The probability associated with this estimate is only 40%. We believe this has resulted in unrealistically high predictions of possible benefits as described in this chapter. The report should have at least presented alternative figures based on the most reliable estimate at the 95% probability level. Otherwise the data presented are misleading.

2. On page 161 the second to last paragraph, first column states that geologic conditions are "extremely favorable for major discoveries." Perhaps the authors of this section have access to information that is missing from Chapter III; we don't believe that chapter supports such a conclusion as it now reads. One of the most expensive dry holes ever drilled was in Arctic Alaska, in an area with a predicted 70% chance of finding economically recoverable oil. The chance for this in the 1002 area is 19%.

3(a). On page 163 several statements in the left column support the concept that the nation's (and by inference, the world's) oil reserves are finite and will probably be exhausted in the not too distant future. The figures of 9 to 30 years are given for exhaustion of known reserves. In light of this it would be appropriate for the report to acknowledge that if the 1002 area contains any oil at all, it would only be a short-lived supply, and not very significant at all in terms of solving our long-range energy problems.

(b) The third paragraph in the right column on page 163 contains a key statement as to why we believe that the oil industry is so intent on getting into the 1002 area. The fact that all of the known promising onshore areas have already been explored for oil makes the 1002 area that much more attractive; offshore exploration and development are expensive. We believe that the "forbidden fruit" concept may be at work here and that it is serving to inflate ideas about the real oil potential of the area. That appears to be obvious when one looks at the Secretary's recommendation in comparison to the data contained in the report. If an area's untapped energy potential were sufficient reason for developing it, then Yellowstone National Park would be a geothermal energy project and Grand Canyon National Park would be a hydroelectric project. Commitments to preserve areas like these (including the Arctic NWR) in their natural states have been made by the American people repeatedly in the past. Continuing to preserve these areas is a reaffirmation of that commitment.

4. The answers to our long-range energy needs will be found only in looking at a broad range of sources and technologies, in addition to the implementation of effective energy conservation measures. On page 164 the second paragraph focuses only on fossil fuel energy sources. In this regard the report is extremely short-sighted. Also in this paragraph, what is meant by "long-term energy supplies"? Thirty years until the oil runs out isn't a very long time.

5. On page 164 the report concludes that full leasing of the 1002 area could significantly reduce the country's dependence on foreign oil. However, previous pages indicated that the United States would continue to rely heavily on foreign oil despite any possible contribution from the 1002 area. Also, in reference to Table VII-2 on page 162 we see that under full leasing the 1002 area would, if mean resource estimates prove correct, contribute at best less than 5% of U.S. oil demand. In terms of oil imports it would be just over 8%. We don't see how these figures can be termed "significant" by anyone's definition.

6. Also on page 164 the report states that oil produced from the 1002 area would enhance national security. Under the proposed development scenario, oil from the 1002 area would only be as reliable as the Trans-Alaska Pipeline System. America does have highly effective military forces, yet even they might be hard put to defend the 800 mile length of the pipeline. One well-placed bomb or cruise missile, or even land-based sabotage, could effectively eliminate this source of energy very early on in any conflict. If oil is needed for national security, it is difficult to understand why additions to the Strategic Petroleum Reserve have been halted. It seems like now is the time to make such additions in the interest of national security, when oil prices are low and foreign oil is available.

7. We note that the report states on page 165 that oil production from the 1002 area could reduce the foreign trade deficit by just over $8 billion in the year 2005. Presumably this figure is based on the inflated $33 per barrel price of oil used elsewhere in the report. Predictions should also be made using a $20 per barrel price or other lower and more realistic oil prices. The report doesn't project what trade deficits or oil prices will be in 2005, but it does state the deficit will likely increase from its present level. The report gives the 1984 deficit as $123 billion. If the trade deficit in 2005 is not any more than this, which is not likely, the reduction from oil production on the 1002 area will only amount to about 6.5%. Realistically, it might be somewhat less than this.

8. Table VII-4 on page 165 fails to take into account the potential effect of land exchanges inside the 1002 area. These exchanges have been under negotiation for years, and draft agreements currently exist. Above the Table it is noted that if non-Federal subsurface areas are leased by others, then portions of bonus, rent and royalty income shown as Federal revenue will accrue to others. Although this statement referred to the potential leasing of seismically mapped structures off-refuge, it remains true for lands traded out of federal ownership inside the 1002 area. Thus, under what now appears to be the most likley scenario if the 1002 area is developed, significantly smaller amounts of revenue will accrue to the federal government because of land exchanges.

9. We note, to the report writers' credit, that in the first paragraph on page 166 it is acknowledged that the coastal plain's economically recoverable estimates are speculative and not very precise. The conclusion to Chapter VII goes on to state that "Only actual exploration can provide the information needed to determine the extent and distribution of the resources, and, therefore, the potential benefit to the economy." This seems to provide a logical basis for the next chapter, the Secretary's Recommendations. However, the advice was not heeded, as review of that chapter shows.

SECRETARY'S RECOMMENDATION

We do not agree with the Secretary's Recommendations presented in Chapter VIII. The recommendation does not appear to be based on the information presented in the report, nor does it appear to be compatible with refuge purposes as defined in ANILCA. Bearing in mind the purposes for which the Arctic National Wildlife Range, and later Refuge, was established, we urge that the Secretary's Recommendation be rewritten to favor protection of the area's wilderness and wildlife resources over environmentally destructive development. To fulfill his obligations as guardian of our wild lands, the Secretary of the Interior should recommend wilderness designation for the 1002 area.

Our specific observations regarding the Secretary's Recommendation are as follows:

1. (a) The first paragraph on page 169 is highly misleading. It states that the 1002 area has been predicted to contain as much as 29 BBO but fails to mention that the probability associated with this prediction is only 5%. The failure to mention probabilities or to take them into consideration in the recommendations is highly deceptive, as is the failure to state that 29 BBO is the highest figure predicted relative to oil in place. To be accurate and informative, the Secretary should mention here that even if there are 29 BBO in place, the amount that could be recovered would be a much smaller figure.

(b) The second paragraph on this page states that the coastal plain could make a significant contribution to the economy and security of the nation, again with no accounting for the probabilities associated with the oil estimates. This statement is not based on information gathered through a careful reading of the report, nor is it based on a realistic evaluation of the national and international situation. This paragraph also states that development of the 1002 area could occur in an environmentally sound manner. For reasons stated and documented in our comments relative to the Executive Summary section, we emphatically disagree with this statement.

(c) The third paragraph makes several statements that are not at all supported by the text of the report, in particular the text of Chapter III. By not basing the recommendations on the report, the Secretary demonstrates extreme negligence, which amounts to a gross misuse of the government funds spent in conducting years of baseline studies and doing the geological analyses.

(d) This page goes on to paint an incredibly gloomy picture of the nation's energy future. And then it proposes to destroy the last area of the Alaskan North Slope that could be preserved as wilderness, in exchange for a meager supply of oil that would be a stop-gap measure at best in providing for that energy future. This indicates irresponsibility on the part of the person who is supposed to be the chief steward of this country's natural resources.

2. In the last paragraph on page 169 the recommendations make reference to the fact that the Central Arctic Caribou Herd population has increased substantially since oil development began in the Prudhoe Bay oilfield, using

this as part of the justification for recommending full leasing. This statement ignores information presented in Chapter V of the report which predicts major impacts on the Porcupine Caribou Herd and other species from full leasing of the 1002 area. Information included on page 108 of the 1002 report itself describes important differences between the two caribou herds, and reasons why conclusions based on comparisons of the two herds cannot always be relied upon. On page 169, the Secretary oversimplifies the situation. The Central Arctic Herd is much smaller than the Porcupine Herd and has available to it much more extensive potential calving areas than does the Porcupine Herd. We could go on with this discussion of impacts to caribou, but it has already been treated elsewhere, and we refer the reader to that source (Elison et al. 1986).

3(a) On page 170 the second paragraph presents an elaborate scenario for developing and offering lease sales in the 1002 area. It sounds like a lot of effort for an area that the DOI is already making extensive plans to trade away to private entities.

(b) The statement "Development must result in no unnecessary adverse effects, and unavoidable habitat losses should be fully compensated", is found on page 170 and in Assistant Secretary Horn's cover letter to the 1002 report. This is not only vague and contradictory, but has no bearing on reality (legislative, administrative, or otherwise). It seems like unavoidable habitat losses would be unnecessary adverse effects. Please explain what the words "unnecessary" and "compensated" mean in the quoted sentence. What standards will be used to define what "necessary adverse effects" are?

(c) ANILCA Section 304(b) reads: "...the Secretary may not permit any use, or grant easements for any purpose ... unless such use (including but not limited to any oil and gas leasing ...) or purpose is compatible with the purposes of the refuge." Does the 1002 report make such a compatibility determination? If so, where in the report can it be found? If not, then how can the Secretary propose full leasing without first determining compatibility? Given the purposes for which the Arctic National Wildlife Refuge was established under ANILCA Section 303, and the 1002 report's admission that many adverse impacts will be unavoidable under a full leasing program, we submit that full leasing cannot possibly be compatible with refuge purposes.

5. The report fails to consider the cumulative impacts on coastal plain resources from other activities, such as possible oil development in Canada, on adjacent state lands and offshore. Development of the Arctic Refuge coastal plain will most likely lead to development of those other areas, thereby ensuring that cumulative impacts occur. The federal government has already sold offshore oil and gas leases in the Beaufort Sea, and the State currently plans to conduct two lease sales in waters offshore of the refuge in 1987 and 1988. It is highly likely that additional infrastructure within the 1002 area would be required to support future exploration and development activities in these other areas. Failure to consider these cumulative impacts makes the environmental impact evaluations in the report less realistic.

6. The report fails to consider some of the other more widespread, insidious impacts that would result from burning of the fossil fuels that

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might be produced from the refuge. These include decreased air quality, with attendant disease and, in some cases, death. It is estimated that as many as 50,000 deaths occur each year in the U.S. as a result of fossil fuel pollutants (USOTA 1984 as cited in Postel 1986). Combustion products of fossil fuel are known also to be a major contributor to the global atmospheric increase in carbon dioxide and other compounds, which are predicted to begin producing some major climatic changes and other adverse effects on human health, food production, and forests during the early part of the next century (Mercer 1978 as cited in Hayes 1978, Postel 1986).

7. We are particularly disappointed that the report does not bring into its consideration of the nation's energy future alternatives to this country's futile reliance on fossil fuels which will someday be expended. Such consideration would have been widely regarded as a progressive step into the future. In Menzies (1978)(as cited in Hayes 1978), Robert Donahue, then Vice Chairman of Sun Oil Company, was quoted as saying, "We are in a business that is dying." Some new source or sources of energy will be required to fill the gap; that is inevitable. It has been predicted that by 2025 as much as 75% of the world's energy could be obtained from solar sources (Hayes 1977). Hayes (1977) states that "Every essential feature of the proposed solar transition has already proven technically viable; if the 50-year timetable is not met, the roadblocks will have been political -- not technical." By disallowing oil development on the 1002 area, the federal government would be helping in a small way toward speeding this transition, while at the same time preserving one of the world's most significant wildlife and wilderness areas.

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SUMMARY AND CONCLUSION

Our major problems with and objections to the 1002 report in its present form are:

a) The report fails to consider cumulative impacts to coastal plain resources

b) Proposed mitigation measures are likely to be largely ineffective

c) Possible effects of contaminants and hazardous wastes on coastal plain populations and habitats are not adequately addressed

d) The magnitude of activities and facilities that will be necessary for a full leasing and production program are not adequately portrayed

e) Possible sources and impacts of air, water and noise pollution are not addressed

f) The report fails to consider the potential effects of land exchanges that are currently being negotiated for the 1002 area

g) The Secretary's recommendation for full oil and gas leasing not only violates FWS mitigation policy but is contrary to all of the purposes for which the refuge was established under ANILCA Section 303

h) Wilderness review, mandated under ANILCA Section 1004, has not been conducted

In conclusion, the NAEC finds the 1002 report to Congress extremely disappointing. We fail to see how the Secretary's recommendations are supported by information contained in the draft 1002 report if one considers the important wildlife and wilderness values of the Arctic NWR coastal plain, the predicted impacts of oil and gas development there, and the very limited contribution that the coastal plain could ever be expected to make to the country's energy resources. Under these conditions, we do not see how it could ever be in the best interest of this country to destroy the coastal plain's surface in what might be a vain quest for non-renewable resources. Therefore, we believe Alternative E, Wilderness Designation, is the most prudent and meaningful course in this matter, and we urge the Secretary to alter his recommendations accordingly.

We feel that a near total rewrite of the draft 1002 report is necessary, due to the broad extent and serious nature of the problems we have outlined. The language in ANILCA mandates that this report contain the information it now lacks before it can be presented to Congress. Our comments in this letter indicate in detail what that informaton is. We look forward to seeing your responses to our concerns.

Sincerely,

Kate Pendleton

Kate Pendleton
Associate Director

cc: Hon. Ted Stevens
Hon. Frank Murkowski
Hon. Don Young
Governor Steve Cowper
Secretary Donald Hodel
Assistant Secretary Bill Horn
Regional Director Bob Gilmore
Refuge Manager Glenn Elison
Other environmental groups

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DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Randall R. Rogers

Mailing Address 218 Driveway, Fbks, Ak. 99701

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☒ I am speaking for Northern Alaska Environmental Center
(please enter name of organization you represent)

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Northern Alaska Environmental Center

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January 5, 1987

STATEMENT OF RANDALL R. ROGERS, EXECUTIVE DIRECTOR, NORTHERN ALASKA ENVIRONMENTAL CENTER, BEFORE THE U.S. FISH AND WILDLIFE SERVICE ON THE ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT

Originally founded in 1971, the Northern Alaska Environmental Center is the northernmost conservation organization in the United States. We have a membership of over 700 persons living both within and outside the State of Alaska. The Northern Center is dedicated to the protection of public lands and waters of arctic and interior Alaska.

The flaws in the reasoning and conclusions of the draft 1002 report are much too numerous to be adequately dealt with which was the original time we thought we had three minutes of verbal testimony. The Northern Center will provide detailed written comments on the draft report prior to the closing of the public comment period.

We are extremely perturbed at the Department of Interior's attempts to keep the voices of the Alaskan public out of the decision on the coastal plain of the Arctic Refuge. It is dispicable that a public agency would go to such great lengths to avoid the involvement of the american people.

We would not be here today if it were not for a court order forcing the Department to provide for public involvement. Even with this court order, Interior has refused to conduct hearings in Fairbanks and Arctic Village, two of the communities who will be most affected by the final decision. We can only speculate that the decision to avoid a hearing in Fairbanks was based on the U.S. Fish and Wildlife Service's knowledge that residents of Fairbanks are deeply concerned with the ecological integrity of the Arctic Refuge. We do not believe it was simply a buerocratic oversight that the people of Fairbanks have been denied the opportunity to voice their concerns on the draft 1002 report.

The Northern Alaska Environmental Center supports Alternative E, which recommends wilderness designation of the entire 1002 area. Information provided in the draft 1002 report does not justify the proposal for full leasing of the coastal plain. In fact, it appears that this recommendation is based largely on political motivations to promote the oil industry, rather than the data derived during the coastal plain resource assessment.

The environmental effects of oil development in the coastal can be summarized by one quote from the report.

> "Long-term losses in fish and wildlife resources, subsistence uses and wilderness values would be the inevitable consequences of a long-term committment to oil and gas development, production and transportation."

A major flaw of the report is its failure to consider the cumulative impacts from other activities on coastal plain resources. The federal government has already sold offshore oil and gas leases in the Beaufort Sea, and the State is proposing to conduct two lease sales in the waters offshore of the refuge in the near future. This failure to consider these cumulative impacts makes the environmental impact evaluations in the report less realistic. In addition, mitigation measures proposed in the report represent wishful thinking at best and do not realistically assure protection of biological resources.

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The high oil and gas potential for the area that is described in the executive summary are not supported by the text of the report. Reasons for this observation include:

a. The report states that there is only a 19% chance of there being economically recoverable oil in the 1002 area. We do not see this 1 in 5 chance of discovering oil as very good odds for risking damage to the internationally significant wildlife and wilderness resources of the refuge.

b. In several places in the report, the proximity of the area to Prudhoe Bay is cited as an encouraging factor. The report states that most of the Prudhoe Bay production is from Ledge Sandstone rocks of the Ellesmerian sequence. It is also stated that these rocks are likely ~~non~~-existant in the 1002 area. NOT

c. Page 66 of the report states that the two largest prospects account for the majority of the estimated in-place oil. Yet it is also stated that these prospects are dependent on the presence of Ellesmerian rocks as reservoirs. Once again, the report states that these types of rocks are not likely present in the 1002 area.

d. On page 54 the report states that if Ledge Sandstone rocks are not present, then the chances of oil being present in the area are much reduced. These rocks are cited as being the major possible source rocks for oil production in the area, but their existence in the area is uncertain. The report states that "Drilling one or two wells in critical areas would resolve this question." Yet, the report recommends full leasing! This recommendation is not logical and prudent considering the predicted environmental consequences of full leasing.

The report bases its arguments on the national need for oil on unrealistically high oil prices of $33 per barrel and estimates of in-place oil with low percentages for probability of occurance. If the report used realistic oil price assumptions and relied on estimates of in-place oil with high probabilities for occurance, strong arguments for the national need for oil could not be made.

In fact, if one looks solely at the economic factors in considering the fate of the Arctic Refuge coastal plain, it does not make sense to move forward with full scale leasing. At a time when existing oil fields in Alaska and other parts of the nation are shutting down production we should not initiate leasing of a field which, in all liklihood, is no larger and lies in one of the most environmentally sensitive areas of North America.

If leases are sold in the 1002 area during this time of low oil prices the only beneficiaries will be the multi-national oil companies. Alaskans and all americans who might benefit from oil lease revenues will see only a minimal return while jobs associated with actual production will not be realized until oil prices rise adequately for the oil companies to reap huge profits with little cost.

In summary, we urge the Department to consider the values for which the Arctic Refuge was established and recommend the best mechanism available to protect those values, namely, wilderness designation of the coastal plain.

PACIFIC LEGAL FOUNDATION

COMMENTS OF PACIFIC LEGAL FOUNDATION
ON THE DRAFT ARCTIC NATIONAL WILDLIFE
REFUGE, ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT

February 3, 1987

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INTRODUCTION

Pacific Legal Foundation is a nonprofit public interest law firm based in Sacramento, California, with a branch office in Anchorage, Alaska. PLF has over 19,000 supporters throughout the United States and has the primary purpose of litigating in the public interest in defense of individual freedoms, private property rights, and the free enterprise system. PLF has extensive experience in the field of natural resource and environmental law and the issues surrounding natural resource development. Because the disposition of the Arctic National Wildlife Refuge (ANWR) coastal plain is of great national significance, PLF is submitting these comments for the purpose of discussing the draft report. PLF believes that the report fully complies with all legal requirements and addresses all issues necessary under law. PLF also concludes that the report's recommendation for congressional action that would allow the leasing of the coastal plain is supported by the facts and is in the national interest.

I

THE FISH AND WILDLIFE SERVICE HAS DONE AN ADMIRABLE JOB IN ENCOURAGING PUBLIC COMMENT ON THE ANWR COASTAL PLAIN

Although some controversy existed over whether or not public comment had to be solicited during the preparation of the ANWR coastal plain report, PLF believes that the level of public participation in the review of the draft report fully satisfies all legal requirements. The hearings in Anchorage, Katovik, and

Washington, D.C., were all very well attended, and it was obvious that the interested public had ample notice and was fully aware of the hearing process. It is especially noteworthy that the hearings in Katovik, Alaska, were well attended by local native individuals and associations who were able to express their concerns, support, or opposition to the recommendation of congressional action for leasing the ANWR coastal plain. Since Katovik will be the community most affected by any oil and gas exploration or leasing activity, the participation of Katovik residents was crucial to the fulfillment of the public participation requirement. In addition to this evidence of compliance, it is to be expected that many other individuals and organizations are participating with written comments. In conclusion, allegations made by some groups of inadequate public hearings are totally unfounded.

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II

THE DRAFT REPORT HAS CONSIDERED FULLY, TO THE EXTENT REQUIRED BY LAW, THE POTENTIAL ENVIRONMENTAL EFFECTS OF EXPLORATION ON THE ANWR COASTAL PLAIN

After reviewing some of the oral testimony given at the Anchorage hearings on the ANWR coastal plain report, PLF is aware that certain criticisms have been leveled against the draft report involving an alleged failure to adequately study certain potential environmental consequences of exploration on the coastal plain. PLF believes that these allegations are baseless and that the Fish and Wildlife Service has more than adequately

studied all potential significant environmental consequences that might result from exploration activity.

A. "Cumulative Effects"

It is especially important that the scope of the proposed report and its recommendation for congressional action be put into perspective when determining exactly what should be included in the final report. For example, it was suggested at the Anchorage hearings that the draft plan failed to address the "cumulative impacts" of a whole menu of activities in the arctic. In other words, the commentator believed that the coastal plain report should have assessed every development activity, actual and proposed, anywhere in the same general arctic geographic region. The draft plan, however, was completely correct in limiting its study to those activities having some rational bearing to the range of proposals found in the plan. Otherwise, there would literally be no end to the scope, detail, complexity, and expense to the study; and there certainly would be no way it could be completed in an efficient and timely manner. When Congress directed Fish and Wildlife to prepare the report it ordered that the coastal plain be studied, not the entire arctic geographical region. More importantly, there is no legal justification for extending the scope of the report beyond that which is the subject of the report--the coastal plain and the study's action alternatives including congressional action to permit leasing.

Statutory and case law requires a discussion of "cumulative impacts" in only two situations. The first is where

an agency is proceeding according to a programmatic or regional plan, as when a proposed activity is merely a segmented part of a larger action. For example, the construction of a forest road cannot be considered in isolation from a timber harvesting plan when that road is designed solely to facilitate the timber harvesting plan. Therefore, a discussion of the environmental impacts from the road construction must also consider the related timber plan. The second instance in which cumulative impacts must be discussed is where a specific proposal for an activity simply cannot be considered in isolation from other similar or related activities in the same specific area.

Neither circumstance is present here and there is no need to study additional "cumulative impacts." The secretary's proposal for Congress to facilitate leasing is in no way related to any other actual or proposed activity in the arctic. There is absolutely no connection between the recommendation for congressional legislation and oil activities to the west on the North Slope, or anywhere else. There is most certainly no relationship to any activities in Canada.

Furthermore, the recommendation for congressional legislation will not result in any immediate leasing activity or environmental effects. Before any leasing commences after appropriate legislation there still must be a comprehensive environmental review. It is at this review stage where cumulative effects, if any, should be considered. Otherwise, the report will simply be far too speculative to be of any value. It is too soon to tell where leasing will be proposed and what its

extent will be. When there are actual leasing proposals on the table, then and only then will it be appropriate to study the "cumulative effects." For these reasons, the report properly confined its discussion to potential environmental consequences germane to the proposal for congressional action, namely the actual leasing of the coastal plain.

B. "More Study"

Some commentators have suggested that "more study" is required before the Congress can make a reasoned decision on the leasing of the coastal plain. This is untrue. The draft report is fully complete and contains all the data necessary for Congress to make an informed decision. It appears that the call "more study" is nothing more than a thinly disguised attempt to delay the project into oblivion. The nation needs to begin today the exploration for more oil reserves because production will take years to implement after a discovery is made. As domestic reserves decline, the need for future reserves will become imperative. If the needless call for more study is heeded, we will probably study ourselves right into another and more serious oil shortage. More to the point, the critics of oil exploration have submitted no compelling arguments for more study. The coastal plain region is one of the most studied environments in the world.

Indeed this is not the first time calls for more study have clouded the picture in the ANWR. When the Alaskan Arctic Gas Pipeline Company began the process for building a gas pipeline, an exhaustive series of environmental studies were

initiated. Despite objections that the studies were inadequate, the Federal Energy Regulatory Commission conclusively determined that pipeline construction could be compatible with environmental values in the Arctic National Wildlife Refuge.

However there is one area of uncertainty that still must be resolved. Despite a plethora of geophysical and geological surveys, it is still not known how much recoverable oil may lie under the coastal plain. The only way this information can conclusively be discovered is for exploratory drilling to commence. Therefore, the secretary's proposed recommendation for congressional action to facilitate leasing is highly appropriate.

III

THE ECONOMIC BENEFITS OF OIL LEASING WILL INURE TO THE ENTIRE NATION

The draft ANWR report accurately reports that the economic benefits from the development of the coastal plain will benefit the nation by helping to avoid future shortages, reducing our dependency on foreign oil and foreign pricing structures, and improving our balance of trade. A further economic advantage that should be considered is the tremendous economic benefit to the lower 48 states that will result from a major exploration effort on the ANWR coastal plain. The infrastructure and expertise required to take advantage of leasing opportunities on the coastal plain will not all be supplied by Alaska. Instead, the now severely depressed oil exploration industry of the lower 48 will be called on to help explore and develop the coastal

plain. This could very well be a substantial boost to the support industries. For example, between 1980 and 1986 a total of $10,536,000,000 North Slope oil development dollars were spent in the United States, of which $9.18 billion were expended in the lower 48. In the State of California alone, over $1.8 billion was spent through the oil support industries on North Slope production. If the exploration of the coastal plain commences there will be great direct economic benefits to all other states, and, if the exploration is successful, there could be a boost to the lower 48 economies to match that provided by North Slope production. This sort of private sector economic development should be strongly supported. Adhering to the secretary's recommendation will help achieve this goal.

CONCLUSION

The draft ANWR coastal plain report is an important and well designed document. It accurately portrays the potential economic benefits that will arise if the recommendation for congressional action is adhered to. All relevant potential environmental consequences are addressed as well. The report fully complies with legal requirements, and its recommendations should be supported.

DATED: February 3, 1987.

Respectfully submitted,

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By _____
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Renewable Resources Inc.

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January 26, 1987

Director
U.S. Fish & Wildlife Service
Division of Refuges
U.S. Department of Interior
Room 2343, Main Interior Building
18th & C Streets
Washington, D.C. 20240
U.S.A.

Dear Sir:

Re: ANWR Coastal Plain Resource Assessment

Enclosed are review comments on the subject Draft EIS. I have also enclosed an unpublished paper which is cited in the review.

Sincerely yours,

RENEWABLE RESOURCES INC.

R.D. Jakimchuk
President

RDJ/ir
enc.

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A REVIEW OF THE REPORT ON THE ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN RESOURCES ASSESSMENT

Prepared by

R.D. Jakimchuk and L.G. Sopuck

of

Renewable Resources, Inc.

For the

Alaska Oil and Gas Association

January 1987

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1.0 INTRODUCTION

The purpose of this report is to review the terrestrial wildlife portions of the U.S. Secretary of the Interior's 1002(h) report concerning oil development in the Arctic National Wildlife Refuge (ANWR) in northeastern Alaska. Our approach was to assess the adequacy of the data base used to describe resource values and to predict impacts. We then determined whether the data base was used in an objective and scientifically-sound manner to predict impacts and recommend appropriate mitigative measures. Following sections provide periodic reference to Appendix I which is a list of specific comments keyed to Chapters II and VI of the 1002 report. Appendix I should be consulted for additional and more specific comments.

2.0 ADEQUACY OF THE DATA BASE

The wildlife resource and impact assessment sections of the 1002 report often contain unreliable statistics and poorly referenced and unqualified statements. Conclusions are often based on uncritical acceptance of one or two studies or on unreliable data bases. In some cases, speculative statements are not distinguished from those which are well-documented and hence are misleading.

There are several examples in the report of where the reliability of population data are not addressed. For example, the estimate of 180,000 animals for the Porcupine caribou herd (PCH) in 1986 is crude because the herd has not been properly censused since 1983 when an estimate of 135,000 animals was obtained (Whitten, 1986). However, the uncertainty of the 1986 estimate was not addressed in the report. The report also states that there is a major concentration of Central Arctic herd (CAH) caribou calving on the Canning River Delta. This was based on very limited survey information. In contrast, more extensive calving ground surveys conducted by Renewable Resources Consulting Services Ltd. (RRCS) from 1981-86 show that the Canning River Delta is not a major calving area, but that there tends to be a continuum of calving along the coast with concentrations between major river valleys (Carruthers et al., 1984; Carruthers and Jakimchuk, 1985; Sopuck and Jakimchuk, 1986). These studies were not referenced in the text.

The available data base on the distribution and movements of the PCH and CAH is vastly under-utilized in the report. The calving distribution of the PCH was studied by RRCS from 1972 to 1977 but these studies are not cited directly in the report (Jakimchuk et al., 1974; Roseneau et al., 1974; Roseneau and Curatolo, 1975, 1976; Curatolo and Roseneau, 1977; Bente 1977). However, these reports contain important

site-specific movement and distribution data for the PCH. The report states that caribou use riparian areas during spring and summer but does not cite a recent study by Carruthers et al. (1984a) that shows that females with calves usually avoid riparian habitats. In addition, the movements and distribution of CAH caribou within the 1002 area are described in detail in the report, yet the movements have been very poorly documented to date. If recent unpublished data were used they should have been referenced in the report.

The definition of the "core calving area" for the PCH was derived using information obtained from 1972-85. This report refers to this period as the "14-year study". In fact, the data were obtained from several individual studies and surveys. During some years (e.g., 1973, 1974, 1980) very limited information was obtained on the calving distribution of the PCH, and even more limited estimates of density. Yet it appears in the report that the "core calving area" was defined based on a solid, 14-year data base.

In the impact section of the report, the indirect loss of habitat as a result of behavioral avoidance is quantified using a worst-case scenario. However, based on the studies conducted to date, it is extremely speculative to predict a "zone of total displacement" around a particular development. These speculations are based primarily on one quantitative

study, Dau and Cameron (1986). This study shows short-term partial displacement by maternal groups around an active road system, but also shows that caribou responses can be highly variable. In addition, no quantitative information on how caribou may habituate to these disturbances is available. Habituation over the long term may significantly reduce this "zone of displacement".

The report presents several statements as fact rather than speculation. For example, it is assumed that increased energy demands on individual caribou during the insect relief period will lead to reduced survival and productivity of the herd. However, there are no studies on North American populations of caribou that have established this link. Also, the report makes the implicit assumption that caribou are a "food-limited" species. However, there are no studies that show that mainland populations of caribou in North America are food-limited. European references are not appropriate because reindeer herds are maintained at artificially high stocking levels in largely predator free systems.

The report states that the PCH may have difficulty accommodating to developments such as pipelines because they will interact with them for short periods during the year. However, the report fails to discuss RRCS studies of the Nelchina herd (Carruthers et al., 1984b) which shows that this

herd is exposed to TAPS only twice each year, but crosses it successfully. In the assessment of the impacts of aircraft overflights on caribou, the report ignores the work by Davis et al. (1985). The 1002 report appears to cite references selectively rather than presenting a more balanced viewpoint. Davis et al. show that caribou populations can continue to grow despite sometimes severe harassment from aircraft and other military activities including bombing and strafing within traditional calving ranges.

In summary, the 1002 report does not adequately qualify or reference its conclusions and hence presents an unbalanced assessment of impacts. In many cases, the worst case scenario for impacts is unjustified.

3.0 MAJOR ISSUES FOR THE PORCUPINE AND CENTRAL ARCTIC HERDS

Although a worst case scenario is a valid approach to environmental analysis, for significant resources such as the PCH it should incorporate the following:

1. Assumptions should be realistic and properly qualified.
2. The factual basis for analysis should be supported and well documented.
3. Impact criteria should be well defined and supported.

4. Use of the scientific literature should be objective rather than selective.

3.1 The Displacement Issue

The impact assessment on the PCH is largely based on two studies: Whitten and Cameron (1985) who concluded that calving of the CAH has been displaced from the Prudhoe Bay area since the onset of petroleum development, and Dau and Cameron (1986) who reported local displacement of maternal caribou along the Milne Point Road. Whitten and Cameron (1985) present conclusions based on anecdotal data which are largely correlations after the fact. Jakimchuk (1986) presents a detailed rebuttal to the principal conclusion that calving of the CAH has been displaced from Prudhoe Bay. Their own paper recognizes the possibility of other factors such as flooding which may account for the lower calving density in the Prudhoe Bay Complex (PBC). Jakimchuk (1986) reviews evidence that indicates that the PBC was not an important calving area even before development and that the correlations made by Whitten and Cameron reflect a calving distribution in response to natural influences. However, neither viewpoint can be termed conclusive because of the post facto correlations which are made and the limitations of pre-development data and possible comparisons. Jakimchuk (1986) does, however, present a

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critical appraisal of those data and the conclusions of Whitten and Cameron. The evidence supports the notion that the Prudhoe area is similar to other deltas in having a low calving density which existed pre-development and that conclusions that calving has been displaced from the PBC are unsupportable.

Because of the contentious and inconclusive nature of the Prudhoe Bay scenario, the report of Whitten and Cameron (1985) is not a sufficiently strong basis to rely on for the PCH scenario analysis.

Dau and Cameron (1986) present a far better study design and basis for assessing the implications of sensory disturbance to the distribution of calving caribou. Because of its importance as the basis for the impact analysis we have reviewed that study (Appendix II) for its relevance and validity. Several points have emerged from that review which are important to the analysis for the PCH.

1. The Dau and Cameron study, although a better design than previous studies, is not definitive. It documents a <u>partial</u> avoidance by maternal cows over a period of high disturbance. However its limitations include lack of a control, and no discussion of conflicting results with West Sak Road studies which show no avoidance by calving groups along the West Sak Road. Their comments on lack of habituation by caribou to disturbance are unsupportable.

Although Dau and Cameron document reduced habitat use (i.e., lower densities) by maternal groups near the road, they did not in fact document displacement which may be defined as an active process of dislocation of caribou from a previously used area in response to a stimulus. Further, they do not comment on the significance of the fact that numbers of calving caribou in their study area almost doubled between the pre- and post-development study periods.

The most significant error of the scenario analysis for the PCH is the assumption that what is termed "behavioural displacement" would be total for a 2-mile zone adjacent to roads using Dau and Cameron (1986) as a basis for that analysis. A total displacement was not found by Dau and Cameron and there is no basis for the assumption of a zone of habitat loss of that magnitude. Moreover, the analysis unjustifiably fails to discuss the potential for habituation and is highly selective in use of relevant references. It specifically ignores those references which may temper conclusions pertaining to the adverse effects of disturbance and displacement on caribou demography.

For example, Davis et al. (1985) report no short term demographic effects on the Delta herd from displacement from their core calving area and no adverse demographic effects on the herd from severe disturbances on the calving grounds. This

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reference is not even cited in the EIS. The analysis of aircraft disturbance ignores at least a dozen aircraft disturbance studies, many of which are more quantitative or relevant than those cited. The gratuitous editorial comment on Bergerud et al. (1984) (ref. 41, p. 110, App. I) as a paper that is "widely disputed" indicates a biased approach to dissenting viewpoints. We consider that such an arbitrary dismissal of a major, refereed, published paper is unethical.

Previous sections of this review and Appendix 1 identify omissions of specific papers relevant to an objective analysis of impacts. Another example is omission of Carruthers et al. (1984b) on crossing success of TAPS by the Nelchina herd, which has a direct relevance to the question of effects on caribou which only periodically contact a pipeline (ref. 36, p. 109, App. I). This report is not listed in the bibliography of the EIS.

The assumption that displacement from the PCH core calving area would be complete is not justified on the basis of known examples. The further link to population decline is even more speculative. There is inadequate treatment of alternative habitat use and the potential mitigating effects of habituation. The net result of the foregoing omissions is to greatly exaggerate the worst case beyond what can be supported on scientific evidence.

Although the qualifiers "could be", and "maybe" are, frequently used in the impact predictions they are not defined. The assessment would be enhanced considerably by an objective risk or probability analysis in order to place predictions in context with their likelihood of occurrence.

The analysis of comparative calving densities for various herds has been linked to the vulnerability of the PCH to population decline if displacement occurs because of its higher calving densities. That analysis, however, depends entirely on undocumented assumptions that:

a) There is a relationship between calving density and herd productivity.
b) That alternative calving areas are incapable of sustaining the PCH at current levels.
c) That displacement would be complete.
d) That the growth of the CAH is partially a result of its low calving density.

The arguments presented in the EIS regarding assumed relationships between calving density and herd productivity are both speculative and hypothetical. There is no supporting data to warrant the conclusions made. Therefore, the severity of the impacts predicted are overstated and subject to question.

We have given little attention to the impact assessment of the CAH in this summary and refer the reader to specific notes and comments in Appendix I. In general, projected impacts on tne CAH are highly overstated since 1002 developments would impinge on a smaller portion of the herd than do existing petroleum developments in the Central Arctic region.

3.2 The Insect Relief Habitat Issue

Although there is considerable theoretical concern for, and discussion of, the importance of insect relief habitat to the PCH and CAH, there is very little documentation of its role or significance to the herds. The overall requirements for insect relief and its relationship to herd health and energetics requires additional study and assessment. As a migratory herd the PCH has insect relief habitat options both north and south of the study area and has utilized both coastal and montane habitats for that purpose. Overall, insect relief habitats are neither scarce nor inaccessible. Maintenance of movement patterns as specified in the mitigation measures and as experienced by the CAH would ensure access to insect relief habitats both along the coast and inland. In addition, elevated areas of gravel pads will increase availability of insect relief sites inland albeit to a minor extent compared to natural areas.

At present, there is no basis to conclude that access to insect relief habitat will be impaired by the development scenario provided that mitigation measures proposed are implemented.

3.3 Mitigation

In general, we agree with the mitigation analysis. The major exception is the recommendations for ramps to facilitate caribou passage. Recent studies show that ramps are not necessary to ensure caribou passage across pipeline corridors provided adequate pipe clearance is available. Further, the construction of ramps has biological costs associated with gravel removal and transport and habitat alteration at source locations and ramp locations.

Although we are in agreement that air traffic should be controlled to minimize disturbance the mitigation analysis presents a one-sided scenario by omitting references to caribou populations exposed to aircraft disturbance which have not suffered demographic effects (Bergerud et al., 1984; Davis et al., 1985). The restrictions proposed for aircraft appear to be overly conservative. For example 2,000 ft-ceilings on overflights are proposed from 20 May to 15 August. However, by

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15 July the majority of caribou have left the 1002 area on their mid-summer migration into Canada.

There is also scope to add to and improve the mitigation measures to further reduce impacts on the PCH. These include site-specific scheduling to minimize activity during sensitive periods.

A major unknown is how large concentrations of caribou (100,000 or more in post-calving aggregations) would respond to and negotiate oil development infrastructure. There is reason to believe that large groups are more susceptible to influences such as deflection because of the impetus of their numbers and the dynamics of group leadership. Because of these unknowns it would be prudent to establish facilities such as roads and pipelines in areas of minimal potential conflict with large aggregations of caribou.

Despite evidence that caribou cross under pipelines with clearances as low as 5 ft, we have previously recommended a higher clearance where interaction with large aggregations are anticipated. We feel that a minimum of 7 ft ground/pipe clearance within the range of the Porcupine caribou herd would be a highly significant improvement as a mitigation measure. The major rationale for increasing the clearance is to provide a larger margin for facilitating passage of large

concentrations of caribou and because of the aforementioned impetus of large groups which can govern directional movements during post-calving and mid-summer migration. A higher clearance would facilitate passage of mature antlered bulls and would maintain a physical opening between passing animals and the overhead pipe which would be visible to those animals in the rearguard of large herds.

The existing scenario shows a proposed pipeline location traversing the known post-calving aggregation area for the PCH south of Camden Bay. Additional study is recommended to improve that location, possibly by moving it further north to avoid the area of massive aggregation without precluding access to insect relief habitat.

The foregoing and other measures such as scheduling or convoying traffic during periods of major caribou movements would serve to greatly minimize adverse impacts on the herd and reduce the magnitude of predicted impacts considerably.

In view of the foregoing we disagree with the statement (ref. 43, p. 111, App. I) that mitigation is not possible in Resource Category I lands and feel that there are significant mitigative opportunities and measures to reduce the adverse effects of development activities on those lands.

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4.0 OTHER SPECIES

Appendix I provides specific annotations for other species. A major deficiency in the analysis is incomplete use of available literature and data sources. As a result, potential negative impacts tend to be over-emphasized, e.g., the status of Polar Bear denning is accorded considerable attention. However, denning in the 1002 area is an extremely minor component of denning adjacent to ANWR which in turn is a minor component of denning overall for the Beaufort Sea polar bear population.

We are in agreement with the projected impacts and description on grizzly bears. The exponential growth rate of muskoxen may be limited by habitat availability in future. Effects of disturbance on this growth rate are speculative at the present time. The history of the transplant and growth have established the capability of muskoxen to pioneer a new environment and is evidence that they are responsive to opportunities provided by mitigation. In the absence of controls or management, muskoxen would be forage regulated at some future point and might compete with caribou in a conflicting way.

APPENDIX I.

Detailed review comments on the ANWR impact assessment report, pp. 27-170.

A) Chapter II, Existing Environment, pp. 27-45.

Page	Reference No.	Comments
28	1-2	The "core calving area", as defined, has caribou densities of 50 animals/mi^2 or more during five of 14 years. Caribou use of their calving grounds is very dynamic with site-specific densities varying greatly within the calving period. Core calving area is not necessarily "traditionally" favored and the words "strong fidelity" are misleading. It is in fact an area where high density of calving has occurred frequently, i.e., yearly overlap within the overall calving range.
28	3	This paragraph lacks references and is misleading. The generalization that caribou use riparian areas as travel routes and important feeding areas is not fully supported by the available literature (see Jakimchuk and McCourt, 1975; LeResche and Linderman, 1975).
28	4	References or qualifications are required on types of disturbances which may affect bonding and increase in mortality. We need a more realistic impact prediction on the effects of disturbance on calf mortality.
28	5	Uplands are in southern part of calving grounds, not the northern part. Also, use of uplands by most calving cows contradicts previous statement (see #3) that calving "caribou" use vegetated riparian habitats (see Jakimchuk et al., in press). There are no citations of work done by Renewable Resources Consulting Services Ltd. on calving distribution of the Porcupine caribou herd during the 1970s.

Page	Reference No.	Comments
28	6	It is important to distinguish between post-calving movement and aggregation and the mid-summer migration (see Jakimchuk and McCourt, 1975). Summer movements (midsummer migration) are the most consistent movements of the year. Post-calving movements are also quite predictable.
28	7	There is no attempt to define the phrase "critical life stages".
29	8	Is productivity the basis for determining 'impact' or is habitat? Unless the direct link implied is documented for caribou both definitions should not be used simultaneously.
29	9	More documentation of August numbers is needed to determine the frequency of August occupation of the 1002 area (e.g., are numbers closer to 15,000 or to lower end of range?).
29	11	This paragraph requires references. The movements of Central Arctic herd in the 1002 area have not been adequately documented to date.
29	12	Again no references are provided. The most detailed information on calving distribution of the Central Arctic herd is available from Sopuck and Jakimchuk (1986), Carruthers and Jakimchuk (1985) and Carruthers et al. (1984a). The presence of 1,000 females and calves on Canning Delta in most years contradicts data which show more of a calving continuum along the coast with concentrations between major river valleys. Also, the calving situation at Prudhoe Bay oilfield is misleading. The results of Whitten and Cameron (1985) were rebutted by Jakimchuk (1986) who reviewed evidence that the Prudhoe Bay area was never an important calving area for the Central Arctic herd.
29	13	Use of riparian areas as travel corridors and feeding areas by the Central Arctic herd by cows and calves is not supported by the literature (see Carruthers et al., 1984a; Jakimchuk et al., in press).

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Page	Reference No.	Comments
		This paragraph ignores the Central Arctic herd as a whole and only discusses the 1002 area and is therefore, incomplete. Since most of the herd occurs outside the 1002 area, this paragraph gives a misleading view of importance of the area to the Central Arctic herd.
29	15	In the presentation of Central Arctic herd distribution and abundance there are no comments on productivity. This omission downplays the tripling of herd size which has occurred since the Prudhoe Bay development started.
30	16	Additional data on moose obtained in the 1970s are available from the Arctic Gas Biological Report Series, Vol. 6, Ch. 1.
20	17	Data on the Sadlerochit Mountains sheep herd are available in an earlier reference (see Arctic Gas Biological Report Series, Vol. 6, Ch. 1).
31	19	More detailed information than available in Chesemore (1967) on Arctic fox distribution in the 1002 area is available from Quimby and Snarski (1974), Arctic Gas Biological Report Series, Vol. 6, Ch. 2.
32	20	Additional information on wolverines in the 1002 area is available from Quimby and Snarski (1974), Arctic Gas Biological Report Series, Vol. 6, Ch. 2).
32	21	Again, earlier work on bears in the 1002 area by Quimby and Snarski (1974) is ignored.
33	24	This paragraph lacks references which are especially required since conculsions presented are controversial.
33	24	Numbers of polar bears in the ANWR part of the Beaufort should be indicated; the Beaufort Sea estimate of 2,000 includes Canadian waters. "Influx of females" implies large numbers moving into the 1002 area. This is not so. References for the population estimate are not given.

Page	Reference No.	Comments
33	25	This paragraph contains very vague and misleading statements. It leaves the impression that a high percentage of the 2,000 bears in the Beaufort population use ANWR. This is not the case. One to two dens in each of four out of five years does not indicate high use of the area by denning bears. See Moore and Quimby (1974) for earlier studies on polar bear denning locations (Biological Report Series, Vol. 32, Ch. 2) which also found a low frequency of denning in ANWR. The 15 dens found between 1951-1985 is cumulative and does not represent actual numbers in any one year.
34	30	Additional information on ringed seals adjacent to ANWR can be found in Moore (1976)Biol. Rept. Series, Vol. 36, Ch. 2. This reference was not cited.
37	31	Studies conducted by McCart et al. (Biol. Rept. Series) on fisheries resources in the ANWR area are not cited.
45	32	The impacts of oil development on the Wilderness resources of the 1002 area will be a key issue.

B) Chapter VI, Environmental Consequences, pp. 95-119.

96	1	These definitions of impacts do not attempt to quantify the changes in abundance in wildlife populations from the natural state that corresponds to each level of impact. Also there is no allowance for accommodation or habituation by species to modifying influences.
98	2	We agree that the PCH concentrated calving area is considered unique and irreplaceable.
98	3	The remainder of the 1002 area cannot be considered scarce habitats, nationally vs. regionally, and should be category 3-4 for most species.

Page	Reference No.	Comments
105	5	Although up to 82 percent of calving for the Porcupine caribou herd has occurred in the 1002 area, in some years almost no calving has occurred there. However, use of the area is more consistent during the late June/early July insect relief period. The statement that the insect relief period is highly stressful is based largely on theoretical considerations - insect relief habitats are widespread north and south of the 1002 area. An inland pipeline may interfere with movements to the coast and post-calving aggregations; however, a coastal pipeline would not.
105	6	This statement should be qualified as to extent of displacement and should indicate that only a minor component of the Central Arctic caribou herd is involved.
106	7	These statements are hypothetical and too generalized because: 1) Density is only an important consideration if proposed activities have effects on populations. 2) It is debatable if the interaction would be greater than at Prudhoe Bay. The Porcupine caribou herd does not always calve in core area and not all of the core area will be affected. 3) Nonetheless, calving and post-calving densities and numbers do differ significantly from the Central Arctic caribou herd and differing implications may occur. If an adverse effect occurs it would certainly affect a greater proportion of the population especially during post-calving aggregation. We agree also that the Porcupine caribou herd will form larger groups than the Central Arctic caribou herd during post-calving and that predator populations also differ between the two areas.
106	8	This paragraph is of major importance and is highly misleading (see Jakimchuk, 1986; Caribou workshop paper) because: - the Prudhoe Bay oil field was never an

Page	Reference No.	Comments
		important calving area. - Whitten and Cameron (1985) do not show an absence of calving for the entire period but co-incidentally with delayed snowmelt. - Whitten and Cameron also discuss other possibilities for low pre- and post-calving densities. - Other Central Arctic caribou herd calving areas show similar pre- and post-development low calving distributions. This section superficially covers a very important topic and uncritically accepts selected findings of one study (i.e., Whitten and Cameron, 1985).
106	9	Inappropriate secondary reference to a review paper when other references, e.g., Carruthers et al. (1984a), are original sources of systematic data with wider coverage than any other.
106	10	Long term data collected from 1981-86 by Renewable Resources Inc. indicates that the Canning River Delta is not a major calving area for the Central Arctic herd. However, it receives greater use during the post-calving period.
106	11	Table VI-4 shows progressive increase in calving numbers in the oilfield from 1972-1974. A detailed critique of these data is available in Jakimchuk (1986). Also, population estimates for the Central Arctic herd for 1981-1986 are available from various RRCS studies.
106	12	The amount of the "core calving areas" within the 1002 area depends on the definition of core calving ground used. The criteria of >50 caribou/km^2 in at least 5 of 14 years resulting in 80 percent within the 1002 area may be too conservative (i.e., the major calving grounds are actually much larger).
106	12	There are no recently published population estimates for the Porcupine caribou herd since 1983. The 1983 photocensus estimate

Page	Reference No.	Comments
		since 1983. The 1983 photocensus estimate was 135,000. Therefore recent estimates of 165,000 in 1985 and 181,000 in 1986 are guesses rather than actual censuses as implied.
106	13	Year-round use of the 1002 area by 4,000 Central Arctic caribou is undocumented.
106	14	Core-calving and concentrated calving areas are defined using the density of ≥50 caribou/ mi^2 yet there is no indication of how these estimates of density were made. Also, a better indication of the use of the 1002 area for calving would be data on the percentage of the herd that calved there each year.
107	16	Indirect habitat losses as a result of behavioral avoidance are difficult to quantify. Studies to date show that the degree of avoidance by caribou is variable and that caribou may habituate to these disturbances over the long term. Indirect habitat losses due to physical barriers may be more signficant depending on the success of mitigation measures employed. Insufficient pipe heights or over-reliance on ramps in combination with disturbance may impede free movements of caribou. This problem may be significant for very large aggregations of Porcupine herd caribou during the post-calving (insect relief) period. Data on the responses of very large groups of caribou to physical barriers are presently unavailable.
107	17	Present studies of behavioral avoidance by caribou of roads do not prove that disturbance is a major source of habitat loss. We need to know how many caribou show the displacement response and whether habituation will occur in the long term.
107	18	The statement is not true, and not definitive. Dau and Cameron (1986) show local response to roads consisting of reduced densities of maternal caribou <u>not displacement</u> from calving grounds. Conclusions and statements by Cameron and Whitten (1979) have been challenged by

Page	Reference No.	Comments
		Bergerud et al. (1984). Citation is used inappropriately here.
107	19	This statement is grossly misleading since there is no evidence available to support it. The following sentence can also apply to many other areas within the range of the CAH. Both the statement and cited study are misleading (Whitten and Cameron, 1985) and have been separately criticized by Jakimchuk (1986) and Carruthers et al. (1984a). The extent of displacement in the Prudhoe Bay area caused by development is difficult to quantify since the area was never an important calving area and because pre-development data are not sufficiently quantitative.
107	20	The study by Dau and Cameron (1986) shows reduced habitat use by caribou. However, the extent of reduced habitat use shows considerable variation. Habituation of caribou may reduce this effect in the long term.
108	21	If displacement does occur, adjacent areas may not be undesirable since they are frequently used with no short term adverse effects on productivity. Long term studies on effects on productivity of displacement would be required to determine the significance of displacement from a high density calving area. Although displacement of the Porcupine caribou herd from a "core calving area" may be deleterious, studies of the Central Arctic herd show that caribou numbers can increase despite development within their calving areas. We agree, however, that caution should be used in extrapolating Central Arctic caribou herd results to the Porcupine caribou herd since the Porcupine caribou herd occurs at much higher densities on their calving grounds and because predators are more abundant adjacent to the Porcupine caribou herd calving areas. In addition, caution should be used in the assumption that displacement of the Porcupine caribou herd

Page	Reference No.	Comments
		from a "core calving area" would occur in total as implied. The probability of this is low based on evidence from the CAH.
108	22	This statement presupposes a food limiting habitat and a complete loss - the references used deal with non-caribou apparently since caribou are not a food limited species and comparable references are not available for mainland herds of Barren-ground caribou in North America.
	25	There is no basis for "unlikely" conclusion. This is speculation only based on inference of higher density. Also presupposes a "massive" displacement rather than a local displacement. This is an example where the CAH experience is downplayed despite the existence of data on compatibility with development. "...no recognizable... long term effect... has been demonstrated <u>to date</u> (emphasis ours).
	26	However, all participants of the FWS workshop did not agree to the extent or significance of that displacement.
108	27-28	Dau and Cameron (1986) indicate that reduced density of maternal caribou which they term displacement may occur within 2 miles from active roads. However, the percentage of caribou affected is uncertain. A significant number of caribou within 2 miles may be unaffected by disturbance. Therefore, development would not result in the complete loss of 32 percent of the Porcupine caribou herd core calving area as calculated.
108	28	It is erroneous and misleading to imply a "total displacement" two miles wide. The term <u>probable population decline</u> is unsubstantiated i.e., displacement is linked to decline, but such an effect has never been demonstrated or documented. The assumption of massive displacement is unwarranted based on the Central Arctic caribou herd experience.
108	29	Several studies show that pipelines such as TAPS and Kuparuk do not create a barrier. Note one-sided refs. Need to clearly

Page	Reference No.	Comments
		establish the likelihood of conditions which constitute interference or provide better qualifications of statements made.
109	31	Agree - valid concern. I have previously recommended 7' ground to pipe clearance rather than the 5' level cited in this and the workshop report.
109	31	We agree that the effect of potential barriers are greater during post-calving than during calving because of the very large size of post-calving aggregations and the sudden, erratic movements between inland areas and coastal insect-relief habitats. There is insufficient evidence, however, to indicate that survival or productivity of caribou may be reduced as a result of a disruption in movements during this period. We recommend that the location of a main east-west pipeline be studied furtner and that pipe heights should be raised from the minimum of 5' cited in the EIS to 7' within the range of the PCH.
109	32	The European references used are not appropriate - carrying capacity and nutritional limitations are greater for European populations.
109	34	This statement is based on one example and hence is not objective.
109	35	There is no evidence that ramps will significantly increase crossing success - rather pipe heights and the presence of vehicular traffic are more important.
109	36	It is appropriate to discuss RRCS studies of the Nelchina herd (Carruthers et al., 1984b) here and reference it. This herd is exposed to TAPS only twice a year, but crosses it successfully.
109	37	This worst case is unjustified on the basis of known responses of caribou. It is unrealistic and ignores experience to date. Also should not assume 2-mile sphere of influence even <u>without</u> mitigation.

Page	Reference No.	Comments
110	38	Disturbance and harassment are significantly different. There is no evidence that disturbance will result in direct or indirect mortality as a result of trampling or increased energy loss.
110	39	This paragraph ignores several other studies some of which are more quantitative.
110	40	Davis et al. (1985) report no demographic effects or calving ground displacement on the Delta caribou herd from severe aircraft disturbance and other disturbance associated with military activity. This is an example where significant conclusions of a recent peer review paper (Davis et al., 1985) are ignored in favour of an outdated non-peer review reference.
110	41	The editorial comment "widely disputed view" is an inappropriate and unsubstantiated comment on a peer-review published paper.
111	43	We disagree with this conclusion since Category 1 habitats would not suffer an inevitable "loss". Mitigation of Category I habitat is possible because: 1) A 2-mile avoidance zone is not a valid assumption (see previous comments). 2) Many mitigation options are available including: - Traffic control - Reduced human activity during calving - Reduced aircraft overflights - Speed limits on traffic, etc.
111	44	Ramps are over-emphasized and not justified. Elevation of pipelines to 7' above ground (because of large groups) should be a priority over ramps.
111	46	Davis et al. (1985) do not indicate a problem. Restrictions could be lifted after 15 July because most PCH animals are gone on summer movements by that date. We agree with a minimum altitude of 2,000' May 20 through July 15th.
111	47	We basically agree with all mitigation measures except for ramps. However, more

Page	Reference No.	Comments
		measures could also be listed, to further ameliorate impacts.
112	48	Environmental description map in Chapter II shows extent of alternative habitats. Whether these could sustain a growing population assuming loss of all core calving area (although unlikely) is unknown.
112	49	Insect relief habitats need to be more accurately described. We need to know how much space is necessary to give relief to the Porcupine caribou herd.
112	50	There is a major step between potential undocumented effects and a population decline. However this paragraph seems to be properly qualified.
112	51	Is it a decline or distribution change or both? There is no basis for predicting either a 5-10 percent decline or distribution change. The opposite, a three-fold population increase in the CAH accompanied the Prudhoe Bay development which interacted with a much larger proportion of the CAH than would be the case for the 1002 area. The prediction of a decline and distribution change for the CAH throughout its range based on the 1002 interaction totally ignores the well-documented facts of the actual effects of development. This paragraph is unfounded.
113	52	There is no basis given for extrapolating effects on individuals to population effects.
113	54	A major unjustified assumption here is that disturbance will result in absolute loss of habitat value. Also an exponentially expanding population suggests that in the near term it is below carrying capacity.
114	55	Evidence is opposite, these sub-groups all originated from two transplants, one made on Barter Island (1969) and the other at Kavik Camp (13 muskox transplanted in 1970).

Page	Reference No.	Comments
116	56	These conclusions are entirely speculative and there is no possibility of subsequent determination if they are correct or incorrect.
117	57	Agree with this section in general.
118	59	This paragraph is misleading because 12-13 percent of the Beaufort Sea Population do NOT den on land.
119	60	This paragraph should be qualified with a more objective review of likelihood of effects on productivity of bears.

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APPENDIX II

Review of Dau and Cameron (1986) Report entitled "Effects of a road system on caribou distribution during calving". "Rangifer", Special Issue No. 1:95-101.

Dau and Cameron have demonstrated a local, short-term reduced density of maternal caribou groups adjacent to an active road system which they refer to as partial displacement. However, several qualifications to their results need to be made that were absent in the report. The authors admit that it is speculative to extrapolate the local effects on maternal caribou to the population as a whole. Yet they imply that displacement will result in widespread, long-term loss of traditionally-used habitat. We argue that such conclusions are unwarranted at this time.

The experimental design of Dau and Cameron, although more rigorous than previous work, did not include adequate controls. The design requires a control area containing a hypothetical road alignment and located in an area of similar habitat and calving density, well away from human activity. Monitoring of a control area during an equivalent study period (1978-85) would indicate whether changes in caribou distribution similar to the experimental area can occur in the absence of development.

In addition, Dau and Cameron fail to note that:

1) despite partial displacement and increasing development activity, caribou densities increased in their study area from 1978-85;

2) most of the displacement was observed in the middle sections of the road, the north and south ends of the road alignment supported lower densities of caribou before and after the development;

3) non-maternal groups, which included up to 25 percent calves, occurred at higher densities (although not significantly higher) near the road alignment than away from the alignment during the post-development period;

4) habituation was not evident up to 1985 because the intensity of human activity was also increasing dramatically at this time.

The Dau and Cameron study showed statistically significant differences in caribou density vs. distance but also indicate that annual variability was high. In fact, the annual variability within each 4-year period was almost significant ($p = 0.053$) for calves. This suggests that the displacement response varied considerably from year to year.

It is noteworthy that Dau and Cameron showed that non-maternal caribou were not displaced by the road development. Also, the response by maternal groups was partial displacement within a zone of 0-3 km (0-1.9 mi). In the ANWR report it is implied that all caribou show a total displacement within 2 miles. This scenario is not supported by the Dau and Cameron report.

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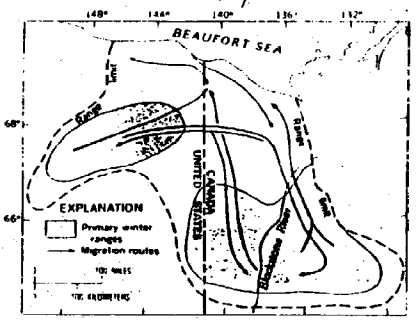

Figure II-4.--Migration routes and winter range of the Porcupine caribou herd

were as low as 101,000 (LeResche, 1972). The lower levels of earlier estimates may reflect a truly smaller population, less accurate or less complete survey techniques, or a combination of these factors. Caribou populations appear to fluctuate unpredictably over the long term. The long-term maximum and minimum population of the PCH and the carrying capacity of the PCH are unknown.

The PCH ranges over 98,100 square miles of northeast Alaska and northwest Canada, and constitutes the largest population of large mammals shared between the two nations (fig. II-4).

The traditional calving grounds of the PCH extend throughout the Arctic foothills and coastal plain from the Canning River in Alaska to the Babbage River in Canada, including the entire 1002 area, the calving grounds encompass an area of nearly 8.9 million acres (pl. 2A). From year-to-year, the distribution of caribou on these calving grounds varies considerably, with most calving usually taking place in the area between the Hulahula River and the Canadian border. During 1972-85 detailed observations were made of calving areas of the PCH. As a result of these studies, areas where caribou were present during calving at a density of at least 50 caribou/square mile were identified as concentrated calving areas. The core calving area is a location to which pregnant cows have shown a strong fidelity as traditionally favored calving habitat. Those concentrated calving areas used in at least 5 years during the 14-year study were identified as the core calving area. Of the 2.1 million acres identified as concentrated calving areas, 934,000 acres (44 percent) are within the 1002 area. An even greater proportion, 242,000 acres (78 percent), of the 311,000 acres of core calving area is within the 1002 area.

Spring migrations to the calving grounds start in May from winter ranges, which are usually south of the Continental Divide in Alaska and in central Yukon Territory and adjacent Northwest Territories in Canada (fig. II-4). Timing and routes of migrations vary annually depending on winter distributions, snow conditions, and the onset of spring weather. Most caribou migrate to reach the calving grounds of the 1002 area from Canada, moving westward along the northern foothills of the Brooks Range. In some years many caribou also pass through the first snow-free mountain valleys east of the Aichilik River in Alaska. As spring conditions progress, caribou in the foothills spread northward along a broad front, primarily following the major river corridors and associated terraces where snowmelt has advanced.

During years when snowmelt on the coastal plain is early, a broad zone north of the foothills is used for calving. In such years calving concentrations tend to be more northerly and scattered calving extends to the coast. When spring is late, calving is more southerly and easterly, followed by a distinct movement west and northwest. Once caribou have reached the calving grounds there is less directional movement. During and immediately after calving, foraging caribou use vegetated riparian habitats as well as tussock uplands. Riparian areas (pl. 2A) are used as travel corridors and important feeding areas in both spring and summer.

The percentage of PCH cows using the 1002 area for calving was estimated to be 74 percent in 1983 and 82 percent in 1985. In 1984, 35 percent of the cows calved in the 1002 area; 38 percent calved adjacent to the 1002 area, east of the Aichilik River. The latter group moved into the 1002 area within a week of giving birth and joined the cows already there (U.S. Fish and Wildlife Service, unpublished data). These estimates were extrapolations from locational data on radio-collared cows.

In arctic areas, caribou reproduction is highly synchronous. The majority of calving occurs within a 2- to 3-week period, when a single calf is born to most adult females (3 years old). Caribou calves are precocious, being able to stand and nurse within 1 hour following birth. They are capable of travel with adults within a week. The first 24 hours of life is critical, when a behavioral bond is formed between the calf and its mother. Disturbance of cow-calf groups on the calving grounds may interfere with bond formation and can increase calf mortality.

Usually caribou begin to arrive on the calving grounds of the Arctic Refuge during mid- to late May. The first calves are born during the last week of May; peak calving occurs during June 4-6. Although calving has been observed in a variety of terrains, most calves are born in snow-free areas of sedge tussock uplands, where the cows seek suitable vegetation. Predator densities are apparently less in these areas and, subsequently, calf survival is better in the northern parts of the calving grounds which become snow-free when snowmelt is early (U.S. Fish and Wildlife Service, 1982; Mauer and others, 1983; Whitten and others, 1984, 1985).

After calving, small bands of cows with newborn calves gradually merge into larger groups. Yearlings, barren

females, and bulls occupying the southern and eastern periphery of the calving grounds begin to mix with the cows and calves, ultimately forming huge postcalving aggregations. By late June or early July aggregations of 80,000 or more caribou on the 1002 area are common. Postcalving movements show considerable annual variation.

Although rather small in proportion to the herd's entire range, the calving/postcalving area is an important, identifiable habitat that has been repeatedly used by the PCH during these critical life stages.

As the spring progresses, weather conditions promote the emergence of swarms of mosquitoes. Harassment by these insects drives the caribou into dense aggregations and results in their increased movement to areas of relief. The groups usually move rapidly toward the coast seeking relief on points, river deltas, mudflats, aufeis, large gravel bars, barrier islands, and in the shallows of lagoons (pl. 2A). Some groups also move to higher elevations in the mountains for relief. In other years there can be a gradual westward shift across the coastal plain and northern foothills.

The postcalving season is the low point of the annual physiological cycle when energy reserves of parturient cows are especially low. The stresses of winter, pregnancy, migration, birth, lactation, hair molt, antler growth, and insect harassment draw heavily upon this segment of the population (Dauphine, 1976; White and others, 1975). Access to insect-relief habitat and forage resources during this period may be critical to herd productivity. In early July the herds usually move east and south, vacating the 1002 area by mid-July. In certain years, residual groups numbering up to 15,000 animals have remained on the 1002 area and adjacent foothills and mountains through August. Occasionally, remnants of such groups (up to 2,000 animals) have wintered in northern mountains and foothills.

An international agreement for management of the PCH is currently being negotiated between the governments of the United States and Canada. The State of Alaska and Provincial governments as well as local users are participating in the negotiations.

Harvest of the PCH occurs in both the United States and Canada. The harvest by individual Native villages is highly variable, depending upon herd movements. Recent annual harvests from the PCH by Kaktovik, the only village adjacent to the 1002 area, have ranged from 25 to 75 animals (Pedersen and Coffing, 1984). Annual harvest of the PCH throughout its range was estimated at 3,000-5,000 animals (LeBlond, 1979). The harvest varies greatly from village to village and from year to year within the same village. The annual harvest at Arctic Village, Alaska, ranges from 200 to 1,000 (LeBlond, 1979). During 1983-85 annual harvest of the PCH within Canada averaged approximately 1,700 animals for the years in which data were available (Yukon Territory Wildlife Branch, unpublished data).

The Central Arctic caribou herd (CAH) has been increasing, and in 1985 numbered about 12,000 to 14,000. Its range is entirely north of the Continental Divide, from the Ikpikpuk and Colville Rivers on the west to the Sadlerochit River on the east (pl. 2B). The TAPS, Dalton Highway corridor and Prudhoe Bay-Kuparuk oil fields lie within the herd's range. In July 1983 the herd comprised 46 percent cows, 21 percent calves, and 33 percent bulls (Hinman 1985).

Females of the CAH wintering in the mountains and foothills near the western part of the 1002 area migrate north-northwest across the rolling uplands south of Camden Bay to the calving grounds on or near the Canning and Staines River deltas. A northward movement along the Canning River corridor also occurs.

CAH calving activity has been concentrated in two areas: the vicinity of the lower Kuparuk River and the Canning River delta. Most years as many as 1,000 females calve on the Canning River delta within the 1002 area (pl. 2B). Scattered, low-density calving extends as far east as the Sadlerochit River. Little or no calving has been observed in the TAPS-Prudhoe Bay oil field area since about 1973 (U.S. Fish and Wildlife Service, 1982; Whitten and Cameron, 1985).

After calving, some CAH caribou move southeastward, to the uplands south of Camden Bay. During the insect season (July) there is often a strong eastward movement along coastal habitats between the Canning River delta and Camden Bay. An estimated 2,000-3,000 caribou of the CAH use the 1002 area (Canning River delta and coastal habitats along Camden Bay) for post-calving and insect-relief (pl. 2B). During the summer, an additional 1,000 animals may be scattered west of the Sadlerochit River and north of the Sadlerochit Mountains. Riparian areas are used for travel corridors as well as important spring and summer feeding areas. In late summer and fall, CAH caribou are found scattered across the coastal plain south of Camden Bay, in foothills north of the Sadlerochit Mountains, and in uplands south of the Sadlerochit Mountains where they remain for the winter. During most winters, scattered groups of CAH caribou range throughout the 1002 area west of the Kalakturuk River and adjacent uplands to the south. The number of wintering animals ranges from 100 to 1,000.

The annual harvest of CAH caribou by Kaktovik residents has most recently been estimated to be 25-75 animals (Pedersen and Coffing, 1984). This harvest occurs along the coast during the summer when residents can travel by boat and inland during the fall and spring when snowmachine travel is possible (pl. 2D).

MUSKOXEN

Muskoxen were exterminated from the North Slope by the late 1800's, so carrying capacity and past historic levels are unknown. In an effort to reestablish an indigenous

population, 50 muskoxen were reintroduced to the Arctic Refuge in 1969 and 1970 (Rosenau and Stoll, 1974). The muskox population has grown exponentially since 1974 (fig. II-5) because of high productivity and low mortality. In 1985, the postcalving refuge population was estimated at 476, more than triple the 1979 population.

Muskoxen are highly social, usually found in mixed sex herds. Herd size of the 1002 area population varies seasonally, the smallest herds occurring during the rut in August. Many bull muskoxen do not remain with a mixed sex herd for long periods of time, but move from herd to herd, associate with other bulls in small groups, or travel alone (Reynolds and others, 1985). In response to predators or other threats, muskoxen form a compact defensive formation.

Muskoxen have used the same areas along the Nigusanak-Okerokovik-Angun, Sadlerochit, and Tamayariak-Kalakturuk river drainages for the past several years with approximately 80, 160, and 230 animals using those drainages, respectively. Muskoxen using the Sadlerochit and Tamayariak areas seem to be part of the same subpopulation, whereas animals in the Okerokovik area seem to be a separate subpopulation. Many of the cows marked for the baseline study research in 1982-85 have remained in these areas (pl. 2C) and show a high site-specific fidelity. Riparian areas are important travel corridors and muskoxen regularly feed there year-round. Dispersal of mixed sex herds into new areas on the Kalakturuk River and drainages east of the Aichikk River is also occurring.

Though not migratory, muskoxen apparently move in response to seasonal changes in snow cover and vegetation. In summer and fall, they are often found in riparian habitats along major drainages, where they feed on willows and forbs. In winter and spring many animals move to adjacent uplands with less snow cover to feed on tussock sedges (Reynolds and others, 1985). Preliminary FWS data indicate that muskoxen apparently reduce both their movements and activity during winter, probably as an adaptation to conserve energy. Table II-2 and plate 2C show the extent of muskoxen habitat within the Arctic Refuge and 1002 area and delineate those seasonal or year-round use areas where muskoxen have been observed most frequently, year after year (1982-85).

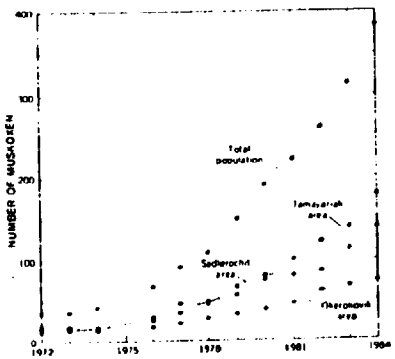

Figure II-5.--Estimated numbers of muskoxen in post-calving populations in the Arctic Refuge, 1972-84.

Table II-2.--Observed muskox range within the Arctic National Wildlife Refuge and within the 1002 area, 1982-85

	Within Arctic Refuge (acres)	Within 1002 area (acres)	Percent of total use area within 1002 area
High seasonal or year-round use with calving	251,000	207,000	82
High seasonal or year-round use "without calving"	211,000	158,000	75
Total observed range, including high-use areas	1,116,000	760,000	68

Muskoxen hunting on the Arctic Refuge under permit from the Alaska Department of Fish and Game started in 1983. Five bull-only permits have been issued annually; the 1983, 1984, 1985, and 1986 harvests were 4, 5, 4, and 3, respectively.

MOOSE

Patterns of moose distribution north of the Brooks Range vary seasonally (pl. 1C). Winter concentrations occur south of the 1002 area where up to 158 and 239 moose have been counted in the Canning and Kongakut River drainages, respectively. A few moose are scattered in other river drainages (U.S. Fish and Wildlife Service, 1982; Martin and Garner, 1984, 1985).

In late May or early June small widely dispersed groups of moose move northward along riparian systems. Moose using the 1002 area have dispersed from populations to the south and use a variety of habitats in July and early August. The number of moose using the 1002 area at any one time probably does not exceed 25. In late August, moose begin to aggregate; the largest groups occur in October during the rut south of the 1002 area. Most moose using the 1002 area move southward to winter in valleys of the Brooks Range. Riparian willow species

comprise a major part of the forage used by moose. mountain alder is an important winter food where available

Subsistence hunters from Kaktovik take one or two moose annually (Jacobson and Wentworth, 1982). Other hunters harvest a few moose, generally less than 10 annually, from the North Slope of the Arctic Refuge. Most of this harvest is in the Canning River and Kongakut drainages, and nearly all outside the 1002 area

DALL SHEEP

Although the estimated total population of Dall sheep within the original 8.9-million-acre Arctic Refuge is approximately 6,800. Dall sheep are very rare on the 1002 area, because suitable habitat is lacking. The Sadlerochit Mountains contain an estimated 270 sheep, and constitute the northernmost extent of their range in North America (T.G. Smith, 1979).

Traditional summer range consists mainly of alpine slopes and meadows. Winter range, limited mostly by topography, consists of windblown slopes and ridges, usually south-facing. FWS surveys indicate that Dall sheep have used the lower foothill terrain near Sadlerochit Spring, mostly in winter; in summer, they cross this tundra area in moving to other habitats (D. Ross and M. A. Spindler unpublished data, 1981)

WOLVES

Wolves are found throughout Alaska's North Slope. On the 1002 area, the population density is lower than in areas farther south. Wolves occupy large home ranges. In winter wolves tend to congregate in areas of overwintering caribou and possibly moose or Dall sheep. Daily movement depends on availability of prey. Estimates of density for restricted geographic areas vary widely, but most fall within the range of 6 to 200 square miles per wolf (Mech, 1970). Mating occurs in March, and pups (usually 4-7 per litter) are born in dens 2 months later. Although the 1002 area appears to contain suitable denning habitat, no dens have been found. Dens that have been documented are in mountainous terrain 10 to 40 miles south of the 1002 area. The number of wolves using the 1002 area on a seasonal basis is low and apparently does not exceed 5-10 animals annually

Populations in or adjacent to the 1002 area were depressed in the late 1970's by an outbreak of rabies. A similar outbreak occurred in 1985 when six dead wolves, including four radio-collared animals, were found. Four of the animals were confirmed as rabid. Historical den sites on the Kongakut, Hulahula, and Aichilik Rivers were deserted in 1985. Death of breeding wolves from rabies was suspected as the reason. However, four new dens were found, three of them occupied by wolves which were remnants of earlier packs.

Wolves on the North Slope are known to prey on caribou, moose, sheep, ground squirrels, small rodents, and birds. Wolves are typically associated with drainage systems which they use as travel corridors. They are also attracted to riparian areas because of the abundance of prey, including ground squirrels. During the summer when prey species are most abundant, wolves are distributed throughout all 1002 area habitat types (U.S. Fish and Wildlife Service, 1982; Haugen, 1984, 1985; Weiler and others, 1985). Wolves are hunted and trapped by Kaktovik residents. Most of the harvest occurs in the Hulahula, Sadlerochit, and Okpilak River areas (Jacobson and Wentworth, 1982; Weiler and others, 1986). Generally, fewer than 10 wolves are harvested annually, usually south of the 1002 area

ARCTIC FOXES

Arctic foxes move seasonally between summer breeding habitats in wet tundra and winter habitats along the northern Alaska coast and onto the sea ice (Chesemore, 1967). They are limited in their range by habitat and interspecific competition with red foxes. Periodic outbreaks of rabies can reduce fox populations. Productivity of foxes is related to abundance of microtines (small rodents). Foxes regulate their food supply, despite fluctuating prey availability, by caching food in early summer when prey is abundant and utilizing food caches and carrion in late summer when fewer prey are available. At Demarcation Bay arctic foxes spent most of their time in medium relief, low-center polygon and meadow habitats, preying on small mammals and bird nests (Burgess, 1984). In 1979 when rodents were at low population levels, foxes at Demarcation Bay depended mainly on birds and eggs. No pups were produced that year (Burgess, 1984).

Arctic foxes are trapped by Kaktovik residents in the winter for fur. The number taken annually fluctuates according to their abundance. In years of abundance more than 100 foxes may be taken. Most trapping is within 15 miles of the coast, mainly on or near Barter Island (Jacobson and Wentworth, 1982)

WOLVERINES

Wolverines frequent all types of terrain found in Arctic areas, as evident from observations and tracks. Rivers and mountains are frequently associated with territorial boundaries. Snowdrifts are important for wolverine den sites, and, in the tundra, remnant snowdrifts in small drainages are used by females for rearing their offspring (Magoun, 1985)

A few wolverines inhabit the 1002 area. Accurate population figures are unavailable. A rough estimate of the 1002 area wolverine population can be made from the wolverine densities and assumptions used by Magoun (1985) for estimating the population in the Western Arctic. On Magoun's assumptions, the estimated density for the 1002 area is 90 wolverines. This figure may not be very accurate. Magoun's area and the 1002 area are not identical. Magoun studied a virtually unexploited population whereas wolverines in the 1002 area and environs are routinely harvested by Kaktovik residents. Furthermore, sighting records for the 1002 area are sparse; recent FWS studies have resulted in very few sightings.

Wolverines feed opportunistically and have been reported pursuing large ungulates such as caribou, moose, and Dall sheep, though they are more commonly scavengers than predators. In the Arctic, ground squirrels are an important food (Rausch and Pearson, 1972). Caribou are scavenged - particularly during May and June when they are numerous on the 1002 area. During June and July wolverines also prey on birds and eggs.

Kaktovik residents hunt wolverines most frequently in the foothills and northern mountainous areas of the Sadlerochit, Hulahula, and Okpilak Rivers. ADF&G records indicate that an average of about one wolverine per year is harvested from the 1002 area; this may be an underestimate because of incomplete reporting. Magoun (1985) believed that harvest in Game Management Unit 26A (Western Arctic) was 2 to 10 times greater than reported. During the winter of 1980-81, seven wolverines were taken by Kaktovik residents (Jacobson and Wentworth, 1982). Wolverines are sometimes harvested by trappers near the village of Kaktovik. These animals are mostly subadults that may be dispersing onto the 1002 area from the foothills to the south. Information is lacking as to whether the 1002 area wolverine population is resident or transient.

BROWN BEARS

Brown bears seasonally use the 1002 area. At periods of greatest abundance (in June) use is estimated at one bear per 10 square miles, or approximately 108 bears (Garner and others, 1984). Brown bears north of the Brooks Range are at the northern limit of their range. These populations are characterized as having low reproductive rates as a result of short periods of food availability, large individual home ranges (95 to 520 square miles), and habitats that provide little protective cover (Reynolds and others, 1976; Reynolds, 1979; Garner, Weiler, and Martin, 1983).

Brown bears appear on the 1002 area in late May and are generally most abundant during June and July when caribou are most plentiful. The bears breed during this same period. Brown bears are found throughout the entire 1002 area. There are two known high-use areas. One, used by 50-70 adult bears and cubs, is in the southeastern section of the 1002 area where caribou calving is concentrated. The second, used by 15-20 bears, is a much smaller area along the upper reaches of the Katakturuk River (pl. 1D). Moderate use (30-80 bears) is located between and around the high use areas and are generally used for a shorter period (June-July). (Note that bear numbers from each use area cannot be added because they represent different times of residency. Each bear may use more than one or all areas delineated.) After caribou leave the 1002 area in early July, brown bears gradually move south into the foothills and mountains (Garner and others, 1981, 1984, 1985). Riparian areas are [illegible] used as travel corridors. Brown bear habitat changes seasonally according to food availability (U.S. Fish and Wildlife Service, 1982). Spring foods include vegetation, carrion, caribou, ground squirrels, and rodents. River courses frequently contain abundant prey as well as preferred vegetation. During mid- to late summer, brown bears shift to eating horsetail, grasses, and sedges. In the fall, they eat wild sweetpea roots, crow- berries, blueberries, bearberries, and ground squirrels and other rodents (Phillips, 1984).

Denning occurs in late September and October, depending on soil conditions (the top soil must be frozen to support den excavation) and weather (Pearson, 1976; Reynolds and others, 1976; Garner and others, 1983, 1984, 1985). Cubs are born in the den in January and early February. Litters range from one to three cubs; the average litter for bears using the 1002 area is 1.9 (Garner and others, 1984). Most dens are located in the foothills and mountains south of the 1002 area. Six of 129 (4.6 percent) known den sites within the Arctic Refuge have been located on the 1002 area (Garner and others, 1983, 1984, 1985). Brown bears emerge from winter dens in late April through May. On the 1002 area the survival rate among cubs and yearlings ranges from zero to 100 percent. Causes of juvenile mortality on the 1002 area are not well known, but a major cause is probably the killing of juveniles by mature males such as occurs in other brown bear populations (Stringham, 1983).

Residents of Kaktovik harvest an average of 2 brown bears annually. The bears are taken opportunistically on the 1002 area or farther south in the foothills or mountains (Jacobson and Wentworth, 1982). The sport harvest within the Arctic Refuge north of the Brooks Range averages 2-4 brown bears annually. Virtually all sport harvest is south of the 1002 area.

ARCTIC GROUND SQUIRRELS AND OTHER RODENTS

Arctic ground squirrels are found throughout the 1002 area in colonies restricted to well-drained soils free of permafrost. Ground squirrels hibernate from late September through May (U.S. Fish and Wildlife Service, 1982). Activity resumes in the spring, before the snow begins to disappear. Mating is followed by a 25-day gestation period. Young ground squirrels grow rapidly in preparation for winter hibernation.

Ground squirrels are a subsistence food for Kaktovik residents. They are also important in the diets of snowy owls, rough-legged hawks, brown bears, arctic foxes, red foxes, and wolves.

Other rodents found on the 1002 area include the collared lemming, brown lemming, and tundra vole. Red-backed voles and tundra voles may occur in the foothills in

the southern part of the 1002 area. The brown lemming is the leading herbivore along the coast and in high population years can account for more plant consumption than ungulates (Batzli and others, 1980). Impacts on the vegetation are cyclic and correspond to the brown lemming's 3- to 5-year population cycle. Lemmings and voles are active all year, grazing frozen plant material and breeding under the snow. Maximum population densities occur after successful winter reproduction. Shallow snow depths result in low temperatures under the snow, creating an energy stress that can reduce winter reproductive success.

MARINE MAMMALS

Fourteen species of marine mammals may occur off the coast of the Arctic Refuge. Some of these--the spotted seal and walrus--are occasional visitors. Others such as the killer whale, gray whale, humpback whale, fin whale, narwhal, harbor porpoise, and hooded seal are only rarely seen because this part of the Beaufort Sea is at the extreme margin of their ranges. Five of the species were evaluated: polar bear, ringed seal, bearded seal, beluga whale, and the endangered bowhead whale.

POLAR BEARS

Polar bears are closely associated with pack ice of the Arctic Ocean throughout most of the year. The Beaufort Sea population of polar bears is estimated to be 2,000. Some females move to coastal areas and occasionally farther inland during October and November to seek maternity den sites. Pregnant polar bears, and later their cubs, probably spend more time on the 1002 area than other segments of the polar bear population. Other groups of polar bears seasonally frequent the coastal periphery of the area. Recapture of polar bears marked by the FWS in recent years indicates that an influx of females accompanied by cubs as old as 20 months and subadult animals coincides with the fall ice-edge advance to the shoreline.

Polar bear dens have been found as far as 250 miles offshore and 32 miles inland. Eighty-seven percent of dens located in 1983-85 were offshore. The onshore area from the Colville delta to the Canadian border is within the area used by the Beaufort Sea population of polar bears for denning. However, the most consistently used land denning areas were on and adjacent to the 1002 area where 1-2 dens were found in 4 of the 5 years, between winter 1981-82, when the FWS began a continuing study of North Slope polar bears, and winter 1985-86 (Amstrup, 1988a). The ideal denning sites are riverbanks, draws, and the leeward side of bluffs where snow accumulation is sufficient to support den construction. At least 15 dens were located in the 1002 area, 1951-85 (pl. 1E). Another five dens have been located on ice near the 1002 area.

Three locations in the 1002 area (pl. 1E) have been delineated as confirmed denning areas, that is, areas in which polar bear dens and denning activity have been observed during more than one winter. Dens or denning activity has also been observed in other 1002 area locations, but data are inadequate to confirm recurrent use.

Female polar bears that den on land move onshore to seek out den sites in October and November, depending on ice movement and ice buildup in the fall (Lentfer and Hensel, 1980). Denning females give birth to 1 or 2 cubs in December or January and bears emerge in late March or early April, depending upon weather conditions. The female and cubs generally remain near the den, making short forays for 1 to 2 weeks until the cubs gain strength and become acclimated to outside conditions. Soon thereafter they move to the sea ice to feed on seals. Many females with new cubs concentrate their foraging on the shore-fast ice, which varies in width from a few feet to more than 30 miles.

When the nearshore ice breaks up in the spring, the bears move with the sea ice and many concentrate at the south edge of the pack ice. This position varies seasonally but usually is between the coast and latitude 72°N.

Except for a shore lead, the Beaufort Sea is ice covered year-round. Open water nearshore begins to freeze in September or October, and nearshore ice does not melt until May or early June. Male and nondenning female polar bears inhabit the sea ice throughout the winter. The distribution of polar bears is influenced by the availability of their major prey species, ringed and bearded seals, which concentrate in areas of drifting pack ice (Lentfer, 1971; Stirling and others, 1975). Ringed seals probably constitute 95 percent of the polar bear's diet (Burns and Eley, 1978).

Polar bears are protected under the provisions of the Marine Mammal Protection Act of 1972. An international agreement for the conservation of polar bears was ratified in 1976 by the governments of Canada, Denmark, Norway, the Union of Soviet Socialist Republics, and the United States of America. Article II requires that appropriate actions be taken to protect ecosystems of which polar bears are a part, especially denning and feeding sites.

Large numbers of polar bears may occur seasonally along the coast of the Arctic Refuge near the village of Kaktovik where whale carcasses can be scavenged (Amstrup and others, 1986). Each year many bears are available to local subsistence hunters, but in most recent years the kill has been small (FWS, unpublished data). Annual subsistence harvest of polar bears by local residents was as high as 23 to 28 in 1980-81; at least one polar bear was confirmed as being taken in each of the following 4 years, with three bears being taken in 1985-86 (Schliebe, 1985; Jacobson and Wentworth, 1982; FWS, unpublished data).

SEALS AND WHALES

Ringed seals, bearded seals and, occasionally, spotted seals occur in the Beaufort Sea and along the coast north of the coastal plain, including the lagoons of the 1002 area (U.S. Fish and Wildlife Service, 1992). Although there is some evidence of ringed seals within the refuge in summer and fall, their primary habitats are generally outside the 1002 area. Ringed seals use stable, shore fast ice as their primary pupping habitat (T.G. Smith, 1980). To improve chances of successfully rearing pups, older, more dominant female ringed seals select and actively defend territories on stable shore-fast ice for pupping. Subadult and younger females are forced to construct lairs on active pack ice, increasing the chances of predation by polar bears. Bearded seals are chiefly associated with the pack ice edge throughout the year. Primary breeding and pupping habitat is associated with the ice edge. A small number of bearded seals remain in northern ice-bound areas. The extent of active pack ice use by seals is not well understood within the 1002 area. However, seals in Canada do occupy active pack ice, a preferred hunting area for polar bears (T.G. Smith, 1980).

Kaktovik residents harvest spotted, ringed, and bearded seals for subsistence, though relatively few seals are taken (Jacobson and Wentworth, 1982).

Bowhead and gray whales are listed as endangered species. Gray whales are occasionally found in the Beaufort Sea, north of the 1002 area (U.S. Fish and Wildlife Service, 1982). The bowhead whale is known to inhabit waters offshore of the Arctic Refuge in September and October during its fall migration along the Beaufort Sea coast. The southern boundary of the bowheads' fall migration corridor is generally the 66-foot isobath, although they are occasionally seen in shallower water. Demarcation Bay east of the 1002 area is a feeding area for these whales; waters off the 1002 area may also be used (National Marine Fisheries Service, 1983). Belukha (beluga) whales also migrate through waters north of the 1002 area.

Bowhead whales are taken for subsistence by residents of Kaktovik. Subsistence whaling at Kaktovik began in 1964. During 1981-85 the annual harvest has averaged one whale, with an average of one additional whale struck and lost each year.

BIRDS

One hundred eight species of birds have been recorded on the Arctic Refuge coastal plain (Gamer and Reynolds, 1986a, b). The majority are migratory, present only from May to September. Six species are considered permanent residents--rock and willow ptarmigan, snowy owl, common raven, gyrfalcon, and American dipper. The common and hoary redpoll, ivory gull, and Ross' gull occasionally winter on the 1002 area. Twenty-one species occur offshore, mostly from late July to mid-September, with distribution generally limited to within 35 miles of shore. Sixteen offshore species breed locally on coastal tundra or barrier islands (Bartels, 1973). Greatest concentrations of summer resident waterbirds on the Arctic Refuge occur in two general habitats--shallow coastal waters and tundra wetlands (pl. 3A).

Birds begin using coastal lagoons when the snow melts in early June. During this period, river overflows cover lagoon deltas and provide the first open water of the season. Habitat use during the breeding season (mainly June and July) varies with bird species. Peak numbers of birds are often seen in August and September during staging and early migration. Smaller numbers are present until freezeup in late September or early October.

Lagoon areas are relatively high in productivity, and are important during all phases of the avian life cycle. More than 35,000 waterbirds of 20-25 species (oldsquaw) may use the coastal lagoons during the open-water period (July-September). As many as 11,000 birds may be present in a lagoon at one time. Some birds move from terrestrial nesting habitats into shallow lagoons, bays, and sand spits to molt and for protection from predation during this flightless stage. The lagoon systems are also important feeding areas used by oldsquaw, eiders, scoters, and other ducks, loons, phalaropes, terns, gulls, jaegers, and black guillemots (Divoky, 1978).

Migratory birds are international in range; nesting and wintering grounds and migration routes may occur not only in different countries but on different continents. International treaties for the protection of migratory birds have been ratified between the United States and the Union of Soviet Socialist Republics, Japan, Canada, and Mexico. In addition, measures for the protection of migratory birds are contained in the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, an agreement to which the United States is a party.

Species-specific information follows, under five bird categories: swans, geese, and ducks; seabirds and shorebirds; raptors; ptarmigan; and passerines.

SWANS, GEESE, AND DUCKS

Tundra swans are common breeding birds of the thaw-lake plains. Up to 150 nests and 400 to 500 adult swans have been counted on the 1002 area during annual surveys (Brackney and others, 1985a). Swans arrive in late May and early June and concentrate on the Canning-Tamayariak delta, the Hulahula-Okpilak delta, Barter Island lakes, Jago River wetlands, the Aichilik-Egaksrak deltas, and Demarcation Bay area lakes (pl. 3A). Spring surveys from 1982 to 1985 showed average densities of 1 swan per 0.67 square mile in concentration areas. These areas apparently offer highly desirable swan nesting and feeding habitat. Average density for the overall 2,960-square-mile area studied was 1 swan per 7.7 square miles. Swans depart the breeding grounds from late August to late September, those swans with young being last to leave (U.S. Fish and

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reported include arctic char, arctic grayling, arctic cisco arctic flounder, fourhorn sculpin, least cisco, round whitefish, broad whitefish, ninespine stickleback, chum salmon and burbot. Lake trout are also found in several lakes within the Canning River drainage but outside the 1002 area. Other 1002 area streams (pl 1B) that support fish populations are listed below.

Streams that support fish populations
(excluding Canning River)

A: Arctic grayling.
B: Resident arctic char
C Anadromous arctic char
D Pink salmon

	A	B	C	D
Tamayanak River	x			
Ikkiyaruk Creek	x	x		
Sadlerochit River	x	x		x
Hulahula River	x		x	
Akutoktak River	x			
Okpilak River	x			
Aichilik River	x		x	

These and many other smaller streams and coastal lakes have populations of ninespine sticklebacks. The other major streams in the 1002 area (Kalakturuk River Marsh Creek, Carter Creek, Jago River and tributaries Niguanak River, Sikreturak River, Angun River, and Kogotpak River) apparently do not support major fish populations. They may support fish locally and serve as summer feeding areas for a few fish but seemingly lack adequate overwintering habitat.

The drainages that originate in or transect the 1002 area range from small intermittent flow tundra streams to the Canning River which has an estimated 50-year flood discharge of 13,500 cfs (Childers and others, 1977). The integrity of riparian areas is important for maintenance of water quality and fish stocks on the coastal plain. Most of the water present is a result of precipitation, surface permafrost-thaw processes, deep-lake drain, or springs. Peak flows are associated with snowmelt in early summer or with rainfall during late summer and fall. By late October, most rivers in the 1002 area have no measurable flow. As riffle areas freeze to the bottom, overwintering fish become isolated in deeper pools, spring areas, or brackish river deltas. Substantial movement from summer feeding areas to small overwintering areas has been recorded (West and Wiswar, 1985). Ice accumulation on Arctic rivers is thickest from late March through early May.

Available fish overwintering habitat, such as deeper pools, is greatly reduced in early spring. Although pool depth is important, several other factors affect suitability for overwintering. These factors, which ultimately affect dissolved oxygen concentration, include density of organisms in the pool area, species' physiological tolerances, volume of the pool, temperature, amount of organic matter, and the influence of springs. Overwintering habitat is probably the greatest limiting factor for Arctic anadromous and fresh water fish populations (pl 1B).

Springs supply most, if not all, of the free-flowing water in the 1002 area during late winter. The importance of springs for spawning, rearing, and overwintering arctic fish populations has been well documented in the Arctic Refuge and other Arctic areas. Macro-invertebrates (aquatic insects consumed by fish) are generally much more abundant and diverse in springs and spring-fed sections of stream channels than in other Arctic Refuge stream habitats (Glesne and Deschermeier, 1984).

Lakes are uncommon in the 1002 area. The few that exist are generally thaw lakes located along the coast. Lakes less than 6 or 7 feet deep generally lack fish over-wintering capabilities: they either freeze to the bottom by late winter or have poor water quality because of freeze concentrations of dissolved solids and low dissolved oxygen levels. Lakes near the coast may be brackish, owing to saltwater intrusion or windblown ocean spray. In contrast to the more inland lakes, some shallow coastal lakes may be important summer feeding areas for anadromous and marine fish, depending on access.

Coastal lakes near the Canning River delta, sampled during summer, have contained arctic char, arctic grayling, arctic flounder, round whitefish, and broad whitefish (Ward and Craig, 1974). In deeper mountain and foothill lakes to the south of the 1002 area, arctic char, arctic grayling, and/or lake trout may be found. The best known and most widely used for recreation and subsistence are Lake Peters and Lake Schrader, in the headwaters of the Sadlerochit River. These lakes contain all three of the aforementioned fish species.

Most Native subsistence use of fish occurs along the coast. Arctic char and arctic cisco are the primary species caught during summer when they are present in large numbers in the Arctic Refuge lagoon systems. The arctic cisco is an international resource believed to originate in the Mackenzie River in Canada. Some subsistence use of arctic cod occurs in winter in apparent response to its increased abundance during that time. Arctic cod (Lowry, and others, 1978) also constitutes more than 95 percent of the diet of ringed seals which in turn are the major prey of the area's polar bears. Some winter subsistence fishing also occurs at fresh-water overwintering sites. The most notable of these are "Fish Hole One" and "Fish Hole Two" on the Hulahula River (pl 1B) where arctic char and arctic grayling are caught from holes in the river ice.

Sport fishing is currently minimal in the 1002 area because of difficulty in access and seasonal limitations on fish abundance.

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school with four classrooms, library, gymnasium, swimming pool, and kitchen. A vocational education building was completed in 1981. Junior and senior high school enrollment for the 1984-85 school year was 36.

Kaktovik has a health clinic staffed by a health aide. Two NSB Department of Public Safety Officers are located at Kaktovik. Federal facilities include the Post Office, the Arctic Refuge field office, and the Bar Main DEW site.

ARCHEOLOGY

Approximately 100 archeological sites are known to occur within the 1002 area (pl 1A). Dated sites appear to be comparatively recent and of either Historic Inupiat (approximately AD 1838-present) or Western Thule (about AD 900-1838) origin. Several smaller sites--mostly scatters of lithic debris from the manufacture, maintenance, and use of stone tools--are not yet datable but may be considerably older.

Sites near the 1002 area are known to be as much as 8,000 years old (U.S. Fish and Wildlife Service, 1982). A fairly widely accepted date from the Old Crow area of the Yukon Territory (about 150 miles southeast of the 1002 area) indicates that people have been present in the general area for the last 27,000 years. Even though sites of such an early period are few, sites 5,000-6,000 years old may occur on the 1002 area, but are yet to be discovered.

In the 1002 area, archeological sites may occur almost anywhere. However, some areas are much more likely to have sites, especially coastal areas and offshore barrier islands. Most identified sites consist of the remains of sod houses, log cabins, burials, caches, lookout towers, and related features. Older sites may have become buried under considerable sediment.

Archeological sites are also likely along rivers and streams that cross the 1002 area from the Philip Smith Mountains. These rivers could have provided fishing areas and would have been natural travel routes between the coast and the foothills. Sites known from the river courses are chiefly tent rings, although there are two interior sites with sod houses. Points of particular interest are high, well-drained banks, especially near stream confluences.

Undiscovered sites may also be on high points of land that provide overlooks above the surrounding moist tundra; such spots are known to produce archeological sites throughout most of northern Alaska and Canada. There are relatively few such locations on the 1002 area, and sites identified in such locations are uniformly small scatters of lithic material.

Archeological sites are even less likely on the relatively stable sandy areas in river deltas. As with the overlook sites, material from blowouts in such deltas is currently limited to lithic remains.

The remainder of the 1002 area consists largely of flat to gently rolling tundra; now very wet. Such areas are least likely to contain sites, or to contain sites that are susceptible to discovery.

RECREATION

Recreational use of the Arctic Refuge is varied and is related to wildlife or wilderness values. Types and amount of recreation are limited by the refuge's remoteness, harsh climate, and poor access. Fewer than 3,000 visits occur annually. Wet and moist ground conditions in the short summer season make surface travel difficult, and extended periods of cold and darkness during the winter reduce recreational uses at that time. Access to the refuge is almost exclusively by aircraft and is costly. Recreational use of the 1002 area is slowly increasing as it becomes better known and scheduled airline services to Barter Island improve.

The most common forms of recreation on the 1002 area are hunting, backpacking, and float trips on some of the larger rivers such as the Canning, Hulahula, and Aichilik. Other recreational pursuits are wildlife observation, photography, sightseeing, cross-country skiing, fishing, and nature study. Most recreationists involve themselves in a variety of these activities. Kaktovik residents also engage in snowmobiling.

In 1984, 13 hunting guides operated on the refuge, though none guided on the 1002 area. An additional 10 recreational guides conducted group float or backpack trips on the refuge. Four of these operated, at least in part, on the 1002 area. Float-trip groups average 6-12 people. Figures on nonguided recreationists are unavailable. But probably fewer than 100 unguided visits occur annually on the ground in the 1002 area. Several hundred visitors fly over the 1002 area annually for sightseeing or en route to other locations on the Arctic Refuge.

WILDERNESS AND ESTHETICS

The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America. Approximately 8 million acres of the refuge is designated as wilderness by ANILCA section 702(3), and adjoin the 1002 area on the south and east. The eastern coastal plain, from the eastern 1002 area boundary to the Canadian border is designated wilderness.

Wilderness is described by the Wilderness Act of 1964 (Public Law 88-557) as "... an area of undeveloped Federal lands retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and

Table VI-1.--Definitions of environmental effects

[Long-term, 20 years or more. Short-term, less than 20 years]

Effect level	Definition
	Physical resources
Major	Widespread modification of considerable severity in landforms, surface appearance, or distribution of physical resources, or contamination of those resources, lasting several tens of years. Modifications could occur during development/production phase.
Moderate	Local modification of considerable severity in landform, or surface appearance, or contamination of physical resources, lasting several tens of years; or widespread modification of *lesser severity in surface appearance or other characteristics of physical resources*, lasting from a few years to several tens of years. Modifications could occur during the exploration phase.
Minor	Localized, relatively isolated change lasting from less than 1 year to no more than 10 years, with no observable residual modification in surface appearance, distribution, or other characteristics of physical resources.
Negligible	Little or no change in the surface appearance, distribution or other characteristics of physical resources.
	Biological resources
Major	Widespread, long-term change in habitat availability or quality which would likely modify natural abundance or distribution of species using the 1002 area. Modification will persist at least as long as modifying influences exist.
Moderate	Widespread, short-term change in habitat availability or quality which would likely modify natural abundance or distribution of species using the 1002 area; or local modification in habitat availability or quality *which would likely modify natural abundance or distribution* at least as long as modifying influences exist.
Minor	Short-term, local change of species abundance, distribution, habitat availability, or habitat quality.
Negligible	Little or no change in population, habitat availability, or habitat quality.
	Socioeconomic resources
Major	Requires substantial changes in governmental policies, planning, or budgeting, or is likely to affect the economic or social well-being of residents of the area.
Moderate	Requires some modification of governmental policies, planning, or budgeting, or may affect the economic or social well-being of residents of the area.
Minor	Requires marginal change in governmental policies, planning, or budgeting, or may marginally affect the economic or social well-being of residents of the area.
Negligible	Not sufficient to have any measurable effect on governmental policies, planning or budgeting, or any measurable effect on the economic or social well-being of residents of the *area*.

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Table VI-3.--Resource categories and mitigation goals

[FWS Mitigation Policy: FR, v. 46, no. 15, January 23, 1981. Habitat value: a measure of the suitability of an area to support a given evaluation species]

Resource category	Designation criteria of habitat to be affected	Mitigation planning goal
1	Habitat of high value for evaluation species. Unique and irreplaceable on a national basis or in the ecoregion.	No loss of existing habitat value
2	Habitat of high value for evaluation species. Relatively scarce or becoming scarce on a national basis or in the ecoregion.	No net loss of in-kind habitat value.
3	Habitat of high to medium value for evaluation species. Relatively abundant on a national basis.	Minimize loss of in-kind habitat value. No net loss of value.
4	Habitat of medium to low value for evaluation species.	Minimize loss of habitat value

consequent determination of mitigation goals is based upon the habitat values assigned to specified evaluation species. This habitat value is a measure of the suitability of the area to support a given evaluation species

The mitigation policy recommends that legally designated or set-aside areas, such as National Wildlife Refuges, be given special consideration as either Resource Category 1 or 2. As described in Chapter II, high-value habitat for each of the five evaluation species exists within the 1002 area. The Porcupine caribou herd (PCH) core calving area is considered unique and irreplaceable. Habitat in this area has been designated *Resource Category 1 (pl. 2A)* because of its high fish and wildlife values, particularly for PCH caribou. The remainder of the 1002 area has been designated Resource Category 2.

The FWS normally recommends that all losses of Resource Category 1 habitat be prevented, as these one-of-a-kind areas cannot be replaced. Insignificant changes that do not result in adverse impacts on habitat value may be acceptable, provided they will have no significant cumulative impact.

Assumptions

Assumptions used in the physical, biological, and socioeconomic assessments include:

1. The Secretary of the Interior, through the FWS, would retain authority to issue refuge special-use permits for activities in the 1002 area, and to provide site-specific stipulations for all necessary authorizations.

2. Planning, design, construction, operation and maintenance, and rehabilitation would be accomplished using the most current available technology and practices. It is assumed that the 32 mitigation measures summarized at the end of this chapter, or measures at least as effective, will be included in development, construction, and operation plans, and will be implemented.

3. Any authorized operations and related activities would comply with all applicable Federal and State laws and regulations, as well as with any special laws and regulations the Congress or the Secretary of the Interior promulgate to govern activities on the 1002 area.

4. The environmental protection standards governing the seismic exploration program on the 1002 area (50 CFR 37.31-33) and the land-use stipulations for exploration drilling on the KIC/ASRC lands (August 9, 1983, agreement between ASRC and the United States) would continue to be in effect for oil and gas activities in the 1002 area. This would include special protections for terrestrial and aquatic environments and cultural resources, and designation of special areas such as Sadlerochit Spring. These regulations and stipulations may duplicate some of the mitigation measures recommended in this analysis, but also include specific references to the *handling and disposal of garbage, combustible and* noncombustible solid wastes, used equipment, sewage and gray water, fuel and hazardous or toxic materials, and provision for hazardous substances control and contingency plans.

ALTERNATIVE A--FULL LEASING

Effects on Physical Geography and Processes

Potential and probable impacts to the physical environment of oil development resulting from a full leasing program on the 1002 area are considered in four phases, each having progressively greater impact: geological and geophysical (principally seismic) exploration; exploratory drilling; development drilling; and construction of all-season

what methods, without seriously affecting fish, wildlife, and habitat that rely on the spring. However, the existing "no surface occupancy" restriction for oil exploration and development is assumed to remain in effect. This precludes surface development and disturbance, maintaining the area's physical features and important fish, wildlife, and subsistence resource values.

Conclusion

Development as a result of fully leasing the 1002 area would have negligible effects on the Sadlerochit Spring Special Area under current protective management regulations.

COASTAL AND MARINE ENVIRONMENT

Petroleum development and production in the 1002 area and associated transportation at both onshore and offshore sites would have a variety of effects. Docks and causeways can affect dispersion, nutrient transfer, temperatures, salinities, invertebrate abundance and diversity, fish passage, and other uses of those areas by fish and wildlife. Disruption of natural nearshore currents can result in sea water intrusions into lagoons causing lower water temperatures and higher salinities. Salinity and temperature changes could alter invertebrate abundance; decreases in invertebrates would mean lower coastal area values to fish and wildlife. Such intrusions may also alter fish movements by reducing existing favorable habitat conditions in nearshore zones.

Noise created by construction and other operations in coastal areas could be a disturbance factor, sufficiently reducing the quality of the coastal and marine habitats to cause avoidance by some marine birds and mammals.

Debris washing ashore from transport and offshore activities could increase with increased human activities in the area. The driftline is used for nesting habitat by several species of waterfowl and seabirds (pl. 3A, B, C). Disruption and physical alteration of the driftline from activities associated with oil development could affect bird nesting success by disturbing nesting birds or altering their nests. Debris and disruption of driftlines would also affect esthetics. Occasional fish and wildlife mortalities could occur where animals become entangled in or ingest debris.

Any spill of oil or other hazardous materials along the coast could severely affect coastal and marine habitats and fish and wildlife. For example, decreased invertebrates result in decreased food for fish and wildlife. Sea ducks, such as oldsquaw which heavily use this coastal area, could be displaced, and direct mortality could occur. Level of impact would relate to the volume of oil spilled, location, effectiveness of cleanup, time of year, and fish and wildlife species present.

Mitigation

Experience gained from construction and operation of docks and causeways for Prudhoe Bay should be used to plan and construct docks and causeways for the 1002 area so that those facilities do not affect longshore water transport and lagoon water chemistry or impede fish movements. Release of fuels and other hazardous substances to the environment should be minimized by developing and implementing control, use, and disposal plans for such substances.

Conclusion

Overall, the effect of full leasing is anticipated to be minor on coastal and marine habitats. However, there is a small probability of major adverse effects depending on the extent and duration of future cumulative developments or in the event of a catastrophic offshore or coastal oil spill.

TERRESTRIAL MAMMALS

CARIBOU

Caribou use the 1002 area during the summer months for two important activities, calving and seeking relief from insect harassment. During that period, 3,000-4,000 caribou from the 12,000-14,000 member CAH use the 1002 area. Up to 82 percent of the calving caribou in the PCH calved on the 1002 area in recent years (1972-85) and the entire 180,000-member PCH may use the area in some years, mainly during the late June/early July insect-relief period. Concentrations of caribou are generally absent from the 1002 area in winter, except for as many as 1,000 animals (7 percent) of the CAH scattered between the Sadlerochit Mountains and Camden Bay.

Exploration

Winter seismic programs in 1984 and 1985 on the 1002 area, and exploratory drilling on adjacent Kaktovik Inupiat Corporation (KIC)/Arctic Slope Regional Corporation (ASRC) lands in the winters of 1985 and 1988, resulted in no apparent conflict with CAH or PCH activities. Similar results were found during both seismic and exploratory drilling work in the NPRA and on State lands within the range of the CAH (U.S. Bureau of Land Management, 1983; Fancy, 1983). Winter oil exploration, including exploratory drilling, would likely have a negligible effect on PCH caribou since they are generally absent from the area. Disturbance, resulting in displacement, could occur to the CAH. Disturbance and displacement to both the CAH and PCH from the short-term, scattered and local activities of summer surface geology programs would be almost negligible.

Production, Transportation, and Development

Effects on caribou from petroleum field development, production, and transportation would occur from direct habitat modification, indirect habitat loss (displacement, barriers to movement which reduce access to insect relief and other habitats, and disturbance/harassment), and direct mortality (e.g., hunting, collisions with vehicles, or other accidents). Analogies comparing the effects of current oil development on the CAH and effects of potential 1002 area development on the PCH must be drawn with caution. Movements, density, and traditions of the PCH differ from those of the CAH (Chapter II). Because of the greater density of PCH on their calving grounds, the PCH would interact with oil development much more extensively and intensively than the CAH has interacted with oil development in the Prudhoe Bay area.

Caribou calving in the Prudhoe Bay area was reported by Gavin (1971), Child (1973), and White and others (1975), when development of the Prudhoe Bay oil field was beginning. Later studies (Cameron and Whitten, 1979, 1980; Cameron and others, 1981; Whitten and Cameron, 1985) indicate an absence of calving near the coast at Prudhoe Bay during 1976-85, possibly due to avoidance of the activity area by calving caribou. Two centers of concentrated calving activity were identified: (1) west of Prudhoe Bay in the vicinity of the Kuparuk and Ugnuravik Rivers (including recent oil development in the Milne Point and Kuparuk areas); (2) east of Prudhoe Bay, primarily in the Buffen Point to Canning River delta area (Shideler, 1986). Surveys in 1981 indicate that the Canning River delta area may support more calving caribou than the Kuparuk area (Whitten and Cameron, 1985). Table VI-4 compares calving in the Prudhoe Bay area and population of the CAH with development of the Prudhoe Bay oil field. The apparent herd increase has been attributed to high calf production and survival as well as relatively light hunting pressure (Whitten and Cameron, 1983).

Even more tenuous are parallels between caribou activities and population trends on NPRA with those which might result from oil development on the 1002 area. Although NPRA has been extensively explored, no oil production or infrastructure development has occurred.

Approximately 242,000 acres of the 1002 area used as a core calving area by the PCH has been determined Resource Category 1 habitat in accordance with the FWS mitigation policy. More than 50 caribou/sq mi have been present during calving in at least 5 of 14 years (1972-85) for which detailed data exist (pl. 2A); nearly 80 percent of the total core calving area for the 180,000 member PCH occurs in this portion of the 1002 area (table VI-5). The remaining approximately 1,304,000 acres, considered Resource Category 2 habitat, includes areas used year-round by up to 4,000 CAH caribou and for concentrated and scattered calving, postcalving aggregations, and insect-relief habitat by the PCH.

If the 1002 area's anticipated oil and gas resources were developed across the entire area, direct modification of caribou habitat could total approximately 5,650 acres. East of the Sadlerochit River about 3,650 acres used by the PCH, of which about 1,300 acres are Resource Category 1 habitat, would be affected. West of the Sadlerochit River some 2,000 acres, predominantly used by the CAH, would be affected. Slightly more than 0.3 percent of all Resource Category 2 habitat would be directly modified. Most of the reduction in habitat value would result from covering feeding and calving habitat with gravel.

Because insects are easily blown off somewhat elevated, unvegetated areas by wind, some positive effect might occur in the form of increased insect-relief habitat (Curatolo and others, 1982; Ellison and others, 1986). However, it is generally during the oestrid fly (nose bot and warble flies) harassment period from late July to early

Table VI-4.--Central Arctic caribou herd population calving in Prudhoe Bay area, and Prudhoe Bay development activities, 1969-85

(Information from Shideler (1986); some variation exists in calving areas surveyed. Long-term investigations of the CAH begun in 1974 by ADF&G. N.A., not available)

Year	Total CAH population	Number cows and calves	Development activities
1969-70	([1])	([1])	Oil discovered.
1972	N.A.	13	Deadhorse airport, road system, several drill
1973	N.A.	42	pads developed.
1974	N.A.	51	Construction of TAPS; rapid area growth in roads, facilities, and drill pads.
1976	N.A.	([2])	Oil production begins.
1978	6,000	([3])	Drill sites and road connecting Kuparuk with Prudhoe Bay developed.
1981	9,000	N.A.	Kuparuk pipeline connecting to TAPS completed.
1983	N.A.	0	Expansion of Kuparuk oil field.
1985	12,000-14,000	N.A.	Pipeline to Milne Point constructed.

[1]Reports of area used for calving by the 3,000 or so caribou residing in Prudhoe Bay area, early 1970's
[2]A handful.
[3]About 10.

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Table VI-5.--Porcupine caribou herd calving area potentially affected by development under full leasing or limited leasing, assuming an approximately 2-mile sphere of influence

	Concentrated calving area[1]	Core calving area[2]
Total calving area within 1002 area (acres)	934,000	242,000
Area (acres) potentially influenced by development:		
Full leasing	357,000	78,000
Limited leasing	261,000	10,000
Percent of 1002 calving area potentially influenced by development:		
Full leasing	38	32
Limited leasing	28	4
Total calving area (acres) in U.S. and Canada	2,117,000	311,000
Percent of total U.S. and Canada area potentially influenced by development:		
Full leasing	17	25
Limited leasing	12	3

[1]At least 50 caribou/square mile during calving, in 1-4 years, 1972-85.
[2]At least 50 caribou/square mile during calving for at least 5 years, 1972-85.

August that caribou seek relief on unvegetated gravel roads, well pads, or the shade of pipelines and buildings on those pads (Curatolo, 1983; Fancy, 1983). Insect harassment of PCH on the 1002 area generally results from swarms of mosquitoes early in the summer season. The PCH usually leaves the 1002 area prior to the emergence of oestrid flies.

Secondary modification of habitat due to changes in surface water flow, snow accumulation, roadside dust deposition, gravel spray from vehicle movements, and pollution incidents would reduce the habitat value of additional acreage. These changes in vegetation, and thus food availability, could occur on approximately 7,000 acres, of which nearly 1,800 acres is in Resource Category 1 (1 percent). Total modification of caribou habitat attributable to direct and secondary changes would occur on about 12,650 acres, or 0.6 percent of the 1002 area, and 1.3 percent of the core calving area (Resource Category 1 habitat).

Major indirect losses of habitat and additional reductions in habitat value would be widespread throughout the 1002 area. The habitat value losses from these indirect effects would result from behavioral avoidance of development areas; decreased accessibility to undeveloped areas (insect-relief habitats along the coast) due to physical barriers and disturbances such as pipelines, traffic, or facilities; and other disturbances or harassment by oil development activities and personnel during sensitive caribou life stages.

Disturbance to caribou is unavoidable if oil development occurs on the 1002 area. Historically the entire area has been used by PCH caribou at varying levels of intensity. Disturbance can result from a variety of sources including presence of pipelines and roads, aircraft operations, general construction, routine operation of the oil field, presence of people, and hunting. Reactions depend upon several factors, including caribou age and sex, herd size, presence of calves, season, and type and distance of the disturbance.

Behavioral avoidance of development areas displaces caribou from preferred habitats of traditional use. It is generally believed to result from human activity (noise, vehicle movements, presence of people, and odors), instead of the mere presence of roads, pipelines, and buildings. Avoidance of oil development and other human activity by caribou has been reported by numerous investigators (Dau and Cameron, 1986; Cameron and others, 1979; Whitten and Cameron, 1983; Fancy and others, 1981; Urquhart, 1973; Wright and Fancy, 1980). The reported extent of displacement varies. Displacement of the CAH from historic calving grounds in response to oil development at Prudhoe Bay has been documented (Dau and Cameron, 1986; Cameron and Whitten, 1979). Whitten and Cameron (1983) found consistently low numbers of caribou and generally low percentages of calves in the Prudhoe Bay oil field from their annual surveys of the CAH calving grounds, 1978-82, with caribou being displaced to adjacent areas already used for calving. Mean densities of caribou in five other regions of the calving grounds were 2 to 18 times higher than at Prudhoe Bay. Dau and Cameron (1986), in what may be the most systematic study of caribou displacement by oil development, reported that maternal caribou groups showed measurable declines in habitat use within approximately 2 miles on either side of the Milne Point road in the central Alaskan arctic.

Caribou select calving areas because of favorable weather causing early snowmelt, advanced emergence of new vegetation, relative absence of predators, proximity to insect-relief habitat, absence of disturbance, or some combination of these and other factors. Maternal cows and their calves are most sensitive to disturbance during calving and immediately thereafter (Calef and others, 1976; Miller and Gunn, 1979; Ellison and others, 1986).

Displacement of the PCH from a core calving area to a less desirable area would be expected to reduce caribou productivity. Loss of important habitat has been shown to directly impact ungulate populations (Wolfe, 1978; Skoviin, 1982). But no recognizable, long-term effect upon the CAH as a result of displacement by oil development in the central Alaskan Arctic has been demonstrated to date. In considering the effects of displacement of the CAH from traditional calving grounds, Whitten and Cameron (1985) contend that the CAH has not experienced a reduction in productivity or consequent population decline because: (1) the CAH has been displaced from only part of its calving grounds; (2) suitable alternative high-quality habitat appears available for caribou displaced from Prudhoe Bay; and (3) overall density of CAH caribou on their calving grounds is much lower than that of other arctic herds in Alaska. Although the CAH and PCH calving grounds are roughly equal in size and the Western Arctic herd calving ground is about 50 percent larger, the population of the PCH is about 15 times larger and that of the Western Arctic herd is about 18 times larger than the CAH (based on 1982 population estimates).

Both absolute (number of caribou, including calves, on the calving grounds divided by area of calving grounds) and effective (allowing for the length of time a herd uses its calving grounds each year) densities of the CAH are a fraction of PCH and Western Arctic herd calving ground densities. As described by Whitten and Cameron (1985), absolute density for the PCH is nearly 14 times, and for the Western Arctic herd nearly 15 times greater than for the CAH. The difference in effective densities is even greater, particularly for the PCH, which are found at approximately 24 caribou per square kilometer as compared with approximately 5 caribou per square kilometer for the CAH. Effective density of the Western Arctic herd is 15 caribou per square kilometer.

With the CAH calving density remaining low compared to other herds, despite a recent population increase, overcrowding and consequent habitat stress that might result in reduced productivity have not yet occurred, nor have caribou been displaced to areas of reduced habitat value or areas where they might be exposed to increased predation. Unlike the Western Arctic or Porcupine caribou herds, the CAH has been exposed to minimal predation in recent years. With the influx of workers and use of the haul road for Prudhoe Bay development, the wolf population in the Central Arctic area decreased in the mid-1970's because of hunting. At that time CAH numbers began increasing. The wolf population has remained low and brown bears, which also prey on caribou, are only moderately abundant in the area.

The lack of observable adverse effects from displacement exhibited by the CAH would be unlikely for the PCH. The PCH is much more crowded in its calving habitats, and a substantially greater proportion of important calving habitats would be involved with development that included their core calving area. Furthermore, predators are more abundant adjacent to their core and concentrated calving areas. For example, preliminary analysis of radio-relocation data indicate that brown bears shift habitat use patterns to coastal areas in June and early July (pl. 1D) to coincide with occupancy of those habitats by calving and postcalving caribou (Garner and others, 1985).

Biologists participating in the FWS workshop all agreed that displacement from areas of human activity related to oil and gas activities would occur (Ellison and others, 1986).

Plates 2A and 2B show the substantial overlap of potential oil development facilities with PCH calving areas and smaller overlap of such areas with CAH calving areas. Calving caribou of the PCH and those CAH caribou using the 1002 area are the most sensitive segment of those herds. They would annually encounter oil development during one of the most, if not the most critical time in their yearly cycle. Based upon the work of Dau and Cameron (1985), caribou are displaced approximately 2 miles out from development. This is most applicable during calving and immediately postcalving, which coincides with the greatest caribou use of the 1002 area. Within this approximately 2-mile area of influence are about 357,000 acres (38 percent) of the total concentrated calving grounds in the 1002 area.

For this analysis, core calving areas for the PCH are defined as concentrated calving areas used by at least 50 caribou/sq mi in 5 or more of the last 14 years (Chapter II and pl. 2A). Development in these areas is of particular concern. Seventy-eight percent of the PCH's core calving areas is within the 1002 area and is designated as Resource Category 1 habitat. An approximately 2-mile displacement of caribou out from petroleum facilities would include loss of 32 percent of the most critical PCH core calving areas (table VI-5). The mitigation goal for Resource Category 1 habitat is no loss of existing habitat value. The projected displacement from preferred calving habitat would represent a complete loss of habitat values. Measuring the probable population decline from complete loss of habitat values in calving areas is impossible and the ultimate effects of displacement are unknown.

Barriers to caribou movements are another source of indirect habitat loss. Roads without activity generally present little problem to free movement of caribou. Depending upon design pipelines may create a barrier. Those adjacent to or close to active roadways would probably most impede free movement (Ellison and others, 1986). Several investigators have described where passage

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of caribou through oil or other development areas has been inhibited because of linear oil-development facilities and associated activities (Curatolo and others, 1982; Smith and Cameron, 1985a, b; Klein, 1980). This is of particular concern in the 1002 area because the probable pipeline/haul road route would bisect the area.

Barriers to caribou movements could result in decreased calving success by reducing access to preferred calving areas, compounding the displacement from calving areas which could result from disturbance as discussed previously. A greater concern, relative to the location of potential barriers under the full leasing scenario, would be inhibiting movements for the large postcalving aggregations which annually occur on the 1002 area as they move between inland feeding areas and coastal insect-relief habitats. In years when ice breakup is late and more of the PCH calving occurs east and southeast of the 1002 area, there is a strong westward movement following calving. Virtually the entire PCH gathers on the 1002 area for foraging and insect relief, with large portions of the herd tending to remain on the 1002 area later into July and August during the years of late breakup (Roseneau and Stern, 1974; U.S. Fish and Wildlife Service, 1982; U.S. Fish and Wildlife Service, unpublished data). The insect season is a period of extreme natural harassment and one of the primary driving forces in the annual caribou cycle. This harassment follows closely behind the critical calving period. Insect harassment can have a pronounced negative effect on caribou survival. Helle and Tervainen (1984) reported that insect harassment reduced growth in reindeer calves in Finland and contributed heavily to increased mortality the following winter. Insect harassment also affected the body size at maturity. Insect haressment and the avoidance actions of caribou put considerable energy stress on caribou (Reimers, 1980; White, 1983). Davis and Valkenburg (1979) reported several dead and sick calves in the Western Arctic caribou herd, all with heavy infestations of nose bot larvae. Reduced access to insect-relief habitat would result in greater energy stress with possibly reduced survival.

Numerous investigators have reported on the varying successes of caribou in crossing roads and pipelines associated with Prudhoe Bay facilities (Fancy, 1982, 1983; Curatolo, 1984; Curatolo and Murphy, 1983; Smith and Cameron, 1985a, b). Crossing success depends on several factors including traffic and human activity levels, pipeline design, season, and type and amount of insect harassment. Caribou crossing success is generally greatest at buried pipelines and then decreases for roads without traffic, to elevated (at least 5 feet above ground) pipelines adjacent to roads without traffic, to pipelines adjacent to roads with traffic. Large mosquito-harassed groups do not readily cross beneath elevated pipelines (Curatolo and Murphy, 1983; Smith and Cameron, 1985b); deflections of up to 20 miles during which caribou trotted or ran have been observed in the central Alaskan Arctic. During the oestrid fly season, caribou crossing success was markedly increased. In summarizing their 1981-83 studies of caribou crossings at roads and pipelines in the Prudhoe Bay and Kuparuk oil fields, Curatolo and Murphy (in press) attributed the lower crossing frequencies at pipeline/road sites to the combined stimulus of vehicular traffic and a pipeline.

After evaluating caribou responses to pipelines, roads, and pipeline/road complexes in the Kuparuk oil field, Curatolo and Murphy (1983) suggested that caribou movements could be facilitated by separating pipelines from heavily traveled roads and constructing ramps at strategic locations over elevated pipelines. Other researchers have concurred that roads should be separated from pipelines as a means of improving caribou passage through development areas (Curatolo and others, 1982; Robus and Curatolo, 1983; Ellison and others, 1985). The optimum separation between roads and pipelines depends upon terrain; preliminary information indicates that a separation of at least 400-800 feet improves caribou crossing success (Curatolo and Reges, 1986).

Where Curatolo and Murphy (1983) and Smith and Cameron (1985a, b) documented reduced crossing success in areas of oil-related development, it has been for caribou exposed to major oil and gas development for extended periods annually in the central Alaskan Arctic since the early 1970's. Because some habituation would presumably have occurred, animals in the CAH may be more likely to cross an oil-field development than the PCH which would encounter such developments for only 2 or 3 months each year.

Eighteen percent (294,000 acres) of the 1002 area, including KIC/ASRC lands, used for insect-relief and other purposes by the PCH lie north of the proposed pipeline/road corridor. Use of this area by the PCH could be affected by two possible factors. If caribou refuse to cross through any development areas, then 294,000 acres would be unavailable as habitat. That area encompasses 52 percent of total insect-relief habitats and over 80 percent of coastal insect-relief habitats. This would mean that all coastal insect-relief habitats within the 1002 area, except for a small area in the eastern portion, would become unavailable under full development. The second factor is to assume the approximately 2-mile sphere of influence for oil development used previously. Under that assumption, caribou crossing through the development area would avoid using approximately 72,000 acres or 29 percent of identified coastal insect-relief habitat within the 1002 area and KIC/ASRC lands (Pank and others, 1986). Failure to obtain relief from insect harassment from either factor could shorten foraging time, leading to poorer physical condition and subsequently to increased susceptibility to predation and reduced overwinter survival.

Notwithstanding the limited sample size and timeframe covered, the satellite telemetry work of Pank and others (1986) provides an indication of the extent to which 1002 area caribou could interact with facilities and infrastructure necessary for full leasing. Their preliminary analysis of the potential interaction between PCH and CAH caribou and the oil development scenario used in this report involved 10 caribou radio-collared on winter range in the Arctic Refuge, two from the CAH and eight from the PCH. An interaction was defined as whenever a caribou point location, or any segment of a line connecting two point locations calculated for the same caribou on adjacent days, was within approximately 2 miles of a road, pipeline, drill pad, airfield, or other development facility. Point locations for the five caribou from the PCH which entered the 1002 area in summer 1985 can be examined to indicate the extent of time caribou usually spend within the development area. Of the 232 point locations, 51 (22 percent of the time) were within approximately 2 miles of the infrastructure for full development. Moreover, 34 percent of caribou routes between locations on adjacent days were also within the approximately 2-mile area influenced by development. The two CAH caribou encountered the development scenario to a much greater extent than did the collared PCH caribou: 413 (32.7 percent) of 1264 point locations and 83 percent of routes were within the approximately 2-mile interaction area.

Effects of disturbance might also include injury by trampling during stampedes, particularly calves; energy stress, possibly critical during times of low energy reserves such as winter and postcalving; and inability to reach insect-relief habitat which also increases energy loss. Miller and Gunn (1979) and Northwest Territories Wildlife Service (1979) noted that major physiological responses to harassment may occur in the absence of visible behavioral changes.

Aircraft activities are another cause of disturbance; numerous instances involving caribou have been documented. For example, Calef and others (1976) reported that helicopters which hazed caribou from the rear caused the most severe panic reaction. Large herds of up to 60,000 animals could be herded by flying at altitudes of up to 2,000 feet above ground level (AGL). Calves were more sensitive than other age classes and caribou on calving grounds were most reactive.

Recommendations for aircraft restrictions differ. According to Calef and others (1976), flight elevations of 500 feet AGL would prevent most injurious caribou reactions and altitudes of 1,000 feet AGL would avoid mild escape responses. These investigators recommended that aircraft maintain altitudes of 1,000 feet AGL during caribou calving, caribou rut, and early winter. Davis and Valkenburg (1979) also noted an inverse relationship between the altitude of aircraft and severity of the caribou's reaction. They recommended altitudes of 2,000 feet AGL from May to August. The Peary caribou herd in Canada reacted similarly to helicopters (Miller and Gunn, 1979); altitudes of 2,000 feet AGL were recommended for May to November and 1,000 feet AGL at other times.

Davis and Valkenburg (1979) reported that caribou may respond more to people on the ground than to flying aircraft. They recommend that people and vehicles maintain a minimum distance of 3,000 feet from caribou during calving. Curatolo and others (1982), Miller and Gunn (1979), and Ellison and others (1986) have all reported that traffic, people, or general activity is more disturbing to caribou than merely the presence of roads or structures. No agreement on effects, and sometimes even causes, of disturbance exists. For example, Bergerud and others (1984) have a dissenting, though widely disputed, view. For review of the effects of various human developments on the demographics of seven North American caribou herds and one wild Norwegian reindeer herd, they postulated that caribou can withstand periodic severe disturbance without adverse effects on productivity and survival. They discounted the effects of much of the disturbance associated with development activities, concluding instead that increased hunting along transportation corridors through several herd ranges was responsible for distributional changes.

One of the more significant effects on caribou as a result of better human access to their habitats has been increased harvest (Bergerud and others, 1984). Obviously, hunting directly reduces the number of caribou in a population. More important, it reinforces the negative stimulus in surviving animals to associate human activity and development with danger. This negative stimulus increases the intensity and duration of disturbance and displacement. It also reduces habituation which, over time, could otherwise offset some displacement. Habituation of caribou to structures and activity occurs more readily in unhunted than hunted populations (Klein, 1980).

Legal harvest outside developed areas would be expected to increase moderately as workers could conveniently travel to adjacent areas to hunt caribou in season. The State of Alaska as lead, in cooperation with the FWS, sets seasons and bag limits for the 1002 area. Closing the oil development area to hunters should reduce illegal take to a minor level. Still, law enforcement in such a remote area is often difficult. For example, notwithstanding the fact that a 5-mile corridor along either side of the Dalton Highway from the Yukon River north to Prudhoe Bay, the gravel TAPS haul road, has been closed to firearms since 1975, State Fish and Wildlife Protection Officers and Alaska Department of Fish and Game (ADF&G) biologists are discovering increasing numbers of people hunting illegally within the corridor and outside the corridor through illegal access using all-terrain vehicles. The ADF&G has been monitoring the kill; their biologists estimate that as many as 800 caribou were taken in Game Management Unit 26B (Central Arctic) during fall and winter 1985-1986. All but 82 came from along the approximately 200 miles of the haul road between Prudhoe Bay and Atigun Pass (K.R. Whitten, ADF&G, unpublished data). The majority of this harvest is illegal because hunters either lacked a road permit where necessary or illegally used all-terrain vehicles for access. While the prohibition on discharging firearms extends to all users, including subsistence users, subsistence take is not considered a significant factor in the total harvest because of the distance of subsistence users from this area. State protection officers have found it

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difficult to assign staff to such remote areas to enforce existing laws and regulations.

Based upon experience with TAPS and Prudhoe Bay, mortality as a result of vehicle collisions, entanglement and other accidents should be minor (R.D. Cameron and K.R. Whitten, unpublished data).

Mitigation

The following measures would help avoid and minimize habitat value losses in the 1,304,000 acres of Resource Category 2 caribou habitat. Mitigation of the loss of caribou habitat in Resource Category 1 (242,000 acres of core calving area) is not possible.

For exploration activities, all environmental protection measures required during the previous 1002 coastal plain exploration program (50 CFR 37.31) and the drilling of an exploration well on KIC/ASRC lands (August 9, 1983, Agreement between Arctic Slope Regional Corporation and the United States of America, Appendix 2, Land Use Stipulations) will maintain most habitat values. Oil exploration, with the exception of surface geology studies, should be limited to the period of winter conditions, generally November 1 to May 1.

For oil development, the success of various stipulations designed as mitigation will ultimately determine the degree to which oil development actually affects caribou using the 1002 area. Measures previously used with success for Arctic oil development as well as other measures which should further help to reduce negative effects on caribou include:

1. Bury all pipelines where possible (Cameron and Whitten, 1979; Elison and others, 1986). Because of permafrost, opportunities for pipeline burial will be few. Where burial is not feasible:
   - A Place ramps over structures in areas of natural crossings or where development tends to funnel caribou (Curatolo and Murphy, 1983; Robus and Curatolo, 1983; Elison and others, 1986).
   - B Elevate pipelines (the most common practice) to allow free passage of caribou in areas without ramps (Elison and others, 1986).
2. Reduce disturbance from vehicle activity by limiting use of development infrastructure to essential industry and agency personnel on official business (Elison and others, 1986).
3. Close the area within 5 miles of all development and associated infrastructure to hunting and trapping, as well as to discharge of firearms, so as to reduce disturbance to caribou and to protect people and equipment (Elison and others, 1986; Carruthers and others, 1984).
4. Site nonessential facilities outside calving areas and major movement zones (Cameron and Whitten, 1979; Elison and others, 1986).
5. Separate roads and pipelines as necessary in areas used for crossing to improve crossing success (Curatolo and Murphy, 1983; Curatolo and others, 1982; Robus and Curatolo, 1983; Elison and others, 1986; Curatolo and Reges, 1986).
6. Acquire authority to establish time and area closures or restrictions on surface activity to minimize disturbances during calving or in concentrated use areas (Cameron and Whitten, 1979; Curatolo and others, 1982; Robus and Curatolo, 1983).
7. Establish time and area closures and minimum altitude restrictions for aircraft operations of 1000 feet AGL (Aug. 16 through May 19) and 2000 feet AGL (May 20 through Aug. 15). Altitude and time restrictions may be modified after further study.
8. Monitor the effects of oil development on caribou.
9. Annually monitor herd size, productivity, movements, distribution, and general health. If greater or additional adverse effects are found to occur than those initially predicted, additional mitigation or protective management actions would be implemented upon the recommendation of the FWS, in conjunction with the State where effects extend beyond the boundaries of the 1002 area. Additional mitigation could include further seasonal area closures, surface or air traffic restrictions, phasing of field development, or state-of-the-art measures.
10. Protect insect-relief habitat and facilitate free movement and access for caribou by reducing surface occupancy in the zone from the coast to 3 miles inland (Elison and others, 1986). Occupancy would be restricted to marine facilities and infrastructure necessary to move inland beyond the restricted zone.
11. Protect riparian and adjacent areas by placing permanent production facilities outside the areas within 3/4 mile of the high-water mark on both sides of identified watercourses (pl. 2A) and by limiting crossings of transportation facilities.

Conclusion

Surface geologic exploration and study conducted throughout the year would be controlled by specific time and area closures to avoid conflicts with caribou calving and movements during the insect-relief period. Seismic activity would be confined to winter work only. Based upon experience from the 1983-1985 exploration program in the 1002 area, only negligible effects would occur. Localized avoidance and disturbance of a minor nature may occur in the area of exploration wells if caribou entered the area while well drilling activities were underway. Because human activity would be low, effects would most likely result from some avoidance and displacement around well pads.

The expanding population trend for the CAH in the past decade would indicate that the CAH is not at carrying capacity (the number of healthy animals that can be maintained by habitat on a given unit of land). However, the point at which cumulative effects and expanding developments all modify suitable displacement habitat is unknown. Also unknown is carrying capacity of the PCH. Given the geography of the calving areas and current densities in those areas, the availability of suitable alternative habitats is not apparent.

A major change in distribution as an adverse result of displacement of both that portion of the CAH using the 1002 area as well as the entire PCH could occur if the 1002 area were fully developed. The main oil pipeline would bisect the 1002 area between the western and northeastern boundaries. Disturbance would occur from the presence and activities of up to 6,000 people, hundreds of vehicles, and major construction and production activities scattered throughout the 1002 area, including sensitive caribou calving areas. Use of approximately 25 percent of the total PCH core calving area and 29 percent of the coastal insect-relief habitat could be reduced or eliminated. Potentially a much larger portion, nearly 60 percent of coastal insect-relief habitat, could be affected if development proves to be a barrier to caribou movements. Loss of calving habitat, barriers to free movement causing reduced access to insect-relief and other areas, disturbance, stress, and other factors would cumulatively reduce both available habitat and habitat values on remaining areas, resulting in caribou population declines.

These changes in habitat availability and value, combined with increased harvest, could result in a major population decline and change in distribution of 20-40 percent, based on the amount of calving and insect-relief habitats to be adversely affected. Because of the many variables involved and lack of relevant experience in estimating impacts on this herd and because of the difficulty in quantifying impacts, this estimate is uncertain.

For the CAH, a moderate change in distribution or decline in that portion of the CAH using the 1002 area could occur. The effect on the entire CAH population throughout its range may also be moderate. Those effects on the segment of the CAH within the 1002 area would be similar to those on the PCH that occur from disturbance, displacement and barriers to free movement. The population decline or distribution change would be 5-10 percent for the CAH throughout its range.

MUSKOXEN

Recently reintroduced to the Arctic Refuge, muskoxen are rapidly expanding and pioneering new areas. From the 69 muskoxen introduced between 1969 and 1970 the population has grown to 476 in 1985. Carrying capacity has apparently not been reached.

Experience in the Arctic Refuge from winter seismic exploration in 1984 and 1985 and summer surface exploration in 1983, 1984, and 1985, indicates that these activities have only minor disturbance effects upon Arctic Refuge muskoxen. Harassment may result in a net energy drain if it occurs during the critical winter period, and can thereby reduce survival. Reynolds and LaPlant (1985) reported no long-term or widespread changes in distribution or use of traditional areas in response to disturbance by seismic exploration. In response to seismic activity, one herd did move 2.8 miles and another herd moved 1.9 miles within 24 hours. Jingfors and Lassen (1984) found that muskox disturbed by seismic vehicles either ran or gradually moved away. Other investigators (Carruthers, 1976; Russell, 1977) reported similar responses by muskoxen from winter seismic exploration in Canada.

Potentially economic prospects in blocks A, C, and D occur partially in year-round high-use areas, including calving areas (pl. 2C). Direct loss of muskoxen habitat from oil development could total approximately 2,700 acres.

Disturbance caused by routine oil field operation and associated infrastructure may exclude or reduce muskoxen use of preferred habitat. Muskox reaction to helicopters depends on sex and age of animals, group size, number of calves in a group, the position of the sun and wind direction relative to the disturbance, what the animals are doing at the time of disturbance, and terrain (Miller and Gunn, 1979). In their extensive study of the reaction to helicopter disturbance of muskoxen on Banks Islands, Northwest Territories, Canada, Miller and Gunn (1979) reported that: cows and calves and solitary bulls were the most responsive to disturbance; the reaction of muskoxen to disturbance was similar to their response to a predator; and the degree of reaction to disturbance was generally inversely related to the distance of the disturbing stimuli. The presence of people on the ground in association with helicopters that had landed increased the disturbance. Although muskoxen disturbed by helicopters usually moved less than 0.2 mile, Miller and Gunn (1979) recommended minimum altitudes of 2,000 feet AGL during May-November and 1,000 feet AGL during December-April.

Muskoxen may also be disturbed by seismic surveys. One herd was reported to have run at least 0.8 mile after being disturbed by seismic vehicles 1.9 miles away (Reynolds and LaPlant, 1985). Temporary displacement of up to 2 miles has been observed on both sides of seismic lines (Russell, 1977). While oil field development and operation would be much more intrusive and sustained than seismic exploration, the increased disturbance may be

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partially offset by habituation which has been observed by Miller and Gunn (1979) during experimental helicopter harassment

Muskoxen are present on the 1002 area throughout the winter when most exploration and construction activities would take place. Muskoxen daily activity may decrease during winter (Reynolds, 1986) as part of their behavioral strategy for energy conservation. Repeated disturbance causing increased or prolonged activity during the winter results in energy drain which may adversely affect survival of individuals or productivity of pregnant females

The effects on muskoxen from habitat loss or stress due to disturbance have been difficult to measure. Miller and Gunn (1979) concluded that lack of visible response does not necessarily mean the absence of physiological changes or energy drain which may have a major effect on the population over time. Muskoxen, as residents on the 1002 area, will be exposed to year-round activity. As described in the previous section on caribou, loss of important habitat has been shown to have major negative effects on ungulates—muskoxen, like caribou, presumably select wintering and calving areas because of factors favorable to herd productivity and survival: availability of preferred forage, better weather or snow conditions, relative absence of predators, lack of disturbance, or some combination of these and other factors. Displacement from calving areas would have a negative effect on muskoxen production. The magnitude of that effect is difficult to accurately predict, particularly in view of the expanding nature of the population and refuge management objectives to allow continued population expansion. The effect on production would likely be related to the magnitude and duration of displacement

No information is available on the reaction of muskoxen to sustained oil development and production activities. From the reports of Russell (1977) and Reynolds and LaPlant (1985), a 2-mile sphere of influence was assumed in calculating the range which could be affected by full leasing. Table VI.6 shows that habitat values could be lost or greatly reduced throughout about one third (256,000 acres) of the muskox range within the 1002 area. Habitats used for high seasonal or year-round use, including calving, would be disproportionately affected; muskoxen would be displaced from approximately 53 percent of those habitats. Habitat values could be lost on nearly 75 percent of the high use habitats in which calving occurs. Such a high percentage of loss in valuable calving habitat could have a major negative influence on herd productivity.

Direct mortality could result from hunting, vehicle collisions, and other accidents associated with development. Muskoxen are highly vulnerable to hunting, and direct mortality would be expected to increase over time as access into previously undeveloped areas increased. Increased hunting regulation and enforcement would be required to reduce illegal harvest. With adequate enforcement of season and bag limit restrictions, the number of animals killed would be expected to permit only a minor effect on the population.

Mitigation

Negative effects to muskoxen could be mitigated by standard stipulations prohibiting disturbance, implementing necessary time and area closures, and requiring on-site monitoring. Continued monitoring of the population's growth, distribution, and movements would detect changes and determine what, if any, additional mitigation may be needed. Because riparian areas are favored habitats, those stipulations for caribou that close valuable riparian areas to siting of permanent facilities and limit crossings of those areas by transportation facilities would minimize potential interactions and disturbance, which would reduce effects on muskoxen as well (pl. 2C).

Table VI-6.--Observed muskox range potentially affected by development under full leasing or limited leasing, assuming a 2 mile sphere of influence

	High-use range seasonally or year-round		Other range	Total range
	Without calving	With calving		
Total muskox range (acres) within Arctic Refuge	251,000	211,000	654,000	1,116,000
Area (acres) within development sphere of influence:				
Full leasing	48,000	112,000	98,000	256,000
Limited leasing	46,000	110,000	98,000	254,000
Percent of Arctic Refuge range influenced by development:				
Full leasing	18	53	15	23
Limited leasing	18	52	15	23
Total muskox range (acres) within 1002 area	207,000	158,000	395,000	760,000
Percent of 1002 area influenced by development:				
Full leasing	22	71	25	34
Limited leasing	22	70	25	33

Conclusion

Major negative effects upon the muskoxen population from oil development could occur, considering the present management objectives for continued population growth of the herd under natural regulation and the displacement from habitat likely to occur. Muskoxen could be displaced from up to 71 percent of their high-use, year-round with calving, habitats within the 1002 area. This, coupled with direct mortality, and the unavoidable disturbances would cause the population to decrease and its distribution to be altered. Effects would be most pronounced on the subpopulation using the Niguanak-Okerokovik-Angun River area. This subpopulation is the smallest (approximately 80) and has the least amount of interchange with other subpopulations. Consequently the likelihood of immigration offsetting population-depressing forces on this subpopulation would be very limited.

Predicted population changes resulting from petroleum development are speculative. There are no references in the literature to analogous activities in other muskoxen ranges. However, considering the large extent (158,000 acres, 43 percent) of all high-use muskoxen habitats within the 1002 area, as well as more than 33 percent of the population's high-use habitats throughout the Arctic Refuge which could be affected under full leasing, a change in distribution or decline affecting 25-50 percent of the population may occur.

MOOSE

The 1002 area is not high-quality moose habitat. Peak use by moose is during the summer when the 1002 area population probably is less than 25; during the winter, moose are rare on the area. The portion of the total refuge population represented by this figure is not known.

Direct loss of habitat is expected to be about 140 acres out of the 98,000 acres of the 1002 area identified as moose use areas. Affected areas are low-density habitats (less than one moose per 26 square miles), mainly in Block D (pl. 1C).

Moose adapt readily and habituate to the presence of human activity; they are not easily disturbed (Dennistion, 1956; Peterson, 1955). Moose have expanded their range in North America at the same time that human disturbance has spread (Davis and Franzmann, 1979). On the Kenai National Wildlife Refuge in Alaska, helicopter supported winter seismic surveys using explosives did not modify moose distribution patterns, movements, or behavior (Bangs and Bailey, 1982). Most studies have dealt with moose in forested areas. The response of moose to disturbance in tundra areas has not been demonstrated.

Increased human development on the Kenai Peninsula, Alaska, has resulted in increased moose mortality from hunting, vehicle collisions, poaching, and other causes (Bangs and others, 1982). Moose mortality on the 1002 area could occur as a result of hunting or accidental death, especially vehicle collisions. Because so few moose use the area and because of the area's open nature, the number killed would probably be very low.

Moose populations south of the 1002 area would come under increased hunting pressure due to the influx of workers to the area. Declines in the population age structure and average antler size would probably occur. Moose concentrate in riparian habitats south of the 1002 area where they are highly visible and vulnerable to hunting.

Mitigation

None would be needed beyond those general measures for caribou such as limiting use of transportation corridors and closing the area within 5 miles of project facilities to the discharge of firearms. Moose harvest on Arctic Refuge would be regulated by the State of Alaska in cooperation with the FWS, and should consequently be kept within sustainable limits by modifying harvest seasons and bag limits.

Conclusion

Effects on the regional moose population from habitat loss and mortality due to oil development in the 1002 area would be minor.

DALL SHEEP

Dall sheep are rarely found north of the Sadlerochit Mountains in the 1002 area, although they are common in the Brooks Range, south of the 1002 area. Increased hunting pressure, air traffic, and harassment by sightseers could adversely affect Dall sheep.

Mitigation

More restrictive hunting regulations could be required if increased harvest affects the health of Dall sheep populations or reduces the quality of hunting and associated recreational use.

Conclusion

Indirect effects on sheep outside the 1002 area would be minor. Full leasing would have a negligible effect on Dall sheep in the 1002 area; average age and, consequently, horn size of rams may decline somewhat as a result of increased hunting pressure.

WOLVES

Five to ten wolves seasonally use the 1002 area (Weller and others, 1985), mainly in the summer for hunting when prey is most abundant. Wolf dens have not been documented in the 1002 area. Wolves have denned infrequently on the coastal plain east and west of the 1002

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known to be cautious and wary of humans (Krott, 1960). Wolverine distributions and movements on the 1002 area would be altered by the presence of human activity associated with oil development. Displacement of wolverines from local areas of development on the 1002 area is very likely. In considering potential population effects to wolverines from the proposed Susitna hydroelectric project, Whitman and Ballard (1984) thought that local avoidance of work camps would not significantly influence wolverine movements or productivity.

Because wolverines are primarily scavengers, their abundance is related to the biomass and turnover of large herbivore populations (van Zyll de Jong, 1975). Thus, the magnitude of anticipated effects on populations of caribou, muskox, and moose upon which wolverines depend will directly affect the degree of effects on wolverines. Major effects have been projected for caribou and muskox populations, minor effects for moose. Magoun (1985) stated that successful management of wolverines in Game Management Unit 26A on the North Slope was directly related to successful management of the Western Arctic and Teshekpuk Lake caribou herds. She further stated that a decline in these herds could result in a decline in wolverine productivity. Whitman and Ballard (1984) believed that a decrease in the populations of moose and other prey as a result of the proposed Susitna hydroelectric project could eventually affect wolverine densities, population size, and movements. Reduction in abundance of the primary predators (wolves and brown bears for which moderate and minor effects are predicted, respectively) could also decrease the abundance of prey carcasses available for scavenging by wolverines.

During the winter wolverines on the tundra are vulnerable to hunting from snowmobiles and aircraft. Increased hunting and trapping could occur on the 1002 area as a result of the greatly improved access provided by the roads, trails, and airstrips associated with oil and gas development, and the increased human populations in the region. Hornocker and Hash (1981) found that trapping was the primary cause of wolverine mortality. Van Zyll de Jong (1975) felt that human predation was the factor most likely to affect wolverine numbers.

Mitigation

Measures designed for prey species such as caribou, muskox, and moose will also benefit wolverines. Control of access and harvest to minimize direct mortality would be the most important determinant of effects. This control is recommended as mitigation for effects on several species.

Conclusion

The cumulative effects of displacement/avoidance and reduced food resources could result in localized, long-term changes (a moderate effect) in wolverine distribution. Inadequate controls on access and harvest could possibly reduce by half or more the 1002 area wolverine population. If this occurred, it would result in a major effect.

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BROWN BEARS

Brown bears are common on the 1002 area during May-September when they forage and range widely. The 1002 area contains habitat used seasonally by bears at moderate or high density (pl. 1D). Habitat use and populations throughout the Arctic Refuge have not been similarly delineated.

Under full leasing, direct loss of brown bear habitat would total about 3,500 acres. Oil-field activities would take place throughout approximately 17 percent of high and moderate brown bear use areas within the 1002 area. Quantifying the number of animals involved is difficult. Seasonal density of bears on the 1002 area averages one bear/30 square miles, but local densities can range from one bear/16.5 square miles to one bear/2,200 square miles.

Brown bears use the 1002 area mainly for feeding from late May through July when caribou are present. The potential decline in caribou population and change in distribution probable with full leasing (major for the PCH and moderate for the CAH) could cause a decline in an important brown bear food source. This could result in decreased bear productivity and survival of young in years when alternate food sources, such as small rodents, are scarce.

Brown bears are not readily displaced by human presence or activity. Brown bears along the TAPS corridor became so habituated to development activity that they occasionally entered occupied buildings in search of food (Follmann and others, 1980), routinely fed at garbage dumps, and waited along roads and other activity areas for handouts. Electrified fencing successfully eliminated problems with both brown and black bears in two summer camps of 100 people each in the Brooks Range (Follmann and Hechtel, 1983).

Disturbance to brown bears denning on the 1002 area could occur, particularly from winter seismic exploration because such activity occurs after brown bears have denned and den sites may not be known. Disturbance of denning bears, once development is complete, should be negligible since bears would likely avoid denning in areas where activity was occurring. Hanley and others (1981) found that brown bears in their dens were disturbed by seismic blasting 1.2 miles away, as demonstrated by movement within the den, but no negative effect such as den abandonment was documented. Reynolds and others (1983) reported that seismic vehicles or shot detonation resulted in increased heart rate and movement in the dens of instrumented brown bears. Harding and Nagy (1980) reported brown bears successfully wintering within 1-4 miles of active oil exploration camps. Conversely, they also reported a den being abandoned when a seismic vehicle drove over it, and den destruction during gravel mining. Quimby (1974) reported that 5 of 10 brown bears apparently abandoned dens in early October after being followed to their dens by helicopters.

Only 6 of 129 (4.7 percent) den sites documented during the Arctic Refuge baseline studies were located on the 1002 area (Garner and others, 1984, 1985). Therefore, the potential to disturb denning habitat and disrupt denning activities of the regional brown bear population from oil exploration and development would be low, and impacts would be expected to be minor.

Aircraft disturbance of bears is unavoidable. Doll and others (1974) and McCourt and others (1974) reported variable reactions by bears to aircraft disturbance at 1,000 feet AGL or less. Douglass and others (1980) reported bears reacted strongly to hazing by vehicles and aircraft.

Direct bear mortalities from accidents or being shot in defense of human life and property will occur. Drug-induced death of bears occasionally occurs when nuisance bears are immobilized for relocation. Accidents, such as vehicle collisions, could also reduce bear numbers. Follmann and others (1980) reported 13 brown bears killed in conjunction with TAPS construction and operation during 1971-79. The BLM (1983) estimated that oil development on NPRA in an area of bear density similar to the 1002 area would produce a loss of one bear annually as a result of confrontation between bears and oil development personnel. The rate of mortality would presumable be similar on the 1002 area. Most deaths would probably result from bears' being attracted by improper garbage or food handling, or illegal feeding.

Bears that seasonally use the 1002 area are part of the same regional population inhabiting the mountains and foothills of the Brooks Range. Hunting pressure on this population could increase if oil workers remained on the 1002 area during off-duty periods to pursue recreational activities. Increased harvest of bears occurred during construction of TAPS (Follmann and Hechtel, 1983). Schallenberger (1980) similarly reported an increase in bear harvest as a result of increased human presence associated with oil development. Further regulation of hunting by the State and the FWS would probably be required.

Mitigation

In addition to those measures listed earlier in the chapter, strictly enforcing prohibitions on feeding wildlife, adequate food storage, control of harvest, and control of aircraft flight altitudes and corridors would lessen adverse effects of development resulting from full leasing. An active monitoring program for brown bears during seismic exploration, construction, and other development activities would help avoid disturbing denning bears. Buffer zones of at least 1/2 mile would be established around any known dens as required for previous exploration in the 1002 area [50 CFR 37.32 (c)].

Conclusion

A moderate decline in brown bear numbers or change in distribution could result from the additive effects of direct mortality, decreased prey availability, harassment, and disturbance in denning areas.

ARCTIC GROUND SQUIRRELS AND OTHER RODENTS

Arctic ground squirrels are commonly found throughout much of the 1002 area. Moderate effects would result from localized habitat alterations such as placing gravel pads over squirrel colonies. Minor effects would be expected as a result of road kills.

Other rodents, primarily lemmings and voles, are naturally cyclic in abundance but can be expected to be affected somewhat by development on the 1002 area. Some effects may be positive--structures and debris would provide protective cover from hawks, owls, or other predators. Negative effects could include localized destruction of nesting sites and increased mortalities from entrapment and traffic.

Mitigation

None additional to that already outlined is recommended

Conclusion

Developing oil resources throughout the 1002 area would cause minor to moderate effects on squirrel populations because of habitat loss and alteration. Effects on lemmings and voles should be minor.

MARINE MAMMALS

Though 14 species of marine mammals may occur off the coast of the Arctic Refuge, only 5 species were evaluated: polar bear, ringed and bearded seals, and beluga and bowhead whales.

POLAR BEARS

Polar bears are one of the few large mammal species present on the 1002 area during winter.

Polar bears are particularly sensitive to human activities during the denning period. Belikov (1976) reported that females will usually abandon their dens prematurely if disturbed. Early den abandonment can be fatal to cubs unable to fend for themselves or travel with their mother. Development of potential petroleum prospects in Block C could have a moderate adverse effect on the continued suitability of the eastern portion of the 1002 area for denning polar bears, substantially decreasing the habitat values of this area. At least eight polar bear dens were located within this area between 1972 and 1985 (pl. 1E).

Factors that may influence responses of denning female polar bears to disturbance include: frequency and level of disturbance, distance of the disturbance from the den, and the stage of denning when disturbance occurs.

Pregnant females beginning to den in the fall are especially vulnerable. A radio-collared female polar bear denning in the 1002 area emerged from her den in early February 1985 (Amstrup, 1986b), as the suspected result of repeated disturbance from motorized exploration support equipment within 1,600 feet of the den site. The bear was suspected of being pregnant when she entered her den, even though no cubs were later observed.

Pipelines and roadways may prevent female polar bears from moving to and from inland denning areas (Amstrup and others, 1988; Lentfer and Hensel, 1980). Disturbance from oil exploration, construction, and production in the immediate vicinity of polar bear dens could cause the bears to abandon dens. Production activities could create disturbances that would likely keep bears from returning to those preferred denning areas.

Locating petroleum resources, with resultant development and production facilities, in confirmed coastal denning areas could produce a major reduction in the availability of 1002 area denning habitat. Although the number of bears returning each year varies depending on ice, snow, and weather conditions, some researchers believe female polar bears show fidelity to birth sites and try to reach areas previously used for denning (Lentfer and Hensel, 1980). Recent analyses suggest that mortalities of female polar bears are now about the maximum the Beaufort Sea population can sustain (Amstrup and others, 1986) without a decrease in population levels. Thus, preserving undisturbed onshore denning habitat each year is very important for the 12 to 13 percent of females denning on land rather than offshore ice. Moreover, if there is an especially significant area for denning on land in Alaska, it is on and adjacent to the 1002 area (U.S. Fish and Wildlife Service, unpublished data).

Additional habitat value losses would result from development of marine facilities. The Pokok port site is located in a confirmed coastal denning area; polar bears were known to have denned within approximately 1 mile of the site in 3 of the last 5 years. The Camden Bay area has also been used by denning polar bears.

The effects of oil development on nondenning segments of polar bear populations are not well known. These segments of the population generally inhabit the pack ice throughout the year, although in the fall a number of animals, primarily family groups composed of females and juveniles, are seen along the coast (Amstrup and others, 1986). Potential adverse effects to bears inhabiting pack ice could be caused by shipping traffic and its concomitant disturbance of water and ice or from an accidental oil spill from a ship or loading facility. Disturbance alone may not greatly affect nondenning bears. Direct effects of oil contamination are not well known. Initial results of a study conducted in Canada (Hurst and others, 1982) indicate that bears forced to enter an oil slick and then subjected to cold temperatures and wind will die; that study did not determine if polar bears will voluntarily enter an oil slick.

Polar bears are attracted by garbage dumps and could become a nuisance or threat to personnel in camps. Because bears are attracted to the Barter Island area to scavenge on whale carcasses, nearby oil facilities could experience a higher occurrence of nuisance bears than other facilities report.

Mitigation

Some adverse effects to polar bears could be reduced by documenting den locations and use areas so that oil-development activities avoid them to the maximum extent possible. Avoiding suitable denning habitat is most important. To prevent disturbance which could cause early den abandonment, buffer zones of at least 1/2 mile should be established around known dens, such as the zones described for brown bears [50 CFR 37.32 (c)]. Activities along the coast during the late October-early November period when bears come ashore to den should be minimized. Where possible, orienting seismic lines, pipelines, and roads at right angles to the coast in coastal areas could further minimize interference with denning bears. Also, ice quality and movement data collected by industry should be made available to the FWS to augment research attempts to understand polar bear movements and behavior. Such data would be invaluable in learning how to predict and minimize adverse effects of industrial activities on polar bears.

If attracted by garbage, polar bears could become a nuisance or threat to personnel and would need to be relocated. Proper garbage control and fencing of camps would reduce this problem. Because killing polar bears by anyone except Alaskan Natives is prohibited under the Marine Mammal Protection Act of 1972, nuisance bears would have to be trapped and relocated.

Conclusion

Although only a few polar bears use the 1002 area, the exclusion of only one or two bears from areas consistently used for denning would be a moderate impact on that segment of the Beaufort Sea population because some decline in the reproduction rate could result. Given the apparently stable Beaufort Sea population of approximately 2,000 polar bears, such exclusion and decline in natality would likely not affect the species' overall survival, so long as similar intensive developments did not occur along the entire northern coast of Alaska and Canada. Biologists believe that the Beaufort Sea population can sustain little, if any, increase in mortality of females because population surveys and calculations show that the number of animals dying each year is approximately equal to the population increase from reproduction (Amstrup and others, 1988).

SEALS AND WHALES

Oil-development activities with the greatest potential for affecting seals and whales would be those occurring along the immediate coast or just offshore. Under full

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DRAFT - 27 October 1986

THE RELATIONSHIP OF CARIBOU SUMMER DISTRIBUTIONS AND THE TRANS-ALASKA PIPELINE: DOES ABSENCE MEAN DISPLACEMENT?

By

R.D. Jakimchuk

for

Joint Industry - Alaska Department of Fish & Game

Caribou Workshop

28-30 October 1986

INTRODUCTION

The ideal experimental design to test whether calving and post-calving cow/calf groups avoid TAPS and are displaced by oil developments in the Prudhoe Bay area is not available to us. Such a design would have as its basic elements comparable pre-development baseline data for control areas and areas which would subsequently be perturbed. Comparable techniques would be used to measure changes of various ecological variables in control and exposure areas before and following perturbation. The experimental design would be careful to ensure that comparisons are valid and would eliminate biases owing to either environmental variables or to the changing seasonal behaviors and distributions of caribou. The designs would endeavor to eliminate biases associated with the highly clumped or non-homogeneous distributions of caribou which characterize the species by recognizing the implications of differing densities, grouping behaviour, sexual segregation, and differential habitat use to the analysis. Surveys would be conducted during comparable time and life cycle periods to reduce the foregoing potential biases. The foregoing would ensure that data were comparable for the test and control areas within years, so that between-year comparisons could be made

between controls as well as test (exposure) areas both before and after development. Finally, the study design would encourage identification and measurement of exogenous environmental influences such as snow characteristics, plant phenology or seasonal flooding which may, independently of the previously mentioned variables, affect the distribution of and habitat use by caribou between two apparently similar areas. Such measurements would help account for variations in use or density which might occur even where exhaustive attempts were made to standardize the experiment based on the criteria I have previously mentioned.

The lack of many of the foregoing elements has contributed to differing interpretations on the relationship between caribou distributions and North Slope petroleum developments, especially as it pertains to calving distributions and the percentage calves associated with the TAPS corridor. These differing interpretations, in turn, have generated controversy which has often obscured rather than clarified issues. However, despite deficiencies in many of the data requirements I have described, there are numerous bodies of evidence which can objectively focus on questions of caribou interaction with the TAPS corridor and the implication of that interaction. These data, accumulated over a period of the past 16 years, provide a basis for interpreting the relative role of ecological factors and disturbance in governing the

distribution, movements and habitat use of Central Arctic caribou. In this paper I can only develop and substantiate some important principles: I do not intend to review and debate the minutiae of 15 years of survey data but to point out some of the most significant findings which encompass the period prior to and following development of the TAPS corridor.

Specific data for the area are available for the period before extensive oilfield development, the construction of the Dalton Highway in 1974, or the pipeline between 1975 and 1977. The main sources of pre-development data are studies by Angus Gavin from 1969 to 1978 (Gavin 1977; Gavin and Chamberlain 1979), White et al. (1975), and Child (1973). Post-development data are derived from a wide range of ADF&G and industry sponsored studies from 1975 to the present.

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METHODOLOGICAL PROBLEMS: UNEQUAL COMPARISONS

One of the major difficulties in any analysis of Central Arctic caribou and development interactions is separating out the relative influence on caribou of the pipeline, the Dalton Highway and the oilfield development. Although this paper deals with the TAPS corridor, it cannot ignore pre-construction calving distributions as they relate to Prudhoe Bay and TAPS. Therefore I must comment, in part, on

the conclusions pertaining to the oilfield presented by Smith and Cameron (1983) and Whitten and Cameron (1985). Figure 1 shows the study area and the TAPS corridor.

The major conclusions of Cameron and Whitten (1980_) and Cameron et al. (1979) are that cow/calf groups avoid the TAPS corridor during calving and the summer period based on a comparison of calf percentages along the corridor versus regionally. The major conclusion of Smith and Cameron (1983) and Whitten and Cameron (1985) is that calving caribou have been displaced from the Prudhoe Bay Oilfield. This conclusion is based on low densities of calving caribou in the field and a lower calf percentage of total caribou in the field versus the regional percentage.

The problem of comparability of data is a major limitation to the conclusions drawn by Cameron and Whitten (1980_), Cameron et al. (1979, 1985). In the latter final report, comparisons of calf percentages between regional and corridor values during the calving period (June) are available for only two years (1975-76) of the seven-year study (1975-1982). Other seasonal periods were compared but they combined periods in which seasonal distributions are known to vary considerably and frequently in response to environmental factors. Thus, comparisons of short yearling percentages in April/May between the TAPS corridor and regional values does

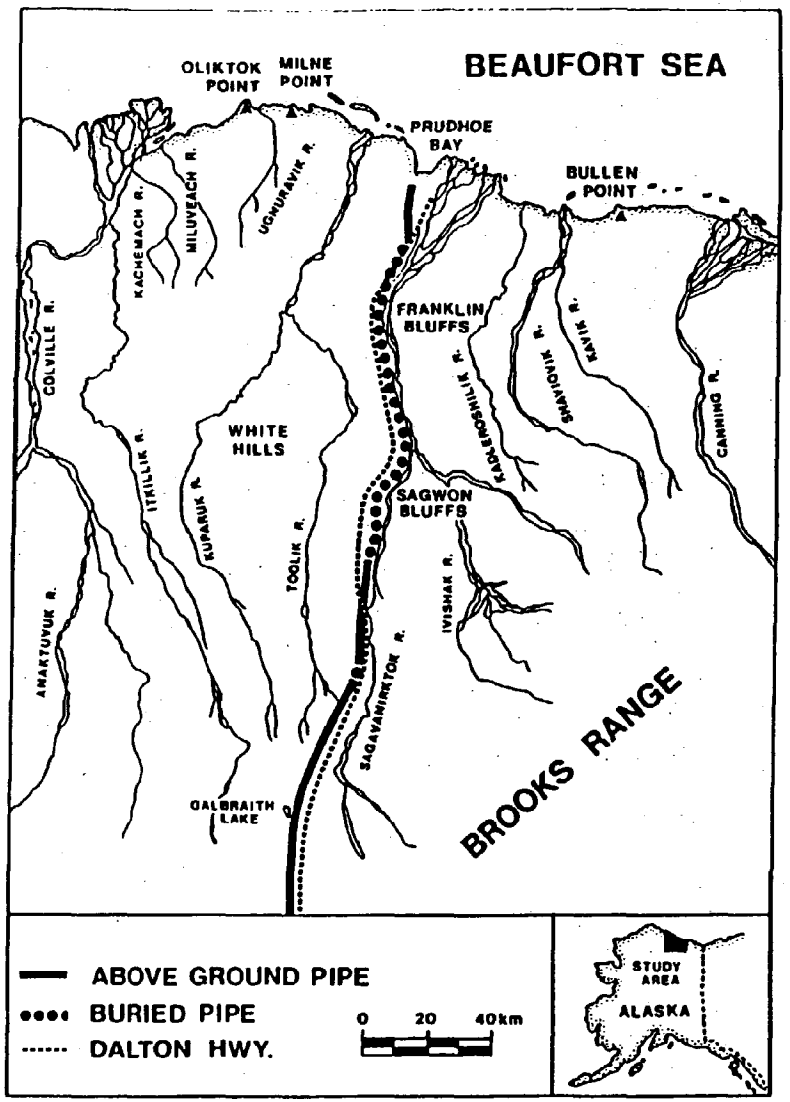

Figure 1. The study area.

not take into account sexual segregation (Figure 2) and differential habitat use by the sexes at that time (Figure 3), while comparisons for the July-August period are confounded by the extreme flux in movements in response to insects which can affect calf percentages in a specific area drastically even on a given day (White et al. 1978). Even so, calf percentages along the corridor and regionally were the same in two of five years for the July-August period (Cameron et al. 1985), suggesting that factors other than the TAPS corridor influenced those percentages.

Although Cameron et al. (1985) attempt to reduce previous biases in survey coverage of non-riparian habitats regionally by deleting road surveys south of Region 4 and coastal transects from aerial surveys, regional surveys still appear to oversample non-riparian habitats. The published methodology (Cameron and Whitten 1979) states a deliberate effort to sample non-riparian habitats on regional surveys for at least 3 km on either side of riparian habitats. Thus, many high density non-riparian calving areas are sampled in the regional surveys (Figure 4) and compared to the 1 km wide surveys on either side of the Dalton Highway which is closely associated with riparian habitat of the Sagavanirktok River (Figure 5). The route of TAPS does not transect such calving concentrations and traverses approximately three times the regional percentage of riparian habitat (Carruthers et al. 1984).

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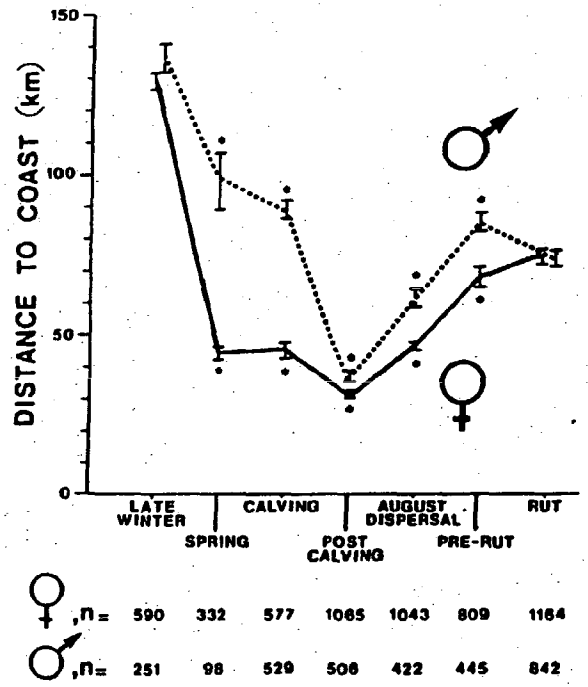

Figure 2. Seasonal variation in average distance to coast for male and female caribou groups within the study area (1981-1983).

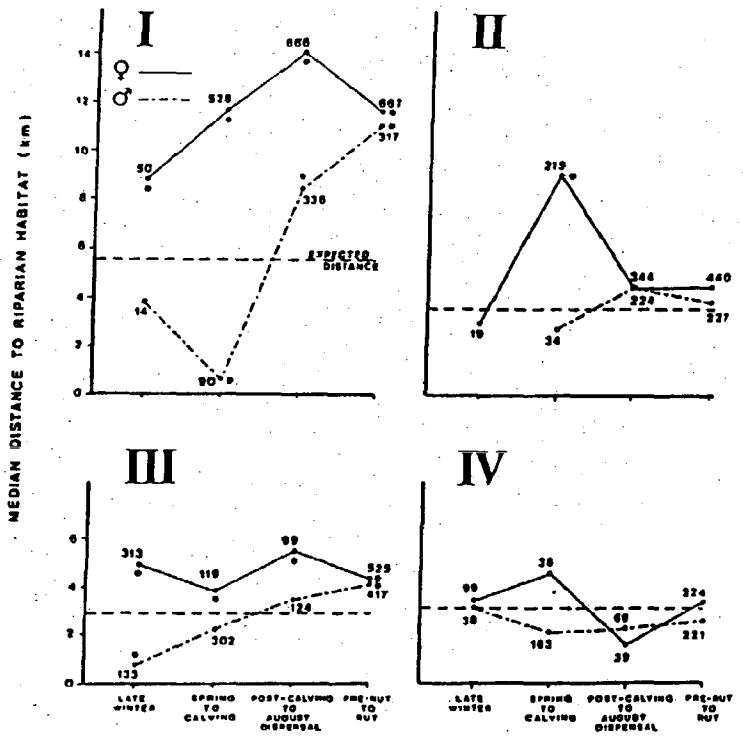

Figure 3. Seasonal variation in median distance to riparian habitat (km) of male and female caribou for four subregions of the study area (1981-1983).
*Asterisk denotes that median distance is significantly different than expected based on a random distribution. $p < .05$

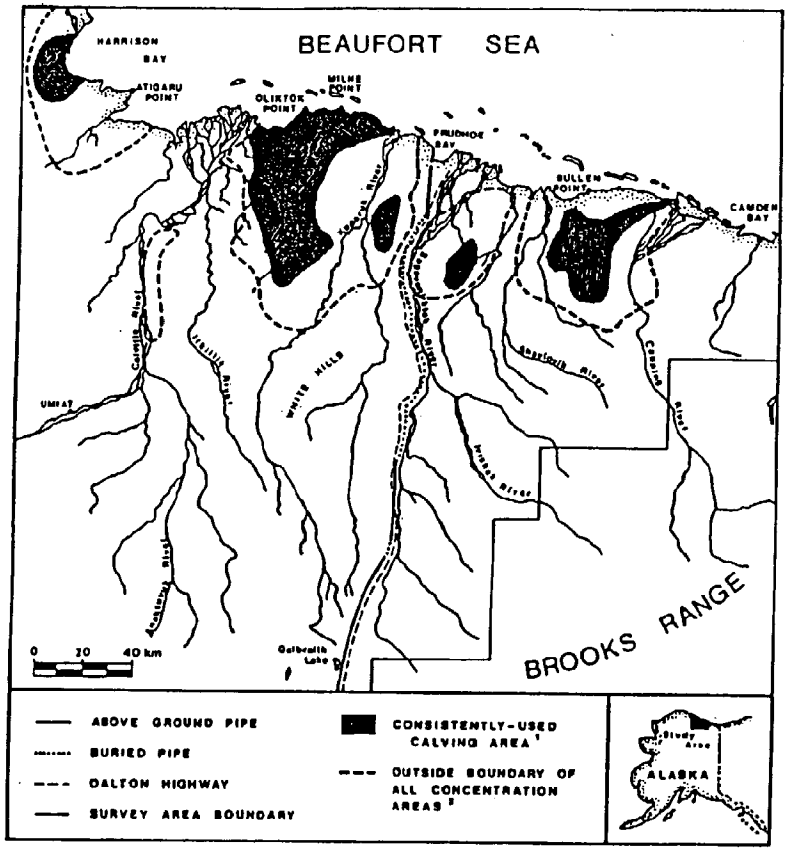

Figure 4. Location of calving concentration areas, 1981-1986.
[1]Area of concentrated calving in 4 of 6 years from 1981-1986 (between Canning and Colville Rivers) and in 2 of 3 years from 1984-1986 (west of Colville and east of Canning River only).
[2]This boundary encompasses all concentration areas recorded from 1981-1986.

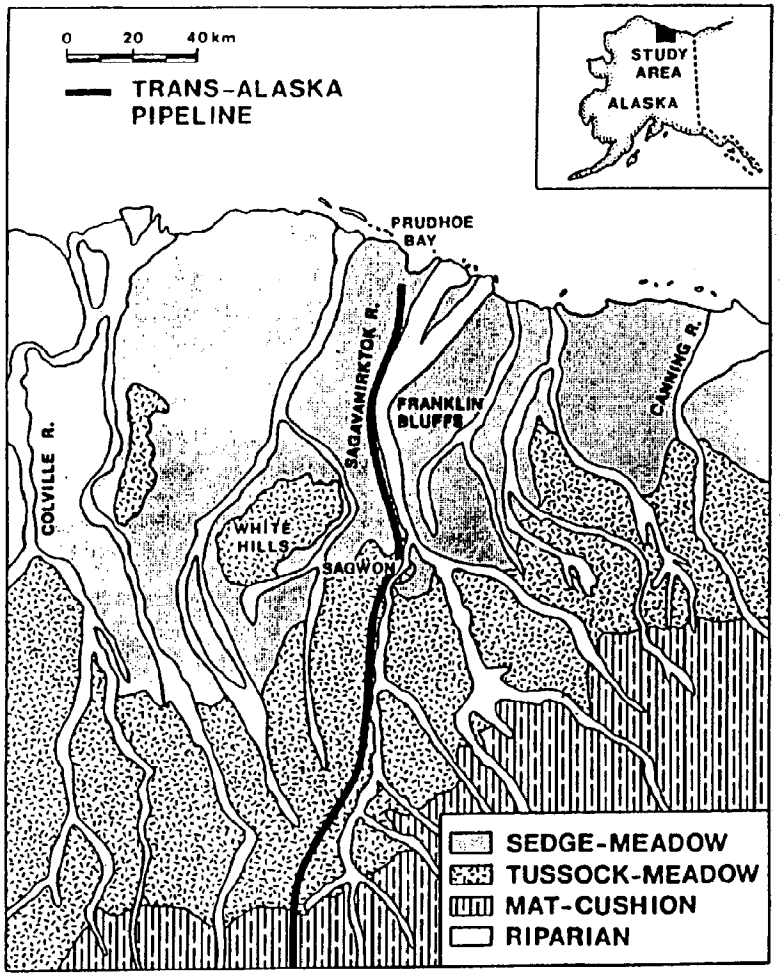

Figure 5. Generalized habitat types within the study area.

Table 1. Estimated caribou populations, North Slope, Alaska, 1970-1978.

	Colville-Canning Region, Ca. 9000 Sq. Mi.						Prudhoe Bay Area[1], Ca. 455 Sq. Mi.					
Year	Cows	Calves	Calves per100[2] Cows	Year-lings	Bulls	Total	Cows	Calves	Calves per100[3] Cows	Year-lings	Bulls[4]	Total
1970	8,868	5,962	67	5,193	1,581	21,604	24	17	71	8		49
1971	8,600	3,100	36	2,000	1,300	15,000	16	7	44	7		30
1972	1,200	450	37	350	500	2,500	8	5	63	4		17
1973	9,200	3,500	38	2,500	1,200	16,400	24	9	38	9		42
1974	10,000	3,800	37	3,500	1,100	18,600	34	9	27	8		51
1975	7,800	2,800	36	2,600	1,300	14,500	27	13	48	4		44
1976	2,200	750	34	1,100	950	5,000	19	4	21	5		28
1977	3,200	1,200	37	600	1,000	6,000	14	11	79	3		28
1978	3,170	1,580	50	970	1,100	6,820	29	15	52	7	6	57

[1]Encompasses the area from the Sagavanirktok River to Kuparuk River and from the Coast to Franklin Bluffs.
[2]Colville-Canning Region ten year average = 41 calves per 100 cows per year.
[3]Prudhoe Bay Area ten year average = 46 calves per 100 cows per year.
[4]No data available except for 1978.

SOURCE: Gavin and Chamberlain (1979).

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I do not disagree that calf percentages are lower along the TAPS corridor than for the region as a whole but with the interpretation of why they are lower. There is considerable evidence that:

1. The Prudhoe Bay area was not an important calving area even prior to development (Table 1; White et al. 1975; Gavin 1977; Gavin and Chamberlain 1979) (Figure 6).

2. There is well documented evidence that sexual segregation (Cameron and Whitten 1979; Carruthers et al. 1984) and differential habitat use result in different distributions of cow/calf and bull groups in riparian versus non-riparian habitats (Jakimchuk et al., in press; Curatolo 1985). Indeed, Curatolo found that this differential habitat use occurred even within intensively developed areas and that calf percentages were consistently lower in riparian habitat. Jakimchuk et al. (in press) show that differing distance relationships to riparian habitats between bulls and cows are consistent regional distributional trend.

3. Finally, along the West Sak Road, where habitats normally used by cows and calves have been traversed by a road corridor, thus eliminating the habitat bias to a large degree, summer calf percentages have been the same or

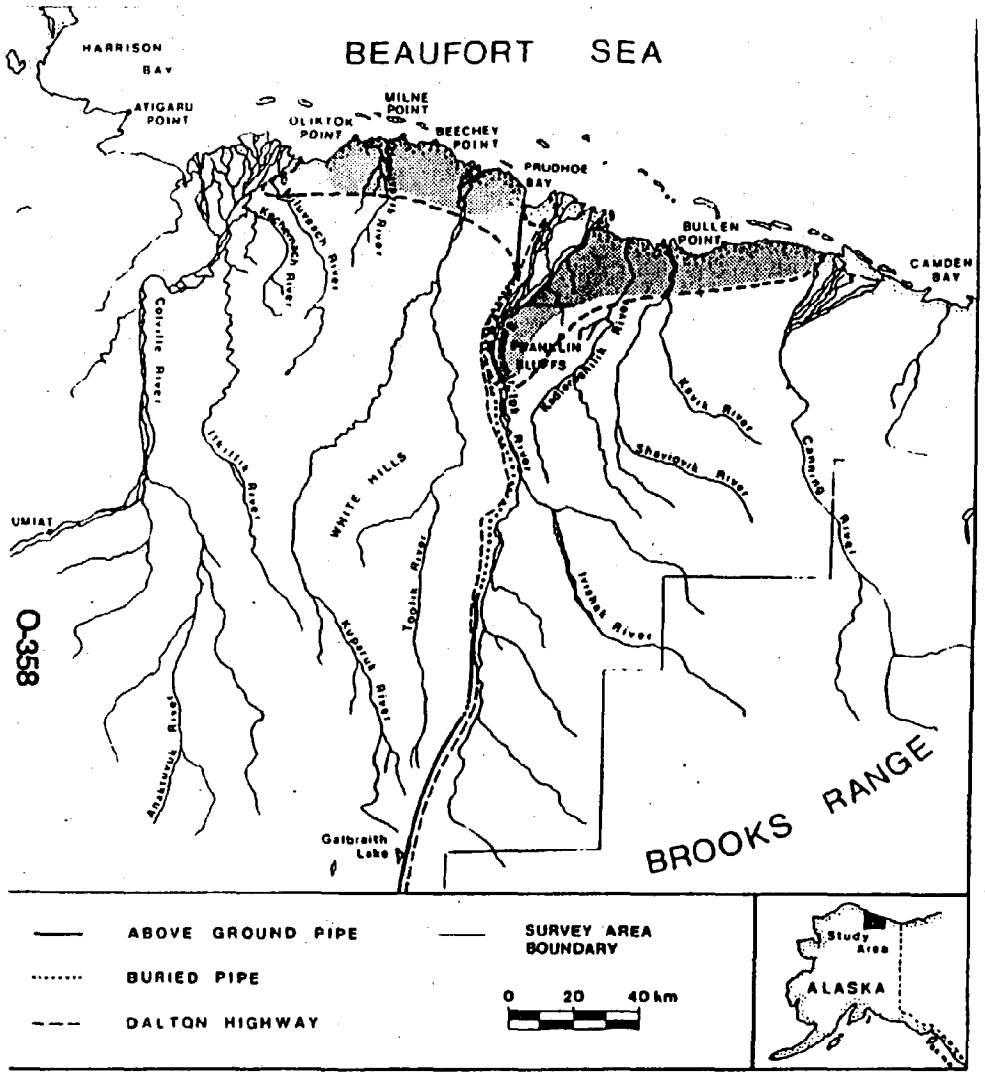

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Figure 6. Major calving areas of Central Arctic caribou in 3 of 4 years (1970-1973 inclusive). Dotted line denotes calving in at least one of four years (After Gavin 1977).

virtually the same as regional values in five of seven years following the development of the corridor (Table 2).

Notwithstanding Table 2, which eliminates a major habitat bias, calf percentages alone are a poor measure of impact along the TAPS corridor when one considers seasonal variations in caribou distribution in response to environmental influences such as snow cover, insect harassment, and differential habitat use by the sexes.

The major evidence presented that calving has been displaced from the Prudhoe Bay area are the low calf percentages recorded, the low number of calving groups found there during summer and the higher incidence of calving south of Prudhoe Bay (Whitten and Cameron 1983; Smith and Cameron 1983). However, comparison of pre- and post-development calving distributions shows a similar distribution to that found in recent years (Sopuck and Jakimchuk 1986), with more calving south of Prudhoe Bay than in the Prudhoe Bay oilfield area even prior to extensive development (Figures 4 and 6). The apparent reason for this is the frequent, extensive flooding associated with sedge meadows in the Prudhoe Bay area. Late snow melt and flooding of lowland habitats in the coastal zone at calving has occurred in 7 of the past 13 years where data are available (Table 3). In years of delayed snow melt, calving farther inland has been consistently reported. This

Table 2. A comparison of regional calf percentages and calf percentages observed along the West Sak (Spine) Road during summer 1978-1984.

Year	Spine Road (West Sak) Percent Calves	Regional Calf Percentages Percent Calves	Source
1978	26	25	Cameron & Whitten 1979b
1979	25.0	25	Cameron & Whitten 1980b
1980	20.0	21	Cameron et al. 1981
1981	18.0[ab]	27	Cameron et al. 1983
1982	16.0	No Data	Smith et al. 1984
1983	17.5	21	Smith et al. 1984
1984	22.3	23.2	Smith et al. 1984

[a] Represents 14,966 total caribou seen from the road in 1981 versus 4,552 seen in 1980.

[b] Of caribou observed crossing West Sak road and Kuparuk pipeline in 1981, calves were 25% of total caribou.

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Table 3. Pheonology of snowmelt and calving distributions in the central Arctic region, 1970-1986.

Year	Snowmelt Phenology During Calving	Comments on Calving Distribution	Source
1970	No data	"Usual distribution" (see Fig. 6)	Gavin 1977
1971	Deep snow coastal plain	Calving in foothills	Gavin 1977
1972	Heavy snow	Low use of Coastal Zone & Prudhoe Bay	Gavin 1977
1973	Dry year	Some inland calving	Gavin 1977
1974	No data	"Usual distribution" (Fig. 6)	Gavin 1977
1975	No data	Scattered calving, no concentration areas	
1976	Heavy snow	"Usual distribution" (Fig. 6)	Gavin 1977
1977		"Usual distribution" (Fig. 6)	Gavin 1977
1978	Late snowmelt, flooding		
1979	Dry - relatively snow-free	No data	Cameron et al. 1981
1980	Late Snowmelt - extensive flooding	More inland caribou	Whitten & Cameron 1985
1981	Dry, snow-free calving	Little inland	Cameron et al. 1983
1982	Late snowmelt - extensive flooding	More calving inland	Whitten & Cameron 1985
1983	Relatively dry	Usual (see Fig. 6)	
1984	Relatively dry	Usual (Fig. 6)	Sopuck & Jakimchuk 1986
1985	Relatively dry	Usual	Sopuck & Jakimchuk 1986
1986	Late snowmelt	Majority inland calving east of Sag River.	Sopuck & Jakimchuk 1986

seems to be a reasonable explanation for the consistent calving associated with the Franklin Bluffs area south of Prudhoe Bay which was documented prior to extensive oilfield development at Prudhoe Bay.

If we look at factors affecting pre- and post-calving distributions we find strong well-documented ecological reasons to explain observed distributions. When we test these hypotheses by looking at known calving and post-calving areas where development has occurred, such as the West Sak Road area and Prudhoe Bay, we find that the hypotheses pertaining to habitat use and their effects on distribution hold (Curatolo 1985; Jakimchuk et al., in press; this paper). The explanations for apparent discrepancies between what occurs along the TAPS corridor and regionally are in response to ecological factors. This explains the apparent contradiction of avoidance of TAPS but no avoidance of the Spine Road during summer by the same caribou on the same summer range.

I have concluded that absence does not equal displacement. I do not think that cow/calf groups avoid TAPS but the major river valley associated with TAPS - a relationship which also holds regionally for other comparable major rivers such as the Canning and Colville. Similarly, I think the evidence is strong that the Prudhoe Bay complex prior to development was not an important calving area. Its present

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low use for calving represents an historical distribution rather than a displacement of calving to other areas.

I do not disagree that cows with neonates are sensitive to disturbance. There is ample evidence to support this sensitivity not only for caribou but for other cervids and bovids as well. This sensitivity appears to be strongly associated with a behavioral repertoire in response to predation. I do not disagree, either, that developments such as roads with traffic and human activity, are disturbing to cows with calves, or that some types of barriers can physically exclude caribou from their ranges. I do, however, distinguish between the sensory disturbances associated with the Dalton Highway which have been documented, and the notion of avoidance or displacement along the TAPS corridor which implies a permanency that is not justified by the evidence. I feel that the pipeline itself is not a source of disturbance - most of it is buried in the Sag. River floodplain. Most of the existing disturbance comes from the traffic and hunting along the Dalton Highway. But even here, except for hunting mortality, I feel that the disturbances are temporary and are not instrumental in altering either the behavior or distribution of caribou along that corridor in any fundamental or permanent way. In short, I think that caribou are frequently disturbed by activity within the corridor but they do not avoid it for this reason.

Evidence suggesting that disturbances to date are temporary and sensory in nature is available from a broader review of the growth, distribution and movements of the Central Arctic herd (previous papers). There is no indication that there has been any change in distribution, life cycle patterns or the fundamental ecology of caribou resulting from the interaction with existing oil development. On the contrary, the herd has grown in size and has continued to use and occupy habitats in the region in a manner consistent with pre-development use. The best evidence for this is where pre-development baseline data exist, such as the Kuparuk and Milne Point developments. There are no overall effects on seasonal distribution, habitat use or numbers which can currently be attributed to petroleum development. The seasonal cycles of caribou in the Central Arctic region continue despite the development which only recently includes their major pre-development calving ranges.

As development continues and expands, it is important to monitor and document interactions with caribou and to assess their significance. If decisions are taken that any habitat alteration is deleterious and this forms the basis for permitting, it will be difficult to justify management oriented research because of the a priori conclusion that all changes are equally deletrious. The most important requirement for future research, in my view, is to identify where compatibility

exists between a viable caribou population and development, to document where development activities are incompatible, to identify the nature of the problem, and to develop means of effective mitigation.

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Senator Frank Murkowski
Congressman Don Young

February 5, 1987

Secretary Donald Hodel
Department of the Interior
Washington DC 20240

Dear Secretary Hodel:

The Resource Development Council respectfully submits the enclosed comments on the Draft Legislative Environmenatl Impact Statement for the Arctic National Wildlife Refuge Coastal Plain Resource Assessment.

I have also enclosed resolutions in support of the preferred alternative from a variety of cities, boroughs and other concerned parties for the official record.

We hope these comments are of use to you and your staff as you review the document and prepare a final report. Please call on me if we can be of assistance in any way.

Sincerely,

RESOURCE DEVELOPMENT COUNCIL
for Alaska, Inc.

Paula Easley

Paula P. Easley
Executive Director

cc: Governor Steve Cowper
Senator Ted Stevens
Senator Frank Murkowski
Congressman Don Young
Vern Wiggins, Alaska Land Use Council
Representative Sam Cotten, Alaska Legislature
Senator Jack Coghill, Alaska Legislature
Janie Leask, Alaska Federation of Natives
Alaska Coalition for American Energy Security

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Comments of Resource Development Council, Inc., on the Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment

February 4, 1987

INTRODUCTION:

The Resource Development Council for Alaska, Inc., (RDC) is a private statewide economic development organization committed to the orderly development of Alaska's resources. The broadly-based membership of our Council comes from a wide range of economic, social, geographic and ethnic sectors of Alaska. Our membership represents individuals, companies, trade associations, native corporations, universities, chambers of commerce and municipalities throughout the state.

The Resource Development Council strongly supports the opening of the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas exploration and development. In light of the national interest, Alternative A, full leasing of the "1002" study area, is the only acceptable alternative.

Public Comment

Although there has been some concern over whether or not public comment was required for preparation of the

report, RDC believes, especially in light of the time extension for written comments, the level of public participation in the review of the draft report has been adequate and fully meets all legal requirements. RDC also believes that the public hearings in Anchorage, Kaktovik and Washington, D.C. were well publicized. Because of the advanced notification, large numbers of people attended the hearings.

The National Interest

There are many good reasons why the opening of eight percent of the refuge to oil and gas leasing is in the national interest.

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Development of world-class oil deposits in the refuge proposed for leasing would promote economic development, reduce our dependence on foreign oil, foster orderly development in the absence of an energy crisis, increase revenues from taxes and royalties, strengthen national security, restrain the national trade deficit and create thousands of new jobs.

Although there is plenty of oil on the market today, domestic crude reserves are plummeting while consumption is rising. Domestic crude production from existing fields is forecast to decline from 8.9 million barrels per day in 1985 to slightly over 6 million barrels per day in 1991. Current domestic crude production has already fallen by 400,000 barrels per day. By the year 2000, production may plunge to 4 million

barrels per day unless new domestic discoveries are found and developed. If new significant discoveries are not developed, the U.S. could find itself dependent upon foreign sources for 75 percent of its consumption within 15 years, double our present level of dependency. Since it takes up to 15 years to bring major Arctic oil fields into production, the immediate opening of the ANWR Coastal Plain for exploration and development is of extreme importance.

With the free world's sources of petroleum heavily concentrated in the volatile Middle East, increased future dependency on this region threatens our national interest. Saudi Arabia itself holds about one-quarter of the world's reserves. Nearly three-quarters of all reserves are found in the Middle East, a region of great instability. Given past experience, the U.S. is very vulnerable to supply disruptions and subsequent price escalation due to its dependence on foreign sources of oil.

The best way to assure that the United States will have secure supplies of oil is to pursue exploration and development here at home. And the best chance to find a new world-class domestic supply of oil is in the Coastal Plain of ANWR.

Many Americans find it hard to believe that we have lost the advantages gained in conservation and are rapidly moving back to a future of massive energy import dependence. With the

drastic drop in oil prices, compounded with the fall in domestic production and the dramatic rise in consumption, the present oil glut will evaporate before the end of this decade. The drop in oil prices has resulted in significant reductions in U.S. exploration, production and drilling activity, and there is little that can be done to reverse this trend.

Until oil prices increase significantly, U.S. exploration will remain stagnant. Our dependence on imports will continue to increase and our vulnerability to oil price shocks and oil shortages will rise to excessively dangerous levels.

It is important that the U.S. have the foresight to develop potential ANWR oil and gas deposits soon to avoid a future energy crisis. All the geologic factors favorable for significant oil and gas discoveries exist in the 1002 area, which is the most promising area for a major discovery of oil and gas in all untested onshore areas of North America.

It is particularly important that Congress allow the siting in ANWR of oil and gas facilities needed to support offshore oil and gas development occurring north of ANWR on state-owned submerged lands and on the federal Outer Continental Shelf. None of the alternatives in the report specifically states that support facilities would be permitted. This provision would be compatible with Alternative A, B, C and D, and should be added to these alternatives.

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Economic Benefits

Development and production of substantial oil reserves in the 1002 area would promote economic development not only in Alaska, but also in the contiguous states. Thousands of new jobs would be created as the demand for goods and services developed. Positive impacts would be felt well beyond the energy industry.

In Alaska, oil production in the refuge would provide a major new source of income to underwrite important state programs and promote economic growth. Other states would also benefit since much of the production and transportation facilities would be designed and constructed prior to being shipped north.

Oil and gas development in the 1002 area would also assist the nation in reducing the national trade deficit. The deficit soared to record levels in November and appears to be totally out of control. Every barrel of oil the U.S. buys from foreign sources increases that deficit. The price that this nation pays for imported oil is the largest single factor in the deficit. As much as $90 billion is spent each year on foreign oil. With the mounting national trade deficit, any improvement in the balance of trade picture is beneficial. Since every state is partially responsible for the deficit, each must do its share or more to produce resources that can help offset foreign imports.

Oil and Gas Resources

Although there are some attractive offshore areas yet to be explored, the 1002 area is particularly promising among onshore areas because it contains extensions of other producing trends. With all the geographic factors favorable for significant oil and gas discoveries existing in the 1002 area, the Coastal Plain holds the greatest potential of containing super-gaint oil fields of all unexplored areas of the U.S.

According to the draft report, there is a 95 percent chance the 1002 area contains more than 4.8 billion barrels of oil. There is a 5 percent chance the area contains more than 29.4 billion barrels of oil. The average range of inplace estimates yields a mean estimate of 13.8 billion barrels of oil. The report also estimates that there is an average economically recoverable resource estimate of 3.2 billion barrels of oil.

However, the report said that "the estimation of recoverable resource was limited to those prospects (all structural) which can be identified and delineated with reasonable degree of certainty, and which are physically large enough that they could reasonably be expected to contain commercial quantities of oil."

Given this criteria, the Resource Development Council believes the report's reserve estimate should represent a minimum. Recoverable oil from stratigraphic traps could be

considerable since many of the plays are stratigraphic in nature. In addition, minimum economic field size would decrease as infrastruture from larger fields is developed. For example, fields considered less than economically marginal by themselves could come on line later as infrastructure is developed throughout the area to tap larger fields. Further, price fluctuations could have a tremendous impact on the economic viability of any prospect.

The report indicates that there is only a 20 percent chance of finding economically recoverable oil. This estimate is misleading to those who are not familiar with industry risk and success ratios. The 20 percent estimate actually represents a considerable increase over typical industry success ratios and in fact establishes an excellent chance for finding major oil deposits.

According to the Alaska Oil and Gas Association, only one out of ten wells drilled encounters any hydrocarbons at all, and of those that do, only one out of five ever turns into a developable oil field. Out of 100 exploratory wells drilled, only ten would encounter oil. Of those ten, only two will have discovered economically developable fields. This represents a two percent chance of success compared to 20 percent. As a result, 20 percent odds are ten times higher than the industry's success rate in Alaska, a state that provides America with over 20 percent of its domestic production.

Due to the complex geology of the 1002 area, drilling will definitely be required to define the subsurface values. Drilling should begin immediately in order to inventory and confirm the suspected resources.

North Slope Environment/Experience

The NEPA-mandated EIS process frequently forces new development projects to predict environmental consequences with little or no previous field experience to guide the predictions. For the ANWR Coastal Plain, the test case has already occurred over an 18-year period at nearby Prudhoe Bay. The experience of regulatory agencies combined with that of industry in the Arctic environment provides convincing evidence that the 1002 area can be developed with minimal environmental impacts.

The Resource Development Council agrees with the DEIS in that "the evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the coastal plain and generate similar minimal effects."

Development of Prudhoe Bay has enabled the industry and regulatory agencies to spend millions of dollars and hundreds of man-years to research the interaction of fish and wildlife with oil field development. As a result, the North Slope is one

of the most-studied ecosystems in North America. This fact should be clearly stated in the final report in light of charges by non-development interests that very little study has occurred and that much more is needed before development is allowed.

The Council strongly concurs with the statement that "most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at Prudhoe Bay and from construction of the Trans-Alaska Pipeline System (TAPS)."

It should be pointed out that the worst-case scenarios adopted by non-development interests 15 years ago to prevent construction of TAPS and development at Prudhoe Bay have been proven false. Dire predictions pointing to the destruction of major caribou herds, waterfowl and loss of habitat have simply not occurred. Today healthy caribou herds thrive in the midst of development activities. The Central Arctic herd, whose summer range includes Prudhoe Bay and Kuparuk oil fields, has not only grown, but multiplied in size.

Most of the highly-speculative environmental concerns that we hear today by those opposing development in the 1002 area are similar to those aired in the 1970s to discourage construction of TAPS. The public should recognize that the dire predictions being made today are unwarranted and in fact have already been proven false through environmentally-sound development at Prudhoe Bay.

Development Impacts

The Resource Development Council believes that the small loss of habitat represented by development in the 1002 area will not impact growth or productivity of caribou. Habitat is not currently preventing the growth of the Porcupine herd since the herd's large population has remained far below the carrying capacity of the Coastal Plain. A small reduction in total range should not significantly alter the herd's population. Given existing technology, coupled with the potential size of any anticipated discovery, development in the refuge would comprise an extremely small portion of the 1002 area, which itself represents only eight percent of the refuge.

Since habitat is not limiting the continued growth and survival of the herd, conclusions within the report regarding displacement of maternal cows or bulls carry little significance. As a result, loss of access to small portions of available habitat due to oil field development will have minimal impact on the herd.

There has been some degree of displacement of caribou at Prudhoe Bay due to habitat alterations. However, habitat is not limiting caribou populations for any Alaskan herds. Therefore, a small degree of habitat alteration as a result of development on the Coastal Plain will have an insignificant impact on the growth and productivity of the Porcupine caribou herd.

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In defining management goals for a herd, a key ingredient is the concept of habitat carrying capacity. Neither the Central Arctic Herd nor the Porcupine Herd approach the carrying capacity of their ranges based on food, calving habitat, insect relief or any other habitat basis. It is an established fact that the total habitat has never been fully occupied, and that caribou populations have maintained densities much lower than the maximum dictated by habitat.

Since habitat is not limiting growth, ample room exists to accommodate development interests in the 1002 area without impacting the size or growth of the Porcupine herd. This point should be strongly emphasized in the net conclusions of the 1002 report.

The report correctly points out in Chapter II that wide annual variations in calving distribution frequently occur due to weather patterns and the timing of spring thaw. The acknowledged effect of weather erodes the core calving area concept and points out the wide annual variability and adaptability of caribou. In 1983 and 1985, about 74 percent of the Porcupine herd calved in the 1002 area. In 1984, only 35 percent of the herd calved in the area. These figures clearly show the adaptability of the herd to yearly variations in weather conditions and point out that calving distributions do vary widely. This shows that caribou have calved in other places outside the "core calving area" without harm.

The "core calving area" for the Porcupine herd has been arbitrarily defined as an area where high density calving has occurred for at least 5 of the last 14 years. High density calving has occurred in some of this area in 9 of the 14 years, which strongly indicates that calving has occurred outside the "core calving area" anywhere from 5 to 9 years. The facts show that caribou calve anywhere on the Coastal Plain, and in large areas outside the plain.

What percentage of all calving areas does the "core calving area" represent? According to Table VI-5, the total "core calving area" is 311,000 acres, while total concentrated calving occurs over 2,117,000 acres. This shows that core calving represents 15 percent of all concentrated calving areas, and would represent an even lower percentage if peripheral calving areas were included. While the core area is important to the herd, it is not necessarily critical since the caribou have successfully calved over very large areas in the past.

However, it has been assumed that areas outside the "core calving area" have reduced habitat values or higher exposure to predators. If this assumption were true, reduced productivity should be apparent from years that the herd calved in alternative ranges. Data show no sign of reduced productivity, but does indicate that the herd has steadily grown since the early 1970s. The record also has shown that caribou have consistently shown flexibility in their habitat requirements.

Skoog (1968) and Bergerud et. al. (1984) believe that caribou are not habitat limited. Shank (1979) states that "...northern large mammals (excepting sheep) are most likely not often resource limited suggesting that at least some degree of distributional alteration could be accommodated without drastic demographic consequences."

Given the frequent variability of calving across the Coastal Plain and the flexibility of caribou in their habitat requirements, and the fact that alterations can be accommodated without drastic demograhic consequences, the Resource Development Council asks that conclusions regarding the relative importance of the Jago Highlands as a core-calving area be de-emphasized throughout the report.

The Resource Development Council believes that the "unique and irreplaceable" nature required for designating habitat as Resource Category 1 does not pertain to caribou calving habitat as indicated in the report. It has yet to be proved that the Porcupine herd has a specific "core" calving area that is unique and irreplaceable. The herd's calving concentrations vary each year, some falling within the same general areas, while in other years separated by hundreds of miles. Members of the herd calve in a range that spreads over 200 miles in an east-west distance and over an area exceeding 6,500 square miles, larger than the state of Connecticut. In 1982, the majority of the herd calved east of the Alaska border in Canada. In 1986, much of the herd calved outside the 1002 area. It is indeed a misconception that a "core" calving

area exists as a specific tract of land with fixed boundaries, used consistently and predictably.

The fact that the Porcupine herd has higher calving densities than the Central Arctic herd at Prudhoe Bay is not sufficient to argue that displacement would likely cause adverse effects. As mentioned earlier, alternative calving habitat is available in sufficient quantities. The large area used by the Porcupine herd for calving and its historical use and success in that habitat indicate this is the case.

Therefore, any arguments against extrapolation of Central Arctic herd data to the Porcupine herd are not valid when based on the fact that the Porcupine herd may occupy habitat in higher densities than the Central Arctic herd. We ask that this point be clearly made in the conclusion of the environmental impacts for Alternative A.

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In regard to insect relief, caribou demonstrate wide variation in their selection and use of insect relief habitat. Although many groups move toward the Arctic Ocean, the report correctly points out that many also move to higher elevations along the mountains. However, we are concerned that the report places undue emphasis on the coastal insect relief habitats while failing to place enough recognition on the wide variations of insect relief habitats. It should also be pointed out that the Prudhoe Bay development pads and roads have created new insect relief habitat and have not

prohibited the Central Arctic herd access to coastal areas. The favorable experience at Prudhoe Bay should be included in the report.

On page six of the report, paragraph five states that "changes in wildlife habitat and wilderness environment could include displacement and reduction in the size of the Porcupine Caribou Herd (PCH). The amount of reduction and its long-term significance for herd viability is highly speculative." (Emphasis added)

We suggest that many of the environmental consequences are overstated and highly speculative. Many of the conclusions of severe impacts and concerns for caribou populations, as presented in the report, are stated as fact, when in actuality, they are highly speculative and not supported by what has taken place at Prudhoe Bay.

It is important to note that the standard used in the 1002 report is "worst case." NEPA as now amended requires that effects be "reasonably foreseeable." The requirement to prepare a "worst case analysis" when faced with incomplete or unavailable information was rescinded last year. Since most of the environmental consequences in the report are based on a worst case analysis supported by inadequate information, a major modification is in order.

The Resource Development Council strongly urges the authors of

the report to reconsider the speculative "worst-case" statements. Due to the "worst-case" bias, RDC asks that those impacts based on a highly-speculative nature be clarified as such throughout the environmental consequences section. This will allow and hopefully ensure that those reading the report are aware of the highly-speculative nature of those conclusions.

We believe it is important to point out that the statement on page 108, paragraph 7 is a major misrepresentation of a study's conclusions. The statement reads: "Based upon the work of Dau and Cameron (1985), caribou are displaced approximately 2 miles out from development...within this 2 mile area of influence are about 357,000 acres of total core calving grounds in the 1002 area."

O-372

In reality, the relationship between calves and distances from the road (Milne Point) is statistically insignificant. Dau and Cameron did find fewer maternal groups near the road than away from it, but the partial displacement was for 2 kilometers, not 2 miles. In addition, their data show a high degree of annual variability. Their data also show that non-maternal caribou were not displaced by the road corridor and that "partial displacement" was shown within a zone of 0-3 km.

Unfortunately, the USFWS uses these data to imply that a complete displacement of all caribou groups occurred out to 2 miles. This is grossly incorrect and we ask that this section be revised to reflect proper study results. Regardless of the

conclusions of partial displacement, it is important to point out that a significant increase in animals occurred in the study area during a period of maximum development.

Other portions of this section should also be revised. For example, Page 109, paragraph 6 states that "If caribou refuse to cross through any development areas, then 194,000 acres would be unavailable as habitat. That area encompasses 52 percent of total insect-relief and over 80 percent of Coastal insect-relief habitats." The hypothesis that the Porcupine herd would be eliminated from virtually all its coastal insect-relief is based on a "worst-case" scenario that the herd would "refuse to cross through any development areas." There are no studies to support the hypothesis that a properly designed pipeline and road would present a total barrier to caribou movements. Yet there are plenty of examples of herds throughout the world regularly crossing through not only properly developed areas, but inproperly designed pipelines.

Regarding the statements within the report on oil spills, it is important to note that while the authors correctly state that the cumulative effect of spills has not been signficant, they completely ignore the main reason for the lack of significant impact. Of the 82,216 gallons spilled in 1985, very little actually reached the environment because the spills were cleaned up very efficiently. Unfortunately, the discussion leads one to assume that all 82,216 gallons went into the tundra.

Most spills occur on snow-covered gravel production pads where they are easy to spot and cleanup. Those which occur in the summer and off the gravel pads are treated with sorbent pads and rehabilitation and revegetation procedures.

Given industry's good record and the fact that spills are routinely cleaned up before they harm the environment, we take exception to statements such as the one on page 100, paragraph 8: "The almost unavoidable minor oil leaks and spill...which would contaminate the tundra and, possibly, the aquatic environment..." Spills are easily noticed on ice and snow and rarely escape detection, even in quantities of less than one gallon. A mixture of snow and oil can be easily scooped up by a snow shovel or front end loader.

The Council urges the authors to either delete or clarify the statement within the report that reads: "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge." This statement is contrary to the wildlife population data cited in preceding parts of the report which point out the relatively low abundance of wildlife species and the relatively short period of use of the 1002 area.

In addition, we stress that the authors acknowledge that the 30-mile section of the Coastal Plain from the 1002 area east to the Canadian border and further into Canada will remain as wilderness.

The report currently fails to recognize that 500,000 acres of the ANWR Coastal Plain is designated wilderness. Even with full leasing under Alternative A, this section will remain untouched, thus preserving the complete spectrum of arctic ecosystems represented in the Arctic Refuge.

The USFWS, in assessing the environmental consequences of possible oil and gas development in the 1002 area, has focused its impact analyses on loss of habitat value and has quantified its impact conclusions in terms of acres lost. Assuming a direct correlation between acres of habitat available and the population sizes of resident species, USFWS has translated its projections of acres lost to population reductions.

The Resource Development Council does not believe that this simplistic approach to biology justified primarily on the basis of the USFWS Mitigation Policy was ever examined by the agency for its scientific validity in the arctic. The mitigation policy is built on the management of habitat as a means of managing the productivity of fish and wildlife populations.

However, we agree with the Alaska Oil and Gas Association that it is inappropriate to use a habitat-based system to manage a population when habitat availability has not been shown to be a mechanism by which that population is regulated. This policy is especially out of place in the arctic where habitat has not been shown to be a limiting factor for caribou. Data clearly supports

the finding that herd size is regulated by direct mortality due to predation.

The Resource Development Council believes that the current policy of focusing on habitat serves no biologically meaningful purpose. A biologically effective approach to assessing and mitigating effects of development on wildlife would be to first determine systematically how project activities and structures will adversely affect a population and then apply mitigation measures that would avoid or minimize disturbances to the population.

The USFWS Mitigation Policy should not be the foundation for impact analysis or mitigation requirements in the arctic. The foundation for impact analysis and mitigation requirements should be based on well-established principles of applied ecology and range science.

Some repondents have suggested that "more study" is required before Congress can make an informed decision on whether to open the Coastal Plain. The draft report contains all the data necessary for Congress to make an informed decision. The call for "more study" is primarily an attempt by those who would like to delay the project forever. Americans must understand that the Coastal Plain region is one of the most studied environments in the world.

In concluding, the Resource Development Council for Alaska,

Inc., strongly endorses Alternative A, full leasing of the 1002 study area, as the most acceptable alternative consistent with the national interest.

Submitted by: Assemblyman Kubitz

Prepared by: Assembly
Budget Analyst

For Reading: November 25, 1986

AR No. 86-288

ANCHORAGE, ALASKA

DATE 11-25-86

A RESOLUTION OF THE MUNICIPALITY OF ANCHORAGE SUPPORTING EXPLORATION IN THE ARCTIC NATIONAL WILDLIFE REFUGE (ANWR) COASTAL PLAIN

WHEREAS, most other potential Alaska basins have been tested with ~~disappointing~~ varying results, and

WHEREAS, the Arctic National Wildlife Refuge has the highest potential of any unexplored region in the onshore United States, and

WHEREAS, the development of new domestic hydrocarbon supplies is a crucial factor in the national interest, and

WHEREAS, oil and gas activities on the North Slope provide significant economic benefits to federal and state governments and to Alaskans in general, and

WHEREAS, it is a proven fact that the petroleum industry can explore and develop while protecting fragile environments.

NOW THEREFORE, the Anchorage Municipal Assembly resolves that Alaska's elected federal officials should, in all due haste, press forward with appropriate legislation to facilitate the exploration and potential development of the Arctic National Wildlife Refuge Coastal Plain.

PASSED AND APPROVED by the Anchorage Assembly this 25th day of November, 1986.

Chairman

ATTEST:

Municipal Clerk

EJG:vk
A:EJG046a.TXT

O-375

RECEIVED DEC 2 2 1986

AMBLER CITY COUNCIL

RESOLUTION ON THE ANWR COASTAL PLAIN

RESOLUTION 86-07

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass, and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the coastal plain in a safe, responsible manner without significant adverse environmental impacts, and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

O-376

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudue Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas reserves; and

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans;

THEREFORE BE IT RESOLVED THAT City Council of Ambler, Alaska strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

PASSED AND APPROVED this 11th day of December, 1986, by a majority vote of the City Council of Ambler, Alaska.

ATTEST:

Clerk

Mayor

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Brevig Mission City Council
General Delivery
Brevig Mission, Alaska 99785
907-642-3851

RESOLUTION ON THE ANWR COASTAL PLAIN

Resolution 87-01

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass, and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the coastal plain in a safe, responsible manner without significant adverse environmental impacts, and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to drive revenues including portions of bonuses, royalties and rents from oil and gas developement; and

WHEREAS, opening the ANWR Coastal Plain to further exploration, developement and production will generate increased employment and business opportunities for all Alaskans and all Americans;

THEREFORE BE IT RESOLVED THAT Brevig Mission City Council strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

Walter Seetot, Mayor Walter Seetot

Leonard W. Olanna, Vice Mayor

Rita Olanna, Secretary

Elmer Seetot, Jr., Treasurer

Leonard Adam, Member

Elmer Olanna, Member

Steven Olanna, Member

Dated this 9th day of January, 1987.

Attest: Arlene Adam
City Clerk

O-377

RECEIVED [illegible]

CITY OF ELIM
Resolution 87-2

A Resolution on the ANWR Coastal Plain.

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the coastal plain in a safe, responsible manner without significant adverse environmental impacts, and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development, and production; and

WHEREAS, facilities developed to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U. S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas developement; and

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans;

NOW THEREFORE BE IT RESOLVED THAT Elim City Council strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

PASSED AND APPROVED by a DULY CONSTITUTED QUORUM of the ELIM CITY COUNCIL this 5th day of January 1987.

Frederick Brailey
Frederick Brailey, Mayor

ATTEST: Josie Nakarak
Josie Nakarak, City Clerk

O-378

CITY OF HAINES, ALASKA

RESOLUTION NO. 86/87-9

A RESOLUTION ON THE ALASKA NATIONAL WILDLIFE REFUGE COASTAL PLAIN.

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass, and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, opening the ANWR oil range to further exploration, development and production will generate increased employment and business opportunities for all Americans;

O-379

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF HAINES, ALASKA, strongly urges the Congress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration.

PASSED AND APPROVED THIS 1ST DAY OF OCTOBER, 1986.

April S. Lapham, Mayor

ATTEST:

Karen Gilland, City Clerk

S E A L:

Introduced by: Mayor/Glick
Date: Nov. 18, 1986
Vote: 13 Yes, 1 No
Action: Adopted

KENAI PENINSULA BOROUGH

RESOLUTION 86-160

URGING CONGRESS TO OPEN THE ARCTIC NATIONAL WILDLIFE REFUGE TO OIL AND GAS EXPLORATION AND DEVELOPMENT.

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge and is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the Coastal Plain in a safe, responsible manner without significant adverse environmental impacts; and

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WHEREAS, the United States must develop additional domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a congressional decision to open the Coastal Plain to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the Coastal Plain to the Trans-Alaska Pipeline may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the state of Alaska stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development on the ANWR Coastal Plain; and

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and Americans;

NOW THEREFORE, BE IT RESOLVED BY THE ASSEMBLY OF THE KENAI PENINSULA BOROUGH:

Section 1. That the Kenai Peninsula Borough Assembly strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

Section 2. That borough clerk shall send copies of this resolution to Donald P. Hodel, U.S. Secretary of the Interior; to Governor Cowper; U.S. Senators Frank Murkowski and Ted Stevens; and to U.S. Representative Don Young.

ADOPTED BY THE ASSEMBLY OF THE KENAI PENINSULA BOROUGH ON THIS 2nd DAY OF December, 1986.

Jonathan W. Sewall

Jonathan W. Sewall, Assembly President

ATTEST:

Joanne Bundy

Borough Clerk

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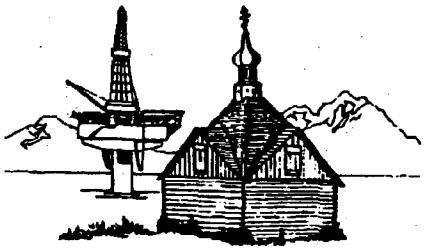

CITY OF KENAI
"Oil Capital of Alaska"
210 FIDALGO KENAI, ALASKA 99611
TELEPHONE 283-7535

December 23, 1986

TO: All Concerned

FROM: John Williams
Mayor

I felt there is an urgent need to advise you of our position concerning ANWR, and have decided to include you on a personal mailing of our resolution. We are all aware of the fact that ANWR may produce the next economic generation for Alaska and with that in mind I am sure I can depend on each of you to stay abreast of the developments affecting ANWR as they occur.

JW:jw

O-381

Suggested by Mayor Williams

RESOLUTION 86-120

A RESOLUTION OF THE COUNCIL OF THE CITY OF KENAI, ALASKA, URGING CONGRESS TO OPEN ANWR COASTAL PLAIN TO OIL AND GAS DEVELOPMENT

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 Million acres of land, amounting to approximately 5% of the entire State landmass, and

WHEREAS, the Coastal Plain is approximately 8% of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas, and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves, and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development, and

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans.

THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF KENAI, ALASKA that the Council strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

PASSED BY THE COUNCIL OF THE CITY OF KENAI, ALASKA this 17th day of December, 1986.

JOHN J. WILLIAMS, MAYOR

ATTEST:

Janet Whelan, City Clerk

CITY OF KOTZEBUE

RESOLUTION 86-37

A resolution urging the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass, and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistantly demonstrated its ability to operate in conditions similar to those found on the coastal plain in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the State, Regional and village corporations stand to derive revenues including portions of bonuses, royalties and rents from oil and gas development from potential land swaps; and

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans;

THEREFORE BE IT RESOLVED THAT the City Council of the City of Kotzebue strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and productiion.

Passed and approved this 18th day of December, 1986.

Willie Goodwin
Mayor, City of Kotzebue

A T T E S T:

Walter Musser
City Clerk, City of Kotzebue

RECEIVED OCT 1986

CITY COUNCIL OF MOUNTAIN VILLAGE

P.O. BOX 32085
MOUNTAIN VILLAGE, ALASKA 99632
(907) 591-2929 or (907) 591-2232

RESOLUTION 86 - 014

WHEREAS, Alaska's Arctic National Wildelife Refuge includes more than 19 millian acres of land, amounting to approximately five percent of the entire state landmass, and;

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas, and;

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production, and;

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the coastal plain in a safe, responsible manner without significant adverse environmental impacts, and;

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century, and;

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development and production, and;

WHEREAS, facilities developed to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed, and;

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves, and;

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development, and;

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans;

THEREFORE BE IT RESOLVED THAT City Council of Mtn. Village strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

ATTEST: Joni Wilde
City Clerk

Edward F Beans
Mayor

RECEIVED FEB 4 1987

Resolution No. 87-01

RESOLUTION ON THE ARCTIC NATIONAL WILDLIFE REFUGE (ANWR) COASTAL PLAIN.

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the coastal plain in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans.

THEREFORE BE IT RESOLVED, that the City of Nulato strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

DATE: January 22, 1987

Mayor

Vice-Mayor

ATTEST: Priscilla Sipary

Member

Member

Member

Member

Member

CITY OF OUZINKIE

RESOLUTION 86-15

RESOLUTION ON THE ANWR COASTAL PLAIN

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass, and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign pertoleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, opening the ANWR oil range to further exploration, development and production will generate increased employment and business opportunities for all Americans;

Received Dec 1 P 1986

RESOLUTION ON THE ANWR COASTAL PLAIN

WHEREAS, Alaska's Artic National Wildlife Refuge includes more than 19 million of land, amounting to approximately five percent of the entire state landmass, and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ablility to operate in conditions similar to those found on the coastal plain in a safe, resopnsible manner without significant adverse enviromental impacts, and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st centry; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands, offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development and production; and

WHEREAS, facilities develop to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues to including portions of bonuses, royalties and rents from oil and gas developement; and

WHEREAS, opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans;

THEREFORE BE IT RESOLVED THAT City of (NEW STUYAHOK) strongly urges the Congress of the UNited States to open the ANWR Coastal Plain to environmentlly responsible oil and gas exploration, development and production.

CITY OF PORT HEIDEN

Resolution 86-45

RESOLUTION ON THE ANWR COASTAL PLAIN

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass, and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

O-386

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, opening the ANWR oil range to further exploration, development and production will generate incresased employment and business opportunities for all Americans:

THEREFORE BE IT RESOLVED THAT the Port Heiden City Council strongly urges the Conress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration, development and production.

PASSED and APPROVED by the PORT HEIDEN CITY COUNCIL this 11 day of November, 1986

Olof Malutin
Mayor

Patricia Christensen
Attested by Clerk

CITY OF SOLDOTNA

RESOLUTION 86-49
(Introduced by City Manager)

A RESOLUTION URGING CONGRESS TO OPEN A PORTION OF THE ARCTIC NATIONAL WILDLIFE REFUGE TO OIL & GAS EXPLORATION AND DEVELOPMENT

WHEREAS, the the Arctic National Wildlife Refuge contains about 1.5 million acres of coastal land between Prudhoe Bay and the Canadian Border which represents the largest and, perhaps, last remaining on-shore deposit of oil in the United States; and,

WHEREAS, this land is a part of a 19 million acre parcel of the Arctic National Wildlife Refuge of which 17.4 million acres has already been closed to the development of natural resources; and,

WHEREAS, the U.S. Congress is expected to decide whether this coastal plain should be opened to oil and gas exploration or whether it should be fully pledged and set aside as a national wildlife refuge; and,

WHEREAS, the Soldotna City Council desires to let its opinions be known prior to the Congresssional debate on this issue;

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SOLDOTNA, ALASKA AS FOLLOWS:

Section 1. A finding is made that sufficient acreage of the State of Alaska has been already been pledged to wildlife preservation and that the remainder should be opened to resource development to further enhance the economy of this state and the nation.

Section 2. Congress is urged to open the coastal plain of the Arctic National Wildlife Refuge for environmentally responsible oil and gas exporation and production.

Section 3. The City Clerk is directed to send a copy of this Resolution to Alaska's Congressional Delegation and the Resource Development Council for Alaska, Inc. to facilitate a demonstration of state wide concensus on this issue by responsible Alaska organizations.

ADOPTED this 1st day of October, 1986.

Mayor

ATTEST:

City Clerk

CITY OF WRANGELL, ALASKA

RESOLUTION NO.09-86-258

A RESOLUTION OF THE COUNCIL OF THE CITY OF WRANGELL, ALASKA, URGING THE CONGRESS OF THE UNITED STATES TO OPEN THE ARCTIC NATIONAL WILDLIFE REFUGE OIL RANGE TO ENVIRONMENTALLY RESPONSIBLE OIL AND GAS EXPLORATION, DEVELOPMENT AND PRODUCTION.

WHEREAS, Alaska's Arctic National Wildlife Refuge (ANWR) includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the oil range to further exploration, development and production; and

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WHEREAS, the facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, National energy security depends on the development of domestic oil and gas resources to replace depleted U. S. Reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, opening the ANWR oil range to further exploration, development and production will generate increased employment and business opportunities for all Americans;

NOW, THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF WRANGELL, ALASKA , strongly urges the Congress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration, development production.

PASSED AND APPROVED SEPTEMBER 23, 1986

ATTEST: Janice K. Henderson
CITY CLERK

MAYOR

Certified a true and correct copy of the original filed in my office.

Janice K. Henderson
City Clerk 9-24-86
City of Wrangell, Alaska

CITY OF VALDEZ, ALASKA

RESOLUTION NO. 8634

A RESOLUTION URGING CONGRESS TO OPEN THE ANWR OIL RANGE TO ENVIRONMENTALLY RESPONSIBLE OIL AND GAS EXPLORATION, DEVELOPMENT AND PRODUCTION.

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 18 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, approximately eight percent of the refuge, known as the ANWR oil range, is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress must decide in the near future if the 1.5 million acre oil range will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the twenty-first century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR oil range are dependent upon a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, opening the ANWR oil range to further exploration, development and production will generate increased employment and business opportunities for all Americans.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF VALDEZ, ALASKA, that the City of Valdez strongly urges the Congress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration, development and production.

CITY OF VALDEZ, ALASKA

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 18 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, approximately eight percent of the refuge, known as the ANWR oil range, is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress must decide in the near future if the 1.5 million acre oil range will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the twenty-first century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR oil range are dependent upon a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, opening the ANWR oil range to further exploration, development and production will generate increased employment and business opportunities for all Americans.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF VALDEZ, ALASKA, that the City of Valdez strongly urges the Congress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration, development and production.

CITY OF VALDEZ, ALASKA

John Devens, Mayor

ATTEST:

Jim Watson, City Manager/City Clerk

ALASKA STATE CHAMBER OF COMMERCE

RESOLUTION

Adopted October 1, 1986
Fairbanks, Alaska

WHEREAS, the Arctic National Wildlife Refuge (ANWR) includes more than 18 million acres of land; and

WHEREAS, approximately 8% of the refuge known as the coastal plain is considered highly prospective for the discovery of large quantities of oil; and

WHEREAS, Alaska's petroleum industry during the past 15 years has demonstrated its ability to operate on the North Slope in a safe, responsible manner without adverse environmental impact; and

WHEREAS, development of the oil and gas resources would benefit the State of Alaska by job creation, royalty and tax income; and,

WHEREAS, the United States must develop domestic petroleum resources for national security reasons;

THEREFORE be it resolved that the Alaska State Chamber of Commerce urges the 100th Congress of the United States to open the coastal plain of the Arctic National Wildlife Refuge to environmentally responsible oil and gas exploration, development and production.

Jim Rynearson, Chairman

October 1, 1986

George Krusz, President

October 1, 1986

O-390

Anchorage · Star of the North
Chamber of Commerce

RESOLUTION 86-09

ANWR COASTAL PLAIN

Alaska's Arctic National Wildlife Refuge includes more than 19 million acres of land, amounting to approximately five percent of the entire state landmass, and

the Coastal Plain is approximately eight percent of the refuge, it is considered to be highly prospective for the discovery of large quantities of oil and gas, and

Congress has reserved the discretion to decide if the 1.5 million acres will be opened to further exploration, development and production, and

the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the coastal plain in a safe, responsible manner without significant adverse environmental impacts, and

the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century, and

the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR Coastal Plain would be enhanced by a Congressional decision to open the coastal plain to further exploration, development and production, and

facilities developed to transport petroleum resources on the coastal plain to Pump Station One may allow marginal discoveries between the ANWR Coastal Plain and Prudhoe Bay to be developed, and

national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves, and

the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development, and

opening the ANWR Coastal Plain to further exploration, development and production will generate increased employment and business opportunities for all Alaskans and all Americans;

415 F Street, Anchorage, Alaska 99501-2254 (907) 272-2401

THEREFORE BE IT RESOLVED THAT the Anchorage Chamber of Commerce strongly urges the Congress of the United States to open the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

APPROVED BY THE Anchorage Chamber of Commerce Board of Directors this 21ST day of November, 1986.

Ken Calhoon
President

Wayne K. Beckwith
Executive Vice President

COMMON SENSE FOR ALASKA
P.O. BOX 202087
ANCHORAGE, AK 99520-2087

RESOLUTION ON THE ANWR OIL RANGE

WHEREAS, Alaska's Arctic National Wildlife refuge includes more than 18 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, approximately eight percent of the refuge, known as the ANWR oil range, is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, the petroleum industry has consistently demonstrated its desire and ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

O-392

WHEREAS, Common Sense for Alaska Inc., in its February 1986 report, Coming to Grips with Runaway State Spending, recommended optimizing the state's natural resources assets by, "Maximizing land use through multiple use classifications.....eliminating road blocks, whether in permitting, regulatory control or taxation"; and

WHEREAS, the Congress of the United States must take the necessary legislative action to permit access, exploration and subsequent development of the Arctic National Wildlife Refuge.

Now, therefore, be it resolved that Common Sense for Alaska, Inc., whose goals include fiscal responsibility in government, and private sector vs. public sector emphases on economic development, strongly urges the Congress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration, development and production.

Executive Director for

Jack Hayes
President
Common Sense for Alaska, Inc.

RECEIVED DEC 1 1 1986

THE GRANGE

AMERICA'S FAMILY COMMUNITY FRATERNITY

Northland Pioneer Grange No. 1
P.O. Box 2304
Palmer, Alaska

December 8, 1986

Robert M. Frederick, Legislative Director
National Grange
1616 H Street N.W.
Washington, D.C. 20006

Dear Mr. Frederick;

The Northland Pioneer Grange No. 1 discussed the need for a congressional decision regarding oil exploration in Alaska's Arctic National Wildlife Refuge at our meeting on November 20, 1986.

O-393

Our Grange agreed to support a resolution drafted by the Resource Development Council for Alaska, Inc. in regard to ANWR. It is the opinion of the Northland Pioneer Grange that additional exploration and knowledge of petroleum reserves is of great value to Alaska and the entire U.S. I don't have the latest book of the National Grange Legislative Policies but in several previous ones the National Grange has supported the development of domestic energy reserves in a manner that would minimize any impact on the environment. The enclosed ADC resolution seems consistent with the National Granges stand on energy and Alaska would appreciate any support that could be generated in regard to getting the Congress to approve further exploration in the 1.5 million acres of ANWR proposed for exploration. The Alaska congressional delegation would be helpful in supplying any information you may be interested in.

Thank you very much for any support you can generate.

Sincerely,

Sig Restad

Sigmund H. Restad, Master for 1987

Enclosure

cc: Resource Development Council for Alaska, Inc.
file

GREATER KETCHIKAN CHAMBER OF COMMERCE
Resolution on the
ANWR (ARCTIC NATIONAL WILDLIFE REFUGE)

WHEREAS: Alaska's Arctic National Wildlife Refuge includes more than 18 million acres of land, amounting to approximately 5% of the entire state land mass; and

WHEREAS: Approximately 8% of the refuge, known as the ANWR oil range, is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS: Congress must decide in the near future if the 1.5 million acre oil range will be opened to further exploration, development and production; and

WHEREAS: The petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS: The United States of America must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st Century; and

WHEREAS: The value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR oil range are dependent upon a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS: Facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

O-394

WHEREAS: National energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS: The nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS: Opening the ANWR oil range to further exploration, development and production will generate increased employment and business opportunities for all Americans:

THEREFORE, BE IT RESOLVED THAT the Greater Ketchikan Chamber of Commerce strongly urges the Congress of the United States of America to open the ANWR oil range to environmentally responsible oil and gas exploration, development and production.

DATED at KETCHIKAN, ALASKA this 18th day of September, 1986.

Joy E. Clark

Joy Clark
President
Greater Ketchikan Chamber of Commerce
P.O. Box 5957
Ketchikan, AK 99901

MA

THE CHAMBER
GREATER SEATTLE CHAMBER OF COMMERCE

ADOPTED

by the

BOARD OF TRUSTEES

of the

GREATER SEATTLE CHAMBER OF COMMERCE

January 13, 1986

The Greater Seattle Chamber of Commerce supports opening the Arctic National Wildlife Refuge's Coastal Plain to environmentally responsible oil and gas exploration, development and production.

C-395

BACKGROUND

When Congress passed the Alaska National Interest Lands Conservation Act of 1980, it in effect "locked up" approximately 19 million acres of land now known as the Arctic National Wildlife Refuge (ANWR) by designating it a wilderness area. At the same time, Congress commissioned the Department of Interior to evaluate the 1.5 million acre Coastal Plain for its oil and gas potential and for the effect of oil and gas exploration and development on the environment. The five year study was released November 24, 1986, recommending Congress enact legislation making the Coastal Plain available for oil and gas leasing and authorize the Secretary of the Interior to impose appropriate measures to protect refuge resources. The Coastal Plain is regarded by geologists as the most promising area for major discoveries of oil and gas in North America. Published estimates indicate potential reserves which could be as great as Prudhoe Bay and the Kuparuk fields. (Prudhoe Bay oil reserves are declining. Lead times from discovery to first production are long in Alaska--at least 10-15 years.)

During the coming months, the U.S. Congress will decide whether the Coastal Plain should be opened to oil and gas exploration, development and production or preserved as a wilderness area. Opening the Arctic National Wildlife Refuge Coastal Plain to environmentally responsible oil and gas development is not just a state of Alaska issue. It is a national issue that must be decided in Washington, D.C., and the outcome could have substantial economic impact.

1200 One Union Square
Seattle, Washington

National Security and economic stability depend on sufficient ongoing quantities of domestic oil production. Increased domestic oil product can minimize the possibility of economic disruption due to dependence on foreign oil and help towards decreasing the nation's trade deficit. Presently, one-third of the trade deficit is caused by the purchase of foreign oil and according to the Department of the Interior's report, contributions from the Coastal Plain would save $8.1 billion in the year 2005 on the cost of imported oil.

In addition to the national interest in providing for future energy needs, the opening of the Coastal Plain could represent billions of dollars in business opportunities for the private sector.

During the past fifteen years, Alaska's petroleum industry has demonstrated its ability to operate on the North Slope in a safe, responsible manner without significant adverse environmental impact.

This decision has come after reading the material available, inviting and hearing the Resource Development Council Inc. present the case for opening the Coastal Plain to oil and gas exploration and development, inviting and hearing the Sierra Club present the case for closing the Coastal Plain to oil and gas exploration, and reading the United States Department of Interior's report concerning the Coastal Plain of ANWR.

Opening ANWR's coastal plain to oil and gas exploration and development is supported by the U.S. Department of the Interior, the U.S. Department of Fish and Wildlife, Alaska Oil and Gas Exploration, Alaska State Chamber of Commerce, Resource Development Council for Alaska, Inc., Arctic Slope Regional Native Corporation, and the Interstate Oil Compact Commission.

OPPOSITION

The decisions to be made about opening the ANWR Coastal Plain to exploratory drilling and potential petroleum development are controversial. The Sierra Club, Defenders of Wildlife, The Natural Resources Defense council, the Trustees for Alaska, and the Northern Alaska Environmental Center feel that if oil is found, pressure will build to develop the rest of the refuge. These organizations say that exploration on the 1.5 million-acre refuge would disrupt the porcupine caribou herd estimated at between 160,000 and 200,000. This area is where they breed and calve. Opponents fear the herd will diminish if their calving grounds are developed and want the Coastal Plain added to the 19 million acre wildlife refuge and preserved as an untouched area for arctic wildlife.

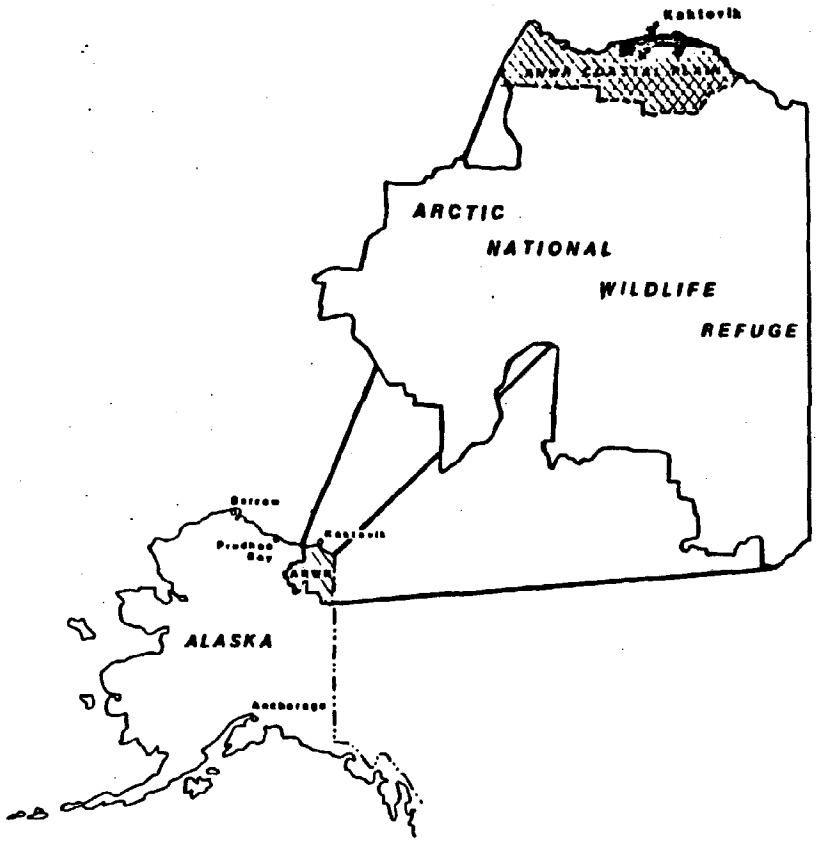
Opponents claim the situation of the central herd is different from the porcupine herd, so it is not possible to make good extrapolations about what might happen to the herd if ANWR is opened for oil and gas exploration. The secretary's reports state that the Central Arctic caribou herds have increased from 3,000 in 1972 to over 13,000 in 1986. While circumstances are somewhat different between Prudhoe Bay and the Coastal Plain, this evidence of responsible oil development concurrent with increased wildlife activity at Prudhoe Bay leads them to be quite optimistic about oil development in the Coastal Plain without significant negative effects on the wildlife resources.

IMPLEMENTATION

Upon approval of the recommendation, communication will be forwarded to each member of Washington's congressional delegation urging their support of the opening of the coastal plain of Alaska's Arctic National Wildlife Refuge to environmentally responsible oil and gas exploration, development and production.

****

ANWR's Coastal Plain



ARCTIC NATIONAL WILDLIFE REFUGE (ANWR) - 19 Million Acres

ANWR COASTAL PLAIN Section 1002 Study Area - 1.5 Million Acres

KAKTOVIK INUPIAT CORPORATION/ARCTIC SLOPE REGIONAL CORPORATION LANDS

RECEIVED DEC 15 1986 BOV EC

PORT of TACOMA U.S.A.

December 10, 1986

Throughout 1986, the Port of Tacoma has taken major steps to increase its visibility and involvement with Alaska. With both Sea-Land and Totem Ocean Trailer Express (TOTE) serving the Alaska trade from Tacoma (along with TOTE's new barge service, Alaska Barge Lines) the Port of Tacoma has become the New Gateway to Alaska, handling over 65% of all waterborne commerce to the State.

However, our interest and commitment to Alaska go far beyond our shipping lines. We realize that the economies and futures of Washington and Alaska have a great deal in common. That's why we established a "Partner Port" relationship with the Port of Anchorage in September. That's why a team of Port Commissioners and staff attended the Alaska State Chamber of Commerce Convention in Fairbanks in October. We were there to talk, and we were there to listen. And the clear message we received, time and time again, was that the Arctic National Wildlife Refuge (ANWR) issue would be a key political issue for not only Alaska, but also for the entire United States during 1987.

I am pleased to tell you that on December 1, 1986, the Port of Tacoma Commission officially adopted a resolution urging Congress to open up the coastal plain of ANWR to environmentally responsible oil and gas exploration, development and production.

We have already started working with our local media to educate them on this important matter, and we are also working to let our elected officials in Washington State know just how important this issue is for the future of our State. We will be expanding these efforts during 1987.

I believe the ANWR issue helps illustrate how closely the future of Alaska and Washington are tied together, and gives us an excellent opportunity to work together to improve that future.

Sincerely,

Rod Koon
Director, Port Relations

good job! BO

C-397

P.O. Box 1837 • Tacoma, Washington 98401 • Telephone (206) 383-5841 • TWX 910-441-2646 • Telex 32-7473

Commissioners Robert G. Earley • Jack E. Fabulich • Jon E. [illegible]

RESOLUTION ON THE ANWR OIL RANGE

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 18 million acres of land, amounting to approximately five percent (5%) of the entire state landmass; and

WHEREAS, approximately eight percent (8%) of the refuge, known as the ANWR oil range, is considered to be highly prospective for the discovery of large quantities of oil and gas; and

WHEREAS, Congress must decide in the near future if the 1.5 million acre oil range will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR oil range are dependent upon a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, the Port of Tacoma is the New Gateway to Alaska, handling over 65% of all waterborne commerce to Alaska; and

WHEREAS, the Port of Tacoma is a Partner Port of the Port of Anchorage, and is working to cooperate on areas of mutual interest; and

WHEREAS, the continued economic growth and development of Alaska is important to the continued growth and development of Tacoma and Washington State; and

WHEREAS, numerous businesses in the Tacoma-Pierce County area have major markets in Alaska; and

WHEREAS, the Port of Tacoma has ample area available for module construction work; and

WHEREAS, opening the ANWR oil range to further exploration, development and production is expected to generate construction, shipping and business opportunities for the Port of Tacoma, the entire Tacoma-Pierce County region, and the State of Washington;

BE IT THEREFORE RESOLVED THAT THE PORT OF TACOMA COMMISSIONERS strongly urge the Congress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration, development and production.

ADOPTED by the Commission of the Port of Tacoma at its regular meeting held on the 1st day of December, 1986, a majority of the members of the Port Commission being present and attested by its Secretary under the official seal of said Commission in authentication of its passage this 1st day of December, 1986.

_____
President of the Port Commission,
Port of Tacoma

ATTEST:

_____
Secretary of the Port Commission,
Port of TAcoma

adopted Dec. 1, 1986 – see attached memo for confirmation

December, 1986

Resolution
to the
Board of Directors
of the
Tacoma-Pierce County Chamber of Commerce
from the
Alaska Committee

SUBJECT: Arctic National Wildlife Refuge (ANWR) Oil & Gas Exploration, etc.

POLICY: The Chamber supports opening the ANWR Coastal Plain to environmentally responsible oil and gas exploration, development and production.

BACKGROUND: Virtually every state has experienced the economic benefits of oil production from Alaska's North Slope, especially Washington and particularly Tacoma. But future jobs will depend on new discoveries of oil, since the major planned facilities are now in place. In addition to the money federal government receives from petroleum lease bonuses, rentals, royalties and excise and income taxes, the oil industry has spent more than $25 billion in North Slope development in goods and services purchased in all 50 states during the last five years.

Specific benefits to Tacoma from further oil exploration and development include:

- Increased tonnage through the Port of Tacoma, and therefore revenues to the Port. TOTE and Sea-Land together ship over 65 percent of all waterborne freight to Alaska.

- Manufacturing and construction of modules used in oil recovery would provide jobs at Parsons in Tacoma. Parsons supplied the North Slope modules during Prudhoe Bay development. The last major sealift left this summer (1986).

- Indirect benefits through employment and manufacture of secondary products used for oil recovery.

The ANWR Coastal Plain is 8 percent of more than 18 million acres of wildlife refuge.

Congress this year will decide whether it is in the national interest to open the Coastal Plain to exploration or to close off the area as wilderness. Representative Morris Udall (D-AZ) has promised to introduce legislation to designate ANWR as protected wilderness. A Department of Interior study released November 23, 1986, termed the Coastal Plain "the most outstanding frontier oil and gas area in the U.S."

The four issues identified in the early debate have these comments:

- National security and economic stability depend on sufficient ongoing quantities of domestic oil production. Remember the oil embargo? The whole oil industry has had an impact on the Port of Tacoma, in employing plumbers, pipefitters, longshoremen and others involved in shipments to Alaska.

- ANWR's oil potential is huge. The Coastal Plain is America's best prospect for new discoveries of domestic petroleum to replace dwindling supplies.

- The environmental record in Arctic Alaska provides positive proof than sensible development can coexist harmoniously with wildlife. The issues have been identified and successfully dealt with in the development of Prudhoe Bay and the construction of the Trans-Alaska pipeline.

- The caribou of the Central Arctic Herd calve and spend their summers on the coastal plain of Alaska--in the Kuparuk and Milne Point (Prudhoe Bay) oil fields. There's every reason to believe the Porcupine Caribou Herd, whose summer range includes the Coastal Plain of ANWR, would likewise adapt and prosper.

IMPLEMENTATION: Inform our Congressional delegation of the Chamber position and our reasons for that position. Work to develop media recogintion of the importance of ANWR development on the local economy. Work to develop coalitions for support of ANWR development.

RESOLUTION ON THE ANWR OIL RANGE

WHEREAS, Alaska's Arctic National Wildlife Refuge includes more than 18 million acres of land, amounting to approximately five percent of the entire state landmass; and

WHEREAS, approximately eight percent of the refuge, known as the ANWR oil range, is considered to be highly prospective for the discovery of large quantities of oil and gas: and

WHEREAS, Congress must decide in the near future if the 1.5 million acre oil range will be opened to further exploration, development and production; and

WHEREAS, the petroleum industry has consistently demonstrated its ability to operate in conditions similar to those found on the oil range in a safe, responsible manner without significant adverse environmental impacts; and

WHEREAS, the United States must prepare to develop domestic petroleum resources if it is to preclude overwhelming dependence on foreign petroleum sources in the 21st century; and

O-400

WHEREAS, the value and development potential of state-owned tidelands and federally-owned OCS lands offshore of the ANWR oil range are dependent upon a Congressional decision to open the oil range to further exploration, development and production; and

WHEREAS, facilities developed to transport petroleum resources on the oil range to Pump Station One may allow marginal discoveries between the ANWR oil range and Prudhoe Bay to be developed; and

WHEREAS, national energy security depends on the development of domestic oil and gas resources to replace depleted U.S. reserves; and

WHEREAS, the nation stands to derive revenues including portions of bonuses, royalties and rents from oil and gas development; and

WHEREAS, opening the ANWR oil range to further exploration, development and production will generate increased employment and business opportunities for all Americans;

THEREFORE BE IT RESOLVED THAT Seward Chamber of Commerce strongly urges the Congress of the United States to open the ANWR oil range to environmentally responsible oil and gas exploration, development and production.

U.S. Chamber of Commerce
1615 H St, NW
Washington, DC 20062

News Department (202) 463-5682

NEWS

FOR IMMEDIATE RELASE

Contact: Frank Benson

U.S. CHAMBER'S BOARD URGES CONGRESS TO PERMIT EXPLORATION OF ALASKAN ARCTIC WILDLIFE REFUGE

WASHINGTON, Nov. 13 -- Publicly owned lands that may be among the nation's richest sources of oil and natural gas should receive Congressional exploration approval, and efforts to close off the area permanently to future exploration and development should be rebuffed, the U.S. Chamber of Commerce stated today.

The Chamber's policy-setting board of directors, at its regularly scheduled fall meeting here this week, called for Congress to enact legislation to determine the extent of reserves in Alaska's Arctic National Wildlife Refuge (ANWR). Such lands were withdrawn from exploration and development with enactment of the 1980 Alaska National Interest Lands Conservation Act, which provided that Congress must specifically authorize any drilling in ANWR's coastal plains.

That area may contain more oil and gas reserves than Alaska's Prudhoe Bay area, and many consider the coastal plain as containing one of the nation's most promising areas for new domestic reserves of crude oil. In light of such a potential, the Chamber's board decided, Congress should authorize exploratory efforts to ascertain the extent of the reserves and should reject efforts to declare the entire coastal plain as wilderness and permanently off-limits for any exploratory or producing efforts.

Acting on recommendation of the business federation's 22-member Natural Resources Committee, the Chamber's board declared that finding new domestic reserves of oil and natural gas is critical to reducing the nation's dependency on imports -- up 37 percent from last year -- and to curbing the country's foreign trade deficit of which one-third represents payments for foreign oil products.

#####

86-204

O-401

cc RDiamond

EC

V 11A for resolution File 0402

SENATOR
ROBERT H. ZIEGLER, SR.
307 BAWDEN STREET
KETCHIKAN, ALASKA 99901

WHILE IN JUNEAU
PO BOX V
JUNEAU, ALASKA 99811

Alaska State Legislature

Senate

MEMBER
SENATE JUDICIARY COMMITTEE

SELECT COMMITTEE ON LEGISLATIVE ETHICS

WESTERN STATES LEGISLATIVE FORESTRY TASK FORCE

EXECUTIVE COMMITTEE
WESTERN LEGISLATIVE CONFERENCE
COUNCIL OF STATE GOVERNMENTS

ALTERNATE MEMBER
NATIONAL CONFERENCE OF STATE LEGISLATURES
STATE AND FEDERAL ASSEMBLY
COMMITTEE ON
FEDERAL TAXATION, TRADE AND ECONOMIC DEVELOPMENT

September 30, 1986

Ms. Joy Clark, President
Greater Ketchikan Chamber of Commerce
Box 5957
Ketchikan, Alaska 99901

Dear Joy:

When Paula and I returned from a legislative conference the latter part of last week, I found your ANSR resolution. Coincidentally, at the Western Legislative Conference meeting, I cosponsored a similar resolution which passed the conference rather handily at its business meeting.

0402

You might consider having me (or Lloyd Jones, as the case may be), try to pass a similar resolution through the State Legislature comes January.

Regards,

RHZ

Robert H. Ziegler, Sr.

10/7/86
Paula -
thought you might like a copy of this for your info.
Jan

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print BOYD J. BROWNFIELD PRES.

Name RESOURCE DEVELOPMENT COUNCIL OF AK

Mailing Address 807 "G" STREET SUITE 200

ANCHORAGE AK 99510

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☒ I am speaking for RESOURCE DEVELOPMENT COUNCIL
(please enter name of organization you represent)

0403

Resource Development Council for Alaska, Inc.

807 "G" Street, Suite 200, Anchorage, Alaska 99501-3440
Box 100516, Anchorage, Alaska 99510-0516 - 907/276-0700

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Senator Frank Murkowski
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Governor Bill Sheffield

DRAFT TESTIMONY OF THE RESOURCE DEVELOPMENT COUNCIL

ENVIRONMENTAL IMPACT STATEMENT
"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"

ANCHORAGE, ALASKA
JANUARY 5, 1987

GOOD MORNING. I AM BOYD BROWNFIELD, PRESIDENT OF THE RESOURCE DEVELOPMENT COUNCIL FOR ALASKA, INC. (RDC). RDC IS A PRIVATE STATEWIDE ECONOMIC DEVELOPMENT ORGANIZATION COMMITTED TO THE ORDERLY DEVELOPMENT OF ALASKA'S RESOURCES. THE BROADLY BASED MEMBERSHIP OF OUR COUNCIL COMES FROM A WIDE RANGE OF ECONOMIC, SOCIAL, GEOGRAPHIC AND ETHNIC SECTORS OF ALASKA. OUR MEMBERSHIP REPRESENTS INDIVIDUALS, COMPANIES TRADE ASSOCIATIONS, NATIVE CORPORATIONS, UNIVERSITIES, CHAMBERS OF COMMERCE, AND MUNICIPALITIES THROUGHOUT THE STATE.

THE RESOURCE DEVELOPMENT COUNCIL STRONGLY SUPPORTS THE OPENING OF THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE TO OIL AND GAS EXPLORATION AND PRDOUCTION. THERE ARE MANY GOOD REASONS WHY THE OPENING OF EIGHT PERCENT OF THE REFUGE TO OIL AND GAS LEASING IS IN THE NATIONAL INTEREST

DEVELOPMENT OF WORLD-CLASS OIL DEPOSITS IN THE REFUGE PROPOSED FOR LEASING WOULD PROMOTE ECONOMIC DEVELOPMENT, REDUCE OUR DEPENDENCE ON FOREIGN OIL, PROMOTE ORDERLY DEVELOPMENT IN THE ABSENCE OF AN ENERGY CRISIS, INCREASE REVENUES FROM TAXES AND ROYALTIES,

STRENGTHEN NATIONAL SECURITY INTERESTS, RESTRAIN THE NATIONAL TRADE DEFICIT AND CREATE THOUSANDS OF NEW JOBS.

WE MUST NOT BE BLINDED BY A TEMPORARY OIL GLUT. BEFORE TOO LONG, AMERICA COULD BE FACING AN ENERGY CRISIS OF UNMATCHED PROPORTIONS.

ALTHOUGH THERE IS PLENTY OF OIL ON THE MARKET TODAY, DOMESTIC OIL RESERVES ARE PLUMMETING WHILE CONSUMPTION IS RISING. RELIABLE SOURCES INDICATE THAT U.S. OIL IMPORTS COULD RISE DRAMATICALLY FROM ABOUT 27 PERCENT OF DOMESTIC CONSUMPTION IN 1985 TO OVER 60 PERCENT IN EIGHT YEARS.

PRUDHOE BAY, AMERICA'S LARGEST OIL FIELD, ACCOUNTS FOR 20 PERCENT OF U.S. DOMESTIC CRUDE PRODUCTION. HOWEVER, IT HAS ALREADY BEEN PUMPED HALF EMPTY AND A STEADY DECLINE IN PRODUCTION WILL SOON BEGIN.

IT IS IMPERATIVE THAT WE LOOK FOR OIL IN ANWR NOW BECAUSE DEVELOPING OIL FIELDS IN ALASKA REQUIRES LEAD TIMES OF 10 TO 15 YEARS FROM DISCOVERY TO FIRST PRODUCTION. ASSUMING A MAJOR FIELD IS DISCOVERED ON THE COASTAL PLAIN TODAY, FIRST PRODUCTION WOULD NOT BE LIKELY BEFORE THE YEAR 2000.

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O-405

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DUE TO THE "WORST CASE" BIAS, WE REQUEST THAT THOSE IMPACTS BASED ON A HIGHLY SPECULATIVE NATURE BE CLARIFIED AS SUCH THROUGHOUT THE ENVIRONMENTAL CONSEQUENCES SECTION. THIS WILL ALLOW AND HOPEFULLY ENSURE THAT THOSE READING THE DOCUMENT ARE AWARE OF THE HIGHLY-SPECULATIVE NATURE OF THOSE IMPACTS.

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ORAL TESTIMONY OF THE RESOURCE DEVELOPMENT COUNCIL

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WASHINGTON, D.C.
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ROCKY MOUNTAIN INSTITUTE

22 January 1987
[BY FEDERAL EXPRESS]

US Fish & Wildlife Service
Att'n: Division of Refuge Management
2343 Main Interior Building
18th & C Streets NW
Washington DC 20240

Dear Sir or Madam:

This letter comments on the Department of the Interior's Draft *Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment*, which recommends opening to full oil and gas leasing the coastal plain of the Arctic National Wildlife Refuge (the "1001 area"--a reference to §1002 of the Alaska National Interest Lands Conservation Act).

These comments deal with the Draft's grossly inadequate and misleading treatment of two issues: national energy needs and policies, and the economic evaluation of the 1002 area. Other issues are no doubt being dealt with by other reviewers. A summary of my qualifications is attached.

Omission of energy-efficiency alternative

The most fundamental flaw in the Draft--one which in my opinion renders it useless as a basis for informed decisionmaking--is that it does not even mention, let alone analyze, the most attractive alternative to increased oil extraction[1], whether in the 1002 area or elsewhere. That alternative is *the more efficient use* of energy in general and of petroleum products in particular. As the *1985 National Energy Policy Plan*--on which the Draft relies for its energy projections and supply-side goals--states at pp. 5 and 13:

> Energy conservation: an integral part of the energy triad. [Energy conservation] has proven to be the most expeditious way to reduce the need for new or imported energy resources, and in fact it now contributes more to balancing our national energy ledger than does any single fuel source. Despite a 21% increase in the number of U.S. households since 1973, for example, current total energy consumption in the U.S. household energy sector is almost the same as it was twelve years ago. Savings in the industrial, commercial, and transportation sectors are similarly impressive. Even if current energy prices remained stable or declined moderately, it would appear to be economically feasible to continue efficiency gains at a substantial pace for the next 25 years.
>
> Conservation--our largest single resource. Conservation contributes more to balancing the national energy ledger today than any single fuel source. If pre-1973 trends in energy use had continued, DOE calculates that Americans would have consumed about 20 quads[2] more of primary energy than they actually did in 1986. This compares with approximately 21 quads supplied that year by domestic petroleum, 20 quads of U.S. coal produced, and 18 quads of domestic natural gas. Conservation has come chiefly from increased efficiency in the use of energy, and from a shift in the nation's mix of goods and services toward less energy intensiveness. The energy productivity of the U.S. economy...has increased 28% during the decade from 1974 to 1984, and rose 14% in the last four years of that period alone.

[1] I use this term rather than the traditional "production" because it more accurately describes the process. Oil was produced geological ages ago; all we know how to do is dig it up and burn it.

[2] One quad (quadrillion or 10^{15} BTU) is equivalent to 0.47 million barrels of oil per day.

The Draft irrationally ignores all demand-side options, even as its Chapter VII cites the same DOE document as the authoritative official statement of the need for and benefits to be derived from additional *supplies* of domestic oil.

The case for primary attention to the demand side can be stated even more strongly. Since 1979, the United States, according to Energy Information Administration statistics, has gotten more than 50 times as much new energy from more efficient use as from *all* net increases of energy combined. (Moreover, of those increases, more new energy has come from sun, wind, water, and wood than from oil, gas, coal, and uranium: renewable sources now total at least a tenth of the Nation's total primary supply, and the fastest-growing part, outpaced only by savings.). Yet the Draft assumes that only more oil itself--not more efficient use of the oil we already have--can meet national needs.

The functional equivalence of oil and oil efficiency is well established. For example, the *1983 National Energy Policy Plan* states at p. 3 that of three "particularly important" areas "of energy programs and action,"

> The first is energy conservation, which ought to be viewed by policymakers, producers, and consumers as a significantly important energy resource. That is, energy conservation should be seen as a set of actions that individuals and businesses can take that are cost-effective alternatives to new supply development. Energy conservation actions are often cheaper and easier to undertake, and they often make good business sense. Since the energy price shocks of the 1970s, energy use per dollar of gross national product has declined steadily; and important energy-efficiency improvements have occurred in a host of areas, from automobiles to homes and office buildings and manufacturing processes. These accomplishments, coupled with the stability of energy prices in general and the lowering of world oil prices within the past year, should not obscure the fact that further gains can still be made. Conservation is, and will remain, an important component of the available energy resource mix.

Since 1973, according to the Energy Information Administration's *Monthly Energy Review* (August 1986, p. 12, data to mid-1986), the United States has reduced the energy intensity of its GNP by 25% and its oil and gas intensity by 36%. OPEC's market share, too, has been cut roughly in half. Yet this was done with such straightforward measures as a 37%-more-efficient car fleet (*id.*, p. 15, preliminary 1985 data *vs.* 1973), caulk guns, and duct tape. Still untapped is the potential offered by newly commercial technologies vastly more powerful, cost-effective, and sophisticated than these. For example, an improved insulating gas used to fill spectrally selective windows--a proven technology entering the market in the first quarter of 1987--raises the potential saving of these windows, when eventually they are fully used in the Frostbelt, to *more than one Trans-Alaska Pipeline's worth* of saved oil which therefore need not be supplied. Such "negabarrels," unlike actual barrels, do not run out and do not harm the environment.

Even with 1980 technologies, the most detailed Federal assessment of the practical potential for raising energy productivity found[3] that it would be very cost-effective to fuel in the year 2000 an American economy 80% larger than that of 1977, with 22-29% *less* fuel than was actually used directly (excluding that used to make electricity) in 1977. That is, more, bigger, and more fully equipped and comfortable buildings could by 2000 be using 58% less total direct fuel than in 1977; industry could add 48% more value while using 6% less fuel; and transportation could increase by 30-70% for personal driving, 60-90% for personal air travel, and 80% for freight, while transportation fuel

[3] Solar Energy Research Institute, A New Prosperity: Building a Sustainable Energy Future, Brick House (Andover MA), 1981, 462 pp.).

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needs dropped by 15-35%. Even these potential savings were quite conservative at the time[4], and have become even more so with age.

Energy-saving technologies are now entering the market so quickly that most of today's best electricity-saving devices were not on the market a year ago; the same was true a year ago; and it is now about six times as cost-effective to save electricity as it was five years ago. Very detailed analyses by this Institute have shown that full use of today's best electricity-saving technologies would deliver the same or improved services while saving half of U.S. electrical use at zero net cost, or three-quarters of U.S. electrical use at a cost below 1.5¢/kW-h--less than the cost of *operating* a fossil- or nuclear-fueled power plant, even if building it were free. Unfortunately, since 1981 the Department of Energy, on whose Energy Research Advisory Board I served in 1980-81, has lost most of its capability to analyze modern energy-saving techniques. DOE's projections of future energy needs therefore take little account of these new developments and hence substantially exaggerate likely future demand[5]. That exaggeration inflates the "need" for oil from the 1002 area, and understates the importance of demand-side alternatives to it.

A major study[6] for the Defense Civil Preparedness Agency, in which the President of this Institute and I were Principal Investigators, examined major oil-saving opportunitеis in the U.S. economy. We found, in addition to many individually smaller but collectively large opportunities, two essentially untapped supergiant "oilfields," each bigger than the biggest in Saudi Arabia, and each capable of sustainably producing (not just temporarily extracting) over five million barrels of oil per day at costs of a few dollars per barrel. One of these "oilfields" is in our attics: it is the "weatherization oilfield" of oil, and natural gas fungible for oil, which could be saved by basic insulation, reglazing, and weatherstripping of sievelike American buildings. The other "oilfield" is under Detroit: it is the "accelerated-scrappage-of-gas-guzzlers" oilfield, representing the savings available by getting Petropigs off the road faster and replacing them with efficient cars[7]. Either of these oilfields could *eliminate* U.S. oil imports--before a synfuel plant, power plant, or 1002-area oilfield ordered today could deliver any energy whatever, and at a tiny fraction of its cost. Either of these "oilfields" could produce in, say, 2005 about eight times as much oil as the Draft contemplates for a successful development program in the 1002 area. Both of these "oilfields" would achieve every national policy goal which the Draft presents as a justification for leasing in the 1002 area, but neither would have significant environmental impacts. It is thus absurd, and contrary to NEPA, to exclude these and other energy efficiency options from the Draft's, and policymakers', informed consideration. The authors of the Draft appear to have artificially restricted their choice of alternatives so as to appear to support a predetermined position, rather than to conscientiously seeking to compare the full range of choices available to achieve the same policy goals.

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[4] See e.g. A.B. Lovins et al., Least-Cost Energy: Solving the CO_2 Problem, Brick House, 1981 (an analysis commissioned by the German Federal Environmental Agency). Copies are available from Rocky Mountain Institute.

[5] I say this from the perspective of an analyst who, unlike DOE, has correctly foreseen the major trends in energy demand for the past decade, by paying attention to the emerging competition between energy supply and improved energy efficiency, and assuming that consumers would behave rationally--as, to the discomfort of the energy industries, they largely did.

[6] Published as a book, Brittle Power: Energy Strategy for National Security, Brick House, 1981. Copies are available from Rocky Mountain Institute.

[7] For example, Brittle Power showed that rather than building synfuel plants, the U.S. would save more oil, faster and cheaper, by giving a free 40+-mpg car to anyone who would scrap his or her Brontomobile so that nobody would ever drive it again; or by paying a cash bonus of several hundred dollars for every mpg by which your new car improved on your old car which you scrapped. These kinds of numbers were agreed, in a recent meeting of the International Association of Energy Economists, to be realistic--but were said to be too sensible to affect Federal energy policy! For more such examples, see A.B. Lovins et al., Energy Unbound: A Fable for America's Future, Sierra Club (San Francisco), 1986.

Energy security issues

The same DCPA analysis[8] documented in detail why frontier projects like North Slope oil extraction do not improve, and may well reduce, national energy security. The same objections, such as vulnerable tanker traffic, which apply to oil from the Mideast (Draft, p. 164) apply also to Alaskan oil, in spades. The Trans-Alaska Pipeline, for example, has been found by the U.S. Army to be utterly indefensible; it runs for nearly 600 miles over some of the roughest and least hospitable terrain in the world, yet is accessible by road or float plane over most of its length. Although its proprietors apparently do not think they have a security problem, TAPS has *already* been repeatedly shot at and bombed; fortunately, these attacks have so far been incompetent. One of the TAPS pumping stations blew itself up by accident in 1977; had it been a northern instead of a southern station, and in the winter, some nine million barrels of hot oil could probably have congealed in a few weeks into the world's largest Chapstick[9]. Even in good weather, the cost of failure in TAPS's oil delivery is measured in hundreds of dollars per *second*; yet it would take as long as seven *months*, with good weather and smooth logistics, to replace a large section of the labyrinth of 48-inch pipe at the system's north end.

Such a fragile supply link can actually interrupt a larger fraction of U.S. oil supply, for longer, with fewer alternatives, than a complete embargo of Arab oil. TAPS, according to the Draft, carries a fifth of U.S. crude oil input, whereas U.S. net imports from Arab OPEC countries accounted in 1985 for only 3% of U.S. petroleum products supplied, and all OPEC countries, for only 12%. Simple, low-technology, probably anonymous and undetectable, and certainly unpreventable sabotage to TAPS therefore presents today a *greater* threat to America's energy security than any conceivable interruption of oil imports from the Mideast. Increasing dependence on TAPS (and additional, equally vulnerable facilities to gather oil from the 1002 area and deliver it into TAPS) would therefore *de*crease, not increase, national energy security. As our DCPA analysis showed in detail, energy efficiency--coupled with the more diverse, dispersed, renewable supply system now emerging in the marketplace--is the key to true energy security.

Investing *one year's* budget for the Rapid Deployment Force (meant to seize Mideast oilfields) in a good weatherization program would about eliminate all U.S. imports of oil from the Mideast[10]. Until energy efficiency programs receive more than Federal budget cuts and benign neglect, it is hard to take seriously the kinds of handwaving "national security" rationales presented in the Draft.

Economic benefits claimed

Similar fallacies lurk in the Draft's treatment of balance-of-trade benefits (even neglecting the likelihood that area-1002 oil would be exported to Japan, under a revised

[8] And a lay summary published in The Atlantic Monthly, November 1983, pp. 118-126.

[9] The operators are said to believe that their pumps are powerful enough to move even cooled-off oil, but that capability is controversial and has never been empirically verified.

[10] It is plausible that least-cost investment of the sums which would be required to find and deliver oil from area 1002 might achieve the same result, but the Draft does not present enough cost data to permit such a calculation.

statute such as the oil industry is earnestly seeking for TAPS output, rather than used in the United States). Energy efficiency produces far more benefit to the balance of trade than new domestic oil supplies can, partly because cheap efficiency, unlike costly oil, directly improves the competitiveness of U.S. industry in world markets. Efficiency investments themselves also tend to have a high labor-intensity and a relatively low capital-intensity. Frontier oil facilities have the opposite characteristics, and hence tend to reduce, not increase, net employment by starving other sectors for capital.

Efficient energy use also has a vastly larger potential for economic benefits to the Nation than all the unexplored hydrocarbon provinces combined. For example, national energy bills in 1984-85 ran about $430 billion, plus another ~$50 billion or more in direct Federal subsidies to the energy sector[11]. This total energy bill of about $480 billion a year would be about $150 billion a year higher still if the U.S. were as energy-inefficient today as it was in 1973. Yet if Americans were now as energy-efficient as their Western European competitors are--and those Europeans are still far short of cost-effective efficiency levels themselves--then U.S. energy bills would fall by an additional *$200 billion per year*--about enough to balance the Federal budget. And if we simply chose the best energy buys at each opportunity for the rest of this century, the resulting cumulative net savings by 2000 could be several *trillion* 1987 dollars--about enough to pay off the entire National Debt. The hoped-for benefits of area-1002 oil would be about 200 times smaller than that. Yet no policymaker reading the Draft could be expected to gain that essential perspective on the decision presented--to appreciate that the main alternative *omitted* can yield, over the same 30-90 years, hundreds of times as much benefit, without the proposed action's costs.

Exaggeration of benefits

Moreover, the Draft seriously exaggerates those potential economic benefits of area-1002 oil. For purposes of this review, I shall *assume* that the probabilistic analysis of the recoverable hydrocarbons likely to be found in area 1002 is correct in every respect, even though no evidence is presented for the past reliability of the methods and models used, and the main assumptions which drive the economic model are in an unpublished paper which has apparently not received the critical peer review normal in published scientific literature. I shall further *assume* that the 10% real discount rate used is consistent with the level of risk in the project, although it appears unlikely that free-market investors would be willing to invest for such returns in a project with a stated 81% probability of finding *no* oil economically recoverable even at high oil prices. Subject to these assumptions, the Draft's economic assessment of area 1002's hydrocarbon prospects includes the following major flaws:

- Only an unusually careful reader would note that *all of the stated probabilities* of finding various amounts of oil, and obtaining various economic benefits, *are fivefold too high*. This is because all those probabilities are "conditional" on there being *any* economically recoverable oil in area 1002 at all, and the probability of *that* occurrence is estimated at ~0.19 (pp. 49, 68, 72, etc.). Thus the *overall* probability of finding >1.0 billion economically recoverable barrels is only ~15%; the overall probability of a very large (9.2 billion recoverable bbl) reserve would be only 1%; and the probability that "the estimated [mean-case] 3.2 billion barrels of recoverable oil would be foregone" under Alternative E is not unity but ~0.19, there being an ~81% probability that wilderness designation would actually forego no benefit whatever, but only costs. Yet the Executive Summary *nowhere mentions* this fivefold exaggeration of the probabilities which the reader is invited to infer. Such a consistent relegation of this fivefold factor to technical fine print leaves an unfortunate impression of dishonesty.
- The ~19% stated probability of finding economically recoverable oil, the size of the reserves corresponding to various probabilities, and the economic benefits of those reserves *all depend sensitively on the future price of oil assumed*. No sensitivity test is provided for this crucial variable. Yet the $33 base-case price assumed (1984 $) for the year 2000 is a point estimate from a DOE model which is already badly outdated[12]. For example, another major model equally well regarded by mainsteam energy modellers--that of the Gas Research Institute--used in 1985 a reference-case year-2010 U.S. refiners' crude acquisition cost ($56.97 in 1984 $) virtually identical to that of the reference case of the 1985 DOE model on which the Draft relies[13] ($56.77 in 1984 $). Yet *one year later, GRI's preliminary 1986 model showed a 32% lower oil price in 2010--only $38.33*[14]. Presumably, the 1986 DOE/NEPP model will show somewhat similar behavior[15], although its 1986 runs have not yet been published and were not used or cited in the Draft.
- Such price volatility makes the Draft's conclusions *utterly meaningless*, because the minimum economically recoverable size of an oilfield in the 1002 area, and hence the probability of finding one or more such fields, will depend very sensitively on the oil price assumed. It would not be surprising, for example, if a 30-50% drop in the assumed oil price in 2010 reduced the stated 19% probability of finding any economically recoverable oil in the 1002 area to less than 5%. No data are presented from which this sensitivity can be calculated; the 5% is an illustrative guess on my part. Whatever the change actually turned out to be, not only the *probabilities* of finding various amounts of economically recoverable oil, but also the economic *value* of that oil would depend on the price assumed. It is therefore plausible that a more realistic and up-to-date estimate of long-term oil price could reduce the mean-case present-valued internal benefit of the oil (to be set against all its external costs) from the stated $14.6 billion (1984 $) to ~$5-10 billion, while greatly reducing the probability of realizing *any* benefit from the irreversible loss of the 1002 area's non-hydrocarbon resources.
- As an illustration of the uncertainty of long-term oil prices, the Gas Research Institute's draft 1986 baseline forecast includes a "consensus" of oil experts' estimates of the real oil price in 2000-2010. That "consensus" embraces a range of values spanning a range of *more than fourfold*[16]--yet the Draft nowhere even hints that future oil prices are highly uncertain or that such uncertainty can

[11] These have been exhaustively researched at RMI by H.R. Heede, whose publications are available from the Institute. For a preliminary summary, see The Wall Street Journal, 17 September 1985, p. 28. The direct energy bill of $430 billion a year probably excludes minor expenditures for certain renewable sources on which the Department of Energy does not keep statistics.

[12] Actually, the cited source does not give a base-case 1984-$ world oil price in 2000 of $33/bbl, but rather of $36.75, and a U.S. refiners' acquisition cost of ~$36.98. This discrepancy is apparently unexplained.

[13] National Energy Policy Plan Projections to 2010, DOE/PE-0029/3, December 1985, at p. 2-5.

[14] I.e., $39.61 in 1985 $, converted to 1984 $ using the GNP implicit price deflator. See D.A. Dreyfus, "Preliminary 1986 GRI Baseline Projection of U.S. Energy Supply and Demand," 4 August 1986 paper to GRI Seventh Annual Joint Board of Directors/Advisory Council Energy Seminar.

[15] It has done so before. DOE's Table 5-1, at p. 5-5, DOE/PE-0029/3, op. cit., shows that the NEPP-1985 projection of a year-2010 world oil price of $56.77 reflected a 37% drop in two years: the NEPP-1983 projection was $89.95 (both in 1984 $).

[16] DOE itself (id.) notes a year-2010 range of authoritative projections of 2.7-fold.

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invalidate its conclusions[17]. Just in the four months from November 1985 to March 1986, the world oil price fell from about $28 to about $12[18]--a sobering reminder of how little confidence "consensus" forecasts merit, even those made months rather than decades into the future[19].

- The Draft reflects an apparent effort to distort readers' perspective of the benefits claimed from leasing. For example, a mean net-present-valued internal benefit of $14.6 billion (p. 165) sounds like a big number in isolation; but it is only ~3% of the Nation's *total* energy bill *for a single year* (and even a smaller fraction of the energy bill in a future year with higher prices and presumably higher consumption). In other words, the Draft recommends destroying important values of the 1002 area for a benefit equivalent, over the 30-90 y of proposed hydrocarbon exploitation (p. 6), to about 0.03% to 0.1% of today's annual national energy bill[20]. Yet it certainly doesn't leave that impression: it artfully invites the reader to suppose that in a national context, the potential benefits of the leasing are truly important.
- The Draft often uses undiscounted benefits to inflate their apparent size even more.
- Similarly, the apparent importance of the potential oil resource is seriously distorted (pp. 165-166) by comparing it with *reserves*--the much smaller quantity which the oil industry has bothered to invest in proving out for short-term extraction. The text correctly, though obliquely, suggests that this is not a fair comparison, but it does not make a fair comparison, which would be far less favorable to the Draft's conclusions.
- The Draft's comparisons of area 1002's potential oil output with national oil needs, imports, etc. similarly rest on a single DOE/NEPP model run, showing 16.5 million bbl/d of demand and 7.6 of imports in 2005. (The model actually shows that demand as declining: 16.9 Mbbl/d in 2000, 16.5 in 2005, and 16.1 in 2010--although the Draft leaves the impression of ever-*rising* demand.) But the Draft does not mention, among other sensitivity tests, a "high-efficiency" DOE/NEPP run[21], described at length in the same report, which would reduce year-2010 liquid-fuel requirements (excluding synfuels and electric utility inputs) by 10%, or 1-2/3 million bbl/d. That is equivalent to *2.5 times* the mean output projected for the 1002 area. Oil imports are likewise shown in that DOE sensitivity run to decline from the Draft's reference case by 19%, or 1¾ Mbbl/d, or 2.3 times the mean output from area 1002. The year-2010 world oil price drops by $2.50/bbl. "In fact, the impacts of these efficiency level changes on the world oil prices is marginally higher than those of [another sensitivity test assuming]...20 percent changes in the U.S. oil and gas resources levels."[22] The Draft, however, doesn't mention any sensitivity tests of or variations on the single demand forecast which it assumes[23]--not even those done by DOE itself in the same place.
- The Draft has an "optimistic" case but no corresponding "pessimistic" case, and does not discuss what plausibility it regards any variant on its base-case as meriting, or why.
- The Draft at pp. 164-5 comes perilously close to double-counting benefits. It gives 1002-area oil credit for avoiding potential disruptions of oil supply (p. 8) when those benefits have already been supposedly achieved, and paid for, by the Strategic Petroleum Reserve. It qualitatively assigns a benefit to the extended utilization of TAPS, without considering that the cost of TAPS is already sunk and is therefore irrelevant to any comparison of the marginal costs and benefits of a new decision.

More broadly, one might reasonably have expected the Department of the Interior, as the appointed steward of the Nation's resources, to discuss the policy implications of domestic oil depletion. The Draft describes the collision between supposedly growing demands and declining domestic oil output[24]. What is one to infer from that collision? That the bottom of the barrel *must* be scraped, in the Refuge and everywhere else, because there is, as the Draft leads one to suppose, simply no alternative? Or that we should instead thoughtfully consider whether postponing the ultimate depletion of the Nation's oil resources by fewer than 200 days[25] is worth the Refuge, given that depletion of the finite resource is inevitable and that whatever alternatives will be used to replace that oil will need to be adopted anyway--either sooner or, in the unlikely event that the 1020 area is fully leased and actually does contain economically recoverable oil, 190-odd days later? If alternatives are available, as presumably they are at some price (since even the Draft is not so apocalyptic as to suppose that the United States will cease to exist on the day its last barrel of oil is depleted), what are the costs and benefits of adopting them some 200 days earlier and *not* leasing the Refuge? Isn't leasing taking a gamble, against stated odds worse than 5:1, that those alternatives will need to be adopted anyway, because no economically recoverable oil will be found even with full leasing of area 1002? The Draft is silent on these central questions: it tacitly assumes that *any* extension of the Nation's oil-resource life, however improbable, damaging, or brief, is worth the price. That approach, as economist Prof. Herman Daly once remarked[26] in another context,

[17] For a salutary reminder, before the 1985/86 oil price crash, of the "herd instinct" of oil-price forecasters, see The Future of Oil Prices: The Perils of Prophecy, Cambridge Energy Research Associates/Arthur Anderson & Co., 1984.

[18] J.M. Griffen & C.T. Jones, The Energy Journal 7(4):37 (October 1986).

[19] There are fundamental reasons to believe that the world oil price will remain volatile and unpredictable for many decades to come, just as it is for other commodities. In my opinion, it is fallacious to try to project a future oil price as a basis for investment behavior today. If a client asked me to make such a projection, I would instead ask at what oil price the proposed project ceased to be profitable, and then ask the client how much risk he or she wished to take. For what it is worth, however, the two forecasting groups with the best track record in recent years--both correctly called the 1985/86 price crash--expect that with some fluctuations, e.g. if war or peace breaks out in the Middle East, the real oil price will probably vary within the $16-24/bbl range for at least the rest of this century. The mean of that range is about two-fifths below the Draft's point projection.

[20] Expressed differently, the mean-case output of 659kbbl/d in 2005, at the apparent assumed price of $33.7/bbl (1984 $ in 2005), would correspond to a gross output value of ~$1.46 billion (1984 $ present-valued to 1986) per year, or 0.03% of the 1986 national energy bill. The net value, after subtracting costs, would be even less.

[21] DOE/PE-0029/3, op. cit., pp. 4-32 and 4-33.

[22] Id., p. 4-30.

[23] For officially recognized alternatives, see e.g. SERI, op. cit., and DOE, Low Energy Futures for the United States, DOE/PE-0020, June 1980. Many independent experts, including me, would regard even these low forecasts as an understatement of how much efficiency is now available, worth buying, and practically achievable by a serious commitment to a competitive energy-service marketplace.

[24] It does not, however, describe how oil-and-gas intensity is continuing to decline even with 1986's remarkably low real prices.

[25] Mean economically recoverable oil, 9.2 billion barrels, divided by the DOE/NEPP model's projected annual consumption of 16.5 million bbl/d in 2005, equals 194 days.

[26] "On Thinking About Future Energy Requirements," typescript, Department of Economics, Louisiana State University (Baton Rouge), 1976.

...is unworthy of any organism with a central nervous system, let alone a cerebral cortex. For those of us who also have souls it is almost incomprehensible in its inversion of means and ends.

The Department of the Interior should not shame its traditions, and expose its honest analysts to ridicule, by proceeding with this mendacious Draft. It needs to be done over.

Sincerely,

Amory B. Lovins
Director of Research

encl: biographical sketch

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BIOGRAPHICAL SKETCH OF AMORY B. LOVINS AND L. HUNTER LOVINS

AMORY AND HUNTER LOVINS work together as analysts, lecturers, and consultants on energy and resource policy in over fifteen countries. Their prophetic analyses have placed them among (in *Newsweek*'s phrase) "the Western world's most influential energy thinkers." They shared a 1982 Mitchell Prize and a 1983 Right Livelihood Award (often called the "alternative Nobel Prize"). A 36-minute, 16mm film on their work, *Lovins on the Soft Path*, got blue ribbons at the American and three other film festivals, and in 1985 *60 Minutes* featured their work.

MRS. LOVINS, 36, earned BA degrees from Pitzer College in political studies and sociology, a JD from Loyola University School of Law with the Alumni Award for Outstanding Service, and an honorary doctorate. For six years she was Assistant Director of the California Conservation Project ("Tree People"), which she helped to establish. A member of the California Bar, she has served on the City of Los Angeles Energy Management Advisory Board, lectured extensively, published many papers, coauthored five books on energy policy, and been 1982 Henry R. Luce Visiting Professor at Dartmouth College. Her current research focuses on resource efficiency and local economic development.

AMORY LOVINS, 39, is a consultant experimental physicist educated at Harvard and Oxford. A former Oxford don, he holds an MA by Special Resolution and five honorary doctorates. He was Regents' Lecturer in the University of California in resource policy (1978) and in economics (1981), Grauer Lecturer in the University of British Columbia, 1982 Luce Visiting Professor at Dartmouth, and 1982 Distinguished Visiting Professor in the University of Colorado. In 1980-81 he served on the Department of Energy's senior advisory board, and in 1984 was elected a Fellow of the American Association for the Advancement of Science "for his book *Soft Energy Paths* and many other noteworthy contributions to energy policy." He has briefed five heads of state, testified at hearings in eight countries and twenty-odd states, and published a dozen books and over a hundred papers. Dr. Alvin Weinberg, ex-Director of Oak Ridge National Laboratory, has called Mr. Lovins "surely the most articulate writer on energy in the whole world today."

The Lovinses' clients have included U.S. and U.N. agencies, the International Federation of Institutes for Advanced Study, OECD, Resources for the Future, the German Federal Environmental Agency, the Science Council of Canada, eleven state governments, the U.S. Navy, and the U.S. Defense Civil Preparedness Agency. As part of their work with managers of electric utilities and related industries in more than thirty states, the Lovinses have briefed, among others, the Energy Committee of Xerox Corporation and the senior managements of Westinghouse Electric Corporation, Royal Dutch/Shell Group, Phillips Petroleum, Bank of America, Allstate Insurance Co., Bonneville Power Administration, Tennessee Valley Authority, Texas Utilities, Public Service Co. of New Mexico, Snohomish PUD, and other public and private utilities. They have addressed Edison Electric Institute functions, the Electric Power Research Institute, an American Public Power Association workshop and annual meeting, the National Association of Rural Electric Cooperatives, the National Association of Regulatory Utility Commissioners, the National Association of State Utility Consumer Advocates, the National Regulatory Conference, California PUC and Brookings Institution utility colloquia, and many other industry groups.

Mrs. Lovins is Executive Director, and Mr. Lovins is Director of Research, of ROCKY MOUNTAIN INSTITUTE, a nonprofit foundation which fosters efficient resource use and global security. RMI's 23 staff explore the connections between energy, water, agriculture, security, and local economic development. Much of RMI's budget ($820,000 in 1987) is earned, mainly by consultancy.

Rural Alaska
Community Action Program, Inc.

February 6, 1987

William P. Horn
U.S. Fish and Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, DC 20240

Dear Mr. Horn:

We appreciate this opportunity to comment on the Draft Report to Congress and Legislative Environmental Impact Statement regarding the coastal plain of the Arctic National Wildlife Refuge. These comments are filed on behalf of the Rural Alaska Community Action Program (RurAL CAP), which works to aid rural Alaskans (principally Natives) bring themselves out of poverty.

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RurAL CAP does not have a formal position on whether the coastal plain should be opened to oil and gas exploration and development, left as a refuge within the national wildlife refuge system, or designated as wilderness. We are concerned, however, that full information be presented to Congress and the rural people of Alaska, so that the best decision can be made. These comments are offered in the spirit of assuring as comprehensive and accurate a report as possible.

The principal concern of rural people, especially Natives, is what the impact of development or wilderness will be on subsistence. We commend you on the frank statements contained in the subsistence section in the report with regard to those impacts, which we feel are generally accurate as far as they go. But nevertheless, certain key areas do not receive sufficient coverage.

First, the report does not adequately discuss impacts of development on users of the Porcupine Caribou Herd other than residents of Kaktovik. The people of Arctic Village principally rely on the PCH for subsistence, and the herd is of great importance to other villages as well, such as Venetie, Fort Yukon, Chalkyitsik, and Old Crow in the Yukon Territory. If there are fewer caribou available for these villages, the impacts could be severe. Congress should be made aware of what might happen to other village residents before it decides whether to allow oil and gas development.

Administration • P.O. BOX 200908, ANCHORAGE, AK 99520 • (907) 279-2511

Second, the report gives very short shrift to coastal impacts. If oil and gas development does occur, then it is quite likely that there will be considerable interest in offshore prospects near the coastal plain. For example, shore-based facilities might be used by offshore rigs, and if oil is found, it might be pumped through a pipeline located on the coastal plain. This sort of associated development could have impacts on key subsistence resources, particularly fish and bowhead whales. The report should therefore focus more carefully on the impacts of associated development.

Relatedly, the report pays very little attention to cumulative impacts, focusing purely on what might happen to the coastal plain. This is insufficient to provide the necessary information to Congress or rural people in Alaska. The report should address a variety of cumulative impacts. A critical deficiency in this regard concerns the Central Arctic Herd, another important source of subsistence, especially for Kaktovik and Nuiqsut. Development of the coastal plain might have the effect of pushing the CAH into an even smaller area, given existing development at Prudhoe Bay. This is particularly important in view of the evidence that cows and calves have been avoiding the areas that have been developed in Prudhoe Bay. The report, however, only looks at impacts due to development on the coastal plain -- it should consider the overall impacts on the CAH, due to development throughout the North Slope.

The report notes that two key issues revolve around where the oil and gas facilities will obtain the needed gravel and water. But having said this, the report is totally silent on where these vital materials will be found, or what the environmental impacts of the various alternatives might be. Given the importance of this issue, and the possible negative impacts, the report should contain a detailed discussion of alternative methods of procurement, and the impacts of each alternative.

The report also is totally silent on development for gas, on the grounds that such development is unlikely. But the conclusion that it is unlikely is only part of the report, for Congress wanted information on what exploration for and development of gas would do to the environment. The report must provide this information.

Finally, we are troubled by the lack of analysis in the actual draft recommendation. That recommendation is for full leasing, and operates on the assumption that full leasing can be accomplished without adverse impacts on fish and wildlife or subsistence. But this conclusion is belied by the analysis of the report itself, which concludes that even with stipulations, effects on caribou and subsistence will be major. The recommendation also points to Prudhoe Bay as an example of how environmentally safe development can proceed, yet the report states unequivocably that the experience with caribou at Prudhoe Bay cannot be applied to the coastal plain of ANWR.

We do not feel that the Department, or Congress, can have it both ways. While as noted above, we do not take a position on what the recommendation ought to be, we feel that it is disingenuous for the Department to claim that development can occur in harmony with the wildlife, given the conclusions of the body of the report. It appears that Congress is faced with a basic choice: whether to allow oil and gas exploration and development in the coastal plain and accept the apparently severe impacts on fish and wildlife and subsistence, or to preserve the status quo, or to select wilderness. The Department's recommendation should recognize this basic choice explicitly, so that all involved know what they are getting into.

Thank you for your attention to these comments.

Sincerely,

Jeanine Kennedy
Executive Director

JK:ct

SIERRA CLUB
330 Pennsylvania Avenue, S.E., Washington, D.C. 20003 (202) 547-1141

February 6, 1987

U.S. Fish and Wildlife Service
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Attention: Division of Refuge Management

Dear Sirs:

The Sierra Club has completed its review of the draft Coastal Plain Resource Assessment for the Arctic National Wildlife Refuge. The Sierra Club is an environmental organization with over 400,000 members nationally, and approximately 1,800 members in Alaska.

Sierra Club strongly supports wilderness designation for the entire Arctic National Wildlife Refuge coastal plain. We submit the attached comments for your consideration.

Sincerely,

Michael McCloskey
Acting Executive Director

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The resource assessment is required by Section 1002 of the Alaska National Interest Lands Conservation Act (ANILCA), passed by Congress in 1980. ANILCA left unresolved the question of whether oil and gas development should be allowed to occur on the Arctic National Wildlife Refuge. The 1002 Report, as it is referred to, is to aid Congress in making its final determination on the disposition of the coastal plain, which may hold significant quantities of oil and gas reserves but also contains preeminent wildlife and wilderness resources.

The Report is therefore a very important document; however, the Department of the Interior refused to allow public review of the Report. Only after a successful lawsuit brought by several conservation organizations was the public given this opportunity. As the steward of publicly owned lands, the Department of Interior seriously breached its responsibility by initially denying citizens this very basic right.

The Department is still not living up to the spirit of the court's judgment for a complete and open review process. The Report should have been submitted to Congress in September of 1986 as required by Section 1002. Instead, the Department chose to release the Report in late November with a brief 60-day review and comment period (later extended by two weeks) that overlapped the holiday season when most people are traveling or otherwise preoccupied.

Concurrent with the review and comment period for this Report was the same period for several other public documents. These include the Beaufort Sea Sale 97 Environmental Impact Statement and an environmental impact statement for a gas pipeline from the North Slope south to the tidewater. Additionally, the Alaska Department of Natural Resources is soliciting comments on Camden Bay Sale 50, which is scheduled for leasing later this year; and the Fish and Wildlife Service is also

conducting its Comprehensive Conservation Plan process for the rest of the Arctic Refuge at this same time.

The public is currently overwhelmed with reports, environmental impact statements, or preliminary analyses. All except one call for oil and gas development in environmentally sensitive arctic coastal and off-shore regions. The impossibility of careful review of each of the proposals limits the useful involvement of concerned and affected individuals. No discussion of cumulative impacts as a result of all this development is presented in any of these documents.

Report Deficiencies

The draft Report omits some critical components that are required by the Alaska National Interest Lands Conservation Act and other applicable laws.

First, Section 1002(c)(B) of ANILCA requires a determination of the carrying capacity for fish and wildlife habitats. Alteration of wildlife habitat caused by the development of oil and gas resources would affect its carrying capacity. Without information on carrying capacity, it is even more difficult to assess potential losses of fish and wildlife resources. This may mean that many of the assessments of fish and wildlife losses contained within the Report are too conservative. Furthermore, no discussion is presented relative to the impact that full leasing would have on the natural diversity of wildlife populations. ANILCA requires the Fish and Wildlife Service to manage fish and wildlife populations and their habitats in their natural diversity.

Second, the Report has not assessed the impact from development of gas resources as required by Section 1002(h)(3). If the aforementioned proposal to construct a gas pipeline is permitted by the Bureau of Land

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Management, and construction proceeds, then gas resources of the coastal plain may be judged economical to extract — contrary to the contention of the Department in the Report that "natural gas is not expected to be economic during the time period considered." Additional industrial activity and support facilities for gas production would increase the impact to fish, wildlife and wilderness resources. The law requires that those impacts be assessed; however, they are not in this Report.

Third, Section 1002(h)(5) requires a discussion of the national need for the oil and gas resources of the coastal plain. Such a discussion is done in a cursory and biased fashion in Chapter VII of the Report. No assessment of national need for oil and gas is complete without a discussion of how alternative energy sources and energy conservation programs could cut the nations's need for oil. Existing or proposed programs in this regard should be cited as part of this examination.

Fourth, in Section 1005 of ANILCA the Department is required to consult with various entities and individuals. This has not been done in a satisfactory manner with either the Government of Candada or the people in several Canadian villages who depend heavily on the international wildlife resources of the coastal plain. This oversight in procedural matters needs to be remedied prior to the Report's finalization.

Finally, since this is an environmental impact statement, the Report must conform to the guidelines stipulated by the National Environmental Policy Act. These guidelines require that an evaluation of cumulative effects be performed. It has not been done in the Report. As mentioned above, current state and federal proposals would result in leasing of state submerged lands and federal outer continental shelf areas adjacent to the coastal plain. In addition to the development in the Prudhoe Bay area, a gas pipeline may also be proposed. The major

cumulative effect to the fish and wildlife resources from all these developments are not analyzed. The Department neglects to examine what additional legal authority would be required to minimize environmental impacts.

In our detailed comments that follow, we elaborate on these and other deficiencies in the draft Report.

Wilderness

The coastal plain is an integral part of vast arctic ecosystem encompassed in a pristine state by the Arctic National Wildlife Refuge and the adjacent Yukon National Park in Canada. The Report notes, in an extremely cursory and inadequate discussion, that "the Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems." Moreover, the coastal plain is the portion of the Arctic Refuge most prolific in wildlife.

The irregular coastline -- formed by barrier islands, ice-choked beaches, and sprawling river deltas -- gives way to an austere and rolling coastal plain. Broken only by braided waterways, the coastal plain stretches northward from the Brooks Range. The mountains here are at their closest to the Beaufort Sea of any point along the entire North Slope, making the galcier-covered peaks stunning sentinels that peer downward on the coastal expanse and outward to the ice pack.

The Department assesses impacts to wilderness solely from the perspective of damage incurred to recreationsists' experiences. Recreation is only one reason for the designation of wilderness areas.

Americans have become increasingly conscious of the need to retain some areas in an undeveloped condition for the intrinsic benefits to society. Wilderness areas provide unparalleled research opportunities. Wilderness areas maintain genetic diversity. Wilderness provides wildlife managers with their most effective management tool for conserving fish and wildlife populations. Wilderness areas epitomize our national heritage. We carved our American society out of the natural world around us. Now we finally have come to the sensible conclusion that we have carved enough, and that we need to retain some, as enacted in the Wilderness Act of 1964.

For a century, intense controversies have occurred between those who recognized wilderness' intrinsic benefits to society and those who could not understand resources as other than commodities to be tapped, harnessed, plowed or scraped: the battle over Hetch Hetchy dam in Yosemite, geothermal development adjacent to Yellowstone, efforts to construct dams in Grand Canyon National Park and Dinosaur National Monument, and attempts to log the forests of Olympic National Park.

The Arctic National Wildlife Refuge represents our country's last chance to preserve intact an arctic ecosystem unique in its natural wonder. To the west lie the Prudhoe Bay industrial area and the National Petroleum Reserve-Alaska, both of which are available for oil and gas leasing and other development. The Beaufort Sea to the north is currently scheduled for oil and gas development. Only 25 miles of coastal plain are currently designated wilderness, out of 1,100 miles of arctic coastline in Alaska. Any development on the coastal plain would not just affect those 1.5 million acres, but a significant portion of the established wilderness area in the Arctic Refuge, as well as a Canadian national park.

The Report is sadly remiss in delving into the importance of this wilderness resource. In its final Report, the Department should cite some of its former employees' writings on this subject. Murie and Calef, noted explorers and researchers, long ago recognized the need to protect this arctic world from encroaching development.

Environmental Consequences

Aside from the inevitable -- and irreparable -- loss of a magnificent wilderness treasure, the coastal plain biota would be seriously harmed by oil and gas development.

In general, the sections of the Report that describe the fish and wildlife resources and detail the environmental consequences of oil and gas development are comprehensive and informative. The executive summary, however, fails to note several critical points that were made in the body of the Report. The recommendation to allow full oil and gas leasing is apparently based without complete regard to these issues, highlighted below.

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Caribou

The Porcupine Caribou Herd (PCH) is the fourth-largest herd in North America and the only herd in Alaska whose entire range is almost entirely protected from development. The Arctic National Wildlife Refuge and the adjacent Yukon National Park in Canada were both principally established as sanctuaries for this herd.

The 180,000-head herd is highly migratory in behavior and travels hundreds of miles in a never-ending cycle. The cycle begins with calving on the coastal plain of the Arctic Refuge in late spring, moves through the summer aggregation and fall rut, and ends in its wintering

grounds in the Ogilvie Mountains of Canada and in the interior of Alaska. This cycle has been repeated year after year for eons.

The far western portion of the coastal plain also provides habitat for the Central Arctic Herd (CAH), which at 13,000 animals is approximately one-fourteenth the size of the PCH. The CAH does not migrate extensively and has ample stretches of unconstricted coastal areas on which to calve. Biologists have studied the impacts of development on the CAH for only the last decade or so.

The differences between the two herds are great, and wildlife biologists note that comparisions can only be made with extreme caution. Yet, the executive summary carelessly compares the two herds, and downplays the significance of the differences. The executive summary echoes oil industry claims that experience with its extensive development has shown no adverse effects to caribou and other wildlife resources. This ignores scientific data that demonstrate otherwise.

Impacts from development include displacement from preferred calving habitat. Development also impedes movement to insect-relief areas. That the CAH has not seen a population decline to date means only that it has yet to reach the carrying capacity of available habitat, and was far from such a limit when development of the trans-Alaska pipeline and Prudhoe Bay development began. Moreover, the CAH remains in the vicinity of oil development year-round, and therefore has more time to adjust to industrial activity than would the PCH. The CAH has been further aided by a prohibition on hunting and low predation by other natural predators, which have decreased in numbers since the development at Prudhoe Bay.

More importantly, comparisons cannot be credibly drawn between the two herds because of these additional reasons:

- The absolute density of the PCH on its calving grounds is 14 times that of the CAH. This results in a ratio of more than 50 caribou per square mile for the PCH as opposed to 5 caribou or less per square mile for the CAH.
- The CAH has been displaced from only a small portion of the entire area available for calving, which is equal in size to the PCH calving area. Suitable alternative habitat exists. The PCH, however, will see over a third (38%) of its concentrated calving area list to development under full leasing. No alternative habitat for calving exists. The PCH has calved in the same area for nine of the last fourteen years in which studies have been conducted.

In general terms, the executive summary notes the consequences of oil and gas development to be "some long-term effects on caribou from the Porcupine herd," and foresees that "long-term losses in fish and wildlife resources...would be the inevitable consequences of a long-term commitment to oil and gas development, production and transportation." The executive summary, however, fails to point out just how adversely the caribou of the PCH would be impacted. Field experts predict "a major population decline and change in distribution of 20 to 40 percent." Forty percent of the herd is 72,000 animals. They note that this estimate is uncertain, due in part to lack of relevant experience. The Report, especially the executive summary, needs to clearly distinguish and interpret differences in these herds.

Muskoxen

Muskoxen were extirpated in the last of the 19th century by overhunting. The prehistoric-looking animals were reintroduced in 1969 and have been slowly making a comeback under the careful eye of wildlife managers. They number about 500 animals now.

Development of the oil and gas resources would reverse this trend by displacing muskoxen from as much as 71% of their high-use habitat. Field researchers predict a major population decline or change in distribution of up to 50%. The Report should assess what effect this will have on the statewide population of muskoxen, of which the coastal plain population constitutes one-third.

Polar Bears

The coastal plain of the Arctic Refuge is the only portion of the entire arctic coast of Alaska where researchers have found polar bears to den onshore. The Report falsely states that "the onshore area from the Colville delta to the Canadian border is within the area use by the Beaufort Sea population of polar bears for denning. However, the most consistently used land denning areas were on and adjacent to the 1002 area..."

In 1985, crews transporting materials to an exploratory well site within the coastal plain on Native-owned lands traveled too close to a known den of a pregnant female polar bear. The radio-collared animal later was found to have left her den prematurely, and when she was later tracked and sighted, she had no cubs with her. Presumably, the disturbance caused her to abort her young.

Biologists contend in the Report "that the Beaufort Sea population [of 2,000 animals] can sustain little, if any, increase in mortality." The Report concludes that full-scale development would cause only a moderate impact, "so long as similar intensive developments did not occur along the entire northern coast of Alaska and Canada." Such development is ongoing and proposed throughout the Alaska arctic coastal and outer continental shelf areas, and ongoing in portions of the Canadian outer continental shelf areas.

The polar bear population is now stable. But any additional mortality -- which has already occurred as a result of oil exploration efforts -- will be detrimental to the Beaufort Sea population. This impact will be be exacerbated by similar intensive development elsewhere in the range of polar bears. The Report should thoroughly consider these cumulative effects in making judgments on the degree to which the polar bear population will be affected.

Other Marine and Terrestrial Mammals

Very little is known about the migration and habits of the endangered bowhead and grey whales, or Beluga whales, which are all found in the waters north of the coastal plain, as are ringed, bearded and spotted seals. The assumption in the Report that impacts to these species would be minor neglects consideration of cumulative impacts.

If the coastal plain were opened to oil and gas development, the Report acknowledges that the area would be used extensively as a staging area for off-shore development. Additionally, the prevelant method of extracting oil from arctic off-shore areas is the construction of gravel causeways and islands. The gravel islands and attendant off-shore development would affect feeding areas for the bowhead whales in Demarcation Bay, and disrupt migration routes for all species. The implications need to be assessed in the Report.

Other terrestrial mammals include moose, wolves, grizzly bears, arctic foxes, wolverines and other small mammals. Though each of these species will be affected to one degree or another, no comprehensive discussion of cumulative impacts is contained in the Report. Since this is an environmental impact statement, CEQ regulations (40 CFR Sections 1502.16 and 1508.8) require a discussion of cumulative impacts be done for all wildlife species.

Birds

Of major concern here is the disruption of a major staging area for a variety of migratory waterfowl. Oil and gas development would cause a major population decline and change in distribution of 50% for lesser snow geese, and would also affect other waterfowl and bird species, including the endangered peregrine falcon. For the waterfowl species, development of oil and gas resources would be inconsistent with international migratory waterfowl treaties signed by Canada, Mexico and the U.S. Signatory nations should have been consulted, but were not; this needs to be remedied prior to release of the final Report.

Water Resources and Gravel Extraction

The potential environmental degradation resulting from water and gravel use for exploration, development and production is hardly dealt with in a comprehensive manner. This is one of the most serious shortcomings of the Report. The Report states that not enough water or gravel are available; the lack of water presents a "major engineering obstacle" for the oil industry.

Nearly all of the few lakes, rivers and streams of the coastal plain freeze solid in the winter months. Those that are deep enough not to freeze to the bottom, or that do not freeze entirely because of warm springs, are used by fish for overwintering areas. Likewise, gravel is in short supply on the coastal plain, and is a much-needed material for the construction of well pads, roads, airstrips, port facilities and causeways.

Apparently, the most feasible means of solving both shortages is to mine for gravel in stream and river channels, which would create deep

pools that would remain unfrozen during the winter. If this is the case, then it is difficult to understand how the Department can claim such development would cause only minor impacts to fish resources, especially when the Report in another section notes that taking the amount of water necessary from a water-deficient coastal plain could result in major adverse effects. The effects of this scenario are unsatisfactorily discussed in the Report. More complete discussion should be contained in the final Report.

The Report notes that "populations of slow-growing fish can be affected easily by changes in environmental factors." Some of the anticipated changes could be increased turbidity, decreased water quality, and changes in stream courses, as well as disruptions in the off-shore currents. This will present a much greater impact to anadromous and freshwater species than the Report addresses, and a reassessment of these impacts needs to be conducted in the Report.

Additionally, the effects associated with reserve pits of drilling mud fluid discharges are just now in preliminary stages of study. These investigations have only begun in the last few years on the North Slope. The findings so far are not encouraging, and the scope of study is extremely narrow in these initial stages. Still, results indicate that "along with deterioration in water quality, the quality and quantity of organisms used as food by North Slope bird species may be decreasing." Again, the cumulative effect should be addressed but is not.

Many questions are left unanswered in the discussion of water and gravel resources. Congress is left with incomplete information on which to base its decision to open the area for oil and gas leasing.

Air Quality

Discussion of likely degradation of air quality as a result of intensive industrial activity is essentially nonexistent in this document. Four brief paragraphs in Chapter II note that effects on air quality are localized.

Mention is made of arctic haze, an ominous phenomenon of increasing concern. Its implications to the coastal plain are not discussed even though news reports from the past year cite studies that show increased ground temperatures and associated melting of permafrost in arctic Alaska. The ramifications of these changes are unknown, but potentially serious to the arctic biota.

The extent to which emission of pollutants from North Slope industrial activities contributes to this environmental degradation should be looked at closely in the Report. Some characterizations of North Slope industrial emissions place them in the category of a Chicago-sized city. Self-monitoring by industry has made an accurate assessment virtually impossible. Funding is lacking for monitoring and enforcement agencies on the state and federal levels.

This is especially important, given that the coastal plain is prone to temperature inversions, which concentrate pollutants nearer to the ground and inhibit dispersal. No studies have been initiated to investigate such a concentration's effect on the biota. More study is needed regarding air quality before Congress has sufficient information to allow oil and gas leasing.

Natural Diversity

The opening paragraphs of Chapter I cite the purposes Congress

delineated for the Arctic Refuge when it was enlarged in 1980. The first of four purposes reads, in part:

> To conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, the Porcupine caribou herd, . . . polar bears, grizzly bears, muskox, Dall sheep wolves, wolverines, snow geese, peregrine falcons and other migratory birds and Arctic char and grayling. (emphasis added)

A major population decline and change of distribution of 20-40% for the PCH, and a 38% reduction in its calving habitat, is not conserving this wildlife species and its habitat in its natural diversity. Similarly, a major population decline and change in distribution of 50% for muskoxen is contrary to the natural diversity mandate. The same is true for polar bears, snow geese and other wildlife species. All will see impacts Congress did not intend them to experience when it expanded the Arctic Refuge in 1980.

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Another of the purposes:

> To fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats.

This refers to migratory waterfowl treaties, which will be violated if development is allowed to proceed on the coastal plain.

Mitigation Measures

The Department feels that in most instances major impacts to fish and wildlife and to the environment can be mitigated by placing stipulations on development activities. Oil industry representatives, however, have at various times expressed their displeasure with such stipulations. Industry often claims such restrictions are unnecessary

or improperly designed to produce the desired effect. Industry representatives have even gone so far as to admit publicly that they often do not abide by the Fish and Wildlife Service's mitigation policy, which is applied to the Prudhoe Bay industrial development and which would be applied to any development on the coastal plain. Moreover, stipulations can be administratively changed or tossed out.

These factors inspire little faith in the ability of the Fish and Wildlife Service to ensure protection of fish and wildlife resources. ANILCA Section 1002 requires that the Fish and Wildlife Service examine and request what additional legal authority would be necessary to ensure protection of fish and wildlife resources.

It is apparent that protection of populations and habitats in their natural diversity for most species is impossible, and pollution of air and water from noxious emissions and hazardous wastes is unavoidable. In fact, the Prudhoe Bay industrial development is not the shining example both the oil industry and the Department claim it to be. Since 1972, there have been 23,000 oil spills in the Prudhoe area. The two largest of these spills, categorized as "small," were 200,000 gallons and 658,000 gallons. Studies of 30-year-old oil spills in the arctic show absolutely no recovery. The effects of emitting 80,000 to 100,000 tons of nitrogen oxides into the air — currently permissible for North Slope operations -- are unknown because of little or no government monitoring. Atlantic Richfield Company recently signed a consent decree allowing them to exceed carbon monoxide standards until early in the 1990s. Finally, a state report notes that discharges from 20 out of 21 waste disposal operations are in violation of government standards.

Much of the dirty work is contracted out to smaller firms. Probably the most eye-opening example of abusive practices involved a firm which in 1983 had an illegal spill of approximately 10,000 barrels

of hazardous waste. The fact that this work was contracted out does not absolve the oil industry's responsibility. The operations at Prudhoe Bay are not the idyllic model the industry would like the public to believe. A lack of government monitoring and no enforcement of mitigation measures have obscured the extent of the problems.

Additional authority is needed by the Fish and Wildlife Service and other agencies to minimize adverse environmental impacts. Yet, the Department in its Report makes no substantive requests that would enable the Fish and Wildlife Service to minimize as much as possible impact associated with development, if it is allowed. A more complete examination of the need for additional authority should be included in the final Report, along with requests for such legal measures as would be required to minimize environmental degradation.

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Subsistence

The third purpose outlined for the Arctic Refuge is:

> To provide, in a manner consistent with the purposes set forth [above], the opportunity for continued subsistence uses by local residents.

The Report candidly admits that the major adverse effects to the Porcupine Caribou Herd, "in combination with adverse effects on other subsistence use species, disruption of traditional subsistence use sites, and likely psychological effects on a people accustomed to isolation, will result in a major adverse effect on subsistence uses in the 1002 area."

This ancient way of life would be completely and undeniably lost to a cash-based economy. This is contrary to the purpose quoted above.

Oil Resources

Using data collected from two years of seismic exploratory work, the Department estimates a range of possible in-place oil resources. The Department contends there is a 5% chance that 29.4 billion barrels of oil (BBO) and a 95% chance that 4.8 BBO could be found in 26 different prospects scattered across the coastal plain. The Report then assesses the economically recoverable oil resource, and estimates that at the 5% probability level there could be 9.2 BBO, and 590 MBO has a 95% chance of being recovered. The mean estimated value of in-place resources is pegged at 13.8 BBO in-place, with 3.2 BBO recoverable.

Two very critical factors included in the meat of the Report are omitted from the executive summary. First, the economically recoverable oil resources are calcuated at prices of $33 and $40 per barrel. Second, the chance of actually finding any deposits that could be considered commercial, figured at the lower price, is a mere 19%. Stated another way, at a price of $33 per barrel, there is more than an 80% chance that no oil could be recovered economically from the coastal plain of the Arctic Refuge.

The Department has misled the public in its executive summary about the likelihood of recovering oil from the coastal plain.

Furthermore, to compare any oil prospects of the coastal plain to the Prudhoe Bay fields ignores some of the Report's findings. The discussion of geology notes that "none of the sampled oils are similar to Prudhoe Bay oil." Additionally, potential oil reserves of the coastal plain would be found at depths of 26,000 feet, more than three times the depth oil reservoirs at Prudhoe Bay are found. The analysis of geological formations, moreover, finds marked differences between the "relatively simple structure that underlies" the Prudhoe Bay area and

the "complexly folded and faulted" subsurface of the Arctic Refuge coastal plain.

The Report further acknowledges that in-place oil estimates clearly include "many deposits well below any economic size limit which may currently be assumed for the Arctic, and includes deposits which have reservoir characteristics that preclude them from being economic." This is calculated at an extremely optimistic price of $33 per barrel (in 1984 dollars). The Alaska Department of Revenue price projections do not foresee oil prices reaching that level for at least the next eighteen years:

1987	$13.00/barrel (1987 dollars)
1990	14.98
1995	15.88
2000	17.38
2005	19.54

Admittedly, price projections are subject to a high degree of uncertainty; yet there are strong indications in the world oil market that conservative projections are more realistic for estimating future price trends. The price the Department uses to base economic feasibility of potential oil reserves is unquestionably too optimistic. The present and reliably predicted future oil price is the primary factor preventing several proven North Slope discoveries from being initially tapped or from continuing production. The onshore West Sak field contains 750 MBO to 1 BBO of proven reserves, yet remains untapped by the lessee, Atlantic Richfield Company. Another onshore deposit, Milne Point, began production over a year ago, but operator Conoco recently shut down production from this 60 MBO field. Three off-shore deposits in the arctic -- Seal Island, Colville Delta and Sandpiper -- collectively hold upward of 750 MBO. Oil prices would need to be $24 per barrel to cover high capital expenditures of arctic oil development for the fields noted above. The potential oil fields of the coastal plain would incur the additional expense of drilling deeper to reach the oil.

The highest probabilities for finding economically recoverable oil on the coastal plain would be in amounts that are virtually identical to the size of fields described above. The Alaska Department of Natural Resources assessment of the coastal plain's oil potential backs this statement, finding a 95% chance of only 80 MBO present, with 35% recoverable.

Unfortunately, the Department's analysis contained in the Report is not tempered with a less optimistic economic scenario. Instead, the Summary misleads the public by misrepresenting economic recoverability. Only by carefully scrutinizing the contents buried in the Report does this important facet become clear.

The Department should provide an analysis of economically recoverable resources using more realistic oil price projections. This is critical to later discussions in the Report that discuss benefits from producing oil to the national budget deficit and to state and local government revenues.

National Need

While many of the substantive discussions in the heart of the Report concerning wildlife resources, environmental consequences and geological formations are admirable in their objectivity, the chapter which examines the national need for the coastal plain's potential oil is fraught with subjectivity.

The Report lists and briefly describes the contribution to national objectives production of potential oil from the coastal plain might make. Three of the six include:

- Reducing dependence on imported oil
- Enhancing national security
- Improving international trade balance

These are substantially the same point.

As domestic oil production continues to decline, the U. S. becomes increasingly dependent on foreign sources of oil. This dependence increases the nation's trade deficit and possibly subjects the nation to an interruption of oil supplies. Both these situations jeopardize the national security.

The Department contends potential oil reserves from the coastal plain could help prevent this situation from occurring by significantly contributing to the domestic supply of oil and gas. During the field's production life, however, no more than 8% of U. S. production would be provided by this speculative field. Only 4% of U. S. need would be satisfied by potential oil of the coastal plain. The mean estimated recoverable reserve of 3.2 BBO represents only a six-month supply at current consumption rates of 16 MBO per day.

Furthermore, the aforementioned proven fields in arctic Alaska could be tapped at prices of $24 per barrel. Those fields would then contribute to domestic supplies. The Report completely ignores these prospects.

Unquestionably, the U. S. will become increasingly dependent on foreign oil supplies, namely, the two-thirds of the non-communist world's oil reserves that are found in the Middle East.

In the interest of national security, common sense argues against draining the nation's dwindling domestic supplies, which are estimated

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to be 90% depleted by 2004. Oil flows from the Middle East in stable supplies currently, and at relatively low prices due to a world-wide oversupply. The Strategic Petroleum Reserve, created by Congress to provide a buffer in the event of a supply interruption, should be filled to two or three times its 1986 target level. Yet the present Administration has ceased oil deposits into this reserve at its 1985 level rather than filling it to its minimal target of 750 MBO.

The nation should aggressively pursue energy conservation programs that have proved effective in the last decade and we should continue efforts to find alternative sources of energy. This Administration has proposed discontinued funding for alternative energy and energy conservation programs. The President vetoed legislation passed last year that would have saved the equivalent of a billion barrels of oil per year by requiring energy standards for appliances. The Administration has rolled back standards for automobile fuel efficiency, and favored raising interstate highway speed limits.

Current recovery techniques of the oil industry can only recover 35% to 50% of known oil reserves. The remainder is left in the ground. There is as yet no concerted effort by the industry to enhance oil recovery rates.

While the Department currently stresses the need for the energy resource represented by the potential oil of the coastal plain, it also processes a permit for a pipeline from the North Slope of Alaska to tidewater for exportation of natural gas to the Far East — energy that ironically could be used to meet current U. S. needs.

These glaring inconsistencies in a national energy plan do not inspire confidence in the Department's assessment of national need for the coastal plain's potential oil resource.

The Department needs to present a summary or reassessment of the present Administration's current energy plan, rather than merely quoting bits and pieces of the Department of Energy's 1985 National Energy Policy Plan. The Department should explain why it believes that potential oil reserves of the coastal plan fit into this plan. As part of this discussion, the Department should provide an in-depth discussion of energy conservation measures and alternative energy sources, which could decrease energy demand and lessen the nation's dependence on oil. Finally, a detailed discussion examining the political and economic ramifications of hastened depletion of the nation's last remaining domestic oil supplies should be included.

It is safe to assume, since answers to these important questions are crucial to making a decision on the coastal plain's disposition, that Congress intended a comprehensive discussion that included these aspects of a national need determination when it required such an evaluation be incorporated in the Report. The Department has covered this component unsatisfactorily in the 5-page discussion contained in the Report.

Conclusion

Sierra Club strongly disagrees with the Secretary's recommendation that Congress should adopt legislation which would open the coastal plain of the Arctic National Wildlife Refuge to full easing of oil and gas resources.

The recommendation has been based on highly speculative information regarding potential oil reserves, and on an extremely biased and self-fulfilling analysis of national need for the potential oil underlying the coastal plain. The recommendation also fails to consider cumulative impacts to the arctic biota, despite legal requirements to do

so, and does not consider environmental consequences in relation to the statutory mandate of maintaining wildlife populations and habitats in their natural diversity.

We are compelled to urge the Department to select Alternative E — Wilderness — and recommend such be adopted by Congress, in order to provide the appropriate protection for preeminent wildlife and wilderness resources of the Arctic National Wildlife Refuge.

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STATEMENT OF J. MICHAEL MCCLOSKEY
SIERRA CLUB
ON THE
ARCTIC NATIONAL WILDLIFE REFUGE
DRAFT COASTAL PLAIN RESOURCE ASSESSMENT
WASHINGTON, D.C.

January 9, 1987

O-429

The Sierra Club, a national conservation organization of 400,000 members, supports statutory wilderness protection for the coastal plain of the Arctic National Wildlife Refuge. Our Alaska Chapter, which testified in Anchorage on January 5, strongly agrees.

Sierra Club's support for wildlife protection and wilderness preservation of this one remaining area of the Arctic slope, which is not devoted to petroleum production, dates from before the days of its establishment in 1960 by President Eisenhower.

The Arctic National Wildlife Refuge, together with adjacent national park lands in Canada, comprise the most extensive and diverse undeveloped landscape in the American North, including unsurpassed wildlife values and a "mountains to the sea" spectrum of high Arctic ecosystems and life forms. It is the home for the 180,000-animal Porcupine caribou herd (so named for the Porcupine River). This herd

includes half of all the caribou remaining in Alaska, and is the last large caribou herd which is intact and healthy, living in an intact and healthy wilderness range. These animals are essential to the subsistence culture of Eskimo and Indian peoples on both sides of the international border.

The Porcupine caribou herd calves and raises its young on the Arctic coastal plain within the Arctic National Wildlife Range. This area has characteristics essential to the caribou during this critical portion of their life cycle. These natural values overwhelm the conclusions reached by the 1002 report.

The Interior Department has attempted to prevent public input on this most important issue. Only through the courts have we been allowed to review the draft report, much less comment on it in a public hearing. Furthermore, the Secretary's recommendation, and in particular the brief "executive summary" of the draft report, almost completely ignore the serious environmental consequences of full oil leasing, as delineated by FWS in the EIS section. We do not feel this is in keeping with the responsibilities entrusted to government officials as stewards of our public lands.

The draft report predicts a mean of 3.2 billion barrels of recoverable oil in the 1002 area, but also notes that only a 19 per cent chance of economically recoverable oil is present. This estimate is based in part on a questionable prediction of a $33 per barrel price of crude oil at the time of production. Furthermore, under this scenario, under maximum production, the 1002 area would supply only 4% of total U.S. oil demand, and 8% of domestic production. Its projected lifespan is only about 30 years for active production.

Except for the minor portion of the ANWR coastal plain east of the 1002 area now in wilderness, all of the other lands -- state, Native, and federal -- onshore and offshore, are open to or devoted to petroleum resources. These include state-owned offshore and onshore lands between Prudhoe Bay and the Canning River, such as the Camden Bay and Demarcation Point Lease Sales of 1987 and 1988 and Federal OCS lands in the Beaufort Sea, such as proposed Lease Sale 97. There may be oil development offshore and in the Mackenzie River Delta of Canada.

Not only do these adjacent development possibilities make the protection of wilderness values in ANWR more essential, but they also may produce a cumulative impact on the region which is not analyzed in the draft report.

A major weakness of the 1002 report is its failure to explain adequately how water will be obtained for exploratory drilling. It takes about 15 million gallons of water to drill one exploratory well; yet the FWS states that there is simply not much water available in the 1002 area for oil exploration, which is usually done in the winter. Almost all of the lakes and 24 major streams in the 1002 area freeze to bottom in winter and are not available for water access. The suggestions offered in the report for obtaining water range from the use of piped-in seawater to the creation of deep streambeds by gravel mining. The Fish and Wildlife Service calls water access a major engineering problem for oil development in the 1002 area, yet does not predict the environmental consequences of the proposed schemes to obtain it.

The fish and wildlife values of the 1002 area are incomparable. According to the report, the environmental consequences of full oil leasing would be devastating. Contrary to oil industry claims, we can

only compare Prudhoe Bay oil development and its effects on wildlife to development in the 1002 area with extreme caution. For example, the magnificent 180,000-animal Porcupine caribou herd has its major calving grounds and major insect-relief habitat in the 1002 area. The absolute density of this herd on its calving grounds is 14 times that of the Prudhoe-area Central Arctic Herd of some 12,000-14,000 animals, giving the Porcupine herd little room to adapt to oil production or to escape. There has been almost no reported calving by the Central Arctic Herd in the Prudhoe Bay oil fields since oil development. Full oil production also could result in loss of much of the insect-relief habitat available to the Porcupine herd. The FWS predicts that a major population decline and change in distribution of 20 to 40 percent could occur.

Some of the other significant effects on wildlife could include a 25-50 percent population decline or change in distribution of muskoxen, which now number about 500 animals; a moderate decline in brown bear numbers; a moderate decline in golden eagle numbers, and a major change in lesser snow geese distribution of up to 50 percent.

As pointed out by the Government of the Yukon, "There is no adequate treatment of the transboundary consequences of those direct impacts [on wildlife that utilizes the coastal plain and Canadian habitats] or is an important constituent of a larger regional population." This criticism is very well taken, and again points up a major flaw of the draft report -- the attempt to isolate the coastal plain for purposes of impact analysis. This basis shortcoming must be corrected if the final Assessment is to assist Congress in its decision-making process.

The draft report also predicts that oil development will have a major adverse effect on the subsistence lifestyle of Native people.

The Sierra Club finds the above environmental consequences of oil exploration and/or production in the 1002 area totally overwhelming. We do not accept the Secretary's citing of national security as sufficient justification to drill in this area. In fact, the discussion in the draft report on the nation's need for any oil that might be found on the coastal plain is inadequate.

A detailed discussion and comparison of alternative strategies for meeting the nation's energy demands and objectives should be part of this LEIS. An analysis of alternatives is of course the essence of the environmental impact statement process. Congress is not well served by an LEIS that discusses -- and unabashedly promotes -- only one strategy.

Among other alternatives is one that permanently forgoes exploration and possible development of the coastal plain in favor of reliance on other existing and potential oil and gas reserves. For example, instead of permitting the export of North Slope natural gas (other than possible reserves in the ANWR) to Far Eastern markets, Congress could prohibit such export in the interest of domestic consumption.

More efficient use of existing energy could also help meet the national need for additional energy and at the same time avoid the permanent environmental degradation of the ANWR that the draft report acknowledges will occur if leasing is allowed and economically recoverable quantities of oil and gas are discovered.

The omission of discussion concerning energy conservation programs and alternative energy sources completely discounts any possibility of prolonging existing supplies and lessening the perceived need for oil from the coastal plain. The underlying premise is to allow complete depletion of this country's last remaining on-shore oil supplies, without coherent plans for a future with severe shortages of domestic oil. This would be ironic if it were not for the recent Presidential veto of the National Appliance Energy Conservation Act which would save 1.47 billion barrels of fuel and $3 million to consumers over ten years. Such policies are not in the national interest.

There is no discussion of a proposed land exchange with various Alaska Native regional corporations, in which some subsurface estate in the coastal plain would be exchanged for corporation-owned inholdings within other national wildlife refuges in Alaska. This bundle of exchanges is sometimes referred to by the Department as the "megatrade."

In his introduction to the draft report, Assistant Secretary Horn observes that "Development must result in no unnecessary adverse effects and unavoidable habitat losses should be fully compensated." As the draft report acknowledges, there will be substantial adverse effects and unavoidable habitat losses associated with the proposed leasing. The megatrade is the compensation envisioned by the Department and thus is a fundamental part of the Administration's proposal to open the coastal plain to full leasing.

Already, several hundred thousand dollars of federal funds have been expended for appraisals, negotiations, and other aspects of the proposed megatrade. According to the U.S. Fish and Wildlife Service, the Service hopes to submit the proposed exchange to Congress at the

same time as the final Resource Assessment is submitted or as soon thereafter as possible.

In order that the public and Congress may have the opportunity to assess the Administration's entire proposal, the final Assessment should include a full discussion of the proposed megatrade.

Finally, we oppose any oil drilling in the 1002 area because it will destroy forever one of North America's greatest wilderness areas. No amount of reclamation would ever render this area "wilderness" again.

We are not merely trying to protect beautiful scenery in the Arctic National Wildlife Refuge, nor are we merely attempting to maintain a population of magnificent and unusual animals. We are trying to preserve the best, the largest, the most diverse migratory wildlife wilderness habitat on the continent.

Let me refer to the statement of Dr. Edgar Wayburn, chairman of the Club's Alaska Task Force, to the House Interior Committee in 1977:

> "The Sierra Club itself has a long-time interest in *Alaska*. The Club's founder and first president, John Muir, went to Alaska three times on extensive visits, starting in 1879. The Club's intense concern, however, dates to 1967, when the Directors of the Sierra Club made the future of Alaska's land one of our 6 priority projects. Today, with some 170,000 members all over the country, the Sierra Club has made *Alaska's National Interest Lands* our number one priority.

"Why is the Sierra Club so concerned about Alaska? Is it the tremendous areas of scenic magnificence in Alaska? Is it the great *number and variety of its wild rivers*? Is it because in Alaska there roam freely the last great herds of large wild animals in our country? Is it because in Alaska there is the last of our *unspoiled wilderness remaining on a grand scale*? Is it because in Alaska people can experience the wonders of nature as they can nowhere else on earth?

"It is because of all these reasons -- and much more -- that we are testifying here today. For we believe that in Alaska there are rare -- indeed unmatched -- opportunities for all the people of the United States. There is not only the superb scenic and wildlife resource and unmatched recreational potential. there is the chance for our country to make wise decisions -- to combine good development with good conservation -- and to do it right the first time. In Alaska we have an unparalleled opportunity to learn from our past mistakes. In the past, we have been all too generous with many of our country's greatest treasures. . .We have given away California's coastal redwoods, the Big Thicket in Texas, Florida's Great Cypress swamps -- to name only a few. Now we are having to buy them back for the American people and at enormous cost. In Alaska, we have this remarkable opportunity -- we can set aside superb national lands for their highest and best use at no cost to the American people -- the people to whom they now belong.

"The critical decisions in Alaska are being made at this moment. And these decisions are being made by you. Congress has already dealt generously with the State of Alaska. In the Statehood Act of 1958, Congress granted the new state 104.2 million acres of land, and approximately 45 million acres of tidelands and

submerged lands passed into the ownership of the state at the same time. Thus Alaska was granted a total of nearly 150,000,000 acres of land, more land than was granted all the 17 western states together. 150,000,000 acres, incidentally, is an area 1-1/2 times the entire state of California.

"Congress has also dealt generously and fairly with the Native peoples of Alaska, conveying to them some 43.7 million acres to be their private property to use as they choose -- along with nearly one billion dollars in cash. Congress has in the past also set aside key areas in Alaska to remain in particular Federal ownership. It now seems opportune for Congress to reserve the remainder of the unappropriated public lands of Alaska for their highest and best use for <u>all</u> the American people. We are convinced that the highest and best use for these lands is a status which will protect for all time their unequalled natural values."

. . . . . .

"HR 39 is based on the general principle that significant portions of the wildlands of Alaska which are now in the public domain should remain in public ownership because of their 'nationally significant natural, scenic, historic, geological, scientific, wilderness, cultural, recreational, and wildlife values.' Therefore, the policy goals include preservation of the wildlife, both the resident populations and the millions of wildfowl which migrate seasonally; protection of the habitat in Arctic and sub-Arctic ecosystems; preservation of historic and archaeological sites and cultural values of Native peoples; protection of the wilderness; and provision of wilderness recreational opportunities.

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"A second, related principle behind HR 39 is that the national interest lands should be administered by the most appropriate agency. HR 39 places administration of these lands primarily under the two agencies of our government which are charged with the care of natural ecosystems: the National Park Service and the Fish and Wildlife Service. The National Park Service is charged with the objective of preserving land in its natural state, and providing for human use and enjoyment of the land consistent with that preservation. The Fish and Wildlife Service is charged with protection of habitat for wildlife in the National Refuge System. We propose that these two systems are the proper ones for the protection of most of the Federal lands in Alaska and the perpetuation of the vast wildlife populations they shelter."

The principles that led to Sierra Club's original involvement in the Alaska Lands legislation, H.R. 39, remain unbowed today for the coastal plain of the Arctic National Wildlife Refuge is the quintessence of the natural values remaining in Alaska. Chancy, environmentally destructive energy development in this one magnificent place is not in the national interest.

February 5, 1987

Noreen Clough
Division of Refuge Management
U.S. Fish and Wildlife Service
18th & C Streets
Washington, D.C. 20240

Dear Ms. Clough:

Enclosed please find the comments of Trustees for Alaska on the Department of the Interior's Draft Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment. Thank you for your attention to these comments.

Very truly yours,

Robert W. Adler
Executive Director

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TRUSTEES FOR ALASKA'S COMMENTS
ON THE DRAFT RESOURCE ASSESSMENT
FOR THE COASTAL PLAIN OF THE
ARCTIC NATIONAL WILDLIFE REFUGE

FEBRUARY 5, 1987

I. INTRODUCTION

Trustees for Alaska submits the following comments on the U.S. Department of the Interior's Draft Resource Assessement for the Coastal Plain of the Arctic National Wildlife Refuge, prepared pursuant to section 1002 of the Alaska National Interest Lands Conservation Act (ANILCA) and section 102 of the National Environmental Policy Act (NEPA). Trustees for Alaska is a nonprofit, public interest environmental law firm with approximately 700 members within Alaska and in other states. The opportunity to comment on this draft of the section 1002 report was provided only as a result of a lawsuit filed by Trustees for Alaska. The court ruling required Interior to provide both an opportunity for written comments and public hearings, and emphasized that Interior was required to incorporate and to respond to public comments in the final report to Congress. To comply with this mandate, Interior must address each of these comments in its final report, as well as

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the comments raised by other parties. 40 CFR 1502.9(b).

The Interior Department violated the spirit of the court order, which expressly required the Department to provide the "local population" an opportunity to comment on the report, by failing to hold public hearings in Fairbanks, Arctic Village, and other locations where significant public interest was evident. Moreover, it was unconscionable for Interior to schedule the public comment period and the public hearings over and through the Christmas and New Years holidays, particularly when the District Court decision had been rendered almost a full year before the hearings were held. Even the extended public comment period was insufficient given the complexity and importance of this issue. By scheduling public hearings in this manner, the Department continued its policy of restricting public input into this important issue as much as possible.

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However, the procedural deficiencies in the Department's process are dwarfed by the substantive problems with the draft report. Many of these deficiencies run to the heart of Interior's analysis, and render the current version of the report almost entirely inadequate as a basis for Congress to make an informed decision as to the proper management of the coastal plain of the Arctic National Wildlife Refuge. More importantly, the draft report <u>does not comply with a number of relevant laws and regulations</u>, including NEPA and section 1002 of ANILCA, rendering the report legally deficient and inadequate. As a result of these deficiencies, we believe that the proper course would be for the Department to rewrite the report completely, based on the public comments received, and

to submit a new version of the report for public review before presenting a final report to Congress. The NEPA implementing regulation of the Council on Environmental Quality state that if a draft statement is "so inadequate as to preclude meaningful analysis," a revised draft shall be prepared and circulated for additional public review. 40 CFR 1502.9(a).

Our comments are divided into two main sections. The first section will outline the broad legal and substantive deficiencies in the draft report, and will cut across a number of specific subject areas. The second section will address specific omissions and deficiencies involving particular environmental issues.

II. <u>Major Deficiencies in Interior's Analysis</u>

The draft 1002 report is not merely deficient in the details of its analysis. It contains a large number of fundamental omissions and analytical flaws that render it completely inadequate for purposes of Congressional review. First, the report does not comply with a number of applicable laws and regulations, including NEPA and ANILCA. Second, the report suffers from additional broad analytical defects. It suffers from an exceedingly narrow and obviously result-oriented perspective; it lacks an adequate evaluation of wildlife habitat and carrying capacity; and most importantly, the conclusions do not match the body of the report, as if the author of the draft Secretarial Recommendation section did not read the rest of the document. These broad deficiencies will be detailed below.

A. Legal Deficiencies

1. NEPA

In Trustees for Alaska v. Hodel, the Interior Department ultimately conceded that it was required to include, as part of the section 1002 report, a legislative environmental impact statement under section 102(2)(C) of NEPA. However, the draft report fails to comply with a number of well-accepted requirements for environmental impact statements. Most clearly, the reports fails to consider a large number of individual environmental issues addressed in part 2 of these comments, such as air quality and water quality. But the report falls short of NEPA requirements in a number of more comprehensive respects discussed below.

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Cumulative Impacts Analysis

First, the report fails completely, and in many cases expressly, to consider the cumulative environmental impacts of oil and gas development in the Arctic National Wildlife Refuge with similar development elsewhere in arctic Alaska and Canada. This type of analysis is fundamental to NEPA review, particularly where a project will have regional impacts. Kleppe v. Sierra Club, 427 U.S. 390 (1976). The CEQ regulations require EISs to evaluate both direct and indirect environmental effects, 40 CFR 1502.16, which encompass cumulative environmental impacts. 40 CFR 1508.8. A "cumulative impact" is defined as:

> the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

40 CFR 1508.7.

The environmental effects of oil and gas development in the Arctic National Wildlife Refuge cannot be separated from the effects of similar development both onshore and offshore along the entire coast of Alaska and Canada. This development includes exploration and extraction from the NPRA, state leases at and around Prudhoe Bay, extensive existing and proposed state leases in coastal lagoons across the entire northern Alaskan coast, existing and proposed leases in the Beaufort Sea (Sale 97), and existing and proposed exploration and development onshore and offshore in the Canadian Beafort. Maps of this extensive development can be found in the Mineral Management Service's DEIS on Proposed Sale 97 (Beaufort Sea) (Sale 97 DEIS) and in the State of Alaska's Preliminary Best Interest Findings on Proposed Sale 50 (Camden Bay) (Sale 50 Findings). For example, the Sale 50 Findings note that the state has leased more than 3.6 million acres since 1964, and plans to lease an additional 3.9 million acres on the North Slope within the next five years.

The resources that are threatened by the leasing proposal are not, in many cases, local in nature. This is particularly true for migratory species such as marine mammals, waterfowl and other bird populations, caribou, anadromous fish, and other resources. Moreover, Interior's approach does not recognize that habitat losses within the ANWR, in combination with similar habitat losses elsewhere, may have substantial effects on regional resources.

Interior's failure to consider cumulative impacts is all the more difficult to understand in light of the fact that the development of the Arctic National Wildlife Refuge is considered a neces-

sary economic prerequisite to the development of the nearshore coastal lagoons owned by the state. (Sale 50 Findings). Indeed, development of the two areas will almost certainly share onshore support facilities, including port and loading areas. Yet the 1002 report fails to address the cumulative effects of development within the 1002 area with development of the coastal lagoons along the entire coast of the Refuge. Given the intensive use of this area by resources that migrate between onshore and offshore areas, such as birds, marine mammals, caribou, and anadromous fish, this flaw is fatal to the adequacy of Interior's review.

Similarly, the 1002 report does not address the relationship between 1002 development and proposed federal OCS leasing in the Beaufort Sea. Incredibly, at the same time that its sister agency is proposing full leasing of the ANWR coastal plain, MMS assumes in its Sale 97 DEIS that effects on the Porcupine Caribou Herd from a pipeline and road across the coastal plain are "not likely to occur ... since an onshore pipeline is not assumed to occur under the proposal" (p. IV-B-68). But if oil development occurs in both the ANWR and in the eastern portion of the Beaufort Sea, pipelines from the eastern Beaufort would logically intersect the ANWR onshore pipeline. Yet the cumulative effects of this development are not considered in either document.

There are a large number of examples of the types of cumulative effects on biological and other resources that should have been considered in the 1002 report, but a few examples will suffice. Perhaps the most glaring example is the statement that disturbance to polar bear denning sites:

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> would not likely affect the species' overall survival, so long as similar intensive development did not occur along the entire northern coast of Alaska and Canada.

1002 Report, at 118. But as noted above, similar intensive development is either occuring or planned throughout the northern coast of Alaska and Canada. The 1002 report notes the possible effects of losses of polar bear denning sites on the overall population (pp. 117-18). In particular, Amstrup et al. assert that the Beaufort population can withstand little if any increase in the mortality rate of females. In light of these realities, the lack of a cumulative impacts analysis of this issue is difficult to understand. Notably, the Sale 97 DEIS predicted "moderate" effects on the polar bear population without consideration of development in the ANWR or in the state coastal sales. Obviously, these effects will be further exacerbated by disturbance to denning sites in the Camden Bay and Demarcation Bay lagoons, and in the ANWR coastal plain. No agency has evaluated the total impact on the polar bear population.

Another example of an important cumulative impact ignored in the 1002 report is the effect of port and causeway development on water quality and fish migration. Interior predicts generaly minor effects on aquatic resources from causeway construction. 1002 Report, at 125-26. Yet evidence indicates that the West Dock and Endicott causeways are already resulting in adverse effects, and the Sale 97 DEIS (p. IV-B-24-25) predicts MAJOR cumulative offshore effects from additional developments, without including development in the ANWR and the offshore state waters. Interior not only understates the potential effects of similar developments in the ANWR alone, but fails to consider the cumulative effects.

Similar arguments can be raised with respect to a large number of additional issues. The continuation of the proposed pipeline across the coastal plain on state lands between Prudhoe Bay and the Canning River, which would occur as a direct result of the development of the coastal plain, will transect a major calving area for the Central Arctic Caribou Herd (CAH), but no analysis of the effects of this development on the CAH is given. The report discusses chronic water quality degradation due to leaking drilling muds reserve pits and other sources of waste discharge, but aside from quantifying the number of acres effected, no attempt is made to assess the long-range and cumulative effects of this chronic degradation. The Sale 97 DEIS engages in a comprehensive cumulative oil spill and fuel spill risk assessment, but expressly omits the ANWR and offshore state sales. This gap is not filled by the 1002 report, despite the need to transport large quantities of fuel through the two proposed port facilities.

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Until the 1002 report is revised radically to include a comprehensive cumulative environmental impacts analysis, it falls short of the well-accepted standards for environmental impact analysis, as required by NEPA and the CEQ regulations.

Consideration of Alternatives

Evaluation of all reasonable alternatives is another mainstay of NEPA analysis. Natural Resources Defense Council v. Morton, 458 F.2d 827 (1972). In fact, the CEQ regulations indicate that the evaluation of alternatives is the "heart of the environmental impact statement," and require the agency to "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed

action. 40 CFR 1502.14.

The 1002 Report sets forth a range of alternatives for the management of the coastal plain of the Arctic National Wildlife Refuge, from wilderness designation to full-scale oil and gas leasing. However, the fundamental reasoning behind the proposed Secretarial recommendation for full leasing is the national need for energy resources from the Arctic National Wildlife Refuge. Nowhere does the document evaluate alternative means of meeting the cited energy need, as is required to give the decisionmakers (The Secretary and Congress) and the public a valid basis for a reasoned decision on this issue. In particular, there is no analysis of other energy supply sources, or more importantly, of available and anticipated methods of reducing the nation's consumption of petroleum resources rather than extracting these resources from the last great arctic wilderness in the United States. Notably, even the Sale 97 DEIS includes a consideration of alternative energy sources, including energy conservation and efficiency. While this analysis is woefully deficient (for example, it relies on 1979 information), at least it recognizes the basic NEPA requirement to evaluate alternatives to the project. Failure to consider other strategies for meeting the nation's energy needs essentially constitutes a failure to give due consideration to the wilderness or no action alternatives in the 1002 report, because these options are dismissed out of hand on the basis of national security and need for energy.

Interior's approach is particularly disturbing given this Administration's sorry record in the area of alternative energy

resources. The Administration proposes to lease the Arctic National Wildlife Refuge at the same time that it rejects programs that would save a good portion of the oil that might be extracted from the Refuge.

For example, President Reagan vetoed the National Appliance Efficiency Act, which would save approximately 1 billion barrels of oil, and the energy equivalent of 3 billion barrels of oil. The Administration also proposes to repeal fuel economy standards for automobiles, and to raise the speed limit on interstate highways, both of which will increase oil consumption for reasons that are entirely unrelated to national security and energy independence. In short, the Administration's policy is to increase the demand for oil for reasons of personal comfort or convenience, and then to justify oil and gas development in sensitive environmental areas, indeed, in national environmental treasures, on the basis of national security. The only winners are the oil companies that reap profits from petroleum product sales. The American public pays more for their energy needs, and loses a major part of their national wilderness and wildlife heritage.

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The case for using demand side energy strategies for meeting the energy demand cited in the 1002 report is far from speculative. This case was made in detail in comments submitted to Interior by Amory Lovins of the Rocky Mountain Institute on January 22, 1987, which we incorporate herein by reference. Mr. Lovins notes that since 1979, the United States has gotten 50 times as much new energy from more efficient use than from all net increases of energy supply combined, and demonstrates clearly that equivalent energy of

even the most optimistic predictions for ANWR can be reaped using available but untapped energy efficiency strategies, at far lower economic and environmental cost. The 1002 report, however, ignores this potential resource entirely (as well as all energy supply sources other than oil), and assumes that only oil extraction can meet the cited demand growth.

Interior's failure to consider alternatives to increased oil and gas extraction as a means of meeting national energy needs is all the more inappropriate given the time-frame of the analysis. Oil and gas extraction from the ANWR will not occur for at least 10-15 years. Existing energy efficiency resources could substantially reduce the demand for petroleum resources, as demonstrated in Lovins' comments, without even considering improvements in efficiency technology. By the time the 1002 oilfield could be put into place, these existing technologies could be saving far more oil than would be produced from the ANWR, at far lower cost. The only losers would be the oil companies. Moreover, given the tremendous recent advances in this area, and ongoing improvements in energy efficiency technology, there is strong reason to believe that even greater gains could be made, at lower cost, by the end of the century.

Interior's complete failure to consider alternative means of meeting the nation's energy needs is a fatal flaw in the DEIS, and constitutes a blatant violation of NEPA and the CEQ regulations. In fact, 40 CFR 1502.16(e) and (f) expressly require the consideration of the energy conservation potential of alternatives. This deficiency should be cured as part of a rewritten draft of the 1002

report.

Consideration of Long-Range Impacts

Interior inexplicably considers only the impacts of development that is expected to begin during the first 10-15 years after initial oil and gas leasing of the ANWR. Most notably, the report ignores almost entirely the effects of gas production from the ANWR, because it is beyond the time frame chosen by Interior for analysis. But no reason for the selection of this time-frame is given, and the report itself predicts that gas production would be economically feasible within 2-3 decades. Prevailing NEPA law, however, requires the Department to consider the long-range impacts of development, even if development proceeds in stages. Cady v. Morton, 527 F.2d 786 (9th Cir. 1975).

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It is interesting in this regard to note Interior's own definitions of long-term versus short-term impacts: "Effects that could likely persist 20 years or more were considered 'long-term' and those likely to persist less than 20 years were considered 'short--term.'" Based on this criterion, by excluding the effects of gas production because it is not likely to be economically feasible for 2 or more decades, Interior is considering only the "short-term" effects of leasing in ANWR.

Irreversible and Irretrievable Commitments of Resources and Comparison of Short-term Uses and Long-term Productivity

These two sections are expressly required to be included in environmental impact statements under section 102(2)(c) of NEPA, and by the CEQ regulations, as they form part of the fundamental basis for decisionmaking. Interior's treatment of these issues, however, is entirely summary and cursory in nature, and does not

include the comprehensive explication required by NEPA. In fact, it appears that these two sections, both of which combined comprise less than 3 pages, were simply tacked on to the 1002 report when it was decided that the report had to be accompanied by an EIS.

The summary nature of these two sections leaves little if anything on which the public can comment. To give an example of the deficiency in these sections, however, nowhere does Interior explain in full the significant losses to the nation as a result of the elimination of the only remaining arctic coastal wilderness in the United States.

For example, the report should note that there would be an irretrievable loss of the only baseline area for the study of a complete scope of arctic ecosystems in North America. This would constitute an irretreivable loss to the scientific community and to our civilization's ability to understand natural arctic ecosystems. The report should explain the uniqueness of this region as a wildlife and wilderness resource, rather than stating simply that long-range losses of these resources would occur. The fundamental problem with Interior's treatment of these issues, both here and elsewhere in the report, is the lack of recognition that there is a major difference between the loss of some wilderness acreage on the North Slope of Alaska and the loss of the last chance for a comprehensive arctic wilderness in North America. (Thus, the report mentions in passing that an earlier government analysis recommended wilderness designation for this area, but does not explain why the area is a significant wilderness resource.) Similarly, there is a major difference between some disturbance to a 180,000 head caribou

herd and the disturbance to and predicted decline in the last major migratory caribou herd in the United States which is substantially undisturbed by major human development. Congress and the public have the right to understand what is truly at stake before deciding whether to go along with Interior's proposal to lease this area. It must be acknowledged that this choice reduces to value judgments -- but these judgments cannot be made without a full understanding of the stakes in the debate. This is the fundamental purpose of NEPA.

2. ANILCA

The 1002 report violates both section 1002 and section 810 of ANILCA as a result of fundamental omissions in the analysis:

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a. Section 1002(c) and (h) both require an analysis of the impacts of oil and gas development. Yet the report expressly ignores the impacts of gas development due to the unexplained choice of time frame. Thus, the report on its face fails to comply with the statute.

b. Section 1002(c) requires an evaluation of the carrying capacity of fish and wildlife habitats in the coastal plain, but the 1002 report contains little or no analysis of this issue. For example, the report fails to explain or to analyze the effect of forcing a fixed caribou population into a smaller calving and post-calving habitat. Notably, MMS recognized:

> The need for caribou to migrate appears to be a behavioral adaptation that prevents destruction of forage habitat. If movements are greatly restricted, caribou are likely to overgraze their habitat, leading to perhaps a drastic, long-term population decline.

Sale 97 DEIS, at III-31. The 1002 report does not analyze or even

discuss such habitat reductions, for caribou and other species, in its evaluation of fish and wildlife resources. If such analysis underlies the report, it is neither mentioned nor explained for purposes of public critique. A "black box" evaluation does not serve the public comment goals of NEPA.

c. Section 1002(c) requires an evaluation of the effects of oil and gas development in the coastal plain on the culture and lifestyle of affected native villages. It must be recognized that, even if fish and wildlife mitigation were completely successful, the type of intensive industrial development that will accompany oil and gas leasing in this area will result in major, irreversible changes in the culture and lifestyle of the region. Yet Interior evaluates this issue solely in terms of subsistence yields of fish and game. This approach is not only unduly narrow -- it reflects a callous indifference to the integrity of the local Native culture.

d. Section 1002(h) requires Interior to identify additional legal authority necessary to protect the area's resources. This section of the 1002(h) report is entirely absent. One interpretation is that Interior believes that the existing regulatory regime is completely adequate to protect the valuable natural resources of the area. But given the conclusions elsewhere in the report that long-term losses to fish and wildlife populations and other resources will result from the proposed leasing, it is difficult to understand why Interior would not seek more stringent authority and tools to protect these resources.

e. Section 810(b) of ANILCA states clearly that where environmental impact statements are required pursuant to section 102(2)(c)

of NEPA, as Interior admits here, the notice and hearing required by section 810 of ANILCA are required to be incorporated into the NEPA process. Interior admits openly, at p. 129, that leasing could result in a significant restriction of subsistence uses under section 810 of ANILCA, but expressly refused to incorporate the section 810 analysis into the NEPA process. This omission denied residents of affected villages, including not only Kaktovik but Venetei, Old Crow, Fort Yukon, Arctic Village, and Nuiqsuit, the opportunity to understand and to comment on the proposed significant restrictions on their subsistence uses. Interior's decision conflicts not only with the plain language of ANILCA, but with prevailing Ninth Circuit case law created in the context of OCS lease sales in Alaska.

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3. Fish and Wildlife Compatibility Test

The most fundamental legal basis for the management of activities in fish and wildlife refuges is the "compatibility" test set forth in the National Wildlife Refuge Administration Act, and repeated and applied in section 304 of ANILCA. The Secretary may not permit uses in the Arctic National Wildlife Refuge that are not "compatible with the purposes of the refuge," as set forth in section 303(2) of ANILCA. Incredibly, in evaluating whether oil and gas leasing should be permitted in the coastal plain of the ANWR, Interior did not even evaluate, on the basis of its own assessment of probable impacts, whether the compatibility test would be met.

It is difficult to believe, in fact, in light of some of the predicted impacts in the 1002 report, that this test would be met under even the loosest standards. For example, is it compatible

with the purposes of the refuge to allow an activity that will result in adverse effects to 20-40% of the Porcupine Caribou Herd (36,000-72,000 caribou), 25-50% of the muskoxen population, 5-10% of the Banks Island Snow Geese population (30,000-50,000 geese) and half or more of the wolverine population? The only way to arrive at the conclusion in the proposed Secretarial recommendation is to consider the oil and gas values of the refuge to be paramount to the fish and wildlife purposes for which the refuge was created. This approach is illegal under existing law.

4. Other Environmental Laws

The draft 1002 report fails to consider a wide range of environmental protection laws that could be violated by oil and gas leasing in the Arctic National Wildlife Refuge. In particular, there is no consideration whatsoever of compliance with federal and state air quality, water quality, solid waste, and hazardous waste laws and regulations. This major flaw in the report was noted in the Alaska Department of Environmental Conservation's (DEC's) comments on the 1002 report, at 1-3. Consideration of these laws and regulations would require major revisions to the draft report.

Individual environmental pollution issues will be addressed in greater detail in the second part of these comments. The fundamental assumption used in ignoring these environmental issues, however, appears to be Interior's assumption, as part of its environmental assessment, of full compliance with all relevant laws and regulations (p. 98). However, despite the oil industry's unsubstantiated claim to a perfect environmental compliance record at Prudhoe Bay, assuming 100% compliance with applicable laws and

regulations for purposes of weighing environmental impacts is completely inappropiate.

For example, a printout of state enforcement actions in progress identifies 24 open items, including Notices of Violation, compliance orders, and criminal and civil actions. Violations have ranged from air quality to water quality, solid and hazardous waste. For example, ARCO signed a Consent Decree in 1986 for violations of carbon monoxide air emissions. According to DEC, discharges from 20 out of 21 drilling muds reserve pits violate applicable effluent standards, with violations involving toxic metals such as arsenic, manganese, chromium, lead, and copper, as well as aromatic hydrocarbons. A single brine spill at one location destroyed 5 acres of tundra vegetation, and there has been at least one major hazardous waste incident. In 1983, North Slope Salvage spilled thousands of gallons of chemicals generated by North Slope oil companies as a result of the improper storage of over 10,000 drums of waste material. The owners were convicted of criminal charges. In light of this compliance history, Interior's failure to consider the likelihood of compliance with environmental laws and regulations is completely unwarranted.

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Finally, both Interior and the oil companies treat the "inevitable minor oil spills" as if they were not violations of environmental laws, so long as prompt cleanup action is undertaken. This is simply not the case. Moreover, there is a widespread tendency to understate the magnitude of this problem. According to DEC, there were 521 oil spills on the North Slope in 1985 alone, with a total of more than 82,000 gallons spilled. According to these figures,

the mean volume of oil spilled per incident is approximatley 150 gallons, a conservative estimate given that individual spills over the life of the Prudhoe Bay complex have exceeded 200,000 gallons. Interior states that there have been more than 23,000 separate oil spills since 1973. Multiplying this figure by the conservative average of 150 gallons per spill, more than 3.5 million gallons of oil have been spilled at Prudhoe Bay since 1973. It is difficult to understand how Interior can refer to this major environmental compliance problem as "inevitable small oil spills."

B. Other Major Flaws in Interior's Analysis

In addition to the report's failure to meet the requirements of a large number of applicable laws and regulations, the report suffers from additional major flaws in its analytical approach. The report suffers from an exceedingly narrow perspective, particularly in its evaluation of national need and national security issues. It is immediately apparent from reading the report that the authors, at least of the Executive Summary and Chapters III, VII and VIII, worked backwards from a forgone conclusion that reflects the general bias of the current Administration to a rationalization of the recommended action. This is reflected in a large number of specific biases within the body of the report. These biases are reflected in overstatements of the oil and gas and economic potential of the coastal plain, and in tremendous understatements of the value of the coastal plain to the nation as a wildlife and wilderness resource.

Second, the slanted approach in the report is reflected in the relationship between the recommendations and the report itself.

In fact, the conclusions simply do not match the report, as if the author of Chapter VIII did not even read many of the specific conclusions in the rest of the analysis.

1. Major Biases

It was noted earlier that Interior understates tremendously the losses to the nation of allowing oil and gas leasing in the coastal plain of the Arctic National Wildlife Refuge. These arguments will not be repeated here. Interior matches this bias with its optimistic and unbalanced evaluation of the economic value of the region.

For example, Interior's oil and gas estimates chronically overstate the potential of the region by burying the relationship between the 19% marginal probability of <u>any</u> economically recoverable oil and gas in the ANWR and the probability curve of potential recoverable resources <u>if</u> there is recoverable oil. It is particularly misleading of Interior not to include this fact in the Executive Summary of the Report, particularly when busy members of Congress (and interested members of the public) are not likely to sift through the entire report.

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Even the 19% figure is questionable, however, in light of the economic assumptions used by Interior in determining the minimum economic field size (MEFS), and in calculating the economic benefits of production. Most disturbing is Interior's use of a "most likely" oil price of $33 per barrel (1984 $), and their accompanying failure to employ a sensitivity analysis reflecting a more likely average figure as well as a low-price scenario. In fact, the failure to include a low-price scenario entirely prejudices any

evaluation of the no action and wilderness options in the report.

In fact, the $33/bbl price estimate lacks credibility given current and predicted market conditions. Most oil economists have drastically reduced their predicted oil price estimates given recent dramatic declines in world oil prices. Economist Arlon Tussing commented that Interior's $33/bbl estimate is twice what is currently expected through the turn of the century. Instead, Tussing predicts that oil prices will more likely center around the mid-teens for the foreseeable future, and rise at most to the mid-20's. Seattle Times, January 11, 1987, at B4. The current Alaska Department of Revenue forecast is that oil prices will not rise above $20/bbl into the late 1990's. Notably, oil production in the Arctic National Wildlife Refuge is not even economically feasible at a price of $15/bbl. Other economic assumptions used by Interior, such as a 10.0% real discount rate, are similarly nonconservative, and should be tempered by a sensitivity analysis.

Interior's geologic predictions also appear to be unduly optimistic, in order to make a stronger case for allowing full leasing of the coastal plain. For example, Interior admits that the probability of large oil finds in the coastal plain would be reduced drastically if there were no Ellesmerian rocks below the region, but there is no clear evidence on this point (p.54). The report also admits that the complex, folded structure below much of the coastal plain is far different from the geology in the Prudhoe Bay region, which increases the risk factor (p.70). These uncertainties do not appear to have affected Interior's full leasing recommendation.

A comparison between the federal and state geologic predictions is also illuminating. State geologists, using the same data available to USGS as well as additional data from state lands, were far less optimistic than their federal counterparts. While the low probability (5%) state estimates approached the federal estimates (26.52 BBO versus 29.4 BBO), the state estimates drop off sharply through the rest of the probability curve:

	STATE	FEDERAL
MEAN	7.22 BBO	13.8 BBO
.50	3.77 BBO	11.9 BBO
.95	0.08 BBO	4.8 BBO

These differences do not appear to affect the low probability of an extremely large find in the coastal plain, but render extremely low the chance of finding some oil in economically recoverable quantities. Interior was in possession of the state estimates well before the 1002 report was drafted, but completely ignored the state's predictions. This burying of significant information evidences the Department's lack of objectivity. Congress and the public are entitled to a full understanding of the uncertainty inherent in the oil and gas estimates for the coastal plain.

Finally, Chapter VII of the report consists of unabashed scare tactics designed to frighten the American public into thinking that all possible sources of petroleum resources, wherever located, must be explored and developed. As noted above, Interior ignores completely all other strategies for meeting the nation's energy needs, including other supply side options and all demand side options.

However, the report even ignores other potential sources of

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oil and gas. Most incredibly, the list of major oil fields on page 162 (and elsewhere) omits the 20 BBO West Sak field west of Prudhoe Bay. This field is more certain than the ANWR, is proximate to existing pipelines and support facilities, and would serve the same goal of replacing oil for transport through TAPS. While it was initially thought that extraction from the West Sak sands was not feasible, ARCO recently completed a test well demonstrating that extraction from this field is technically feasible, but not economical given current oil prices. The same economic factors, however, would prevent development in the ANWR, if oil is dicovered in the coastal plain. Moreover, since development in ANWR cannot be expected for a minimum of 10-15 years, ARCO has at least that amount of time to improve extraction technology in the West Sak area. Development of West Sak, which is in a currently developed area rather than the most sensitive portion of one of the nation's most valuable wildlife refuges, is a clear alternative to ANWR development, but is not even mentioned in passing in the draft 1002 report.

2. Variance Between Report and Recommendations

Perhaps the most insidious flaw in the draft 1002 report is the gross variance between information in the body of the report and the proposed Secretarial Recommendations. We believe that a proper rewrite of the draft report would clearly support a wilderness recommendation for the coastal plain. However, even as written, the existing body of the report supports, at most, a recommendation for an extremely limited, winter-only exploration program to determine the nature of rocks beneath the coastal plain. Only

by ignoring much of the information in the report itself can a full leasing proposal be rationally justified. The following comparison of a few selected statements in the body of the report with parallel statements in the recommendations evidences the misleading proposed conclusion:

CONCLUSIONS	REPORT
The Central Arctic caribou has increased substantially during the period that development has occurred within the heart of its range.	Analogies comparing the effects of current oil development on the CAH and effects of potential 1002 area development on the PCH must be drawn with caution.
Overall ... most adverse environmental effects would be minimized or eliminated through mitigation.	Long-term losses of fish and wildlife resources, subsistence uses, and wilderness values would be the inevitable consequence of ... development....
... the coastal plain has been predicted to contain as much as 29 billion barrels of oil	Though the structures appear highly favorable, there is no assurance that they do in fact contain oil and gas.

Other key conclusions in the body of the report are completely ignored in the draft recommendations section. For example, the report states:

> Traditional subsistence life styles would be irreversibly and irretrievably lost or altered with the introduction of widespread industrial activity and greater opportunities for a cash-based economy.

Apparently, the author of the recommendation section felt that the tremendous impact of oil and gas leasing on the local population was not even significant enough to address in the recommendation section.

The generally biased approach evidenced in the report appears to be a political maneuver to begin with an extreme position in an

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effort to obtain a less extreme result. This approach is inappropriate for a government agency that was directed by Congress to prepare a thorough and objective report so that Congress could reach its own conclusions from a fully informed basis. This tactic also denegrates the hard work and sound analysis obviously performed by staff level personnel in the Interior Department, as evidenced by portions of the report and by the Baseline studies prepared pursuant to section 1002(c) of ANILCA.

III. Specific Comments on Environmental Impact Analysis

In addition to the major analytical flaws identified above, we have a number of comments on specific issues addressed, and in some cases omitted entirely, in the environmental impacts section of the 1002 report. Given the large number of problems, only major issues are raised. These comments are organized topically rather than chronologically.

Caribou

The draft 1002 report admits substantial possible impacts to both the PCH and the CAH if oil and gas leasing is allowed in the coastal plain. Given these predictions alone, it is impossible to justify the proposed full leasing recommendation. In fact, the full leasing proposal contradicts the recommendations of virtually all of the caribou biologists at the caribou workshop sponsored by USFWS in 1985 for the express purpose of reviewing this issue. The result is also criticized by biologists in the Alaska Department of Fish and Game, in their comments on the 1002 report.

Historically, major industrial development has been found to be incompatible with, and highly disruptive of, caribou popula-

tions, particularly during calving and post-calving. See Shideler, Impacts of Human Developments and Land Use on Caribou, Vol. II, at 27-34 (case histories from Norway and the U.S.S.R.) In an evaluation of potential oil and gas leasing in the Teshekpuk lake Special Area, the Bureau of Land Management (which has less of a clear mandate to protect fish and wildlife populations than USFWS) stated:

> Based on the available literature ... pregnant cows and cows with calves would not be compatible with a major oil and gas development complex.

Teshekpuk Lake Special Analysis, Biological Evaluation, at 66. In short, the report's conclusions cannot be justified in light of the vast weight of scientific opinion on this issue.

Even the analysis in the report, however, is incomplete and understated. For example, the 1002 report focuses on protection of the "core" and "concentrated" calving grounds of the PCH. Core calving grounds are defined by reference to a density of 50 animals per square mile; concentrated calving grounds are areas where core calving has occurred in 5 of the last 14 years. Nowhere, however, is the derivation of these magic numbers explained. While the numbers obviously have value for comparative purposes, there is no explanation of why they are an appropriate basis for deciding which areas should be protected or not protected, particularly given the historical variation in the use of calving areas by the PCH. In some years, for example, the PCH has used none of the "core" or "concentrated" calving grounds. See ADFG, Alaska Habitat

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Management Guide (AHMG), Arctic Vol. II, at 51 et seq. Since the reasons for this variation are not well understood, it is insufficient to protect only the core areas.

Nor does Interior evaluate the potential effects of restricting caribou to the same calving and post-calving area year after year as the result of permanent industrial development. For example, driving the PCH further south for calving each year will expose calves to higher predation, since predators are more common in the southern calving areas, and since predators will "learn" calving locations with greater certainty. Since predation is a major factor in calf survival, this could have a major effect on the herd. AHMG, Vol. 1 at 123, Vol. II at 69-70; 1002 Report at 28.

A second possible effect of restricting calving areas is overgrazing if calving and post-calving aggregations are forced into the same area each year. Sale 97 DEIS at III-31. Shideler noted the importance of nutrition to reproductive success and calf survival, but these effects are ignored in the 1002 report (or at least go unstated). In fact, nowhere does Interior address the issue of maximum calving densities for caribou. Is there a maximum calving density, and if so, what is the carrying capacity of the remaining undisturbed calving areas given predicted habitat losses in the 1002 area?

Finally, Interior fails to explain why insect relief areas are not considered Category I habitat, deserving of full protection. The report admits that "access to insect-relief habitat and forage resources ... may be critical to herd production." P. 28; See also p. 109; Shideler, at 23-24; ADFG comments at 7-8. For this reason,

ADFG recommended a 3-mile development-free corridor along the coast. Since "insect harassment can have a pronounced negative effect on caribou survival," these critical insect relief areas are worthy of protection.

Birds

The report recognizes some major potential impacts on the major bird populations of the coastal plain, but understates or ignores other possible impacts. For example, there is no discussion of the use of the Camden Bay area (where a port facility and state leasing are proposed) by threatened brant populations. Sale 50 Findings, at 19. Given the sensitivity of brant to disturbance, and the danger of further declines in brant populations, Teshekpuk Evaluation, at 17-23, this issue should be addressed in greater detail.

Similarly, the report understates possible impacts to threatened peregrine falcons, because Interior states that there is no nesting in the 1002 area. But the state reports that peregrines nest immediately adjacent to the 1002 area along the Canning River, and hunt in a 5-15 mile radius. Therefore, activity in the 1002 area, including the construction and use of the area west of the Canning for road and pipeline construction and use, could adversely affect these populations.

Tundra swans are also extremely sensitive to disturbance, Teshekpuk Evaluation at 44. Camden Bay is a high density nesting area for tundra swans; in fact, graphic 3 in the Sale 97 DEIS identifies the ANWR coastal plain as the only major tundra swan concentration area on the North Slope. But the 1002 report does not

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identify this conflict as a major issue.

Finally, the report does not fully analyze the possible effects of two major types of disturbance on ANWR bird populations. First, aircraft flight restrictions are one of the major mitigation methods to protect bird species (as well as other wildlife). However, the report also notes that fog restricts visibility 27% of the time from May to September, with a maximum of 31.5% in August. This is precisely when major bird activity occurs in the area. Human safety will always take precedent over environmental protection (as it should <u>if</u> leasing is allowed). Therefore, Interior must presume that flight restrictions will be avoided much of the time in weighing unavoidable impacts to bird populations.

Second, the report fails completely to conduct a risk assessment for the potentially most devastating impact to ANWR bird populations -- the risk of a major oil or fuel spill in the coastal lagoons, either from supply vessels or from related oil extraction in state lease areas. Since even a single exploratory well requires 500,000 to 800,000 gallons of fuel (refined fuel is more toxic to both plant and animal life than crude oil), the risk of a major spill should be considered even for exploratory activity. According to the Sale 97 DEIS, at IV-B-27-34, a major oil spill could kill thousands or tens of thousands of birds in a coastal lagoon. Rather than performing a risk analysis, as MMS typically does, Interior simply speculates that the risk of a major spill is minor. However, this approach is unwarranted in light of risk figures produced by MMS. For example, without even considering oil development in state coastal lagoons and in the ANWR, MMS predicted

a most likely cumulative probability of 24 spills greater than 1000 barrels in the Beaufort Sea (i.e. not unlikely events). Sale 97 DEIS, at III-A-5. This is not a low probability event. Moreover, the greatest risk of land contact is from nearshore activity that would be precipitated by ANWR leasing, and the effects of land contact could be devastating: a 10,000 barrel spill could contaminate 30 km of shoreline, and a 100,000 barrel spill could contaminate 90 km of shoreline. Id. at III-A-10. Particularly in light of the relationship between state and federal leasing in the ANWR region, Interior should have engaged in a serious oil spill and fuel spill risk evaluation, to give a true picture of the potential environmental risk of leasing in the Arctic National Wildlife Refuge. Obviously, this risk extends to other species as well as birds, particularly marine mammals and fish.

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Fish

1. Interior minimizes or does not consider effects to species that are not used for sport or commercial fishery. (p. 125) But the Refuge is not a fish hatchery; it is supposed to be managed for its natural diversity. Impacts to all fish species should be considered.

2. As noted above, other agencies have documented major water quality and fish passage problems from port and causeway developments. Interior virtually ignores these impacts, and fails to weigh the cumulative impacts of coastal development.

3. Spring-fed and other fish overwintering areas appear to be critical to the survival of many freshwater species. ADFG comments; 1002 report, at 37. Given the shortage of water in the

area, and the tremendous need for water for oil and gas production, this poses a major, unresolved resource conflict. Based on this conflict, ADFG recommends that overwintering areas be treated as a Category 1 habitat, worthy of complete protection. Yet Interior goes so far as to suggest the withdrawal of water from Saddlerochit Spring to meet water needs for oil and gas production (p.104).

4. The identification of fish only in certain watershed areas is highly misleading. According to the AHMG, Arctic Map 11, the watersheds not identified as having fish are in fact unsurveyed. In fact, the map states expressly that "the category 'not present in watershed areas' is not included because available data do not document such areas."

Polar Bears

1. Interior's complete failure to evaluate the cumulative impacts of disturbance to denning sites was addressed extensively above. It is clear, however, that human industrial activity poses a serious threat to polar bear denning. Sale 97 DEIS, at IV-B-38. In fact, one incident of apparent den abandonment resulted from winter exploratory activities on the coastal plain, and is documented in FWS records.

2. Polar bear habitat is protected by the Marine Mammal Protection Act and by International Agreement. The 1002 report does not explain how the unavoidable disturbance of denning sites (both onshore and offshore) that will result from ANWR leasing is consistent with these legal protections.

Bowhead whales

As noted above, Interior performed no oil spill risk analysis

or other extensive evaluation of environmental disturbances to nearshore and coastal areas as a result of leasing in the coastal plain. As a result, there is virtually no evaluation of potential impacts to endangered bowhead whales. However, the possible adverse effects of human activity on bowheads is well-documented. AHMG, Vol. I, at 38-46. Moreover, the Demarcation Bay region east of Barter Island, where Interior proposes a port and loading facility and where the state proposes a lease sale that is not likely to be economically feasible without ANWR development, is one of the two most vulnerable areas for the Beaufort Sea bowhead migration, as it is a critical fall feeding area. AHMG, Vol. II, at 12, 15 and Map 9; Sale 97 DEIS, at I-10, II-27, IV-B-47. Interior's failure to evaluate possible effects to this endangered population is a critical flaw in the report.

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Terrestrial predators

While Interior predicts the impacts of oil leasing on caribou populations, little attempt is made to discuss the resulting effect on predator-prey cycles in the coastal plain. In particular, reductions in caribou populations could have ripple effects on populations of brown bear, wolves, and golden eagles. See AHMG, Vol. II, at 41 and Map 17. Interior's statements regarding the effects on wolves are particularly disturbing. The report indicates that only 5-10 wolves per year use the coastal plain (p. 31) but proceeds to predict only a "moderate decline" in the wolf population (p. 115). What is a "moderate decline" with respect to such a marginal population? This issue must be viewed in light of the fact that oil development near Prudhoe Bay has virtually eliminated the regional

wolf population. A similar result in the 1002 area cannot be considered unlikely.

Muskoxen

The Arctic National Wildlife Refuge contains the second largest muskox population in Alaska, with one third of the state's total population. In addition, the high growth rate of this reintroduced population evidences excellent muskox habitat. In light of the obvious importance of the 1002 area for the survival of this population, Interior's acceptance of major (20-50%) effects to muskox is inexplicable. In particular, oil development is proposed in the middle of two critical habitat areas -- traditional calving areas and important wintering areas. There appears to be no reason why muskox calving areas should be treated as any less important than caribou calving areas. In fact, since Alaska has far fewer healthy muskox herds and vastly lower total numbers of muskox than caribou, it could be argued that it is even more important to protect muskox habitats, or in the language of the mitigation policy, that muskox calving habitat is even more "unique and irreplaceable on a national basis or in the ecoregion." Yet Interior classifies caribou calving areas, but not muskox calving areas, as category I habitat. This result is anomalous and inappropriate.

Subsistence

1. As noted above, Interior treats the subsistence issue as one of pure harvest and harvest opportunity. This demonstrates a fundamental misunderstanding of the importance of subsistence to the way of life of the residents of area villages. Both under NEPA and sections 810 and 1002 of ANILCA, the report should include a

far more comprehensive evaluation of the impacts of development on Native culture and life style. Unfortunately, the unavoidable result of major oil and gas leasing in this area, unlike similar leasing at Prudhoe Bay, which is further from any village, will be a drastic change in the life style of the people of the village of Kaktovik. Similar impacts will occur in other villages that rely heavily on the PCH not only for food, but for cultural sustenance, if major changes in the size and distribution of the PCH and CAH result.

2. Interior's major focus on subsistence impacts only in Kaktovik is entirely inappropriate in light of the heavier reliance on the PCH by other villages, including Arctic Village, Old Crow, Venetie, and Fort Yukon (p. 29). Interior has exhibited an extremely callous indifference to the welfare of the people of these villages.

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Water and gravel resources

Interior properly identifies the fact that oil and gas development in the coastal plain will require major amounts of water and gravel resources, and properly identifies this as a major resource conflict. However, the report falls far short of evaluating and resolving these major conflicts. For example, if the "innovative" methods of water use identified on page 76 are unsuccessful, it is likely that far more gravel roads will be constructed than are currently predicted. Alternatively, once a major commitment to oil and gas extraction from the ANWR is made, it is unlikely that the oil industry will be prevented from using available fresh water and gravel sources, despite adverse effects on fish and other populations. Therefore, the sources of water and gravel necessary to support oil development in the area should be fully identified before a decision to allow leasing is made. If environmentally acceptable sources of these materials are not present, this fact should be clearly stated in the report rather than engaging in an exercise in wishful thinking.

Environmental pollution

As noted above, Interior's evaluation of a wide range of environmental pollution effects from oil leasing in the Arctic National Wildlife Refuge is woefully inadequate. Major potential problems are identified below:

1. Air pollution. There is no evaluation whatsoever of air quality impacts from oil development in the ANWR, despite evidence of major potential problems at Prudhoe Bay, the possibility of more severe problems in the 1002 area in light of the closer proximity of mountainous terrain and frequent inversions, and the cumulative air quality effects of additional development on the North Slope. DEC and EPA currently have a very poor understanding of the effects of air pollution from Prudhoe Bay facilities, but there are a number of reasons for concern. Permitted NOx emissions at Prudhoe are 80,000 to 100,000 tons per year, and ambient monitoring to determine whether these massive emission rates result in ambient air quality violations has just begun. Moreover, it is suspected that EPA's NOx model has underpredicted ambient NOx concentrations, and no snow pH measurements have been taken to determine whether acid precipitation is a problem. But in comments submitted on the state's proposed Camden Bay sale, DEC commented that "air quality

in the proposed sale area will be a significant concern if new production facilities are developed." Another major air quality problem, particularly in a National Wildlife Refuge with proximate wilderness areas, is startup and "emergency" gas flaring, or black smoke incidents. Recent startup flaring on the North Slope continued for an entire month, with black smoke visible for up to 50 miles from the site.

3. Oil spills. The massive cumulative problem of chronic oil spills was identified above. In addition to direct spills to tundra, DEC indicates that chronic leaking of oil through gravel pads is adding to the overall amount of oil reaching the environment. The 1002 report identifies the problem, but makes no attempt to evaluate the long-range and comprehensive effects of oil pollution on the refuge.

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4. Hazardous waste. As noted above, at least one major hazardous waste spill has occurred in the Prudhoe Bay area. In addition, both the state and the oil companies are currently grappling with the major problem of how to handle hazardous wastes from North Slope operations. Currently, oily wastes are taken to the North Slope Borough's Oxbow landfill, but there is no approved facility for hazardous wastes under RCRA. The 1002 report does not address how either oily wastes or other hazardous wastes generated from development in the ANWR will be handled or transported.

5. Solid waste. Similarly, the 1002 report does not address where even nonhazardous solid wastes, which are generated in tremendous quantities by North Slope operations, will be handled. Either these wastes must be transported out of the refuge for disposal, or

a landfill will have to be sited in the refuge.

6. Drilling muds. Interior's treatment of this major waste disposal problem is insufficient. Notably, DEC refers to the 1002 report's treatment of the drilling muds issue as "grossly inadequate and misleading." Each of the 500-600 wells at Prudhoe Bay generate approximately 840,000 gallons of wastes per year. In 1984 alone, 58 million gallons were discharged to tundra wetlands, but as noted above, there have been pervasive violations of applicable discharge standards. Rather than addressing the major water quality problems that could result in the ANWR, Interior suggests that the only permanent effects of drilling muds disposal practices will be the creation of "rectangular-appearing ponds" after operations cease. While mentioning pervasive leakage problems in passing, Interior does not analyze the potential long-range effects on the water supply and other resources in the refuge. Finally, no mention is made of the fact that EPA is in the process of reevaluating the regulation of all oil industry wastes, pursuant to a consent decree in Alaska Center for the Environment v. Thomas. The initial results of this study indicate that existing industry waste disposal practices, on the North Slope and elsewhere, may be inadequate to protect human health and the environment.

IV. Conclusion

Based on the above deficiencies, the draft 1002 report does not serve its intended purpose, and violates a number of applicable laws and regulations. Congress sought an independent, objective analysis so that it could have a well-informed basis for the debate

over the fate of the coastal plain of the Arctic National Wildlife Refuge. This basis simply has not been provided. The report should be rewritten, and submitted for another round of public comment before a final version is submitted to Congress, as required by the NEPA regulations.

However, even on the basis of the adverse impacts predicted in the report, it is apparent that oil and gas development in the 1002 area cannot be accomplished without major, long-term losses to internationally-significant fish and wildlife populations, the irretrievable loss of the nation's last arctic wilderness, and major damage to the culture and lifestyle of the Native villages in and around the refuge.

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On the other hand, it is equally apparent that no effort whatsoever was made to evaluate the true national need for the petroleum resources that may exist in the region, i.e. whether equal amounts of energy could be generated or saved through other strategies. If such an analysis were undertaken seriously, it would be realized that the national security and energy independence goals discussed in the report could be met without the tremendous losses that will accompany oil and gas leasing in the refuge, and at a lower economic cost to the nation. We do not have to lose such precious resources in order to meet our energy goals.

No valid case has been made to allow oil development in this area. Rather, the coastal plain of the Arctic National Wildlife Refuge should receive the protection it deserves through placement in the National Wilderness Preservation System.

Washington Native Plant Society
"Preserve and Enjoy Washington's Flora!"

4611-2nd. Avenue N.E.
Seattle, WA 98105

20 January 1987

U.S. Fish and Wildlife Service
Division of Refuge Management Resources
2343 Main Interior Bldg.
18th. and C Sts. N.W.
Washington, D.C. 20240

Greetings,

This letter is written on behalf of the Washington Native Plant Society's Board of Directors to comment on the proposed alternatives for oil development on the Arctic National Wildlife Refuge (draft 1002 Report). The WNPS is an organization of over 800 professional and amateur botanists in Washington state who share an active interest in the preservation of our nation's native flora and fauna.

The WNPS would like to offer its full support to Alternative E. We wholeheartedly endorse Wilderness Area designation for the entire Arctic NWR. We strongly oppose any form of gas and/or oil development in the Arctic NWR.

We find the "Preferred Alternative" to be totally unacceptable for the following reasons:

1. You have not adequately evaluated or considered the probable impacts of the proposed action on native plant communities and on rare and sensitive plant species.

2. You have not demonstrated a convincing case for either the need for or the feasibility of the proposed extraction program.

3. You have not properly evaluated the cumulative effects of the proposed actions on the extremely fragile natural ecosystems of the high arctic. This is in clear violation of NEPA regulations.

4. You have not adequately assessed the impacts of the proposed action on caribou herds or on the native peoples dependent on these herds.

5. Proper environmental safeguards in respect to disposal of hazardous waste by-products from the proposed actions are not delineated.

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6. The proposed action and other development alternatives presented would cause severe environmental degradation of one of North America's most important and fragile wild ecosystems and would make a mockery of the very concept of the National Wildlife Refuge system. This is clearly not acceptable.

The WNPS urges the withdrawal of the proposed alternative in favor of the only ecologically and biologically justifible course of action - the adoption of Alternative E.

Sincerely,

Mark Egger

Mark Egger
President, WNPS

cc: Hon. Bennett Johnson
Hon. Stve Cowper
Hon. Dan Evans
Hon. Brock Adams

THE WILDERNESS SOCIETY

February 6, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge
Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

RE: Comments on the Draft Resource Assessment for the Arctic National Wildlife Refuge Coastal Plain

Dear Sir:

For over 50 years, The Wilderness Society has been dedicated to the wise management of the federal lands and the preservation of wilderness. The Society's history in Alaska goes back to its very founding by Robert Marshall, an early explorer of the Brooks Range.

The incomparable and indisputable wilderness and wildlife values of the Arctic National Wildlife Refuge, and specifically the coastal plain, have long made it a major focus of The Wilderness Society. The original wildlife range was established in 1960 largely as the result of the tireless efforts of Olaus and Margaret Murie. The late Olaus Murie, President of The Wilderness Society for 17 years, spent years conducting research in the refuge, and Margaret Murie still guides the organization as a member of the Governing Council. The Muries recognized the "unique

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(202) 842-3400

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wildlife, wilderness, and recreational values" that the refuge was established to protect.

The following comments on the draft Resource Assessment and recommendation to Congress on the Arctic National Wildlife Refuge Coastal Plain are submitted on behalf of The Wilderness Society's 160,000 members nationwide.

INTRODUCTION AND SUMMARY

In these comments, The Wilderness Society concludes that the 1002 report fails to meet the requirements of either the Alaska National Interest Lands Conservation Act (ANILCA) or the National Environmental Policy Act (NEPA).

Specifically, the report falls short in the following respects:

** Analysis of oil and economics. The Department's geologists estimated that there was just a 19 percent chance of finding economically producible oil under the coastal plain. This key finding was buried in the report and was not included in either the executive summary or the press release. Moreover, in calculating the likely revenues from oil development and the total value of development, the report fails to multiply the dollar values arrived at by that 19 percent probability.

Further inflating the projected economic gain were the exceptionally optimistic assumptions about future oil prices. The report assumes a 4.1 percent annual increase through the Year 2000. That is more than twice the most optimistic estimate being used today by the Department's

Mineral Management Service (MMS). The report's projected Year 2000 price of $33 per barrel (real 1984 dollars) is 39 percent greater than the price would be using the highest of MMS's assumptions.

** Potential role of energy conservation. In 1985 the Department of Energy issued a National Energy Plan stating that energy conservation "has proven to be the most expeditious way to reduce the need for new or imported energy resources; and in fact it now contributes more to balancing our national energy ledger than does any single fuel source." Yet the Administration has vetoed a bill setting efficiency standards for appliances, rolled back automobile fuel efficiency standards, pushed for higher speed limits, and cut the energy conservation budget. The 1002 report fails to investigate alternative energy sources, as required by the National Environmental Protection Act. The Administration should pursue such options before drilling in an area that, according to the 1002 report, would account for only four percent of U.S. oil needs in the Year 2005.

** Projected environmental consequences. The report predicts population declines of up to 50 percent for muskoxen and 40 percent for the Porcupine caribou herd. It acknowledges that wolves, polar bears, and snow geese, and other wildlife populations would suffer, as well. These projected impacts are conservative. Assuming for the moment that they are reasonable, it is disturbing that the U.S.

Fish and Wildlife Service finds them acceptable. The Wilderness Society considers such losses unacceptable.

Nor does the report show much concern about potential pollution. It does not mention that since 1972 there have been 23,000 oil spills reported at Prudhoe Bay. It does not mention that at Prudhoe Bay 20 of the 21 major reserve pits, which store toxic chemicals and heavy metals, violate EPA discharge standards. It fails to address the impact of the serious air pollution caused by Prudhoe Bay operations on the growing Arctic haze problem--or the contribution that oil activity in the 1002 area would make to that problem. These are important concerns that call for thorough investigation.

** Appropriate mitigation measures. The report acknowledges that there would be serious wildlife population declines and difficulty for those with a subsistence lifestyle, and it concedes that "[t]he wilderness character of the 1002 area would be destroyed..." But the report fails to spell out how these impacts would be mitigated.

** Analysis of area's wilderness values. Section 1004 of ANILCA required a thorough review of the coastal plain's suitability for wilderness designation. Yet the report includes only half a page on the subject; half of that is a quotation from the Wilderness Act. The report concludes that the area could meet the criteria in the Wilderness Act, an indefensibly weak statement in view of the plain's pristine condition, natural qualities and spectacular wilderness values.

** Secret land trade negotiations. The Interior Department has been conducting secret land exchange negotiations with several Native corporations despite requests from Members of Congress to desist. Negotiating to trade away the very area it was directed by statue to study for wilderness protection demonstrates the lack of objectivity that is reflected throughout the report.

** Consultation with Canada. Despite the clear mandate in ANILCA's Section 1005, the Interior Department failed to consult officially with the Canadian Government during preparation of the report. Since release of the report, both the Yukon Government and the Government of Canada have stated clearly that they disagree with its recommendations.

** Provision for public comment. Despite the importance of this issue, its complexity, and the broad interest in it, the Department provided for a relatively brief comment period and hearings in too few locations.

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THE INADEQUACIES OF THE OIL AND GAS ASSESSMENT AND ANALYSIS

Many of the assertions made by the Interior Department in the report's Executive Summary, the "draft" recommendation to Congress, and many of the conclusions drawn throughout the document are not supported by the findings in the report.

In stating the oil potential, for example, the Executive Summary fails to report the marginal probability, or risk, associated with Arctic Coastal Plain development.

Only upon delving deep into the body of the 1002 report does the reader find that there is an 81 percent chance that no economically recoverable oil at all lies within the refuge. The chances of discovery reported in the Executive Summary and fact sheet are "conditional" estimates. The condition is that at least one economically recoverable field will be found. In other words, the much-touted probability that the refuge holds from 0.6 to 9.2 billion barrels of recoverable oil is valid if economically producible oil is discovered -- the chances of which are only one in five.

The Executive Summary declares the Arctic Coastal Plain to be "the most outstanding oil and gas frontier remaining in the U.S." However, though a cursory glance at the report may appear to lend credence to this statement, careful scrutiny fails to substantiate it. This peculiarity results from a combination of omission of crucial information, incomplete analysis, and the inclusion of incomparable sets of numbers in single charts.

The report presents two probability distributions to answer the following questions: (1) what is the likelihood that any hole drilled in the region will encounter economic quantities of oil and gas, and (2) if economic quantities of oil and gas are found, how much is there likely to be? These probability distributions are based on simulation modeling of data obtained from minimal outcrop investigations and reconnaissance seismic surveys.

The Wilderness Society believes that the 1002 report

should instead ask these questions: (a) what is the likelihood that oil and gas will be developed if the area is opened to leasing, and (b) what will be the resulting costs and benefits of this action to the federal and state governments, and the oil-producing corporations. The difference between questions (a) and (b) and the issues addressed in the report is that the DOI document does not go beyond the estimation of the quantities of oil and gas that may be in the refuge. The relevant question that needs to be answered is: What are the financial benefits (both magnitude and duration) that are likely to accrue from opening the coastal plain of the Arctic Refuge to oil and gas development?

If petroleum is economically-producible in the 1002 area, then lease bonus payments, corporate income taxes, severance taxes, windfall profits taxes, royalties, and perhaps other benefits would be obtained by the federal and state governments. These quantifiable benefits from petroleum production must be compared with the largely non-quantifiable costs of development of the wildlife refuge. These costs include the disruption of the caribou calving grounds and other wildlife habitat losses.

If the 1002 area is opened to full-scale oil exploration and development and commercially-exploitable quantities of oil and gas are not found, then the state and federal governments would not receive corporate income taxes, severance taxes, or royalties, and the oil companies would not earn a profit on their exploration investment. In

addition, many of the same non-quantifiable costs that would be realized in the commercial-production scenario would also occur, including the environmental damage caused by the building of haul roads, drilling pads, airstrips, port facilities, desalination plant(s), in the midst of an otherwise pristine area.

Clearly the decision to open the wildlife refuge to petroleum development must consider the quantities of oil and gas that are likely to be present, but the net economic benefits of development must also be considered. The DOI analysis, however, skews this assessment towards development by ignoring the non-quantifiable costs of foregone wildlife and wilderness values and grossly overstating the potential benefits of development.

The estimation of the Net National Economic Benefits (NNEB) presented in Chapter VII of the report is deceivingly high. Unrealistic oil price assumptions are used in the analysis and oil and gas volumes and dollar values are oftentimes presented as if there is a 100 percent probability of finding these commodities. In reality, the probability of drilling a hole that taps an economically-viable oil pool is only 19 percent (pg. 68). Thus, any estimate of the likely oil revenues and associated benefits that could be obtained from the 1002 area should be multiplied by this marginal probability factor in order to present a true picture of the likely value of opening the refuge to petroleum production. To do otherwise ignores the

fact that 8 out of 10 wells drilled in the area will yield no net benefits.

The Net National Economic Benefits are defined in the report (pg.165) as "the expected net value of oil production, or the difference between revenues from sale of oil and the costs of exploration, development, production, and transportation." The remaining dollars go to the state and federal governments and the oil-producing corporation. State and federal benefits are obtained from the lease bonus payments, royalties, severance taxes, and corporate income and profits taxes. Any money left over from these costs is a profit to the oil companies.

According the DOI analysis, the NNEB from full-scale development of the mean potential find of 3.2 billion barrels of oil (BBO) is $14.6 billion (adjusted for the time value of money). The NNEB of limited leasing from a field size of 9.2 BBO (there is a 5% probability of this size or larger) is presented as $9.4 billion using optimistic economic assumptions. These values fail to account for the high potential that no economic oil will be discovered if leasing is allowed. To get the true expected NNEB from these field sizes, the agency should have explicitly factored this risk into the analysis by multiplying the above values by the 19% marginal probability. This would yield the much lower net national economic benefits of $2.8 and $1.8 billion respectively.

The values for the NNEB reported above are obtained

from an analysis using critical assumptions about (1) the minimum field size that is likely to be economically produced, and (2) future oil prices, among others. According to the most-likely DOI scenario, the oil price in the year 2000 is assumed to be $33 per barrel in real 1984 dollars (pg.72) (or about $36.30 in 1987 dollars). In order for this value to be reached in the year 2000, the oil price would have to grow at an average rate of 4.1 percent per year (starting from the current oil price of approximately $18 per barrel). The most recent projections of the Minerals Management Service (MMS) of the DOI assume three oil price growth scenarios: 0, 1, and 2 percent per year. The 4.1 percent growth rate -- in real prices -- is more than twice the highest growth rate assumed by the MMS. Using the optimistic assumption of an oil price of $40 per barrel (about $44 in 1987 dollars), yields a yearly growth rate of approximately 4.9 percent. Since these values are compounded annually, the effect of such a price assumption is magnified with each passing year. For example, using a growth rate of 1 percent per year, the price for a barrel of oil in the year 2000 would only be $18.62 (in 1984 dollars, $20.69 in 1987 dollars). Thus the value of $33 per barrel is 77% higher than the value of $18.62 that would be obtained from a one-percent-per-annum oil price growth rate, and 39% more than the two-percent-per-year growth rate.

The effect of these very high oil price assumptions is to project a much higher NNEB for the oil-producing

projects than would be the case for a more conservative oil price estimate. If the NNEB is calculated using an oil price estimate that is too high, the benefits of producing oil will be over-estimated, and the resulting balancing of the costs and benefits of the project will be misleading.

The incomparable sets of numbers in the two charts on page 50 of the report can also be misleading. Table III-1 fails to report the risks associated with potential oil resources in a variety of areas around the country. Since many of the areas listed are already producing, there is no longer an associated risk that economic finds will not be made. However the range of risks associated with the undiscovered resources vary widely and, by definition, are all greater than the risks associated with proven areas. If the risk were factored into the probabilities for the Arctic, the average quantity of economically recoverable oil expected to occur in the area would be 0.61 billion barrels, not the 3.2 billion barrels reported in this table and throughout the report. Based on current domestic consumption, 0.6 billion barrels would supply the nation for a mere 33 days.

The Interior Department's failure to include a column in the chart (pg. 50) showing the risked probabilities makes it impossible for the public to make any meaningful comparison of the oil potential of the 1002 area with other areas around the country. If the risk information were available, it would likely show that other areas with higher

probabilities of discovery, though of lower quantities of oil, actually have more "outstanding" oil potential than the Arctic.

The same criticism holds true for Figure III-2, also on page 50, a bar graph of the conditional production estimates for the 1002 area compared to five producing fields. Once again, the numbers do not fit because the estimates for the Arctic are contingent upon the one-in-five chance that any economic fields will be discovered, while the other numbers refer to proven reserves. To make a meaningful comparison of this sort, the estimates for the 1002 prospects should be explicitly adjusted downward to account for the differences in risk among the different areas. If the Interior Department had done this, instead of the highest bar for the Arctic outstripping Prudhoe Bay, it would only reach about as high as Kuparuk, a difference of about 7.5 billion barrels. This report is intended to guide the general public and Congress in reaching a decision on the future of the Arctic Coastal Plain. Misrepresentations such as these only serve to undermine the credibility of the entire report.

ENERGY CONSERVATION

The Secretary's recommendation states that "[d]evelopment of its potential oil and gas resources could make a significant contribution to the economy and security of this Nation..." However, even the 3.2 billion barrels of supposedly recoverable oil would supply a mere 4 percent of

U.S. oil demand in the year 2005 (page 169). This much oil could be saved through a variety of energy conservation measures, leaving the Arctic Refuge intact for the benefit of future generations.

In 1985, the Department of Energy issued a National Energy Policy Plan which stated that energy conservation "has proven to be the most expeditious way to reduce the need for new or imported energy resources; and in fact it now contributes more to balancing our national energy ledger than does any single fuel source." Despite this acknowledgement of the benefits of energy conservation, the President recently vetoed the National Appliance Energy Conservation Act, passed overwhelming by both houses of Congress. This single piece of legislation, which would have established national efficiency standards for home appliances, would have saved more than 1.5 billion barrels of oil over the life of appliances purchased during the next 14 years. How can the Administration talk about the need to develop a highly speculative area of the Arctic Refuge for national security, while vetoing a sure-fire way to conserve a very significant amount of energy?

Likewise, the Administration has rolled back automobile mileage standards and supports raising the 55-mph speed limit. Collectively these energy conservation measures and others could save more oil than the Arctic Refuge is predicted to yield under the most likely scenario.

ENVIRONMENTAL CONSEQUENCES

Not only does the Department exaggerate the oil potential of the refuge, it dramatically understates the threat oil development poses to the refuge's incomparable and irreplaceable wildlife. For example, the report concludes that full-scale oil development would have a major adverse impact on the nearly 600 muskoxen that reside on the coastal plain, resulting in the loss of up to 50% of the population. Habitat loss and direct mortality would have a major adverse affect on the snow geese population, a species that is already declining in numbers. The report predicts the average number of snow geese using the 1002 area for Fall staging could be reduced by nearly 50 percent. With an average of 105,000, and as many as 325,000 birds staging in the area, this is a reduction of 52,000 to 162,000 geese.

Polar bears, a circumpolar species also in decline, would lose two of three known concentrated denning areas within the 1002 area to development such as port facilities and desalination plants, vehicles, human intrusion, and noise during critical phases of the animal's life cycle -- hibernation, birthing and nursing. The report concludes that the Beaufort Sea population could not sustain an increase in mortality because the death rate is already equal to the birth rate, yet states that development in the refuge would have an adverse effect on the species. In reaching this conclusion, the report assumes that similar intensive development will not occur along the entire

northern coast of Alaska and Canada. This assumption ignores the fact that, outside of the refuge, the entire Arctic coastal plain shoreline and outer continental shelf in Alaska are open to development. Petroleum development is also occurring east of the refuge in the Mackenzie River delta region of the Northwest Territories. The cumulative effects of current and future oil development could virtually eliminate the polar bear in the United States.

The Interior Department report estimates that five to ten wolves (Weiler and others, 1985) seasonally use the 1002 area, while the Alaska Department of Fish and Game (ADFG) documented as many as 27 adults and seven pups in the northern portion of the Arctic Refuge in late summer, 1984. Both agencies report high mortality in North Slope packs due to hunting, aerial hunting, and disease (e.g. rabies). It is generally acknowledged that wolves have been eliminated in the area around the Prudhoe Bay complex. Yet the report concludes that full-scale petroleum leasing and development, along with 6,000 people moving onto the the coastal plain of the refuge, would result in only a moderate decline in the wolf population. What is a moderate impact on 5, 10, or 20 wolves?

Researchers report the wolf populations on the North Slope are considered low compared to their abundance prior to intensive aerial hunting and predator control (Weiler et al., 1985). The Interior Department report predicts this trend will continue due to the direct mortality (i.e.

hunting) that can be attributed to development. It seems more reasonable to conclude that development would result in the continuation of a major adverse impact on wolves.

Porcupine Caribou Herd

The assessment concludes there could be a major negative impact on the 180,000-head Porcupine caribou herd (PCH), that mitigation is not possible in the herd's core calving area, and that full-scale leasing and development could result in up to a 40% decline in the population. Not only do we believe that such losses are unacceptable, but based on the best scientific research and information, we believe that the effects on the herd would be far greater than the report predicts.

The Wilderness Society's primary concerns are:

1) Loss of calving habitat would be the major contributing factor to population decline. Studies have shown that parturient and postpartum cows accompanied by calves are intolerant of stressful surroundings and seek areas of little or no disturbance (Cameron, 1983). Cameron believes that "intensive oilfield development may result in virtual abandonment of areas previously occupied during calving."

2) Specifically, calving and feeding habitat would be lost by covering drill pads, approximately 20 to 35 acres in size, with 5 feet of gravel. However, the visual impacts of pads with derricks would be far greater. Dau and Cameron (1985) report a two-mile sphere of influence around development -- an area that is avoided by caribou during the critical calving and post-calving period. Under the preferred alternative, the assessment estimates that 50 to 60 drill pads would be constructed on the herd's calving grounds. If the caribou do in fact avoid each of these pads as the research indicates, an enormous amount of habitat would be lost. To make matters worse, the ADFG believes that "the numbers of drill pads and material sites are greatly underestimated." This should be a serious concern for the Fish and Wildlife Service and must be

adequately addressed in the final Environmental Impact Statement.

3) The loss of insect-relief habitat, particularly in coastal areas, is also greatly understated. While the report does admit that nearly 80% of the coastal insect-relief habitat could be affected if development proves to be a barrier to movement, it ignores the fact that research indicates that linear development, such as the proposed east-west road and elevated pipeline bisecting the 1002 area, has the lowest crossing success rate (Shideler:ADFG Technical Report No.86-3, pg. xi, No. 12). Smith and Cameron (1985) found that "large, mosquito-harassed groups of caribou do not readily cross beneath elevated pipelines." They found that many animals walked or trotted parallel to the pipeline for long distances, "result[ing] in a substantial increase in energy expenditure. These authors expressed concern that if this unproductive activity is repeated several times during the summer, as it surely would be in the case of the PCH, it "would result in a net decrease in fat accumulation . . . during the [crucial] midsummer period of rapid growth and fattening." These changes in energy status and the associated stress could have serious implications for the winter survival rate for these animals and adversely affect the long-term health and viability of the herd.

While the report admits that roads/pipelines would impede the free movement of tens of thousands of animals in the PCH, little attention is given to a subsea pipeline alternative. It is stated that such a route is technically feasible but presents significantly higher environmental risks than does an onshore pipeline. This may be true in the short run, but given the irreparable damage any onshore route would have on the PCH, it certainly is not the case in the long run. The ADFG agrees. The agency points out that "although the consequences of an oil spill from a marine pipeline may be catastrophic, the probability of such a spill is very low" (Commissioner Collinsworth, ADFG comments, Enclosure F, pg 1, para.5). Further "the long-term environmental consequences of an aboveground onshore pipeline . . .are cumulatively much more adverse to fish and wildlife than a marine pipeline." This issue must be more fully developed and discussed in the final report.

4)Finally, numerous researchers have reported that vehicle and aircraft traffic, noise, people, and general activity is more disturbing to caribou than merely the presence of roads or structures. The 1002

report asserts many of the adverse affects from development but seems to ignore the effects 6000 people are going to have on the herds, especially during such a critical phase of the life cycle.

Pollution Impacts

The assessment is seriously deficient in addressing the effects of pollution from oil development on the refuge and its sensitive wetlands, aquatic systems, and wildlife. For instance, the report fails to mention that there have been more than 23,000 reported oil spills at Prudhoe since 1972. The two largest spills were 200,000 and 658,000 gallons. Or that in 1985 alone there were 521 spills dumping more than 82,000 gallons of oil onto the tundra and into the drainages. Nor was it pointed out that studies have shown that 30-year old spill sites in Alaska show little signs of recovery.

Improper disposal of drilling waste is seriously affecting water quality in the vicinity of the Prudhoe oilfields. The report should have noted that the 900-square-mile complex contains 500-600 wells, with operations producing approximately 840,000 gallons of drilling muds per well per year. State Department of Environmental Conservation (DEC) reports indicate that discharges from 20 out of 21 major reserve pits that store these wastes violate EPA standards, discharging toxic chemicals and heavy metals such as arsenic, barium, lead, manganese, chromium, zinc, and copper, brine, and carcinogens such as aromatic hydrocarbons into aquatic and

wetland habitats. The ADFG is concerned that this practice will continue in the 1002 area and will "result in chronic and/or acute contamination of wetland organisms by heavy metals, hydrocarbons, or salts." The agency also expresses concern over industry's practice of controlling road dust by applying reserve pit supernatant, further spreading these harmful pollutants to uplands or other wetland areas.

The ADFG concludes that "although the data are strongly suggestive that impacts to fish and wildlife habitat and to lower food-chain organisms are occurring as a result of reserve pit discharges to the surrounding environment, the conclusive link, that of effects on higher food-chain organisms, remains to be proven. However, all indicators suggest that such impacts can and probably do occur -- water quality degradation around the pits has been documented, uptake of compounds known to be detrimental to organisms in laboratory conditions has been found, an important aquatic food-chain organism has been effected, and aquatic invertebrate community structure has been changed." It is therefore perfectly reasonable to conclude that oil development in the coastal plain of the refuge would compound the existing pollution problems on the North Slope and affect a greater number and variety of wildlife species. Moreover, the health of humans living in and adjacent to the refuge, as well as others in North America who consume migratory species, could be affected through consumption of contaminated animals. What is certain is that studies have

either not been undertaken or are inadequate to make these determinations. Meanwhile the industry continues to pollute unabatedly and hopes to expand the current operation into a national wildlife refuge.

There is no mention in the report of the dangers of hazardous waste spills such as ARCO's contractor, North Slope Salvage Company's 1983 spill involving more than 10,000 barrels or how this waste might be properly disposed of should oil development be authorized by Congress.

The 1002 report also fails to address the contribution that air pollution from the Prudhoe oilfields is having on a relatively little understood problem known as Arctic haze. The state permits the release of 80,000-100,000 tons of nitrous oxides (NOx), but the effects of this pollutant are unknown since there has been no air quality monitoring in the region. What is known is that the once-pristine arctic air is becoming increasingly fouled by development in this and other countries. This may have serious implications for global air quality and contribute to climatic warming, commonly known as the "greenhouse effect." Dr. Robert Schnell at the National Oceanic and Atmospheric Administration reports that this blanket of soot in the atmosphere can be as thick as 18,000 feet and may be raising temperatures in the arctic and contributing to the rise of average surface temperatures of the entire planet.

The analysis in the 1002 report of the impacts from air and water pollution are wholly inadequate. Among the many

questions that must be addressed are: What will be the effect of increased arctic haze from development in the 1002 area? Might the temperature inversions, caused or exacerbated by the air pollution that inevitably accompanies petroleum development, contribute to local climatic warming? If so, what could be the long-term effects of such a warming trend? In such a delicate and carefully balanced environment, the consequences could be devastating.

THE INADEQUACIES OF THE BIOLOGICAL DATA AND ANALYSIS

The draft report fails to address or analyze thoroughly the coastal plain's natural environment and the problems and impacts posed by exploration and development. Though the report accurately states that the "Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America," (page 45) it fails to elucidate the biological significance of this fact. The long-term effects of oil and gas development cannot be understood without an explanation of the complex ecological processes and interrelationships of these ecosystems.

The report also states that the "1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge" (page 46). The statement is an accurate, but somewhat empty, one without further elaboration of the broader consequences of exploration and development in the 1002 area.

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The most glaring omission of the report is the absence of any discussion of the cumulative impacts from development in areas adjacent to the refuge, both on and offshore. Oil and gas lease sales are scheduled for millions of acres of adjacent state lands (Camden Bay, Demarcation Point, Prudhoe Bay Uplands) and of 21.2 million federal acres (Sale 97) just offshore in the Beaufort Sea. Sale 97 is scheduled for July 1987 and will be the largest lease sale ever held in the Arctic Ocean. Activities in Canada must also be considered. The effects of all these activities considered together are surely substantially greater than if considered piecemeal.

The report acknowledges the lack of fresh water supplies in the area and the need for large quantities of water for both exploration and development. Yet it does not adequately explain how water will be obtained and what the environmental consequences will be, particularly to fish. Experience at Prudhoe Bay shows that reduction in the quantity and/or quality of water available to overwintering fish is likely to have serious impacts on fish stocks. Therefore water should not be withdrawn from spring areas.

The report should also note that surface waters in the 1002 area differ in character from those in the Prudhoe Bay area. Thus comparisons cannot be freely drawn. Also, the impact of reserve pits on flora and fauna, and their habitats, are not adequately considered. Research indicates that reserve pit discharges are making their way into the

food chain, though the full extent of the harm has yet to be documented.

Another resource essential to petroleum exploration and development is gravel which, like water, is extremely scarce in the 1002 area. The report does not adequately address the sources of gravel, the potential for rehabilitation of materials sites, and the impacts on fish and wildlife. To date, no Prudhoe Bay sites have been returned to a standard suitable for fish and wildlife use.

Throughout the report, in regard to virtually every species of wildlife associated with the refuge, the inadequacies of baseline data and information are cited. Without this critical data and understanding, the predictions of impacts have very little credibility. It seems wholly inappropriate for the agency, at one moment, to cite its own lack of understanding, and, in the next instant, to state as fact that effects will be minor or moderate. This is exactly the posture taken by the agency with regard to moose, fox, wolverines, wolves, brown bears and polar bears, among others. Regarding muskoxen, nothing is known about the effects on industrialization on the species (page 113). Muskoxen have already been eradicated once from the Arctic Refuge. There would be no excuse for repeating the error.

MITIGATION OF IMPACTS ON FISH AND WILDLIFE

The report fails woefully and inexplicably to address the question of mitigation of impacts on fish and wildlife

resources. First, there is no statement that any or all of the proposed mitigation measures would be required under a leasing scenario. Second, even if such were made, The Wilderness Society questions the effectiveness of the proposed measures.

The conclusion of the report itself leaves open the question of the Department's intent regarding mitigation. The description of the area's natural, historical and cultural resources is replete with statements recognizing the severe harm that will come to these irreplaceable values. For example, the report states if leased, "[t]he wilderness character of the 1002 area would be destroyed..." (page 139). The report also acknowledges that the Porcupine Caribou Herd, and so the people who depend on it, will suffer significant harm should the core calving area be leased. Nevertheless, the proposed recommendation to Congress is to lease the entire coastal plain, including the critical core calving area.

INADEQUATE CONSIDERATION OF WILDERNESS VALUES

The 1002 report fails to fulfill the requirements of ANILCA section 1004, requiring the review of the area for wilderness designation. Despite the determination that the area "has outstanding wilderness qualities..." (page 46), the report states merely that "the 1002 area could meet the criteria" (emphasis added, page 46) of the Wilderness Act. The Arctic Coastal Plain, without question, is eminently worthy of inclusion in the National Wilderness Preservation

System. The U.S. House of Representatives has twice passed legislation to designate the area as wilderness. In addition, two separate Fish and Wildlife Service studies (Thayer 1982; draft USFWS 1973) concluded that the area is suitable for designation.

The final report should include a detailed description, rather than a short list, of the area's wilderness qualities, including a discussion of the area's uniqueness, its international significance, and its importance to the scientific community. A half page of description, of which one-quarter consists of a quotation from the Wilderness Act, is simply indefensible in a report intended to assist Congress and the general public in determining whether the coastal plain's wilderness should be protected or foregone for oil development.

INADEQUATE CONSIDERATION OF EFFECTS ON SUBSISTENCE

The report fails to adequately describe the use of the area for subsistence and the impacts petroleum development would have on it, despite the recognition that the "adverse effects of petroleum. . .would have major adverse effects on subsistence activities" (page 138). The report acknowledges that "caribou is the most important food source" (page 41) in Arctic Village and Old Crow. Nevertheless there is only a passing discussion of these villages that are even more dependent on the Porcupine Caribou Herd than Kaktovik. Yet the effects these communities would suffer should the herd's population be reduced significantly or its migration

patterns altered are not even considered. Moreover there is no discussion of how the various mitigation measures proposed, e.g. area and seasonal hunting prohibitions, would affect the subsistence way of life. Finally cumulative impacts of development of adjacent areas must be considered specifically in assessing the effects on subsistence.

The requirements of ANILCA section 810 should be met in the 1002 report, so that Congress may consider its findings in determining the fate of the Arctic Coastal Plain. The report contains the clear implication that the Interior Department decided to postpone the section 810 analysis, until a lease sale is actually planned, in the hope of evading this important requirement. Such an inference is drawn from the statement that section 810 compliance will occur prior to a lease sale, "unless the Congress were to exempt the Secretary from that requirement" (page 129). The Department has no reasonable justification for not preparing the analysis at this critical juncture.

FAILURE TO DISCUSS LAND EXCHANGES

The Department of the Interior has entered into secret land exchange negotiations with several Native corporations and the State of Alaska. The Wilderness Society is unequivocally opposed to any land exchanges regarding the subsurface of the 1002 area and believes this approach is wholly inappropriate. An agency charged with preparing an objective study for Congress should not have simultaneously been negotiating to trade away the very area it was to

study. The lack of neutrality and objectivity proven by this effort manifests itself throughout the report. Despite numerous requests from Members of Congress to suspend the negotiations, the Department has chosen to continue them. Therefore the status and content of this process should be discussed in detail in the 1002 report.

FAILURE TO RECOGNIZE INTERNATIONAL OBLIGATIONS

The Arctic Coastal Plain is an area of almost unparalleled international significance, but the report fails to recognize this simple fact. Furthermore the report omits any meaningful discussion of how international treaty obligations regarding migratory species would be met in the face of development.

The report contains no mention of the Northern Yukon National Park adjoining the refuge or of the importance of cooperative management of shared wildlife resources, including caribou, snow geese, polar bears, and muskoxen. Four-fifths of the subsistence use of the Porcupine Caribou Herd is estimated to occur in Canada. Yet the report fails to assess the consequences to the people of Canada should the herd suffer major declines in number or alteration of its migration pattern. Even more dismaying is that the agency failed to consult Canada in preparing the report. This is inexcusable in any case, but particularly in light of the explicit mandate of ANILCA section 1005 to do so.

THE EFFORT TO EXCLUDE PUBLIC PARTICIPATION

Despite requests from conservationists, and the clear

mandate of NEPA, the Department refused to provide an opportunity for public comment. Thus The Wilderness Society, and other conservation groups, were forced to sue, at considerable expense to the U.S. taxpayer, to claim a right that should have been accorded by the agency without argument.

Even though it lost the lawsuit, the Interior Department continued to seek to prevent effective public participation. First, it provided only a 60-day comment period that fell over the Christmas holidays, effectively reducing the time concerned citizens would have to devote to the report. At any time of year, 60 days would be totally inadequate for a report of this magnitude and complexity. At least 90 days should have been provided. It should also be noted that a last minute two week extension was hardly an effective remedy to the problem as there was no way to notify the general public, outside of Alaska, of the extension.

Second, hearings were not scheduled in several places known to be centers of interest and concern about the issue. One is Fairbanks and another is Arctic Village, which could suffer even greater harm that Kaktovik if the Porcupine Caribou Herd is splintered or diminished in size. Where hearings were held, they were scheduled to exclude broad public participation. The Anchorage hearing, for example, was held the day after most people returned from the Christmas holidays and was scheduled during the day. The

evening session was not announced until the very day of the hearing, providing no notice to the many people who were unable to take a day from work to attend the hearing, but who could have attended in the evening.

CONCLUSION

Among the many unknowns, one certainty remains: development of the Arctic Coastal Plain would devastate the sensitive and unique wilderness environment and would prove highly detrimental to the wildlife that thrives in the area. In light of the known high degree of harm threatened by development and the low probability of petroleum, there is no reasonable justification for the Interior Department's full-scale leasing recommendation.

The Wilderness Society urges the Department of the Interior to reverse the draft recommendation of full-scale leasing and development. The Arctic Coastal Plain is irreplaceable and far too precious to be squandered for what may, at best, be a few months worth of petroleum. It should be given the protection it so richly deserves as a unit of the National Wilderness Preservation System.

Respectfully,

George T. Frampton

George T. Frampton, Jr.
President

Randall D. Snodgrass

Randall D. Snodgrass
Alaska Program Director

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THE WILDERNESS SOCIETY

STATEMENT OF RANDALL D. SNODGRASS, ALASKA PROGRAM DIRECTOR, THE WILDERNESS SOCIETY BEFORE THE U.S. DEPARTMENT OF THE INTERIOR HEARING ON THE DRAFT ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN RESOURCE ASSESSMENT, JANUARY 9, 1987.

My name is Randall Snodgrass and I am the Alaska Program Director for The Wilderness Society, a national conservation organization of 160,000 members dedicated to the wise use and preservation of the nation's public lands.

It should be pointed out at the outset that this hearing is being held today because The Wilderness Society, along with other national and Alaska conservation organizations, filed a lawsuit forcing the Interior Department to solicit public comment on the draft report and recommendation. At great expense to the taxpayers, the Department is currently appealing the decisions of a federal district court judge in Alaska and a panel of judges from the 9th Circuit Court of Appeals in California ordering them to comply with the Alaska National Interest Lands Conservation Act and other laws. This is inexcusable and illustrates an arrogant disregard for the public process. The 60-day comment period scheduled during the holidays (November 24 - January 23), today's hearing, and two hearings held earlier this week in Alaska, still do not provide the general populace adequate opportunity for analysis or comment.

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The Wilderness Society believes that the Assistant Secretary's recommendation for full-scale leasing and development of oil resources that may lie within the 1002 area is totally unsubstantiated by the findings in this report.

- The report concludes that full-scale oil development would have a major adverse impact on the 180,000-head Porcupine caribou herd and could cause a population decline of up to 40%. It also admits that mitigation of the loss of calving habitat is impossible.

- Muskoxen habitat values could be lost or greatly reduced throughout one-third of their range, with losses of nearly 75% of the herd's calving habitat. The U.S. Fish and Wildlife Service concludes that "[s]uch a high percentage of loss in valuable calving habitat could have a major negative influence on herd productivity . . . and would cause the population to decrease."

- Many other wildlife species -- polar bears, grizzly bears, small mammals, and the millions of birds that utilize the coastal plain for summer nesting and feeding -- would be adversely affected by the development.

- Internationally significant wilderness values will be foregone to accommodate the level of development that has been recommended in the 1.5 million acre coastal plain.

- The report fails to address the effects of air and water pollution, oil spills, and hazardous waste (such as drilling muds) on the human and wildlife populations of the refuge. The Alaska Department of Environmental Conservation has documented that this environmental pollution is considerable in the Prudhoe Bay/Kuparuk/Milne Point oilfields. The agency is discovering dangerous chemicals (e.g. arsenic, lead, etc.) and carcinogens appearing in the food chain.

- The report admits that there is only a one in five chance that <u>any</u> economic fields will be discovered in the 1002 area. Yet the Department's recommendation seems to ignore this probability. In public announcements the agency cites the area's mean

conditional potential of 3.2 billion barrels, an estimate that fails to incorporate the risk that no economic finds will be made. If this 19% marginal probability is incorporated, the potential falls to 600 million barrels, a 33 day supply of oil at the current rate of consumption. Finally, the study assumes an oil price of $33 per barrel, but most industry analysts predict that prices will not be that high until after the year 2000.

- The hypocrisy of this Administration is evident when you consider that the development-at-all-cost decision was made as President Reagan was vetoing the National Appliance Energy Conservation Act -- legislation that passed overwhelmingly in both houses of Congress that would have saved more oil than would be produced under the most optimistic scenario in the coastal plain of the refuge.

The risk of oil development to this priceless national wildlife refuge and wilderness area is unquantifiable. The Wilderness Society believes that the sacrifice the American people are being asked to make is too great. The Arctic Wildlife Refuge was established in 1960 to protect unique and pristine arctic ecosystems. It is a part of our national heritage and is of inestimable value to future generations. We cannot allow it to be destroyed for a one in five chance at a 33 day supply of oil. The Wilderness Society urges the Secretary of the Interior to recommend wilderness protection for the entire 1.5 million acre 1002 area.

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name SUSAN ALEXANDER

Mailing Address 519 W 8th

Anch AK 99501

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☐ I am speaking for THE WILDERNESS SOCIETY
(please enter name of organization you represent)

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THE WILDERNESS SOCIETY

STATEMENT OF [redacted] ALASKA REGIONAL DIRECTOR, THE WILDERNESS SOCIETY, BEFORE THE FISH AND WILDLIFE SERVICE, ON THE ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN RESOURCE ASSESSMENT, JANUARY 5, 1987.

For over 50 years, The Wilderness Society has been dedicated to the wise management of the federal lands and the preservation of wilderness. The Society's history in Alaska goes back to its very founding by Robert Marshall, an early explorer of the Brooks Range.

The incomparable and indisputable wilderness and wildlife values of the Arctic National Wildlife Refuge, and specifically the coastal plain, have long made it a major focus of The Wilderness Society. The original wildlife range was established in 1960 thanks, in large part, to the efforts of Olaus and Mardy Murie. The late Olaus Murie, President of the organization for 17 years, spent years conducting research in the refuge, and Mardy Murie still guides the organization as a member of our Governing Council.

On behalf of our 160,000 members nationwide, including 1,400 in Alaska, I would like to present The Wilderness Society's comments on the section 1002 report and recommendation to Congress on the coastal plain of the Arctic National Wildlife Refuge. The problems and shortcomings of the report are far too numerous to elucidate at this hearing and will be discussed at length in written comments to be submitted later. Therefore I will focus on just one of those problems: the gross misrepresentation perpetrated by the Interior Department upon release of the report on November 24th and found throughout the report.

Many of the assertions made by the Interior Department in the materials distributed on November 24th -- the Executive Summary of the report, the news release, and the fact sheet -- are simply not supported by the report itself. All evidence points to the conclusion that the agency set out intentionally to mislead the public, knowing full well the media would have no choice but to rely on the findings set forth in the abbreviated documents supplied at the press conference. For the record, the 1002 report, itself, was not available on that day, except by special request.

ALASKA REGION

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In stating the oil potential, these documents fail to report the marginal probability, or risk, associated with Arctic Coastal Plain development. Only upon delving deep into the 1002 report itself does the reader find that there is an 81 percent chance that no economically recoverable oil at all lies within the refuge. The chances of discovery reported in the Executive Summary and fact sheet are "conditional" estimates. The condition is that at least one economically recoverable field will be found. In other words, the much touted odds that the refuge holds from .6 to 9.2 billion barrels of recoverable oil only come into play if economically producible oil is discovered. Again, there is only a 19 percent chance of that occurrence. To put this 19 percent risk figure in context, the odds of finding an economic field at Mukluk Island were greater than 70 percent. The drilling at Mukluk Island resulted in a dry hole.

The news release and Executive Summary declare the Arctic Coastal Plain to be "the most outstanding oil and gas frontier remaining in the U.S." However, though a cursory glance at the report may appear to support this statement, careful scrutiny fails to substantiate it. This peculiarity results from a combination of the omission of crucial information and the inclusion of incomparable sets of numbers in single charts. In effect, the agency has mixed apples and oranges in reporting their analysis.

This misleading outcome occurs specifically in the two charts on page 50 of the report. Table III-1 fails to report the risks associated with potential oil resources in a variety of areas around the country. Since many of the areas listed are already producing, there is no longer an associated risk. However the range of risks associated with the undiscovered resources vary widely and are all greater than the risks associated with proven areas. If the risk were factored into the probabilities for the Arctic, the average quantity of economically recoverable oil expected to occur in the area would be .61 billion barrels, not the 3.2 billion barrels reported in this table and throughout the report. .61 billion barrels would supply the nation for just over one month.

The Interior Department's failure to include a column listing the risks in the chart makes it impossible for the public to make any meaningful comparison of the oil potential of the 1002 area with other areas around the country. If the risk information were available, it would likely show that other areas with higher probabilities of discovery, though of lower quantities of oil, actually have more "outstanding" oil potential than the Arctic.

The same criticism holds true for Figure III-2, also on page 50, a bar graph of the conditional estimates for the Arctic compared to five producing fields. Once again, the

numbers do not fit because the estimates for the Arctic are contingent upon the one-in-five chance that any economic fields will be discovered, while the other numbers refer to proven reserves. To make a meaningful comparison of this sort, the estimates for the 1002 prospects should be explicitly adjusted downward to account for the differences in risk among the different areas. If the Interior Department had done this, instead of the highest bar for the Arctic outstripping Prudhoe Bay, it would only reach about as high as Kuparuk. That's a difference of about 7.5 billion barrels. This report is intended to guide the general public and Congress in reaching a decision on the future of the Arctic Coastal Plain. But it requires an economist to detect the misrepresentations made by the Interior Department.

What this explanation means is that the probability of finding oil in the Arctic Refuge is far smaller than all the agency hype leads the public to believe. Moreover the anticipated harm to the wildlife, particularly the Porcupine Caribou Herd, is far greater than the agency admits. For example, careful reading of the report reveals such conclusions as "[m]itigation of the loss of caribou habitat in [the core calving area] is not possible" (page 111). Furthermore the report repeatedly cites the lack of information and experience required for an accurate assessment of the impacts.

Among the many unknowns, one certainty remains: development of the Arctic Coastal Plain would devastate the sensitive and unique wilderness environment and would prove highly detrimental to the wildlife that thrives in the area. In light of the known high degree of harm threatened by development and the low probability of oil, there is no reasonable justification for the Interior Department's full-scale leasing recommendation.

The Wilderness Society urges the Department of the Interior to draw the only conclusion demanded by the report and thus, to reverse the draft recommendation. The Arctic Coastal Plain is irreplaceable and far too precious to be squandered for what may, at best, be a few months worth of oil. It should given the protection it so richly deserves as a unit of the National Wilderness Preservation System.

WILDLIFE FEDERATION OF ALASKA
The Alaska Affiliate of the National Wildlife Federation

February 6, 1987

U.S. Fish and Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th and C Streets NW
Washington, D.C. 20240

Re: Comments and Recommendations Pertaining to Draft "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment", November 1986

O-474

The Wildlife Federation of Alaska (WFA) is the state affiliate of the National Wildlife Federation, an organization with 4 1/2 million members nationwide, 8,000 of whom are Alaskans. We have reviewed the above referenced report and recommendation to the Congress of the United States and the legislative environmental impact statement prepared in accordance with Section 1002(h) of the Alaska National Interest Lands Conservation Act (ANILCA) and the National Environmental Policy Act (NEPA). The Wildlife Federation of Alaska recommends that no oil and gas leasing or development activities be allowed on the Coastal Plain of the Arctic National Wildlife Refuge until the issues and deficiencies identified in our comments and recommendations are adequately addressed.

The Wildlife Federation of Alaska offers the following comments on the 1002 process, the Coastal Plain Resource Assessment, and the recommendation of the Department of Interior proposing full leasing of the coastal plain. We have previously offered testimony at a public hearing on the Coastal Plain Resource Assessment held in Anchorage, Alaska, on January 5, 1987. We wish to expand upon selected concerns and issues identified in that testimony by addressing the following topics:

- o 1002 Evaluation Process
- o Coastal Plain Resource Assessment
- o Mitigation
- o Recommendations

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1002 EVALUATION PROCESS

As stated previously in our public testimony, the coastal plain of the Arctic National Wildlife Refuge must always be viewed first as a wildlife refuge. The assessment report recognizes the value of this conservation unit when it states (p. 45) "...The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America." The important values of the coastal plain are also acknowledged by the report's observation that "...The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge" (p. 46).

The establishment of the refuge in 1960 to preserve its unique wildlife, wilderness, and recreation values resulted in the remainder of Alaska's North Slope and adjacent offshore waters being made available for petroleum exploration and development. Passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980 created a requirement under Section 1002(h) of the Act to prepare the Arctic National Wildlife Refuge Coastal Plain Resource Assessment. The analyses and evaluations required for the Section 1002(h) Report to Congress are clearly intended to provide an assessment of the biotic resources, oil and gas production potential, and compatibility of exploration and development in view of impacts to fish, wildlife, and habitats of the area.

The Department of the Interior, and the Draft Resource Assessment before us at this time, would have benefitted significantly from a more open public process that included conservation groups, industry, the State of Alaska, and Canada. Lacking this input, the report exhibits critical deficiencies in adequately addressing the requirements of Section 1002(h)(1-6). We are particularly concerned that the Secretary's recommendation to pursue full leasing of the 1002 area (Alternative A) is not supported by the information and analyses presented in the report. To the contrary, our examination of the baseline information, recognized values of fish and wildlife habitats, and environmental consequences of oil and gas development as presented in the Resource Assessment clearly identifies a level of adverse impact to national and international wildlife populations which is unacceptable and clearly not compatible with the purposes for which the refuge was established. We find it incongruous that this report, recognizing the anticipated loss of unique wildlife use areas and irreplaceable habitats, still concludes that this significant level of adverse impacts is justified. While espousing adherence to the Fish and Wildlife Service Mitigation Policy (46 F.R. 7644-7663, January 23, 1981) in the report's assessment process, the Department of Interior has failed to comply with the criteria for treatment of unmitigable impacts to Resource Category 1 habitats. For those

habitats, the policy direction is clear; "...all losses of existing habitat be prevented as these one-of-a-kind areas cannot be replaced..." (46 F.R. 7657, January 23, 1981). If the Mitigation Policy is truly an integral part of the 1002 area evaluation process and not just a placebo, Resource Category 1 habitats must not be impacted, and the ecological function and access to these areas must be maintained.

As an organization principally concerned with maintenance of fish and wildlife resources and the habitats upon which they depend, the Wildlife Federation of Alaska will attempt to focus their comments in this area of primary interest. However, we feel compelled to briefly express our concerns relating to the economic and social issues addressed in the report.

The Department of Interior predictions of oil and gas potential, estimates of contribution to domestic energy supplies, and projections of net national economic benefits are subjective and highly speculative. Lacking exploration confirmation of oil or gas discoveries, location and size of reservoirs, and a highly optimistic assumption of $33 per barrel for oil, the economic benefits and national need for exploration and production of petroleum from the 1002 Area is not well supported.

This is particularly true in light of the fact that President Reagan recently vetoed the National Appliance Energy Act of 1986. Passed overwhelmingly by both houses of Congress, this act would have saved the nation millions of barrels of oil and billions of dollars on utility bills by the year 2000. In addition, the Reagan Administration has opposed establishment of fuel efficiency standards for automobiles and continuance of the 55 mile/hour speed limit.

No development in the Coastal Plain should be allowed until the concept of national energy security is more clearly defined, including a full discussion of economic forecasts, domestic oil consumption, the projected need for domestic oil reserves in the 1990's, and national strategies for energy conservation such as efficiency standards for home appliances and fuel economy standards for automobiles.

COASTAL PLAIN RESOURCE ASSESSMENT

The Description of the Existing Environment (Chapter II) provides a reasonably good summary of available information and research results for fish and wildlife distributions, populations, and seasonal use of terrestrial and aquatic habitats within the 1002 area. However, discussions of the coastal habitats, their occurrence within and outside the 1002 area, and ecological relationships to fish and wildlife populations are generally not adequate to define specific habitat affinities and habitat

characteristics. This short-coming is particularly important when evaluating opportunities for maintaining no net loss of in-kind habitat values, an important consideration in the mitigation process.

The Evaluation of Environmental Consequences (Chapter VI) is seriously limited since its assessment is dependent on hypothetical development scenarios derived from insufficient geological information. The general locations of oil and gas development activities may be reasonably accurate, but the scenarios are dependent on additional information which is not currently available, including the depth of structures containing oil or gas, the type of recovery methods, well spacing, the need for water injection or gas lift, and other factors specific to the petroleum field. Lacking more dependable geological information which may only be attainable through selected exploratory drilling, the locations, routing, and density of development facilities as shown in the proposed scenarios are meaningless.

The evaluation process and analysis of anticipated impacts to fish, wildlife, and habitats as presented in this report is highly influenced by the presence and precise siting of facilities in relation to important habitats and use areas, including migration corridors. Relatively minor relocation of facilities in the scenario could physically impact comparable acreages, but have drastically differing effects on fish and wildlife populations, their use of habitats, and access to those habitats. The Evaluation of Environmental Consequences should identify facilities and structures which are not site-dependent and which could potentially be relocated as part of the mitigation process. The evaluation must acknowledge that a significant portion of the oil and gas development facilities are site-dependent and do not have the flexibilty of relocation to minimize adverse impacts to important habitats.

The Evaluation of Environmental Consequences also suffers from an excessive dependence on mitigation techiques utilized in the Prudhoe Bay development area (which may not be applicable to resources and habitats in the 1002 area) and the assumption that mitigation technology to be developed in the future will reduce anticipated impacts to an acceptable level. When considering the irreplaceable values of some of the fish and wildlife resources at stake, we are not confident that "...performance standards ...developed for safety and environmental requirements rather than adherence to highly specific design or operational procedures..." (p. 97) is an appropriate approach to mitigation. It is perhaps more important to recognize that a Prudhoe Bay scale development may not be acceptable within a national wildlife refuge.

Consideration of cumulative impacts of oil and gas development in the 1002 area with other existing and proposed onshore and

offshore developments has not been adquately addressed in the Evaluation of Environmental Consequences. In addition, the national and international range and human use of migratory wildlife resources which are highly dependent on habitats available in the 1002 area has not been adequately recognized for the Porcupine Caribou Herd (PCH) or snow geese. Some of our concerns regarding the treatment of these key species are presented below:

PORCUPINE CARIBOU HERD:

A great deal has been learned about the effects of oil and gas exploration and production on caribou in the Prudhoe Bay area, e.g. levels of road traffic that can occur without adversely affecting free passage of caribou or the minimum distances required to separate roads and pipelines to cause minimal disturbance to caribou. However, we must be careful not to extrapolate from all of the Prudhoe Bay conclusions when estimating impacts in the Arctic National Wildlife Refuge because the refuge must accommodate a very large number of animals in a small space. In comparison, Prudhoe Bay supports a relatively small caribou herd in an area of very extensive suitable habitat.

The available literature concerning the Central Arctic Caribou Herd suggests that portions of the herd have been displaced from the Prudhoe Bay and Kuparuk areas during part of their annual cycle with no obvious effect on herd growth. However, within the Arctic National Wildlife Refuge the Coastal Plain is extremely narrow when compared with the Prudhoe - Kuparuk area. The Arctic Refuge Coastal Plain is 6 times larger than the Prudhoe Bay field, but there are approximately 12 times more caribou in the Porcupine Caribou Herd than the Central Arctic Herd. In addition, the PCH appears to be reaching maximum herd size. Most large mammal biologists would conclude that a herd approaching a peak population within its range would occupy essentially all suitable habitat available. Therefore, the opportunity for displacement of the PCH during calving is probably limited, and such displacement could result in a net loss to the caribou population. Although the projected 20-40% decline in PCH population estimated by FWS under a full development scenario (p. 112) is impossible to verify considering all the variables associated with preferred calving and insect relief habitats and migration movement areas, it strongly indicates that displacement of the PCH could cause a significant decline in population.

We heartily concur with the designation of approximately 242,000 acres of the PCH core calving area as Resource Category 1 habitats, recognizing that the 1002 core calving area represents approximately 80% of the total core calving area used by the Porcupine Caribou Herd (p. 106). The assessment also notes (p. 108) that "...measuring the probable population decline from complete loss of habitat values in calving areas is impossible

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and the ultimate effects of displacement are unknown...". Under the full development scenario, the FWS has appropriately recognized that "...mitigation of the loss of caribou habitat in Resource Category 1 ... is not possible..." (p. 111). Following the premise (p. 98) that "... the FWS normally recommends that all losses of Resource Category 1 habitat be prevented, as these one-of-a-kind areas cannot be replaced...", the logical conclusion is that the PCH core calving habitats within the 1002 area should be justifiably excluded in the Secretary's recommendation for oil and gas development.

As spring progresses on the coastal plain and the weather warms following completion of calving activity, conditions are ripe for the emergence of swarms of mosquitos. As harassment by these insects increases, caribou form dense aggregations and move rapidly toward the coast to seek relief in cooler, windswept areas such as river deltas, mudflats, aufeis, large gravel bars, barrier islands, and in the shallows of lagoons (p. 29). At this time, parturient cows are particularly stressed from the rigors of pregnancy, migration, birth, lactation, hair molt, antler growth, and the the ever-present insect harassment.

The Resource Assessment noted that "...the entire 180,000-member PCH may use the area in some years, mainly during the late June/early July insect-relief period..." (p. 105). The FWS observation that "...access to insect relief habitat and forage resources during this period may be critical to herd productivity..." (p. 29) recognizes the significant importance of insect relief areas to the post-calving aggregations of the PCH. The availability of forage resources and the physical features which make up insect relief areas comprise a specialized habitat that may not be replaceable. We recommend designation of primary insect relief habitats in the Coastal Plain of the 1002 area as Resource Category 1 habitats which are unique and irreplaceable components of the Porcupine Caribou Herd use area. In addition to maintaining the function of insect relief areas, access to these habitats from the core calving area must be assured.

Contrary to the facts and analyses presented in the Environmental Consequences and Mitigation discussions, the Secretary's Recommendation (Chapter VIII) to make the entire 1002 area available for oil and gas leasing, even with the caveat that "...leasing would be phased so the core calving area of the PCH would be last to be explored and developed..." (p. 170), is in direct conflict with the findings of the Resource Assessment and the procedures of the FWS Mitigation Policy which "...guided the assessment team in identifying appropriate measures for mitigating avoidable adverse impacts so there would be no unnecessary adverse effects" (p. 97). In this light, we can only conclude that the Secretary has determined "avoidable adverse impacts" to the Porcupine Caribou Herd are the "necessary adverse effects" of oil and gas development.

SNOW GEESE:

Critical fall staging habitats of snow geese from the Banks Island population have not received adequate attention in the report discussions and evaluation of environmental consequences. The Resource Assessment should be expanded to include greater detail on the importance of fall staging activities to the welfare of migrating snow geese, the characteristics of preferred staging habitats, and the human use values of this resource outside the boundary of the 1002 area. An average of 105,000 snow geese, and as many as 325,000 snow geese, have historically staged on the 1002 area in the fall to feed intensively and build energy reserves prior to their southward migration. These fat reserves are considered by waterfowl biologists to be necessary energy reserves to successfully complete migration, particularly for female snow geese recovering from the stress of reproduction activities.

Chapter VI recognizes that "...reduced time spent feeding and lost habitat in which to feed would result from petroleum development, adversely affecting the accumulation of energy reserves essential for migration" (p. 121). In addition, "...a major reduction or change in distribution of snow geese using the 1002 area could occur through the cumulative effects of direct habitat loss, indirect habitat loss due to disturbance, and direct mortality" (p. 122). Based on the report's assumed displacement of snow geese from 45% of their preferred staging habitat, a reduction in the Banks Island snow goose population of 5-10% could occur and the number of snow geese annually staging in the 1002 area could be reduced by almost 50 percent (p. 122). We are not impressed by the statement that "...staging snow geese are highly mobile..." (p. 121) as it indicates a lack of insight into the concepts of preferred habitat and carrying capacity.

The potential reduction in numbers of Banks Island snow geese would be 15-30,000 birds. Approximately 60-70,000 snow geese are harvested annually in the Pacific Flyway with 80-90% of this harvest occurring in California. An additional 30-50,000 snow geese are harvested annually in Alberta and western Saskatchewan. A draft management plan for the Pacific Flyway identifies protection of the Arctic National Wildlife Refuge and Yukon staging areas as an important need. The potential reduction in Banks Island snow geese numbers from loss or disturbance of fall staging habitats in the 1002 area could be equivalent to 50% of the total Pacific Flyway harvest or essentially all of the Alberta and western Saskatchewan hunting harvest in a given year. Based on the important value of this species to national and international uses, we would not consider potential impacts of oil and gas development in the 1002 area to be insignificant.

The report does not demonstrate the availability of alternate staging habitats which could be utilized for in-kind replacement of habitat values, an important consideration for these staging

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areas which are currently designated Resource Category 2. The baseline studies for snow geese conducted on the 1002 area do not define the habitat characteristics which were representative of preferred staging areas, although they noted a heavy dependence on cottongrass (Eriophorum sp.) and speculated that annual shifts in preferred staging areas may be related to heavy utilization of previously used staging areas. If this annual shift to allow recovery of staging habitat vegetation is verified, it would suggest the necessity of considering all fall staging areas used by snow geese in the 1002 area as a part of an annual habitat rotation.

The significant segment of the snow goose population which could be adversely affected or displaced by oil and gas development, the vulnerability of staging snow geese to disturbance, and the undefined unique habitat characteristics of traditional staging areas supports the WFA recommendation to include snow goose fall staging areas within the coastal plain as Resource Category 1 habitats.

PERENNIAL SPRINGS AND FRESHWATER OVERWINTERING AREAS FOR FISH:

Perennial springs and freshwater overwintering areas for resident and anadromous fish have not been adequately addressed in the Resource Assessment. Suitable overwintering habitats in freshwater systems of the refuge are concentrated at a limited number of locations where adequate flow, water quality, dissolved oxygen, and benthic food organisms are available. Perennial ground water sources (springs) are found on most of the major drainages in the 1002 area.

Within the Arctic National Wildlife Refuge, "...overwintering habitat is probably the greatest limiting factor for Arctic anadromous and freshwater fish populations..." (p. 37). The Alaska Habitat Management Guide for the Arctic Region (Alaska Department of Fish and Game, 1986) notes that in smaller North Slope drainages it is conceivable that a single spring-fed site might harbor virtually all members of a particular Arctic char population from eggs to mature adults during the winter period.

Due to the limited occurrence of spring-fed overwintering areas for fish and their importance in maintaining anadromous and freshwater fish populations in the 1002 area, the Wildlife Federation of Alaska recommends that perennial ground water sources which support overwintering fish be designated Resource Category 1 habitats. Protection of these vulnerable habitats must also include appropriate protection of the groundwater source which supplies the overwintering use areas and prohibition of water removal for domestic or industrial use during the winter period. We also request that FWS identify the location of known, spring-fed overwintering areas, suspected but unsubstantiated

overwintering areas, and necessary mitigation measures to avoid adverse impacts to these irreplaceable habitats.

MITIGATION

The WFA has previously identified serious concerns with the approach to mitigation of impacts to fish, wildlife, and their habitats in our January 5, 1987 testimony. We wish to expand upon those concerns and the mitigation process as it applies to the resources and proposed activities identified for the 1002 area.

As examples of the important fish and wildlife habitat values of the 1002 area, the report recognizes intensively used calving, postcalving, and insect-relief habitats for a significant portion of the Porcupine Caribou Herd and sensitive fall staging areas for a large segment of the Banks Island, Canada, snow goose population. The sensitivities of these species and the unique factors of the habitats they utilize are documented. Approximately 78 percent of the PCH core calving area is within the 1002 area, and disturbance of the cow-calf groups on the calving grounds may interfere with bond formation and can increase calf mortality (p. 28).

In addition, the limited availability of these habitats is acknowledged with statements such as "...Geography apparently limits the availability of suitable alternative calving or insect-relief habitats for the herd..." (p. 6) and "...Access to insect-relief habitat and forage resources...may be critical to herd productivity" (p. 28).

Summary statements also reflect the importance of the 1002 area to a wide spectrum of wildlife resources by stating "...The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge" (p. 46).

The evaluation of Irreversible and Irretrievable Commitments of Resources for Alternatives A and B recognizes the significant impacts attributed to oil and gas development:

- declines in population, herd vigor, and behaviorial patterns due to disturbance and displacement of PCH (p. 142)
- long term losses in fish and wildlife resources, subsistence use, and wilderness values as the inevitable consequence of long term development

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- lack of relative experience regarding the responses or adaptability of the PCH to intensive development activities
- unknown capacity of the PCH to utilize undisturbed areas in greater concentrations for calving
- acknowledgement that EVEN WITH EFFECTIVE MITIGATION (emphasis added), PCH displacement or reduction could be as great as 20-40 percent
- recognition that Alternative A development will result in a loss of, at minimum, a significant part of the PCH calving grounds and other use habitats, a limit to continued expansion of 1002 area muskoxen herds, and a loss of notable staging habitats for internationally important migratory snow geese.

A summary of biological effects of Alternative A on the 1002 area identifies major effects on caribou (PCH), muskox, and snow geese (p. 149). Major environmental effects were previously defined (p. 96) as "...Widespread, long-term change in habitat availability or quality which would likely modify natural abundance or distribution of species using the 1002 area".

The Secretary's Recommendation (p. 170) to make the entire 1002 area available for oil and gas leasing includes the control of development by imposition of appropriate mitigation measures to insure "...no unnecessary adverse effects on the refuge's fish and wildlife and their populations..." and with assurance "...that any unavoidable habitat losses are fully compensated" (p. 170). Additionally, the Secretary indicates that "...Development would proceed with the goal of no net loss of habitat quality...", a goal discussed in greater detail in Chapter VI, Environmental Consequences.

The Fish and Wildlife Service Mitigation Policy (46 F.R. 7644-7663, January 23, 1981) recognizes four resource categories with corresponding mitigation planning goals to insure that the level of mitigation is consistent with the fish and wildlife resource values involved. Within the 1002 area, the FWS analysis designated the PCH core calving area as Resource Category 1 based on its unique and irreplaceable values; the remainder of the 1002 area has been designated Resource Category 2 for its importance to five evaluation species used in the analysis.

Resource Category 1 is defined as habitat of high value for evaluation species which is unique and irreplaceable on a national basis or in the ecoregion. The commensurate Mitigation Planning Goal is no loss of existing habitat value. Development of the rationale for mitigation planning goals (46 F.R. 7645, January 23, 1981) included a fundamental principal "...that avoidance or compensation be recommended for the most valued

resources..." and that "...the degree of mitigation requested correspond to the value and scarcity of the habitat at risk".

The Secretary's Recommendation (Chapter VIII) proposes making the entire 1002 area available for oil and gas leasing based on the assumption that most adverse environmental effects would be minimized or eliminated through mitigation based on information from prior oilfield development at Prudhoe Bay, or through additional, ongoing studies and assessments conducted during phased leasing. The FWS Mitigation Policy Guideline for Resource Category 1 habitats states "...The Service will recommend that all losses of existing habitat be prevented as these one-of-a-kind areas cannot be replaced" (46 F.R. 7657, January 23, 1981). Where there is likely to be a significant fish and wildlife resource loss (Resource Category 1), the FWS Mitigation Policy (46 F.R. 7659, January 23, 1981) provides criteria to be addressed in evaluation of projects. Of significant importance is criteria (2) to select the least environmentally damaging reasonable alternative, and criteria (4) which states "...All important recommended means and measures have been adopted with GUARANTEED IMPLEMENTATION (emphasis added) to satisfactorily compensate for unavoidable damage or loss consistent with the appropriate mitigation goal." Since the mitigation goal for Resource Category 1 is no loss of existing habitat value and no means and measures have been identified to achieve that goal in the 1002 report, we believe that any proposal to permit oil and gas development in or adversely affecting Resource Category 1 habitats is not in compliance with the FWS Mitigation Policy.

Finally, the mitigation measures identified in Chapter VI (p. 145) are more appropriate for protection of discrete location habitats and use areas which can be addressed by development buffers, timing of activities, and performance criteria within the scope of technical concerns addressed in prior North Slope oil and gas developments. In particular, the calving, post-calving, and insect relief habitats of the PCH are more extensive, and currently available information indicates unique characteristics which may not be replaceable or available in alternate habitats. The important issue of free movement between seasonally-important use areas of the PCH has not been adequately addressed in the evaluation process. Wildlife movements and migration are recognized as a part of habitat values which must be addressed during the mitigation process (46 F.R. 7645, January 23, 1987).

RECOMMENDATIONS

The Wildlife Federation of Alaska recommends that no oil and gas leasing or development activities be allowed on the coastal plain of the Arctic National Wildlife Refuge until the issues and deficiencies identified in our comments and recommendations are

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adequately addressed. In summary, these include the following:

- National energy security should be clearly defined, including a full discussion of economic forecasts, domestic oil consumption, the projected need for domestic oil reserves in the 1990's, and national strategies for energy conservation such as efficiency standards for home appliances and fuel economy standards for automobiles.

- Decisions on the use of the coastal plain should be delayed until biological research on the characteristics of the Porcupine Caribou Herd calving habitat can be clearly defined. The conclusions of our nation's leading caribou biologists at a workshop entitled "Demography and Behavior of the Central Arctic and Porcupine Caribou Herds in Relation to Oil Field Development" conducted in October 1986 was that scientists do not yet have a clear understanding of the ecological attributes of caribou calving areas on the Arctic Slope. (This workshop was sponsored by the Alaska Oil and Gas Association and the Alaska Department of Fish and Game.) Until critical calving habitat boundaries can be delineated, all land use decisions within the 1002 area should be deferred.

- Insect relief habitats used by the Porcupine Caribou Herd in the Coastal Plain of the 1002 area should be designated Resource Category 1 habitats with specific provision made for adequate access by the PCH to these use areas.

- Fall staging areas for snow geese in the Coastal Plain of the 1002 area should be designated Resource Category 1 habitats.

- The Coastal Plain Resource Assessment should clearly describe appropriate mitigation measures for each development alternative that would result in no net loss of critical fish and wildlife habitat. How will the Department of Interior determine whether appropriate technology is available to restore or revegetate plant communities which occur on the coastal plain, particularly those which comprise caribou calving habitat, caribou insect relief habitat, and snow goose staging habitat?

- The following criteria should be incorporated into the mitigation process for all oil and gas development alternatives considered:

  - no net loss of caribou calving or insect relief habitat is justified in any of the alternatives;

- free passage of caribou must be provided to all insect relief habitats;

- no net loss of snow goose fall staging habitats is justified in any of the alternatives;

o The Wildlife Federation of Alaska opposes any land trade actions that precede or circumvent completion of the 1002 process or any land trade actions that would remove Resource Category 1 habitats (including caribou calving and insect relief areas, snow goose staging areas, and fish overwintering areas) from the Arctic National Wildlife Refuge.

If these issues and deficiencies are addressed in the context of an open public process, then the Fish and Wildlife Service, conservation groups, the oil industry and Congress would have the tools necessary to make well-reasoned decisions about oil and gas development and the protection of wildlife, recreation, subsistence, and wilderness values on the Coastal Plain of the Arctic National Wildlife Refuge.

Thank you for your consideration of these comments.

Sincerely,

Ann L. Rothe, President
WILDLIFE FEDERATION OF ALASKA

cc: Senator Ted Stevens
Senator Frank Murkowski
Congressman Don Young
Jay Hair, National Wildlife Federation
Bruce Apple, National Wildlife Federation

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DANIEL A. POOLE
President
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Vice-President
L. L. WILLIAMSON
Secretary
WESLEY M. DIXON, Jr.
Board Chairman

February 5, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Gentlemen:

Re. the resource assessment of the coastal plan of the Arctic National Wildlife Refuge.

Institute staff has reviewed the draft assessment, which, from the standpoint of identification of the refuge's biological environment and discussion of environmental effects of development, we find reasonably well done. Our review of these aspects will continue.

Our primary concern at this point centers on the Secretary's Recommendations, Chapter VIII. We strongly urge that the Secretary incorporate the following suggestions in his final report to Congress:

1. That the preferential formula whereby the State of Alaska currently receives 90 percent of oil and gas royalties be reduced to no more than are received by other states--50 percent maximum to the state and 50 percent to the federal government.

2. That a substantial portion of the federal share be credited directly to the Migratory Bird Conservation Fund to implement the North American Waterfowl Management Plan.

3. That a lesser amount be credited to the Fish and Wildlife Service for satisfaction of the payments-in-lieu of taxes requirement.

4. That some of the money be made available for refuge operations and maintenance. We would object, however, to any significant commitment of money for O&M until after the needs of the North American Waterfowl Management Plan have been satisfied.

5. Finally, we are inclined to believe that oil companies would find favor with the imposition of a small surcharge per barrel in support of the fish and wildlife program.

We request that this letter be included in the Secretary's final report to Congress.

Sincerely,

Daniel A. Poole
President

DAP:dt

Comments from Industry (I)

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ABR
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2 February 1987

U.S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Bldg.
18th and "C" Street, N.W.
Washington, D.C. 20240

To whom it may concern:

We have reviewed the draft 1002 Report, particularly those sections dealing with terrestrial biology. Our specific comments are attached. In general, the baseline data collected in ANWR for 1002-related biological studies are of high scientific merit, summarized in a brief (understandably), but informative fashion, and should be of great value in the decision-making process and for assessing development-related impacts. In our opinion, most issues regarding potential impacts have been adequately defined, with the exception of the probability for direct loss of habitats and populations. Sections on "The Effects on the Biological Environment", especially in regard to loss of coastal insect relief for caribou and staging habitat for snow geese, need considerably more support from existing data. At a minimum, more detailed explanations of the criteria and rationale used for estimating habitat loss, amounts of displacement, and population declines are necessary. Without these elements, the impact assessments lack credibility.

Thank you for the opportunity to comment. Both reviewers have field experience with many of the species described in and adjacent to the ANWR Coastal Plain. We both agree that the international wildlife values of the 1002 area warrant careful and protective strategies for any resource development and we wish you the best of luck in completing the final report to congress.

Sincerely,

Robert J. Ritchie

Robert J. Ritchie
Stephen M. Murphy

RJR:slk
Attachments

CARIBOU

1. p. 28 Paragraph 3.
It would be appropriate to explain the criteria/rationale used for delineating the core calving area based on occupancy during 5 of 14 years (36%). Concentration areas obviously exist, but 5 of 14 years seems arbitrary and the definition of core calving radically influences the projected impacts. It would be more appropriate to compile a table listing the number of acres that comprise each of the concentration areas (i.e., concentration areas used in only 1 year = ____ acres; 2 years = ____ acres, etc.). This table could then be expanded for impact analyses that would provide estimates of habitat losses for all of the years of use, not just 5 of 14 years.

2. p. 28 Paragraph 5.
This section documents shifts in calving areas due to natural factors. Do data exist on productivity and recruitment during any of these years? These data would be very important for understanding the effects of displacement.

3. p. 106 Paragraph 1.
It is debatable whether Prudhoe Bay was ever a calving area of any consequence, but undoubtedly some caribou have been displaced from this area. However, in the Kuparuk Field, where the development is more state-of-the-art (and presumably more similar to an ANWR development scenario) and where a good data base for pre- and post-construction calving densities exists, the data indicate that access to calving areas and overall densities have not been affected. As in ANWR, there is natural annual variation in calving densities, presumably due primarily to snow cover.

4. p. 107 Paragraph 2.
The secondary habitat modifications described are accurate, but their effects on caribou are not supported by data. Impounded areas are undoubtedly lost as caribou habitat, but road-side dust, for example, accelerates snow melt in spring and we have observed pregnant cows in May selecting road-side areas for foraging.

5. p. 107 Paragraph 2-4.
Very dogmatic with no citations.

6. p. 108 Paragraph 2.
In this paragraph the term "displacement" is used to imply that caribou will completely abandon the core calving area and move to suboptimal habitats. In subsequent text, the 2 mile "sphere of influence" is used to describe displacement. These are radically different concepts and we suggest using more precise terminology, such as major displacement versus localized displacement. In this context, there are no data from the CAH that demonstrate major displacement.

7. p. 108 Paragraph 6.
The ABR representative to the FWS workshop, and others we suspect, were using available evidence (Dau and Cameron 1985) and agreed that localized displacement would occur.

8. p. 109 Paragraph 6.
This impact analysis for the insect season requires more justification. We think that use of the 2 mile "sphere of influence" derived from data acquired during calving is probably inappropriate for insect season analyses. The authors state on p. 107, paragraph 5 that calving is the time of greatest vulnerability to disturbance, yet this worst-case situation is used to delineate insect-season impacts. We agree that the CAH and PCH are not 100% comparable, yet there are extensive insect-season data available on caribou movements, reactions to disturbance, and the effectiveness of mitigation from the CAH experience that apparently were not included in this impact analysis. In the Kuparuk Oilfield virtually no insect relief habitat has been lost to development. Access to the coast may be delayed for large mosquito-harassed groups, but these groups eventually get to the coast. Therefore, the relevant issue is energetic stress resulting from paralleling linear structures and increased exposure to mosquitoes. Recent advances in mitigation theory, such as separations of pipelines and heavily traveled roads, have only recently been implemented and should further improve the situation.

9. p. 110 Paragraph 7.
Illegal harvest of CAH caribou has been increasing in recent years and, in our opinion, there is tremendous potential for negative demographic impacts. Enforcement along the TAPS corridor would be the most effective "mitigation" for this secondary effect of industrial development. This experience should weigh heavily in decisions regarding access into an expanded road system into ANWR.

10. p. 111 Mitigation #5.
"Separate pipelines and roads as necessary" is too vague. Pipelines and roads should be separated when possible on all "haul" and "spine" roads (i.e., roads with regular traffic).

11. p. 112 Paragraphs 3 and 4.
We appreciate the need to develop quantitative estimates for the decision-making process, but the estimates generated here, whether they are high, low, or accurate, have not been adequately supported. Furthermore, a population decline and a change in distribution are very different impacts and to quote the same range of figures for both and not to distinguish between the two is at best confusing.

12. p. 132 Paragraph 2. Same as above

13. p. 134 Paragraph 2.
Once again, the 2 mile "sphere of influence" is probably inappropriate for analyses of impacts during the insect season.

14. p. 134 Paragraph 2.
"Over 80 percent of coastal-insect-relief habitats would remain unavailable under limited leasing." As stated without any qualification, this statement is misleading. This degree of habitat loss is not supported by data from the CAH experience; this should be noted.

15. p. 134 Paragraph 6.
For the CAH there is projected 5-10 percent population decline or distribution change. These are extremely different levels of impact and estimates should be presented for each input separately.

RAPTORS (including the threatened Peregrine Falcon)

1. p. 38 Paragraph 3.
The text states that the "arctic peregrine falcon is the only threatened or endangered species known to occur in the 1002 area." I would reword this to state that the peregrine is the only threatened species known to occur in the 1002 area. Currently, the arctic peregrine (tundrius) is classified as threatened, not endangered. Its recent reclassification (from endangered) was due to signs of a population recovery. Also, I think it is at least worth noting that the 1002 area occurs within the range of the endangered Eskimo curlew.

2. p. 38 Paragraph 4.
I do not disagree that peregrines arrive at their northern aeries between April 21 and May 7, nor that egg-laying and incubation can occur as early as 15 May. I do feel, however, that the use of the word generally is not appropriate. I think the reference used for these dates (NPR-A Task Force 1978) is not the best source of information. A better reference would be USFWS 1982. In that status report the first week of June is given as normal egg-laying for tundrius.

3. p. 38 Paragraph 6.
This section on peregrines ends by noting that several sightings of peregrines during June and July have been made in the 1002 area, and yet the significance of this is unclear. Two things come to mind. First, as peregrines increase as breeders on the North Slope, non-breeders will also. Second, peregrine identification is problematic, especially when gyrfalcons occur in the neighborhood. Although some observations have been well documented in the baseline studies, at least some observations could be of gyrfalcons, not peregrines.

4. p. 123 Paragraph 8.
The report uses two cases to depict how variable the reactions of raptors are to disturbance. I am not sure if the reports' intent was to contrast variability between species or individuals. A great deal of variation occurs in both cases. However, the examples described are not clearly related to the phenomenon of disturbance. Specifically, rough-legged hawks are cyclic in their nesting and although probably more easily sensitized during years of low prey, they often abandon sites during these lows, regardless of disturbance.

5. p. 123 Paragraph 9.
This paragraph mentions high density raptor nesting habitat used by, among others, peregrine falcons. I have been in both areas and do not feel the Saddlerochit area, at least that within the 1002 area, qualifies as high density raptor habitat. Maybe this should be clarified and note that high density habitat lies south of the 1002 area.

6. p. 124 Paragraph 7.
Golden eagles are opportunistic and are abundant at other North Slope sites. If caribou do decline in or shift from the 1002 area, eagles probably will also. However, I think the use of the terms "decline moderately" is unwarranted. "Change distribution" is more appropriate and should be the essence of the statement.

7. p. 126 Paragraph 4.

Minor point: the text states that arctic peregrines are absent from the 1002 area "through April". Elsewhere (e.g., p. 126, paragraph 8) the text mentions 15 April as arrival dates. I would use the former date (end of April, 1 May).

Also in this paragraph, the report states that loss of suitable nesting habitat as a result of facility placement would be minor, since facilities would not be permitted within 2 miles of an aerie in potential nesting habitat. Earlier (p. 124, paragraph 5) recommended restrictions use 1 mile as a buffer zone. Properly developed, at least some facilities have been constructed within 2 miles (Pump Station No. 2, TAPS; Elliott Highway, Grapefruit Rocks Aerie) of aeries.

BIRDS

1. p. 35 Paragraph 3.
Snow geese "move westward into the 1002 area as far as the Hulahula River." Maps in the text (p. 1.3B) designate use areas on the Canning River Delta and Katakturuk Plateau.

2. p. 35 Paragraph 3.
"The average number of (snow) geese using the 1002 area is 105,000, approximately 15-20 percent of the Banks Island Population." I could not find a reference in the baseline studies on how this figure was derived. Since this figure is applied to concluding remarks regarding possible reductions in the Banks Island Population (p. 122, paragraph 2), I think it deserves more of a reference.

3. p. 119 Paragraph 9.
While the general statement that "the responses of birds to human disturbance...are highly variable" is true, there is more information available on this topic than is cited. Recent research, such as "The Effects of the Lisburne Development Project on Geese and Swans" (Murphy et al. 1986), are relevant to this topic. This study, cited in the Seabirds and Shorebirds section, but not in the Swans, Geese, and Ducks section, provides data on the effects of oilfield development on nesting density, nesting success, distribution in the oilfield from June-September, and the behavior of geese and swans experiencing different types and intensities of human activity. These data, combined with findings from the 1986 field season (not available at the time the 1002 Report was finalized), indicate that there were interspecific, seasonal, and sex-related differences in reactions to disturbance.

4. p. 121 Paragraph 4.
"Disturbance...could extend up to 3 miles from the source (compressor simulator)." The assumption is made that other sources (such as structures) will displace geese as well. Snow geese may accommodate to roads and pads and their associated tangential or stationary stimuli at much closer distances than they would to a noisy compressor station.

5. p. 121 Paragraph 6.
Hampton and Joyce (1985, p. 4-7) concluded that "snow geese and Brant displayed accommodation to oilfield development and were not significantly disturbed."

MUSKOXEN

1. p. 113 Paragraph 6.
In describing mitigation for muskoxen, the authors state that "standard stipulations" will be employed. However, a question not asked is "what will muskoxen do when they confront roads and elevated pipelines?" Will they cross like caribou or will other mitigation be required.

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February 2, 1987

U.S. Fish & Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

RE: Draft Arctic National Wildlife Refuge, Alaska
Coastal Plain Resource Assessment

Gentlemen:

ARCO has reviewed the Draft Arctic National Wildlife Refuge (ANWR), Coastal Plain Resource Assessment and has comments to offer for your review and consideration. We welcome this opportunity to participate in the further development of this document that, when finalized, will allow the Secretary of Interior to make a recommendation to the Congress based on the best available scientific and technical information.

We support expeditious leasing of the ANWR Coastal Plain for oil and gas exploration, production, and development. To further this support, we are committed to the exploration of ANWR, provided we gain the access to explore through any congressionally mandated process. To delay leasing in order to conduct further studies would not be in the best interest of the Nation or the State of Alaska in our view. Currently, there is sufficient data to make a prudent decision regarding leasing.

We firmly support the Department of Interior's Section 1002(h) recommendation for the leasing, exploration, and, if oil is found, production on the ANWR Coastal Plain. Our experiences at Prudhoe Bay and Kuparuk, where oil is produced in an environmentally sound manner, convinces us that development at ANWR would accrue significant benefits to the Federal, State, and local governments. These benefits include reduced dependence on foreign oil imports (enhancing our national security and balance of payments) and more jobs (directly in Alaska on ANWR and elsewhere in the construction of facilities/modules and the manufacturing of pipe and other oil field goods).

ARCO Alaska, Inc. is a Subsidiary of Atlantic Richfield Company

During the period of 1980 to 1985, ARCO expenditures for manufactured goods on the North Slope totaled $3.6 billion. This expenditure was for the purchases made from companies and small businesses throughout the 50 states. Although we generally find the resource potential/estimates to be of the proper magnitude, the only way to evaluate an area's resource potential accurately is to drill wells. Sound decisions in the national interest concerning ANWR must be based on a complete picture of its subsurface resources, as well as its surface values.

Attachment I provides specific comments on the ANWR Coastal Plain Resource Assessment. Do not hesitate to call me at (907) 265-6123 if you have any questions.

Finally, ARCO supports the written commentary that is being submitted separately by the Alaska Oil and Gas Association.

Sincerely,

J. M. Posey
Manager
Issues Advocacy

JMP/RO535:sm

Attachment I - Specific Comments
Attachment II - List of Exhibits

ATTACHMENT I

ARCO

Specific Comments on the Draft
ANWR Coastal Plain Resource Assessment

Chapter 2

Page 28 - 3rd paragraph - Caribou

"The core calving area is a location to which pregnant cows have shown a strong fidelity as traditionally favored calving habitat. Those concentrated calving areas used in at least five years during the 14 year study were identified as the core calving area." Does five out of 14 years reflect a strong fidelity? We think not. A strong fidelity would be utilization of an area greater than 50% of the time (See Exhibits 3 and 17).

Chapter 3

In general, this chapter downplays the tremendous value of potential natural gas reserves. Future need may make development of the national reserves viable. Besides conventional natural gas production, these reserves could be produced as natural gas liquids or condensate.

Chapter 4

Page 76 - 2nd paragraph - Exploratory Drilling

The statement that "The drilling rig...usually requiring 110 to 180 C-130 loads,..." should take into account that a modular wheeled rig could be barged to a beachhead in the summer and moved to the location via ice road. This would accelerate mobilization and reduce the number of multiyear wells required to evaluate the potential prospects. Secondly, a modular rig could drill more than one moderate depth well per year (See Exhibits 14, 15, and 16).

Page 77 - 1st full paragraph - Exploratory Drilling

The statement that "...the rig is placed on pilings or timbers." should consider that an alternative of a stable rig footprint is a gravel pad. This is essentially beneficial for a multiyear location for a deeper abnormal pressured prospect (See Exhibits 14, 15, and 16).

Page 77 - 4th full paragraph - Exploratory Drilling

The statement that"...the well is Arctic packed and suspended." should recognize that the well only needs to be filled with a non-freezeable material for suspension. The space between the surface casing and next casing string only needs to be sealed with Arctic pack preceded with cement when the well is completed and the pumpable fluids from the reserve pit have been injected.

Page 80 - Drilling Pads and Wells

The pad size of 20-35 acres may be exaggerated. For example, the average Kuparuk pads is in the range of 10-11 acres. Pad size will vary according to the number of wells to be drilled, as well as other pertinent field considerations.

Page 81 - 1st paragraph - Drilling Pads and Wells

The statement that indicates that liquids "...pumped into a mud disposal well. Solids must be removed..." should be expanded to demonstrate that clearly the mud should be injected into the annular channel between the surface casing and the protective casing. For example, the mud from the drilling process will be injected between the 13-3/8" and 9-5/8" casings in the previous development well.

Consideration should also be given to onsite disposal of the cuttings in an approved manner. Large drill sites with numerous wells will generate sufficient cuttings to make onsite disposal a desirable, environmentally proper alternative (see Exhibit 16).

Finally, flare stacks are not generally used at a drill site.

Page 81 - 5th paragraph - Field Roads and Pipelines

Pipeline sizes vary between 8" and 24". Also, change the sentence regarding vertical support members (VSMs) to read "They are commonly placed on elevated Vertical Support Members." This will give us flexibility and not tie us to a five foot (5') steel VSM.

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Page 82 - Pipelines

In general, this discussion on the technical aspects and concepts of pipeline design and utilization is appropriate; however, certain aspects need further clarification. The discussion of the Kuparuk, Prudhoe Bay and TAPS pipelines are taken in a singular context, when in reality a pipeline that may be designed and constructed for future ANWR development would incorporate the best characteristics of each. There should not be any implications that only elevated pipelines will be acceptable, or all pipelines will utilize a common pipe support or it would be best to have the pipeline parallel the road. The terrain, as well as the field size and development criteria, will determine engineering design. In other words, there may not be any one best design for the entire project; rather, a case-by-case evaluation will determine the best design for each segment.

Page 84 - Airfields for Construction Camps

"Air development" should read "airfield development."

Page 99 - last paragraph - Consequences of Exploratory Drilling

Your reference to "traces of oils used during drilling to 'slicken' up the drill bit;" is not in keeping with current drilling technology utilized on the North Slope. Fresh water-based mud systems are currently used to drill wells on the North Slope.

Page 103 - 3rd full paragraph - Vegetation, Wetlands, and Terrain Types

Impoundment concerns can be mitigated with culverts (see Exhibit 4 and 17).

Page 103 - 4th paragraph - Vegetation, Wetlands, and Terrain Types

Impoundment concerns can be mitigated with culverts (see Exhibit 4 and 17).

Page 103 - 5th paragraph - Vegetation, Wetlands, and Terrain Types

The Meehan (1986) Report is a draft report that contains a significant number of errors; this report and

any reference to it should not be included as part of this document (see Exhibit 2).

Page 107 - 5th paragraph - Production, Transportation, and Development

The sentence "Whitten and Cameron (1985) found consistently low numbers" should be rephrased to read "Whitten and Cameron (1985) found consistently low numbers of caribou and generally low percentages of calves in the Prudhoe Bay oil field from 1978 to 1982. One of several explanations offered is possible displacement by oil field activities. Gavin (1979) also found very low percentages of calves and total caribou in the Prudhoe Bay oil field area prior to and during initial oil field development (1970-1979). White, et.al. (1975) suggests that the high percentage of wet and moist areas near Prudhoe Bay makes this area less attractive to caribou." (see Exhibit 3).

Page 108 - 2nd paragraph - Production, Transportation, and Development

The statement "Displacement of the PCH from a core calving area to a less desirable area would be expected to reduce caribou productivity" confuses the term "less desirable area" with less important. No proof exists to illustrate that the core calving area is more important, productive or valuable; it is only used more often. The entire ANWR and Canadian coastal plain is used for calving, and there is no data that shows the entire plain to be more or less important than the core areas (see Exhibit 3).

Page 108 - 6th paragraph - Production, Transportation, and Development

We consider this paragraph to be an exaggeration. It should be reworded to reflect that "the FWS was examining a hypothetical oil field development, that was three times the size of Prudhoe Bay and situated entirely within the calving areas."

Page 108 -7th paragraph - Production, Transportation, and Development

The statement "Based on the work of Dau and Cameron (1985), caribou are displaced approximately two miles out from development" misrepresents the information actually found in their report. The information from

the Dau and Cameron report for the 1982-85 period is as follows:

Within 1000M of the Road

	Total Caribou	Total Calves
May	1,568	417
June	2,965	546
July	20,132	3,986

Within 100M of the Road

	Total Caribou	Total Calves
May	78	25
June	208	33
July	3,422	757

Based on this data, it is incorrect to assume a two-mile impact/avoidance zone near roads in a calving area. An important shortcoming was its failure to account for the effect of lakes and ponds on the available calving habitat adjacent to the Milne Point Road.

Page 108-109 - Production, Transportation, and Development

In general, clarification is needed with regard to references by S. Murphy and/or J. Curatlo on ramp and crossing studies. As presented, this information is confusing (see Exhibit 6).

Page 120 - 1st paragraph - Swans, Geese, and Ducks

One study that should be referenced is the Murphy, et.al. 1986 "Lisburne Terrestrial Monitoring Program (1985). The effects of the Lisburne Development Project on Geese and Swans." The results of this study indicated that there was little effect on the nesting and area use by geese, swans and ducks in the Lisburne development area.

Page 120 - 2nd paragraph - Swans, Geese, and Ducks

Your reference to "some poaching could also occur." is contrary to oil field practices. The prohibition on firearms in the oil fields is strictly enforced.

Page 121 - last paragraph - Conclusion

A decline in waterfowl populations has not been documented in the Lisburne operational area. This fact is counter to the supposition made that a decline in waterfowl could occur as a result of development.

Page 130 - 4th full paragraph - State and Local Political and Economic Systems

The statement that"...permanent jobs would be filled by commuters...with residences outside Alaska." is absolutely erroneous. Essentially all ARCO personnel live in the greater Anchorage area.

Page 143 - Table VI - 8 - Irreversible and Irretrievable Commitments of Resources

The chart indicates under "Artifacts at Development Sites" that all would be lost in the full and partial leasing alternatives. Current law requires that an archaeological survey of an area must be performed prior to exploration. Important archaeological sites are avoided, studied or removed to prevent damage to archaeological resources. A more accurate statement would be that present survey mandates should preclude any significant loss of artifacts.

Page 145-148 - Summary of Recommended Mitigation for the 1002 Area

We recognize the need for meaningful mitigating measures, and many of those listed are presently utilized in the North Slope oil fields. During the last ten years we have found that some of the mitigation measures that were put in place, without a firm technical or scientific basis, at the onset were unnecessary, ineffective or in some cases proved to be detrimental to the environment (i.e., more tundra was covered by gravel for caribou crossings, roads, and pipeline routes that were unnecessary). We recommend a more general/flexible case-by-case option to mitigate the concerns of the present, using past experience as the guideline for mitigation, which would allow for future innovative methods that may be developed (see Exhibit 17).

ATTACHMENT II

EXHIBIT LIST

The following exhibits have been submitted to the U.S. Fish and Wildlife Service as supplementary information to our ANWR Draft Legislative Environmental Impact Statement Commentary:

Exhibit 1: Critique of draft USFW report "The Effects of Prudhoe Bay Reserve Pit Fluids on the Water Quality and Macroinvertebrates of Tundra Ponds." Correspondence from ARCO to USFW, July 22, August 24, 1985 and USFW reply on August 6, 1985.

Exhibit 2: Critique of R. Meehan's "North Slope Guidance Manual." Letter to Robert Jacobsen, Assistant Regional Director, USFW from T.R. Fink, Manager of Environmental Conservation, ARCO Alaska, October 9, 1986.

Exhibit 3: Coastal Oil Development and its Effects on Caribou Migration and Population Patterns in the Prudhoe Bay region of Alaska's North Slope, 1969-1979, by Angus Gavin and D.W. Chamberlain, September 1980.

Exhibit 4: Prudhoe Bay Unit, Lisburne Development, Drainage and Erosion Control, Design and Criteria Manual, May 1985.

Exhibit 5: Prudhoe Bay Unit, Lisburne Development, Large-Scale Model Study of Arctic Slope Protection, Tekmarine, Inc., Sierra Madre, California, June 1984.

Exhibit 6: Department of the Army, 45th Meeting of the Coastal Engineering Research Board, Fairbanks, Alaska, May 14, 1986.

Exhibit 7: Lisburne Development, 1985 Summer Hydrology.

Exhibit 8: Lisburne Development, 1984 Summer Hydrology.

Exhibit 9: Lisburne Development, 1983 Summer Hydrology.

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Exhibit 10: Breakup 1984, Sagavanirktok and Putuligayuk Rivers, Prudhoe Bay, Alaska

Exhibit 11: Pile Driving and Load Tests in Permafrost for the Kuparuk Pipeline System, Victor Manikian, 1983.

Exhibit 12: Design Evaluations in Support of Offshore Facilities and Gravel Islands in the Arctic.

Exhibit 13: Offshore Seawater Treating Plant, Waterflood Project, Prudhoe Bay Oil Field, December 1984.

Exhibit 14: Prudhoe Bay Unit, Lisburne Development, Geotechnical Investigations, Winter, 1983, Vol. 1, Engineering, Harding Lawson Associates, June 1983.

Exhibit 15: Prudhoe Bay Unit, Lisburne Development, Geotechnical Investigations, Winter, 1983, Vol. 2, Field Data and Laboratory Testing, Harding Lawson Associates, June 1983.

Exhibit 16: Prudhoe Bay Unit, Lisburne Development, Geotechnical Investigations, Winter, 1984, Vol. 3, Engineering, Field Data and Laboratory Testing, Harding Lawson Associates, August 1984.

Exhibit 17: Petroleum Development in Arctic Tundra Wetlands, Gary F. Smith, Scott B. Robertson, Delivered National Wetland Symposium, New Orleans, October 8-10, 1986.

THE ARCTIC ADVENTURERS
P.O. BOX 91107
ANCHORAGE, ALASKA 99509-1107

January 15, 1987

U.S. Fish and Wildlife Service; Division of Refuge Management
2343 Main Interior Building
18th and C Streets, Northwest
Washington, D.C. 20510

Re: Comments on Draft 1002 Report

Mr. Horn:

We are writing to comment on the draft report submitted by the U.S. Fish and Wildlife Service which concerns the Coastal Basin of the Arctic National Wildlife Refuge. We are in support of alternative E which would designate this area as wilderness. We have taken this stand primarily on the grounds that we feel the reserve of recoverable oil in this region does not justify the risk that would be incurred by developing this area. We do not feel the Coastal Basin should be permanently closed to development, but that development should be done at a time when our technology has further developed providing adequate protection for the wildlife and flora.

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We have concerns with the proposed way hazardous waste would be disposed of which could greatly endanger the fragile ego system of this area. The porcupine caribou herd also poses management problems which the proposed development of this area does not address. Using the Central Alaskan herd as a prototype is not feasible. Along with these concerns is the insufficient scope that the draft focused on which, in our belief, does not identify the full impact that development would have on the Arctic region: i.e. Canadian concerns as well as impact on native subsistence.

We feel this area of our country and world is of major national importance to every American and therefore should be preserved in its natural state. After being to this area ourselves we have seen the grandeur that the coastal basin offers and the wildlife that it supports. For the sake of future generations as well as the present ones we would strongly recommend that this area be designated as wilderness thus protecting its beauty and greatness. We are not advocates of "hard line" conservation, for we are all professional men that only desire the chance for our children and grandchildren to enjoy the beauty of nature, if for no other reason than "Because it's there". Please feel free to contact us for further comment.

Sincerely Yours;

Greg Head --The Arctic Adventurers--

Gregory Head (Spokesman)	Tim Forsythe	Greg Scott
Larry Brown	Steve Spalding	Scott Luse
John Landry	Larry Longhurst	Steve Jackson
Fred Whipple	Pete Norseth	Pete Faber

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name John Miller

Mailing Address 550 W 7th Suite 1840, Anchorage, AK 99501

BP Alaska Exploration Inc.

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☒ I am speaking for BP Alaska Exploration Inc.
(please enter name of organization you represent)

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TESTIMONY OF THE

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT"

Anchorage, Alaska

January 5, 1987

I am John Miller, Alaska area manager for BP Alaska Exploration Inc. We welcome the opportunity to offer testimony on the U.S. Department of Interior 1002 (h) report.

BP Alaska strongly support the U.S. Department of Interior's recommendation that the entire 1002 coastal plain area be authorized for oil and gas leasing, exploration and production. The national interest is best served by congressional authorization of the Department of Interior's recommendation. Only then can a factual assessment of the petroleum reserves be made by exploratory drilling of this highly prospective area. However, this cannot be done at any cost. Stipulations that increase costs without compensating benefits should, at most, be selectively applied. For example, the prohibition of all exploratory activity from May 1 to November 1 is not justified by past north slope upland exploratory experience. Conversely, it could require shut down and re-start of operations to finish the well in a second year, thereby expanding threats to well safety and the environment, and increasing costs. Another example is the stipulation that wells not exceeding 10,000 feet in depth be drilled from ice pads. This decision should be site specific based on available pad materials, timing, terrain and other current and local conditions.

BP Alaska support leasing under reasonable environmental stipulations. We agree with the DEIS comments that exploration and development experience at Prudhoe Bay indicates minimal impact on wildlife resources and hence it is

reasonable to assume coastal plain development can also proceed with similar minimal effects; and that most adverse effects would be minimized or eliminated through carefully applied mitigation, using experience and technology acquired from Prudhoe Bay development and construction of the trans-Alaska pipeline. Actually, the Prudhoe Bay and TAPS experience and technology has been further enhanced through subsequent developments of Kuparuk, Milne Point, Lisburne and Endicott Fields along with many attendant environmental studies. But exploration and development of these arctic north slope fields has been very costly. ~~So~~, leasing, exploration and development of commercial prospects can occur under currently projected economic conditions in this high cost region in an environmentally responsible manner; but only if costs are controlled by imposing only prudent stipulations that are fully justified and carefully crafted.

A great deal of emphasis has been placed on the possible detrimental effects that discovery and development of a commercial oil field in the coastal plain will have on the Porcupine Caribou Herd's calving ground and habitat. This is a legitimate concern. BP Alaska agree with the DEIS conclusion that the total available habitat has never been fully occupied, that it is not currently limiting the growth of the herd and that loss of habitat represented by likely 1002 area oil development will not impact caribou growth or productivity. Also, a major oil development would not do irrepairable damage to Porcupine Caribou calving grounds. The ANWR coastal plain is but a portion of the calving grounds of the Porcupine Caribou Herd. A discovery of world ranking size would only involve a small portion of the coastal plain. The herd's calving range extends into the Brooks Range foothills to the south of the ANWR coastal plain and eastward into Canada to the MacKenzie Bay area. Experience with the Central Arctic Herd shows that development at Prudhoe Bay, Kuparuk and Milne Point in the calving range of that herd has not had a negative effect on the herd. The herd has grown

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from about 3,000 animals in 1975 to its current day size of over 13,000 animals. This experience indicates that development in the ANWR coastal plain should not have a negative effect on the calving success of the Porcupine Caribou Herd or its population.

Opening the ANWR coastal plain to leasing is crucial to our national interest. The U.S. produces 8.5 million BOPD and imports 6 million BOPD or 41% of ~~our~~ consumption. Alaska provices 20% of domestic oil production. Domestic production is forecast to decline to 4 million BOPD by the year 2000 and imports are estimated at 12 million BOPD or 75% of our consumption. Alaska north slope production will also decline from 1.9 million BOPD in 1987 to an estimated 0.7 million BOPD in the year 2000. Our dependence on foreign imports is likely to double by the year 2000 under current conditions. The down side of this is that foreign supplies to fill the gap aren't guaranteed. National fuel crises occurred in 1973 and 1979 due to events in the Middle East beyond our control. The question is not whether or not we want another crippling fuel crisis. Of course we don't. The question is how to avoid it. Obviously, developing reliable domestic petroleum producing capacity expeditiously is imperative. Looking in the most promising place to find ~~large reserves~~ is the first logical step. Few will argue that the ANWR ~~coastal plain offers this promising potential~~. Due to long lead times to develop ~~frontier~~ Alaska ~~oil~~ fields, ~~10 to 15 years from discovery to first production,~~ a coastal plain discovery today would not likely start production before the year 2000.

In conclusion, BP Alaska support Alternate A; full leasing of the 1002 area coastal plain under reasonable environmental stipulations. We believe that industry has the proven technology and experience to explore for and develop commercial deposits in an environmentally responsible manner, and that this endeavor is vital to our national interest.

Thank you for this opportunity to present testimony on the draft 1002 (h) report.

STATEMENT FOR PUBLIC HEARING

ARCTIC NATIONAL WILDLIFE REFUGE

U.S. FISH AND WILDLIFE SERVICE

DRAFT REPORT AND RECOMMENDATION TO CONGRESS

My name is Sally DiDomenico and I am speaking on behalf of BP Alaska Exploration Inc. BPAE strongly supports the opening of the Coastal Plain for oil exploration and development.

BP Alaska Exploration is taking a position on this issue based on its long-standing interest in Alaska. BPAE or its parent company, British Petroleum, has been actively involved in exploration activities on the North Slope since the early 1960's. BP was the original lease holder of a considerable portion of the Prudhoe Bay Field. BPAE owns a 29% interest in the Kuparuk River Oil Field, currently producing 260,000 barrels of oil per day; we also hold a number of other onshore and offshore oil and gas leases in Alaska. BPAE is proud of our involvement in the exploration of the North Slope and proud of our record of operating in an environmentally safe manner.

BP Alaska Exploration has been, is, and always will be aware of and concerned for the environmental resources of this State. We believe the environmental resources must be protected. We also believe that it is imperative that the United States assess its remaining, untapped sources of oil and gas. At present this country imports about a third of its daily oil requirements. We cannot afford to increase our reliance on imported oil. We also cannot afford to assume that a particular domestic area has potential and that it can be explored whenever national oil supply conditions make such exploration necessary. The Mukluk well in the Beaufort Sea is a prime and costly example of how disappointing a "promising" area can be. The only means by which the productivity of an area can be known is through drilling. BPAE believes that promising areas such as the Coastal Plain should be explored, and we believe that at the same time the environmental resources in the area can be protected. It is possible to do both. The oil industry has proved it at Prudhoe Bay. BPAE has proved it at the Kuparuk Field.

BPAE supports the U.S. Fish and Wildlife Service in its Draft 1002 Report recommendation that the Coastal Plain be opened for exploration and development. However, we have some concerns regarding the general tone of the report. While we appreciate the difficulties involved in the thorough study which was required for this area, we believe there are many instances within the Report in which an environmental issue has been treated in a less than factual manner. This Report will be the basis for intensive study by the concerned public and by the Congress of the United States. It is imperative that the environmental issues be given a balanced and careful assessment. All aspects of the issue should be presented so that concerned parties can consider the importance of the resources and are also informed of the demonstrated successful protective measures which can be taken to conserve these resources.

I will cite a few specific examples of concern:

On Page 6, the report states, "Oil and gas development will result in widespread, long-term changes in wildlife habitats, wilderness environment and native community activities. Changes could include displacement and reduction in the size of the Porcupine caribou herd". These two statements are made in spite of the fact that the very next statement is "The amount of reduction and its long-term significance for herd viability is highly speculative." We believe that it is factual and fair to state that the effect of oil development on caribou herd is highly speculative. There is no evidence of the detrimental effect which exploration and production has had on caribou. However, we do have proven experience that 18 years of oil industry operation at Prudhoe Bay and Kuparuk River have had only minimal impact on the Wildlife resources — and no detrimental effect on the caribou herd.

Therefore, our track record shows that oil operations and caribou are compatible. We urge that a more balanced discussion of the effect of oil operations on caribou be incorporated into this Report.

Another example of our concern with the Draft Report is:

On page 80 under the topic of Production Infrastructure is the statement "The drilling pad....covers 20-35 acres....requires 160,000-285,000 cubic yards of gavel." In BP's experience these figures are not representative of drilling pads currently used in the Arctic area.

At Kuparuk, using the latest technology, a well pad comprising 24 wells and a reserve pit is located on an 11.5 acre site. Only 46,000 cubic yards of gravel were required to construct the pad. These wells are on a 25 foot spacing allotment; but even with a reduction in well spacing, which would result in a drill pad for 40 - 50 wells (the suggested development scenario in the report) only slightly larger pads than those in use at Kuparuk would be necessary. Improved industry technology not only benefits industry, it also benefits the environment in which industry operates. It is important that such beneficial aspects be presented in the Report.

One last example, and again, this is a concern regarding important information which is not presented to the public. Pages 145 - 147 list a summary of 32 recommended mitigating measures for the protection of environmental resources. The Report does not state that out of the 32 measures recommended, at least half of those measures are either standard, established industry practice, or they represent action which any reasonable North Slope operator would take as a matter of course. Many of the other items refer to environmental monitoring. Industry presently conducts similar monitoring programs for other North Slope projects. In the interest of presenting factual information, it should have been clearly stated that many of the recommended mitigating measures for the Coastal Plain are already being carried out by industry elsewhere in the Arctic.

There are, however, two mitigating measures -- Items 25 and 26 -- which we consider both unwise and unwarranted. Time and area closures in order to protect wildlife resources should not be a pre-established stipulation. Such decisions should be made as the need arises and should be based on a consideration of all aspects of the situation. A temporary closure to protect the wildlife in the area is acceptable. However, if such a closure would result in a detrimental effect to a critical operating procedure or could affect the safety of industry personnel, then a compromise solution must be found by the governmental agencies.

There are other, similar areas of concern to us regarding the manner in which the issues are discussed. We are submitting comments which will cover these concerns in detail.

In summary, BP Alaska Exploration is concerned about the protection of the environmental resources. We do believe industry has proved that we can operate on the North Slope in an environmental safe manner. We believe exploration of ANWR is in the national interest. BP Alaska Exploration supports the opening of the Coastal Plain for oil exploration and development.

STATEMENT OF FREDERICK DOREY
REPRESENTING BP ALASKA EXPLORATION INC.
REGARDING THE
DRAFT COASTAL PLAIN RESOURCE ASSESSMENT
OF THE
ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
January 9, 1987

I am Frederick Dorey, General Counsel of BP Alaska Exploration Inc. BPAE is the wholly-owned subsidiary of the British Petroleum Company which carries out oil and gas exploration and production in the United States. I am pleased to represent BPAE today to support the conclusion of the draft 1002 report that the Coastal Plain of the Arctic National Wildlife Refuge be opened for oil leasing, exploration and development.

BPAE is taking a position on this issue based on a long history of involvement on the North Slope of Alaska. Affiliated companies of BPAE began work in Alaska 27 years ago, and were the original lease holders of a major portion of the Prudhoe Bay Field. BPAE affiliates began the development of Prudhoe Bay and still own a portion of Trans Alaska Pipeline. BPAE is now the second largest owner of the Kuparuk River Unit. That field produces almost 300,000 barrels of oil per day from the area adjacent to Prudhoe Bay. BPAE is proud of its record, and the record of the rest of the industry, for clean and environmentally sensitive development on the North Slope.

During the years of our involvement in Alaska we have also participated in the debate about the benefits and problems of development on the North Slope. Several of the lessons we have learned from that debate over the past 25 years would be of value to the Secretary when he considers his final recommendation to Congress regarding development on the ANWR Coastal Plain.

First Development on the North Slope has been of enormous benefit to the people of the United States and the free world. We all know that oil production there is about 1/5 of the entire American supply. The tax revenue and jobs provided are critical to the native population on the North Slope and the entire State of Alaska. The billions of dollars of development work have also supported thousands of jobs in the Lower 48. Many other American jobs have been sustained by transportation and refining of the oil produced in Alaska. These benefits would never have existed if we had listened to the voices that said "Don't build the Trans Alaska Pipeline" or "Don't allow any change in the environment of the North Slope". If we are lucky enough to find a large reservoir of oil in the ANWR Coastal Plain the same tangible benefits will develop. If there is oil there but we can't discover or develop it - these tangible benefits - of jobs, taxes and economic improvement - will be lost to the country. We will import more oil and export more dollars.

Secondly There have always been gloom-and-doom predictions regarding the environmental and wildlife effects of North Slope oil development and pipeline construction. But in 25 years of development, with appropriate regulation, the dire predictions have been wrong time-after-time. The caribou herds were not decimated by the TAPS Pipeline. The caribou herd whose habitat includes Prudhoe Bay has tripled in size since development began there years ago. The draft recommendation is correct when it says, "Even though the billions of barrels of oil reserves have been brought on line and the infrastructure developed to bring that oil to U.S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy." It is now clear that oil and caribou can coexist in Alaska.

Thirdly It is surprising to learn that many of the people who object to development have little understanding of the enormous geographic extent of the North Slope and the high environmental standards of the oil companies working there. The most common reaction of first-time visitors to the area is astonishment at how vast and desolate the North Slope is and how little impact the oil operations actually make on the environment or the landscape. Many people seem to have an image of oil

drilling and development that is derived from 1930's movies about Texas wildcatters. Most visitors are surprised at how clean, well organized and compact the North Slope facilities are and how much care is given to minimizing effects on the tundra, water, and environment.

If we look at just the 1002 area we find it is larger than the State of Delaware. The need to maintain this perspective will be important when evaluating statements about the 1002 report. For example, many of the possible problems listed in the Environmental Consequences section of the report are insignificant, or very unlikely, or would occur only in isolated locations of a few acres in the 1002 area — an area that is one and a half million acres, within a wildlife refuge that is 19 million acres.

The 1002 report has already become the object of public interest. When it is submitted to Congress the scrutiny will be intense. We firmly believe that an objective analysis of the environmental and wildlife issues and all the relevant facts will support leasing, exploration and development on the Coastal Plain. To that end we have a number of specific comments about items in the report which we will submit to the Department of Interior in writing by January 20th.

However, let me, at this point, give just a couple specific examples of inaccurate facts in the report that could lead to inaccurate conclusions:

On Page 80 under "Production Infrastructure" the report states the drilling pads will cover 20-35 acres and require 160,000-285,000 cubic yards of gravel. BP's experience in the Kuparuk field shows that these figures are excessive and not representative of current or future development in the Arctic area. Currently pads are built on only 11 1/2 acres and use only about 1/5 the gravel cited in the report. With reduced well spacing, 40-50 wells could be put on a pad this size.

Similarly, on Page 81, the report describes gravel roads with a width of 35 feet. The Kuparuk Unit standard width is 10 percent less for main

roads and over 30 percent less for other roads. Thus, more accurate facts would show that development in ANWR will use less land and displace substantially less gravel than predicted in the report.

Additionally, the authors of the report seem to ignore the fact that development of a large oil field is a phased project. Prudhoe, Kuparuk or a major ANWR field, could take 10-20 years to reach its maximum size. Consequently, the introduction of isolated drilling activities on the wildlife habitat is a gradual process. It is not a sudden, or single-season event.

This allows wildlife populations to adapt gradually to the limited changes in their habitat. This is an important point because much of the Environmental Consequences section of the report assumes that changes in the extent or characteristics of habitat will have detrimental effect on key ANWR species. There is ample scientific evidence that most species can adapt well to a change in the geographic extent of their habitat or a limited low-density intrusion into that habitat. Experience at Prudhoe and Kuparuk has proved that the orderly development of oil field operations has had little detrimental effect on wildlife.

In conclusion let me reiterate that BPAE supports the Secretary's recommendation to lease the 1002 area for exploration and development. The logic of the draft recommendation is inescapable. If the Coastal Plain is opened there is the possibility of enormous national benefits - thousands of jobs, added tax base, and additional oil supply. If it is not opened there is no chance for these benefits. About 18 million acres of the Arctic National Wildlife Refuge would remain untouched. On the Coastal Plain oil development and wildlife protection are not mutually inconsistent. Leasing and development should be recommended to Congress.

As I indicted, we will be submitting additional detailed written comments for the record.

Thank you.

BP Alaska Exploration Inc. 100 Pine Street • San Francisco, California 94111 • Telephone (415) 951-4325/6

CHRIS S. GIBSON-SMITH
President

February 6, 1987

U.S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Bldg.
18th and C Sts. N.W.
Washington, D.C. 20240

Re: Comments on Draft Report - Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment

Gentlemen:

BP Alaska Exploration Inc. appreciates this opportunity to submit comments on the Draft Report and Recommendation regarding the Coastal Plain of the Arctic National Wildlife Refuge in Alaska.

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Affiliated companies of BPAE have been active on the North Slope of Alaska for almost 30 years, and were the original lease holders of a major portion of the Prudhoe Bay Field. At present BPAE owns a 29% interest in the Kuparuk River Oil Field and holds a number of other onshore and offshore leases in Northern Alaska.

With this perspective we have read the Draft Report on the coastal plain with great interest. We commend your Agency for the intensive studies and the detailed analyses which were carried out in the preparation of this important document.

BPAE fully supports the recommendation of the Fish and Wildlife Service that the entire 1002 area be made available for oil and gas leasing.

There is justifiable concern regarding the increased dependence on imported, foreign oil, and the decreased domestic oil exploration and production. It is imperative that the United States find and develop the hydrocarbon potential which exists in this country.

The coastal plain is a highly prospective area for hydrocarbons. It also contains significant environmental resources. We believe that the industry has proven that we can explore and operate in an environmentally safe manner on the North Slope.

It was in this spirit of concern for the environment and faith in the excellent environmental record of industry that we participated in two of the public hearings held by the Department of Interior. We now submit these detailed comments on the Draft Report, for your consideration.

The final report prepared by your agency will be the basis of discussion by the Congress and by the general public. The opening of the coastal plain is a controversial issue. It is imperative that all aspects be set forth in a balanced manner. We are concerned that some statements in the Report do not reflect an appropriate balance of the interests involved.

Regarding the oil and gas potential as set forth in Chapter III, we appreciate the difficulties involved in presenting this material in a layman's language. We suggest it might be helpful to illustrate the prospectivity of the coastal plain by comparing it with a known field, such as Prudhoe Bay, i.e. - state that the coastal plain has the potential for another giant oil field comparable to Prudhoe Bay, and that 20% of this country's oil production comes from the Prudhoe Bay Field.

In light of the current oil import situation, we believe it is important to emphasize the potential of this area.

In addition there is a need for a clear perspective regarding the vastness of the area involved. The 1002 area is larger than the State of Delaware. This perspective must be maintained throughout the Report.

Furthermore, the Report seems to ignore the fact that the development of a large oil field is a phased project. Under the climatic restrictions of the North Slope, the development must be even more gradual since major components must be sea-lifted in during the open water seasons. The development of a North Slope project is not a sudden event. This slow, gradual pace allows wildlife populations to adapt to the limited changes which may occur in their habitat. It is our understanding that scientific evidence shows that wildlife species can adapt well to gradual changes in their habitat.

More detailed concerns are as follow:

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The Report states, "The Department did not include gas in its recoverable calculations as it was determined that the gas resources were unlikely to be economic at any point in the 30-year period considered in the Report."

We disagree with this blanket assumption. Given the estimated large quantities of gas in the area, the continued pressure for construction of an Alaskan gas line, and the technological potential over the next 25 years, the economic viability of gas resources should at the least be listed as an uncertain factor.

Also on Page 6

The Report states, "Oil and gas development will result in widespread, long-term changes in wildlife habitats, wilderness environment and native community activities. Changes could include displacement and reduction in the size of the Porcupine caribou herd".

These two statements are not compatible with the very next statement that "The amount of reduction and its long-term significance for herd viability is highly speculative." We believe that it is factual and fair to state that the effect of oil development on the caribou herd is highly speculative. There is no evidence of a detrimental effect which exploration and production has had on caribou. However, we do have proven experience that 18 years of oil industry operation at Prudhoe Bay and Kuparuk River have had only minimal impact on the wildlife resources — and no detrimental effect on the caribou herd.

Industry's record shows that oil operations and caribou are compatible. We urge that a more balanced discussion of the effect of oil operations on caribou be incorporated into this Report.

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"The drilling pad... covers 20-35 acres... requires 160,000-285,000 cubic yards of gravel." In BP's experience these figures are not representative of drilling pads currently used in the Arctic area.

At Kuparuk, using the latest technology, a well pad comprising 24 wells and a reserve pit is located on 11.5 acres. Only 46,000 cubic yards of gravel were required to construct the pad. These wells are on a 25 foot spacing allotment. With a reduction in well spacing, which would result in a drill pad for 40 - 50 wells (the suggested development scenario in the Report), only slightly larger pads than those in use at Kuparuk would be necessary. Improved industry technology not only benefits industry, it also benefits the environment in which industry operates. It is important that such beneficial aspects be presented in the Report.

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Similarly, the Report describes gravel roads with a width of 35 feet. The Kuparuk Unit standard width is 10 percent less for main roads and over 30 percent less for other roads. Thus, more accurate estimates would show that development in ANWR will use less land and displace substantially less gravel than predicted in the Report.

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Marine Facility - "construction of a marine facility to service development... would be necessary because long hauls... from Prudhoe Bay are impractical." This is confusing. A marine facility is required for major equipment sealifts in summer open water seasons. Transport of services year-round including drillsite facilities (truckable) would be via Prudhoe Bay.

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"Access to valves, which require frequent maintenance..." - This is not the case, although on the rare occasion when a valve is automatically closed it may need to be reopened manually.

"A pump station is required every 50-100 miles... 2 or 3 pump stations probably would be required.... The first would be located near the oil field." - This is incorrect. For 150 miles of pipeline no intermediate pump station is necessary. The first and only pump station would be located at the oil field. A pipeline of this length would certainly not be designed with 2 or 3 pump stations; it would most likely have one station and a diameter sufficient for the anticipated maximum flow. An intermediate pump station could then be added if unexpectedly high throughput were to be required.

Communications - "Maintenance continuous control of the pipeline... would require a complex communication system". - This language is misleading, the communication control system is standard technology.

"Each remote station typically includes... a heliport". This is incorrect, only a helipad would be required.

We hope the above comments will be helpful to you as you prepare the final Report for Congress.

In conclusion, we appreciate the efforts of your agency in presenting this information. BPAE strongly supports the recommendation that the entire 1002 area be opened for exploration and development. We believe Congress will recognize the urgency and the importance of allowing this step forward.

Sincerely,

C. S. Gibson-Smith

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Chevron

Chevron U.S.A. Inc.
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R. E. Kropschot
General Manager
Exploration Department
Western Region

February 4, 1987

Comments - DRAFT
Arctic National Wildlife Refuge, Alaska
Coastal Plain Resource Assessment and
Legislative Environmental Impact Statement

Director, U.S. Fish and Wildlife Service
Division of Refuges
2343 Main Interior Building
18th and "C" Streets, N.W.
Washington, D.C. 20240

Dear Sir:

Chevron U.S.A. Inc. appreciates this opportunity to comment on the draft report/LEIS.

Chevron supports the Secretary's recommendation "Alternative A - Full Leasing of the 1002 Area." "...It is assumed that Congressional action would allow all Federal subsurface ownerships of the 1002 area to be available for exploration and development through a leasing program administered by the Department of the Interior ...and would open to oil and gas development and production the private lands within the refuge."

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We believe the report accurately describes the large oil and gas potential of the 1002 area by stating: "Despite its remote location and hostile environment, the 1002 area is the most attractive onshore petroleum exploration target in the United States today. Development of its potential oil and gas resources could make a significant contribution to the economy and security of this nation, and could be done in an environmentally responsible manner..."

Our experience on the North Slope supports the report's conclusion that industry has the ability to explore, develop and produce in an arctic environment with a minimum impact on wildlife, resources and habitat.

The geological/geophysical portion of the report is a complete and thorough analysis of the petroleum geology of the 1002 area. The discussions on the prospective sediments, source rocks, oil generation and prospect types are consistent with the data at hand and are a realistic appraisal of the geology and the petroleum potential.

It is important to recognize that other interpretations of the geology may be valid. Experience shows that different interpretations are common in Federal OCS Sales as evidenced by wide variations in tract bids. Areas identified in the report as non-prospective may be considered attractive by other interpreters and may be sites of subtly defined petroleum traps. In Chevron's opinion, full leasing of the 1002 area ("Alternative A") ensures the best opportunity for an objective and thorough evaluation of the petroleum potential since all concepts could be tested. None of the other alternatives presents such opportunity.

The statistical techniques used to determine the probabilities and the reserve ranges are similar to the methods used by much of the industry in assessing the resources of large unexplored basins. We believe the report's resource estimates are within the range of values that knowledgeable earth scientists agree upon.

While the report raises some concerns regarding water and gravel resources in the 1002 area, we believe this concern is overstated. All the valleys of larger streams are underlain by large quantities of coarse sand and gravel. Further, data from thousands of shallow shot-holes throughout the 1002 area show much of the area is underlain by near surface gravels. While fresh water may not be readily available in much of the 1002 area during the winter (as is the case generally in the Arctic) fresh water can be obtained from lakes, river gravel, storage of summer run-off, and by melting snow and ice as has been the practice for the numerous exploratory wells drilled throughout the Arctic and in Prudhoe Bay.

The environmental effects described for "Alternative A" assumes that three portions of the 1002 area are developed concurrently. We believe the 1002 area will be developed in a sequential manner that will have considerably less impact than stated in the report. There are numerous examples of successful wildlife-oil interfaces, both in Alaska and the Lower 48 States including the Aransas National Wildlife Refuge in South Texas, the Delta National Wildlife Refuge in Louisiana and the Kenai National Wildlife Refuge in Southern Alaska.

We agree with the conclusion that "Most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at Prudhoe Bay and from construction of the Trans-Alaska Pipeline System." The Secretary's plan of following operations and watching for unexpected impacts and then preventing serious effects through special conditions for each project on a case-by-case basis is realistic and sensible. Blanket restrictions can result in inefficient patterns of development and preclude opportunities to learn the best way to mitigate the effects of industry activity. Proposed restrictions should receive complete and fair review by all the parties involved.

We question the requirement for impact compensation. This requirement is from USFWS mitigation policy which has no authority in statute and is used to guide negotiations under the Fish and Wildlife Coordination Act. Compensation may be appropriate in individual cases, but should not be codified.

Chapter VII of the report aptly summarizes the uncertain condition of our country's oil and gas future, and we agree with the reasons for full leasing of the 1002 area. In addition to the economic benefits cited for Alaska and the Federal government, literally all states will benefit by contracts to supply goods and services as they did in the development of Prudhoe Bay Field and construction of the TAPS.

In conclusion, we agree with the Secretary's recommendation for "Alternative A." Legislation must be inacted that grants the Secretary authority to initiate a leasing and development program that is fully compatible with the purposes of the Arctic National Wildlife Refuge.

Although our comments in this letter are brief and deal only with our major viewpoints, there are details of the report which concern us. These topics are described by AOGA in their comments on the 1002 report. As a member company of AOGA, we participated in the identification and draft of comments which were submitted to the Director. We ask that you consider these comments in your preparation of the final draft of the 1002 report.

Very truly yours,

R. E. Kropschot

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James C. Pettersen
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February 5, 1987

U.S. Fish and Wildlife Service
Division of Refuges
U.S. Department of the Interior
Room 2343, Main Interior Building
18th and C Streets
Washington, D.C. 20240

Gentlemen:

Coastal Plain Resource Assessment
Arctic National Wildlife Refuge, Alaska

Conoco Inc. appreciates the opportunity to comment on the draft Coastal Plain Resource Assessment (1002 Report) for the Arctic National Wildlife Refuge (ANWR) which the Department issued November 24, 1986. We commend the Department for the fine job it did in assembling the report and making its recommendation. We recognize a great effort on the part of the many researchers, scientists and technical support staff that went into the compilation of the report. Conoco, as a North Slope operator with a long-standing commitment to exploration in Alaska, recognizes the significance of this draft assessment and the potential for oil and gas underlying the coastal plain. Further, we appreciate having had the opportunity to comment at the public hearings held in Anchorage and Washington, D.C. A copy of those comments is attached.

Conoco agrees that the potential contribution of the oil production from the 1002 Area would make tangibile positive contributions to the nation because it will create jobs, help to provide adequate energy supplies at reasonable costs, reduce our dependence on imported oil, enhance national

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security, promote a favorable balance of international trade, and provide state, local and federal revenues.

I. CONOCO SUPPORTS FULL LEASING

Conoco firmly endorses Alternative A, which proposes full leasing of the 1002 study area, since it most readily meets the needs of the national interest and the vast majority of Americans. We believe there is no justification for Alternative B, which suggests partial leasing, since proper mitigation measures will adequately protect the wildlife. Likewise, Alternative C, allowing further exploration, does little to enhance the geophysical and geological information already available. Confirmation of the hydrocarbon potential of the area can only be verified by drilling the existing geologicial structures. Neither the Alternative D, permitting no action, nor E, which proposes wilderness designation, would allow for careful, reasoned planning and exploration and development of the coastal plain. Those elitist proposals would deny the nation the benefits which would accrue from ANWR oil and gas production in which nearly all Americans would share.

II. CONOCO SEES HIGH GEOLOGIC POTENTIAL

We concur that the area is clearly the most outstanding oil and gas frontier remaining in the United States, and could contribute substantially to our domestic energy supplies. The Draft 1002 Report Assessment of Oil and Gas Potential is a thorough and substantial analysis of the available geological and geophysical data which further supports Conoco's own evaluation of the potential of the coastal plain. Our preliminary geologic and geophysical studies carried out over the past several years indicate

that the coastal plain possesses major hydrocarbon potential. Its location, between two major oil provinces at Prudhoe Bay and Canada's MacKenzie Delta, as well as favorable on site geology, suggests a good probability that additional hydrocarbon accumulations of similar size may also be found in the coastal plain. We attach a high priority to the opportunity to explore for and develop economical hydrocarbon reserves that may underlie the area. It is imperative that industry be allowed to explore for oil and gas on the coastal plain and be permitted to develop it in a safe and environmentally sensitive manner to help ensure a secure domestic supply of energy for the future.

III. CONOCO RECOGNIZES THE NATIONAL SECURITY ISSUE

We can no longer ignore the vulnerability of the United States to energy disruptions. The examples of that vulnerability are all too recent to be forgotten. Conoco's leases on the Alaska North Slope at our Milne Point Field were purchased in 1969. Production from those leases did not begin until late 1985. Because of the necessarily long lead time from initial exploration to actual production (10 to 15 years), we must begin exploration of the ANWR coastal plain now. We cannot afford to wait 15 years after a crucial need arises for ANWR oil.

The United States is rapidly depleting its domestic reserves of oil and gas. Forecasts predict that domestic crude and oil production from existing fields will decline from the nearly nine million barrels per day average in 1985 to slightly more than six million barrels per day in 1991. This is based on predictions that prices will remain at $15.00 per barrel. Current U.S. production has already fallen to nearly eight and a half

million barrels per day and is forecast to fall as low as four million barrels per day by the end of the century. Alaskan crude plays a significant role in our energy supply by providing the U.S. with 20% of its total production.

IV. CONOCO EXPERIENCE IN ARCTIC AND ENVIRONMENTALLY SENSITIVE OPERATIONS

A. Milne Point North Slope Oil Field

Conoco has owned leases at Milne Point since 1969 and our operations there were planned in an environmentally sound and safe manner. The actual operations bear this out. No significant adverse effect has been detected and, in fact, it has been documented that the Central Caribou herd which calves in the area has increased almost threefold.

B. Aransas Pass, Home of the Whooping Crane

Since 1937, Conoco has operated in another environmentally sensitive area known as The Aransas National Wildlife Refuge. This Refuge, in the coastal marsh of southern Texas, is the winter home of the endangered Whooping Crane. During the past 50 years, Conoco has taken measures to insure that its personnel conduct site work with the welfare of the Whooping Cranes in mind. Since 1939, Conoco has drilled 74 wells in Aransas, 40 of which have been producers. When Conoco begins a new well, it works with the Refuge Manager to decide where to put in a road and what material to use to build it. Seismic and drilling activity is scheduled for those periods when the birds are not using the Refuge. The flock has grown from an all time low of 15 cranes in 1941 to 110 birds today. In 1951, Conoco received the Citation of Merit from the National Audubon Society in recognization of cooperation with conservation agencies in furthering the protection of the

Whooping Crane. This experience exemplifies the ability of industry to conduct oil and gas operations in extremely sensitive habitats with good results from both economic and environmental perspectives.

C. Paul J. Rainey Wildlife Refuge With Audubon Society

Another positive example of joint use of a wildlife refuge's resources is our exploratory drilling for oil and gas in the Paul J. Rainey Wildlife Refuge in the marshes of south Louisiana. The Refuge is operated by the National Audubon Society which issued the oil and gas leases to Conoco. We operated under stipulations designed to protect the delicate marsh. This relationship between the protection of environment and conduct of oil operations was portrayed in the film "Reflections" featured at the Petroleum Pavilion at the New Orleans World's Fair in 1984. While exploring there, Conoco worked with Refuge Management to improve the marsh. A weir system was put in place on the Refuge to control water levels. Conoco used four acres of prime wetlands for drilling operations and then worked together with Refuge and Audubon Society Managers to bring 1,200 acres previously void of marine productivity into the vibrant life cycle of the marsh, further demonstrating our consciousness and commitment to the preservation of the environmentally special habitats in which we work.

D. Conoco Operating Awards

In 1985, Conoco was one of three major oil companies honored by the U.S. Commerce Department for "Outstanding Contribution to the Conservation of Marine U.S. Fisheries." Conoco was cited for its efforts involved in the conservation and management of valuable coastal wetlands in the Paul J.

Rainey Wildlife Refuge, the Aransas National Wildlife Refuge, and the donation of Sea Dock property to the Texas Nature Conservancy.

V. CONOCO IS SENSITIVE TO ENVIRONMENTIAL AND WILDLIFE IMPACTS

A. Caribou

There is much concern over the effects of exploration and development activity on caribou in the 1002 area. We have concern for the welfare not only of Caribou, but all wildlife on the coastal plain. However, we believe that we have demonstrated our ability to operate in such an environment with no significant adverse impact to the habitat or the associated wildlife.

The main calving areas for the Central Arctic herd have remained unchanged with the development at Prudhoe Bay, Kuparuk River, and Milne Point. Caribou have never used the Prudhoe Bay area for significant calving activity, but calving activity in the Kuparuk River area has continued while two oil developments have taken place. The major factors determining calving location are snow cover and predator avoidance.

Resource Category I designation as described in the National Environmental Policy Act should not be applied to the coastal plain's core calving area; this area does not meet the "unique and irreplaceable" criteria. For instance, concentrated calving in the Jago Highlands has occurred in only five of the the last fourteen years. Also, there are no data that indicate calf mortality is greater or herd recruitment is lower when calving does not occur in the core calving area. The calving habitat is more

appropriately represented as a continuum across the Arctic coast, and a portion of this region lies within the 1002 area.

Research models at the University of British Columbia indicate forage habitat does not become a factor in the Porcupine herd population until herd size exceeds one million animals; the loss in forage from potential oil development is insignificant.

The caribou study by Dau and Cameron at Milne Point did not distinguish between maternal and nonmaternal females during the surveys. The distribution of maternal females was extrapolated using the total number of caribou and the number of calves. The authors noted that "the latter is an a posteriori analysis, and the results should not be granted the same level of objectivity as the other results." This study should not be characterized as "the most systematic study of caribou displacement by oil development" because the conclusions cited in the 1002 report are based on extrapolated and correlated data, not on actual measured data. The results presented in the 1002 report were for a two-week period in June. During May, July, and August there is no measurable difference in habitat use, including habitat within 100 meters of the road, and distance from the road.

There is no evidence that calving outside the core calving areas has reduced herd productivity with either the Central Arctic herd or the Porcupine Caribou herd (PCH). Positive correlations between calving location and calf mortality and/or herd recruitment have never been published. The population decline estimates for the Central Arctic and

Porcupine herds resulting from oil development are pure speculation and not supported by any actual data or theoretical models.

The Central Arctic herd has not been displaced from its traditional use areas by any North Slope oil field development. During the two or three week calving season, there may be a re-distribution of maternal caribou to avoid areas of human activity. There have been disturbances to caribou movement, particularly the combination of a pipeline adjacent to a road with heavy vehicle traffic. Work by J. A. Curatolo has shown that a roadway/pipline separation of 400-800 feet will minimize this disturbance.

The report states "Caribou populations appear to fluctuate unpredictably over the long term. The long term maximum and minimum population of the PCH and the carrying capacity of the PCH are unknown." There is a "...general lack of relevant information concerning probable reactions of that specific herd (PCH) to oil development..." In discussing the Central Arctic herd, the report states "no recognizable long-term effect upon the Central Arctic herd as a result of displacement by oil development in the central Alaskan Arctic has been documented to date." The above does not support the contention that a 20-40% decline or distribution change of the Porcupine Caribou herd is an "unavoidable impact."

The interactions between caribou and oil field development have been studied for nearly ten years on the North Slope. The information gained each year has been incorporated into subsequent development activities. The more recent developments at Kuparuk and Milne Point have incorporated this learning with revised construction and operation practices. This is a

dynamic process that is continually being refined as new knowledge is incorporated. The petroleum industry has spent millions of dollars in studies and mitigation measures on the North Slope and the efforts are working. The Central Arctic herd, the fastest growing herd in Alaska, shares traditional calving and insect relief habitat with oil field development.

The knowledge gained on the North Slope concerning caribou and oil field development can be directly applied to development on ANWR. Necessary and reasonable mitigation measures have been developed over the past ten years which foster the multiple surface utilization of both caribou and oil development in existing fields. The same cohabitation is possible at ANWR.

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B. Water

The first paragraph under WATER RESOURCES on Page 21 of the Draft Report ignores the fact that Conoco routinely uses subsurface water wells at its Alaska North Slope Milne Point Field to obtain brackish water which is processed through a desalinization plant for the generation of fresh water which is used in our operations there. These desalinization plants are commonly used all over the world in both offshore and desert environments where fresh water might otherwise be unavilable. When this existing technology is applied to ANWR coastal plain operations in concert with the existing surface fresh and salt water resources, we believe that there will be more than adequate supplies of water to sustain oil and gas operations without significantly affecting local environmental demands for fresh water. Gravel borrow pits, if authorized in the coastal plain, could provide another fresh water reservoir source from run off as they do at

other North Slope fields.

At Milne Point, Conoco presently has the capability of providing some 850 barrels a day of desalinized water for operations. The 3 existing brackish water wells produce from a horizon some 3,000 feet below the surface. With a larger desalinization plant we believe that these 3 wells could provide as much as 15,000 barrels of fresh water per day. We have no information to believe that this technology cannot be used at ANWR although the Draft Report indicates that water resources are limited and surficially confined in the 1002 area.

The bulk of the water volume needed is not for the direct drilling of the well, but for the associated ice pad, ice road, and/or ice airstrip. Hence, much of the required water volume will decrease as permanent infrastructure replaces temporary ice structures.

C. Gravel

There has been concern expressed regarding the availability of gravel in the 1002 area. However, on page 20, the report indicates: "The valleys of larger streams are underlain by large quantities of coarse sand and gravel. These include the valleys of the Canning, Tamayariak, Katakturuk, Sadlerochit, Hulahula, Okpilak, Jago, Okerokovik, Kogotpak and Aichilik Rivers. These rivers, especially the Canning, Sadlerochit, Hulahula, Jago and Aichilik, are heavily braided and have extensive unvegetative gravel bars. Gravel also occurs in the south part of the 1002 area between the Canning River and Marsh Creek along tops and flanks of ridges between the Katakturuk and Sadlerochit Rivers and on spits and bars along the coastline

of the Beaufort Sea. This is an apparent contradiction to the portion of the executive summary which says "water and gravel necessary for construction and development are in very limited supply in the 1002 area."

Figure II-2 on page 16 indicates abundant surficial deposits of sand and gravel. Although figure II-2 indicates surface materials only, it is unlikely that these gravel deposits are strictly surficial in nature, particularly since similar deposits are widespread and abundant across the entire North Slope Coastal Plain. In fact, not only do abundant sources of gravel seem to be available in the 1002 area along the major stream valleys, but pages 99-100 indicate that the taking of gravel from areas such as river bars, river terraces, and cutbanks can be done with minimal adverse impacts. Furthermore, two side benefits could result from these types of borrow pit: deep holes could be created for the overwintering of fish; and water reservoirs would be created, thus helping to alleviate the water supply problem.

Further indications of the availability of gravel comes from the shot holes created by drilling which was done throughout the 1002 area over the seismic shooting seasons of 1984 and 1985. Data from holes drilled then indicate that there was an abundance of very near surface gravel. We do not expect the availability of gravel to present a problem in the exploration and development of the coastal plain.

D. Fish

We also take issue with the conclusion in the resource assessment that "Development of KIC/ASRC lands or offshore areas could result in moderate

effects on coastal fish through lost or reduced habitat values, inhibited movements, and direct mortality." We have seen significant positive effects on coastal fish and fisheries related to oil and gas development in the Gulf of Mexico. While there are significant environmental differences between the Gulf and the Beaufort Sea, we cannot find any information in the resource assessment to justify or support the conclusion that coastal fish will be necessarily adversely affected by properly conducted oil and gas operations. Gravel borrow pits can provide overwintering habitat for many species of fish. At Milne Point a bridge over the only fish bearing stream in the area was designed to insure clear passage upstream for the coastal fish population.

VI. CONOCO AGREES WITH LEASING AUTHORITY RECOMMENDATION

The Draft Report's recommendation that leasing authority be granted by Congress to the Fish and Wildlife Authority and The Bureau of Land Management similar to authorities already existing in the National Petroleum Reserve in Alaska (NPRA) is a reasonable and useful way of establishing a leasing process for the coastal plain. The experience of the BLM in the leasing process coupled with oversight by the Fish and Wildlife Service will make the leasing process meet the special needs of this province.

VII. MITIGATION

Naturally, with respect to operating on the coastal plain of ANWR reasonable mitigation measures must be taken. The oil industry has demonstrated willingness and ability to mitigate environmental impacts on the North Slope. Examples of mitigation at Conoco's Milne Point Field

include but are not limited to: power lines were configured to minimize danger to Raptors; traffic minimization, stock piling of materials, the delay of major construction projects during Caribou calving and insect harrassment seasons; continuing educational programs for Conoco and contract personnel to insure that wildlife and environmental harrassment is avoided; prohibition of fire arms and hunting on the lease, pipeline and flow lines are elevated to allow Caribou to pass underneath and burial of pipelines to allow Caribou to cross over; trash containment to avoid attraction of wildlife. There are of course many other examples of reasonable mitigation measures used at Milne Point. We concur with the ANWR Coastal Plain Resource Assessment's general recognition that exploration and production can be accomplished without unacceptable changes to physical, biological or socioeconomic resources.

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VIII. CONCLUSION

In closing, Conoco Inc. again commends the Department on the effort undertaken in preparing the draft coastal plain Resource Assessment. We believe the report squarely frames the issues related to the opening of the coastal plain. We are confident we can meet our commitment to the environment and a strong secure domestic energy future through carefully planned exploration and development and strongly support the Department's recommendation to open the coastal plain to full leasing.

Respectfully,

James C. Patterson

RLL2/dm 024 (DEH)

ATTACHMENT TO CONOCO INC.
COMMENTS ON COASTAL PLAIN RESOURCE ASSESSMENT
ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
DATED, FEBRUARY 5, 1987

CONOCO TESTIMONY ON DRAFT COASTAL PLAIN RESOURCE ASSESSMENT
ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
DEPARTMENT OF INTERIOR HEARING

ATTACHMENT

My name is James C. Patterson. I am a Vice President and General Manager for Conoco Inc., with responsibility for exploration in North America. We welcome this opportunity to appear before you. Conoco supports wholeheartedly the recommendations contained in the Departments' Draft Legislative Environmental Impact Statement, termed the Section 1002 Report, which favors opening the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) to oil and gas leasing. Our position is premised on our assessment of the geological potential of the Coastal Plain and our firm belief that oil and gas exploration and development can be conducted in a manner fully compatible with protection of the environmental resources of this fragile area.

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Hydrocarbon Potential of the Coastal Plain

The Department's estimates of the hydrocarbon potential of the Coastal Plain have been well-publicized; we also believe the area to be geologically attractive having the potential for major hydrocarbon accumulations. From the perspective of an integrated petroleum company engaged in the full range of oil and gas operations, I would like to explain why we urge that the potential of the Coastal Plain be determined more precisely, and at the earliest opportunity.

Conoco's experience in finding and developing significant new petroleum reserves is international in scope.

We are a major operator in the North Sea, Indonesia and Dubai, and are actively pursuing promising exploration opportunities in Egypt, West Africa and Latin America. Generally speaking, the size of reserves to be discovered abroad is much larger and less costly to develop than those believed to remain in the United States.

Yet, we remain committed to exploring for petroleum in this country. Proximity to our downstream operation, the large domestic market for petroleum products and the relatively favorable and stable investment climate represented by the United States are among the many reasons for our continued involvement in domestic oil exploration.

Most of the easily accessible, large reserves of petroleum in this country have already been discovered and developed. In order to replace domestic reserves that are being depleted at a rapid rate, our industry must focus increasingly on "frontier areas" where the possibility of major new discoveries still exists. There are very few frontier areas that Conoco regards as particularly promising. The ANWR Coastal Plain is one of them.

CONOCO ATTACHES HIGH PRIORITY TO THE OPPORTUNITY TO EXPLORE FOR AND DEVELOP ECONOMICAL HYDROCARBON RESERVES THAT MAY BE PROVEN TO EXIST IN THE COASTAL PLAIN. PRELIMINARY GEOLOGICAL AND GEOPHYSICAL STUDIES CARRIED OUT OVER THE PAST SEVERAL YEARS INDICATE MAJOR HYDROCARBON POTENTIAL. THE COASTAL PLAIN'S LOCATION, BETWEEN TWO MAJOR OIL PROVINCES AT PRUDHOE BAY AND IN CANADA'S MCKENZIE DELTA, SUGGESTS A GOOD PROBABILITY THAT ADDITIONAL HYDROCARBON ACCUMULATIONS OF SIMILAR SIZES MAY ALSO BE FOUND IN THE COASTAL PLAIN.

WE CANNOT KNOW FOR CERTAIN THAT THE COASTAL PLAIN CONTAINS OIL OR GAS ACCUMULATIONS UNTIL EXPLORATION DRILLING TAKES PLACE. THE ALASKAN NORTH SLOPE IS A HIGH COST OPERATING ENVIRONMENT. DISCOVERIES MUST BE LARGE TO JUSTIFY DEVELOPMENT AND ALLOW RECOUPMENT OF HEAVY CAPITAL INVESTMENTS REQUIRED FOR SUCH PROJECTS. THE PETROLEUM INDUSTRY IS ACCUSTOMED TO HIGH RISKS, IN ANTICIPATION OF THE REWARDS THAT COMMERCIAL DISCOVERIES BRING. THESE REWARDS EXTEND FAR BEYOND SPECIFIC COMPANY PROFITS. A FEW EXAMPLES RELATED TO CURRENT PETROLEUM OPERATIONS ON THE NORTH SLOPE ARE WORTH NOTING. OIL PRODUCED IN ALASKA PRESENTLY ACCOUNTS FOR APPROXIMATELY 20% OF TOTAL DOMESTIC PRODUCTION. THIS IMPORTANT SOURCE IS EXPECTED TO START DECLINING THIS YEAR AS EXISTING FIELDS BEGIN TO BE DEPLETED. NEW DISCOVERIES ON THE SLOPE WOULD HELP MAINTAIN AND EXPAND ALASKA'S CONTRIBUTION TO DOMESTIC OIL PRODUCTION.

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THE U.S. DEPENDS ON FOREIGN SOURCES FOR ABOUT ONE-THIRD OF ITS OIL. THE AMOUNT OF IMPORTED OIL WILL CONTINUE TO RISE; HOWEVER, NEW DISCOVERIES AT HOME CAN HELP IN ALTERING THIS TREND. AMERICA'S ENERGY SECURITY DEPENDS ON FINDING NEW LARGE HYDROCARBON RESERVES AT HOME.

OPENING THE COASTAL PLAIN TO OIL AND GAS EXPLORATION WOULD ALSO STIMULATE ECONOMIC ACTIVITY IN ALASKA AND THE REST OF THE COUNTRY. PROJECTS CONDUCTED ON ALASKA'S NORTH SLOPE SINCE 1974 REQUIRED $36 BILLION IN INVESTMENTS BY THE OIL INDUSTRY. APPROXIMATELY $10.5 BILLION WAS SPENT IN THE LOWER 48 FOR ALASKAN PETROLEUM ACTIVITIES BETWEEN 1980 AND 1985. IF EXPECTATIONS ABOUT THE COASTAL PLAIN ARE REALIZED, SIMILAR LEVELS OF INVESTMENT AND THE CREATION OF SEVERAL THOUSAND JOBS CAN BE EXPECTED.

IF ECONOMIC DISCOVERIES ARE MADE IN THE COASTAL PLAIN, BOTH THE LOCAL AND FEDERAL GOVERNMENT WILL BENEFIT FROM INCREASED REVENUES IN TAXES AND ROYALTIES. OIL-RELATED INCOME IS A MAJOR FACTOR IN THE ALASKAN ECONOMY. RECEIPTS FROM PETROLEUM ACTIVITIES ON PUBLICALLY-OWNED LANDS IS THE SECOND LARGEST SOURCE OF FEDERAL REVENUES, AFTER INCOME TAXES. THUS, SUCCESSFUL PETROLEUM DEVELOPMENT IN THIS AREA WOULD SERVE BROAD U.S. ECONOMIC INTERESTS, AS WELL AS ENERGY SECURITY NEEDS.

ENVIRONMENTAL COMPATIBILITY OF PETROLEUM OPERATIONS

EARLIER I MENTIONED THE HIGH DEGREE OF RISK THAT AN ENERGY COMPANY LIKE CONOCO ASSUMES WHEN UNDERTAKING EXPLORATION IN FRONTIER AREAS SUCH AS THE ALASKA NORTH SLOPE. CONOCO IS EQUALLY AWARE OF ENVIRONMENTAL RESPONSIBILITIES IMPOSED BY OPERATING IN AREAS AS FRAGILE AS THE COASTAL PLAIN.

THE DEPARTMENT'S STUDY OF THE COASTAL PLAIN INCLUDED DETAILED ANALYSES OF THE BIOLOGICAL ENVIRONMENT OF THE AREA AND HOW IT MIGHT BE AFFECTED BY PETROLEUM OPERATIONS. THERE IS NO QUESTION THAT SPECIAL PRECAUTIONS WILL NEED TO BE TAKEN TO PROTECT THE UNIQUE ECOLOGY OF THE COASTAL PLAIN. CONOCO BELIEVES, HOWEVER, THAT EXPERIENCE GAINED THROUGH OUR OPERATIONS ON THE SLOPE, AND THE COMMITMENT TO ACCOMMODATE ENVIRONMENTAL CONCERNS WILL ENABLE US TO CONDUCT OUR ACTIVITIES IN A MANNER FULLY COMPATIBLE WITH THE SPECIAL CHARACTERISTICS OF THE COASTAL PLAIN. AGAIN, A FEW EXAMPLES FROM THE ESTABLISHED RECORD ARE ILLUSTRATIVE.

I-30

PROTECTION OF THE CARIBOU HABITAT IN ANWR IS A CENTRAL CONCERN REGARDING THE POSSIBLE IMPACT OF PETROLEUM ACTIVITIES ON THE COASTAL PLAIN. IN IMPLEMENTING OUR MILNE POINT PROJECT, CONOCO ENCOUNTERED THE NEED TO COEXIST WITH CARIBOU, IN THIS INSTANCE THE CENTRAL ARCTIC HERD. CONOCO ENGAGED WILDLIFE EXPERTS FROM THE UNIVERSITY OF ALASKA TO STUDY THE MOVEMENTS OF CARIBOU IN THE MILNE POINT AREA AND DESIGNED FACILITIES SO AS TO MITIGATE INTERFERENCE WITH THE HERD.

IN KEEPING WITH THE FINDINGS OF THAT STUDY, THE 11.5 MILE PIPELINE WE BUILT TO CONNECT WITH THE TAP'S SYSTEM INCLUDED SEVERAL CARIBOU CROSSINGS. AT SEVERAL POINTS ALONG THE LINE, THE PIPE IS BURIED, AND A GRADUAL SLOPE COVERS IT, ALLOWING THE ANIMALS TO WALK OVER. ELSEWHERE, THE PIPELINE IS ELEVATED TO PERMIT CARIBOU TO PASS UNDERNEATH. DURING THE SUMMER MONTHS, WHEN THE CARIBOU CALVE IN THE AREA, ROAD TRAFFIC IS RESTRICTED TO AVOID NOISE DISTURBANCE. SIMILAR DESIGN AND OPERATING PROCEDURES WOULD BE INCORPORATED INTO PROJECTS PLANNED FOR THE COASTAL PLAIN TO ENSURE COMPATIBILITY WITH WILDLIFE SPECIES THERE, SUCH AS CARIBOU, MUSK OXEN AND MIGRATORY BIRDS. CONOCO HAS BEEN PRODUCING PETROLEUM IN THE ARANSAS NATIONAL WILDLIFE REFUGE IN TEXAS FOR MORE THAN 40 YEARS WITHOUT HARMING THE ENVIRONMENT OR ENDANGERING THE WILDLIFE.

OTHER OPERATIONAL CONCERNS IN THE COASTAL PLAIN RELATE TO THE TUNDRA AND PERMAFROST BENEATH THE SURFACE. AGAIN, WE REFER TO EXPERIENCE IN NEARBY AREAS. AT EXISTING FIELDS ON THE SLOPE, FACILITIES ARE ELEVATED TO MINIMIZE SURFACE IMPACT. DRILLING AND PRODUCTION OPERATIONS ARE CONSOLIDATED ONTO SPECIALLY DESIGNED AND CONSTRUCTED UNITS THAT PROTECT THE SURFACE AND REDUCE THE TOTAL AREA OCCUPIED. MOST FACILITIES USED ON THE SLOPE ARE PREASSEMBLED AT LOCATIONS IN THE LOWER 48. THIS APPROACH MEANS THAT LESS ACTIVITY IS REQUIRED IN THE IMMEDIATE AREA OF ACTUAL OPERATIONS.

ANOTHER POTENTIAL PROBLEM AREA IS THE RELATIVELY LIMITED NATURAL SUPPLY OF FRESH WATER AVAILABLE ON THE COASTAL PLAIN, WHICH IS TECHNICALLY CATEGORIZED AS AN ARCTIC DESERT WITH LESS THAN 6 INCHES OF PRECIPITATION A YEAR. TECHNOLOGY FOR THE GENERATION OF FRESH WATER TO SUPPORT EXPLORATION AND DEVELOPMENT ACTIVITY IN ARID AREAS IS WELL KNOWN. AT MILNE POINT, CONOCO USES A TECHNIQUE KNOWN AS DESALINAZATION. THIS TECHNIQUE IS COMMONLY USED IN OFFSHORE OPERATIONS WORLDWIDE.

THE TRACK RECORD BUILT BY OIL COMPANIES OPERATING ON THE NORTH SLOPE OVER THE PAST 15 YEARS IS VERY POSITIVE. FROM THE STANDPOINT OF ENVIRONMENTAL PROTECTION, THERE ARE MANY EXAMPLES OF INDUSTRY'S ABILITY TO INNOVATE AND ADAPT IT'S TECHNOLOGIES IN RESPONSE TO LOCAL ENVIRONMENTAL CHARACTERISTICS. NEW PETROLEUM PROJECTS ON THE COASTAL PLAIN WILL BENEFIT FROM PROVEN TECHNOLOGY ON THE SLOPE. A DECISION BY CONGRESS TO ALLOW OIL AND GAS LEASING ON THE COASTAL PLAIN WILL ALLOW THE INDUSTRY TO PLAN FOR EXPLORATION AND DEVELOPMENT IN THE MOST EFFECTIVE AND EFFICIENT MANNER. IT WILL ALSO PROVIDE US VALUABLE TIME IN WHICH TO DESIGN APPROPRIATE FACILITIES FOR THIS SPECIAL ENVIRONMENT. IF CONGRESS DELAYS OPENING THE COASTAL PLAIN, THE INDUSTRY WILL BE UNABLE TO RESPOND IN A TIMELY MANNER TO AN ENERGY CRISIS WHEN IT OCCURS.

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CONOCO COMMENDS THE DEPARTMENT FOR ITS TIMELY REPORT ON ANWR AND STANDS READY TO ASSIST IN EFFORTS TO IMPLEMENT ITS RECOMMENDATIONS. I WOULD BE HAPPY TO RESPOND TO ANY QUESTIONS YOU MAY HAVE.

AWD/SPCH/013
12/29/86

EXXON COMPANY, U.S.A.
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EXPLORATION DEPARTMENT
OFFSHORE/ALASKA DIVISION

M. G. JOHNSON
MANAGER

February 5, 1987

Mr. William P. Horn
U.S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Building
18th and C Streets, NW
Washington, DC 20240

Dear Mr. Horn:

Exxon Company, U.S.A., a division of Exxon Corporation, is pleased to provide comments on the draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. Our overview of key ANWR issues and detailed comments on the draft are attached, along with the testimony we presented in Anchorage on January 5, 1987, and in Washington, DC, on January 9, 1987. Additionally, Exxon endorses the comprehensive comments of the Alaska Oil and Gas Association and the American Petroleum Institute. I-32

Exxon strongly supports the Department of Interior's proposal that "...Congress authorize the Secretary to lease the entire 1002 area for oil and gas exploration and development." We urge that the Secretary of Interior adopt this proposal in the final 1002(h) report when he submits his recommendations to Congress later this year. This proposal is clearly justified on the basis of national energy needs and environmental compatibility.

The 1002(h) report describes the national importance of leasing in ANWR and properly identifies several events faced by our nation during this decade including a lack of major exploration successes and declines in both proven domestic reserves and domestic oil and gas production. Contrary to these production declines, domestic oil demand is increasing. If such trends continue, our nation will become increasingly dependent on potentially unreliable sources of foreign oil.

The anticipated resource potential of ANWR cited in the report is cause for optimism. All of the geologic parameters necessary for the accumulation of commercial quantities of oil and gas appear to be present under the ANWR

Coastal Plain, but there should be no comfort in estimates alone. The potential significance of the reserves possible in ANWR dictate that this nation determine with certainty if oil exists in ANWR. Accordingly, it is vital that Congress authorizes comprehensive and timely oil and gas exploration and development in the ANWR Coastal Plain.

We are not impressed by criticisms that have appeared in the press regarding the Department's resource estimates and discovery probabilities; for the record, we wish to observe that the probabilities of discovery of hydrocarbons are a matter of interpretation, as are the estimates of oil reserves. A wide range of interpretations of existing geological and geophysical data is possible among competent explorationists. If the odds of a commercial discovery are close to 19% as estimated in the report, those odds are very good for a previously undrilled geologic area. Other criticism of the resource estimate distorts the significance of the potential reserves to be found in the coastal plain. To say that the mean resource estimate of recoverable reserves cited in the report will supply the nation with only six months of oil fails to recognize that over 80% of all fields ever discovered in this country individually would have been less than a one day supply of oil and gas. If the DOI ANWR Coastal Plain estimates ultimately prove to be correct, the amount of oil would be very significant.

Fears of environmental degradation have been raised as if not previously investigated or resolved. These fears have inordinately dominated the ANWR access issue to date. We believe these fears misrepresent the facts by ignoring nearly 20 years of environmentally safe operations on the coastal plain of Alaska's North Slope. Based on extensive industry, academic, and resource agency research, there are no detectable adverse impacts on population size or dynamics of any species that inhabits the area. Energy resource development in the ANWR Coastal Plain and protection of environmental values are not mutually exclusive.

Although we strongly support the recommendation for leasing of the entire coastal plain of the Arctic National Wildlife Refuge, we are critical in our attached comments of some impact descriptions that are highly speculative and we object to several of the mitigating measures that are unjustifiable and very restrictive. Nevertheless, we have tried to make constructive comments based on our operating experience and a careful review of research findings.

Oil and gas exploration and development in the coastal plain of the Arctic National Wildlife Refuge is an important national issue. The land access decisions made today could have a profound impact on national and energy security, on our nation's balance of trade, and indeed on the lifestyle and livelihood of Americans. The right to regulate and legislate the use of this nation's public lands imposes a trust obligation upon the members of Congress as well as the Department of Interior. If Congress fails to authorize reasonable exploration and development in ANWR, notwithstanding the demonstrated environmental compatibility of oil and gas operations, then there will have been an obvious breach of trust of the American people.

In summary, we would like to acknowledge the five years of extensive field investigation, data collections and analyses by over 50 trained professional scientists, including wildlife and fishery biologists, botanists, zoologists, chemists, geologists, and resources specialists behind this report. Further, we applaud the authors of the draft report for the conclusions that the entire ANWR Coastal Plain should be open to exploration and development; and unequivocally believe that energy development and economic well-being are compatible with a safe and enjoyable environment.

Sincerely,

MGJ.DTS.pl
2b.DTS(pl2)

EXXON COMPANY, U.S.A. REVIEW COMMENTS
DOI - 1002(h) REPORT

Following a detailed review of the Department of the Interior's 1002(h) report, *Exxon Company, U.S.A. endorses the DOI recommendation to support leasing of the* entire 1002(h) coastal plain area for oil and gas development. Our endorsement of the DOI recommendation to open leasing is based on the following overview and detailed comments.

OVERVIEW

Prudhoe Bay

Often the NEPA-mandated EIS process is forced to predict environmental consequences of new developments with little or no previous field experience to guide the predictions. Clearly, for the ANWR Coastal Plain, the test case has already been run at Prudhoe Bay. Collectively, the experience of the regulatory agencies and industry is captured in the DEIS on page 2: "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the coastal plain and generate similar minimal effects."

Furthermore, we support the statement, also on page 2 of the DEIS, that "most adverse effects would be minimized or eliminated through carefully applied mitigation, using the lessons learned and technology acquired from development at Prudhoe Bay and from construction of the Trans-Alaska Pipeline System (TAPS)."

Trans Alaska Pipeline

Indeed, we would like to point out that all of the environmental activists' unwarranted predictions of 15 years ago, prior to the construction of TAPS, have subsequently been proven false. The demise of major caribou herds, alterations in water quality and major losses of habitat simply have not occurred. Conversely, the development of Prudhoe Bay and TAPS has allowed the State of Alaska to enjoy a period of unprecedented economic prosperity in harmony with a high quality environment and thriving wildlife populations.

Habitat and Carrying Capacity

Numerous sections of Chapter II and VI are devoted to discussions of research on the behavior and movements of caribou in and around oil field development. The main problem with this discussion and the conclusions drawn is that the balance of the scientific community does not consider habitat to be a limiting

factor for any of the stages of the caribou life cycle. Therefore, conclusions regarding displacement of maternal cows or bulls carry little, if any, significance for the continued growth and survival of the herd. Since habitat is not limiting, loss of access to small portions of available habitat due to oil field development is not important.

We readily agree that some degree of modified behavior and displacement has occurred in response to habitat alterations in the Prudhoe field. However, habitat is not limiting caribou population growth for any Alaskan herds at the present time. Therefore, a degree of habitat loss as a result of development on the coastal plain will be inconsequential to growth and productivity of the herd.

In the management of wildlife populations, the concept of habitat carrying capacity is the key to defining management goals for a herd. It is an established fact that neither the Central Arctic Herd (CAH) nor the Porcupine Herd approach the carrying capacity of their ranges. Indeed, Skoog (1968) stated that, "It seems likely that the Alaskan caribou population has remained far below range carrying capacity and that the total habitat has never been fully occupied. In reality, caribou populations seem to have maintained densities much lower than the maximum dictated by food alone, and hence the reduction in total range becomes less meaningful." Thus, we agree with Skoog's early conclusion and those of Bergerud et al. 1984, that habitat is not currently limiting the growth of the Porcupine Caribou Herd (PCH) and that the loss of habitat represented by likely development in the 1002(h) area will not impact growth or productivity of resident caribou.

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Caribou Calving Habitat

The "core calving area" is assumed to be critical to (PCH) herd demographics and, therefore, any displacement from this area would necessarily impact productivity.

We are concerned that the report places undue emphasis on a core-calving concept when, in fact, the historical data for calving use do not support fidelity to a "core calving area." Historical data for calving distribution clearly show that the coastal plain from the Babbage River in Canada, across the 1002(h) area to the Canning River has been used for calving. Thus, calving habitat is more correctly referred to as a continuum across the coastal plain rather than a specific core area.

Chapter II, page 28, correctly points out that wide year-to-year variations in calving distribution can occur due to weather influences and the arrival of spring snow-melt. This acknowledged effect of weather further erodes the core calving area concept and points out the wide annual variability and adaptability of caribou. During 1983, 1984, and 1985, calving estimates varied from 74% to 35% and 82% respectively in the 1002(h) area. These data clearly show the adaptability of the PCH to yearly variations in weather conditions and point out that calving distributions do vary widely.

Therefore, we strongly recommend that conclusions regarding the relative importance of a "core calving area" concept be de-emphasized throughout the report.

We would also like to highlight and support the statements in Chapter VIII of the report which conclude that "...the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy. The Central Arctic Caribou Herd has increased substantially during the period that development has occurred within the heart of its range."

Resource Estimates

Exxon believes the DOI applied a reasonable method in analyzing all available information to develop resource estimates; therefore, we do not challenge these DOI estimates or probability of discovery. However, there is a potential for such a wide range of interpretations among competent geologists that it would be fruitless to debate the accuracy or precision of the resource estimates and discovery probabilities. In general, DOI analysis indicates that all of the necessary geologic factors appear to be present for the accumulation of commercial volumes of oil and gas. These estimated volumes are significant compared to: their potential impact on domestic energy needs, the size of prior discoveries in the United States, and potential discoveries.

In response to criticism that has been voiced, the following observations may be helpful. The DOI resource estimates are based on substantial data that in many cases are more complete than the pre-drilling data available in other frontier areas, such as the Alaskan outer continental shelf and the North Slope (prior to the discovery of Prudhoe Bay). For example, ANWR is bounded on the east and west by known petroleum provinces. Rock outcrops on the ANWR Coastal Plain and immediately south indicate that the necessary source and reservoir rocks exist. Oil seeps and oil stained rocks on the coastal plain are direct evidence that oil did form. Extensive geophysical information has been collected and there are several companies that have proprietary well data which undoubtedly are a factor in their support for exploration and development of the ANWR Coastal Plain.

All of this data, though voluminous, is only indirect evidence that oil and gas may exist in commercial quantities. Collecting additional indirect data through more concentrated geophysical surveys as suggested in Alternative B will not improve the resource estimates or reduce the uncertainty inherent in these estimates. A limited drilling program may yield additional information, but most likely would not answer the two most important questions: Are oil and gas present in ANWR, and are they in large enough quantities to economically produce? Only a well planned and comprehensive exploration drilling program will be able to answer these questions.

To the public, criticism of the Department's resource estimates may seem plausible and persuasive at first glance, but in fact these criticisms are very misleading and grossly distort the exploration and production process. For several reasons, it is very misleading to say that the DOI mean resource estimate, if produced, would supply the nation with only 200 days of oil. First, all of the recoverable oil in a field is not, and cannot, be produced in a matter of days. Fields produce for tens of years. Prudhoe Bay may produce for another 30 years. Second, the 200 days of oil is calculated by dividing the mean resource estimate by total U.S. daily consumption (approximately 16 million barrels). If ANWR ever produces oil, it obviously won't offset all

domestic production and imports for 200 days. However, it could offset a significant percentage of oil imports every day for a long time. Prudhoe Bay, for example, could on average offset approximately 13% of foreign oil imports every day for 30 years (assuming 10 billion barrels recoverable reserves and 7 million barrels per day imports). If the DOI estimate is accurate, the volume is truly significant, considering that over 80% of all the fields ever discovered in the United States would individually have supplied only one day's worth of oil and gas.

It may be intuitively appealing for opponents of ANWR leasing to combine the DOI probability of discovering oil with the estimated amount of oil by saying there is a "...one in five chance at a 33 day supply of oil"* (600 million barrels), but this statement is incorrect. It is intuitively appealing only because it is always appealing to have a simple explanation for a somewhat complex concept. The 19% chance of discovery says that there is one in five chances that there is at least one oil accumulation (or field) that can be commercially developed. (DOI says a field must be 440 million barrels or larger before it will be economic to develop) And, there are four chances in five that there aren't any fields that big in the ANWR Coastal Plain.

If exploration succeeds in finding this "threshold" size field, then it is almost certain (95%) that at least 600 million barrels will be found. There is a small chance (5%) that exploration will be extremely successful and find over 9 billion barrels, but the most likely amount to be found, if exploration is successful, is about 3 billion barrels.

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Detailed review comments on the report follow.

*Statement of Randall D. Snodgrass,Alaska Program Director, The Wilderness Society before the U. S. Department of the Interior Hearing on the Draft Arctic National Wildlife Refuge Coastal Plain Resource Assessment, January 9, 1987.

DETAILED COMMENTS

Chapter II - Existing Environment

Page 2, paragraph 1: The point from this paragraph is the bottom line conclusion of the entire 1002(h) study. We would like to re-emphasize our support for this position. We concur that adverse effects resulting from development can be minimized or entirely eliminated through proven mitigation measures, lessons learned and technology acquired from the Prudhoe Bay development and from construction of the Trans-Alaska Pipeline System (TAPS).

Page 6, column 2, paragraph 5: This paragraph states that "changes in wildlife habitat and wilderness environment could include displacement and reduction in the size of the Porcupine Caribou Herd. The amount of reduction and its long-term significance for herd viability is highly speculative" (emphasis added).

We strongly agree that many of the subsequent environmental consequences are indeed highly speculative. References to the speculative nature of these consequences are obscure and need to be solidly emphasized for each of the environmental consequences. As currently written, many of the conclusions of severe impacts and concerns for caribou populations are stated as fact, when in actuality, they are ultra-conservative speculations not supportable by the Prudhoe Bay or any other experience.

Thus, we ask that the authors of the report reconsider the speculative, "worst-case" statements; at a minimum, we ask that the authors emphasize the highly speculative nature of the conclusions in the environmental consequences section by including appropriate caveats and cautionary statements to avoid further proliferation of these speculative consequences as statements of fact.

Page 23, column 2, last paragraph, also page 104: We feel that undue emphasis is placed on the plant, Thlaspi arcticum. Although the plant is known to occur in the 1002(h) area, its status and distributional ecology are not well understood. Currently, the plant has no status either as threatened or endangered, and yet it is treated as an endangered species throughout the report. More information must be developed on the occurrence and distribution of this species before stipulations and set-back requirements can be promulgated.

Page 28, paragraph 1: "The long-term maximum and minimum population of the PCH and the carrying capacity of the PCH are unknown."

This is a key point not mentioned again in the entire report. We agree that the habitat and range carrying capacity for the Porcupine Caribou Herd (PCH) are indeed unknown. However, it is an accepted fact that the PCH and most circum-polar caribou herds do not approach the carrying capacity of their ranges based on food, calving habitat, insect relief or any other habitat basis.

Since habitat is not limiting growth, the obvious conclusion is that ample room exists to accommodate development interests in the 1002(h) area without potential for impacts on the size or growth of the PCH. Habitat and carrying

capacity relationships are fundamental tenets of caribou biology and we would like this relationship to be much more strongly emphasized in the net conclusions of the 1002(h) report.

Page 28, paragraph 3: "The core calving area is a location to which pregnant cows have shown a strong fidelity as traditionally favored calving habitat. Those concentrated calving areas used in at least 5 years during the 14-year study were identified as the core calving area."

We disagree that use in 5 of 14 years illustrates "strong fidelity". Instead, we believe that a minimum of 1/2 of the historical record is necessary to suggest fidelity in any sense. (See general comment on calving habitat above.)

Page 28, column 2, paragraphs 2 and 3: We are concerned that the report places undue emphasis on a core-calving concept when, in fact, the historical data for calving use do not support fidelity to a "core calving area." Historical data for calving distribution clearly show that the coastal plain from the Babbage River in Canada, across the 1002(h) area to the Canning River has been used for calving. Thus, calving habitat is more correctly referred to as a continuum across the coastal plain rather than a specific core area.

Paragraph 2 correctly points out that wide year-to-year variations in calving distribution can occur due to weather influences and the arrival of spring snow-melt. This acknowledged effect of weather further erodes the core calving area concept and points out the wide annual variability and adaptability of caribou.

Paragraph 3 clearly shows this annual variability. During 1983, 1984, and 1985, calving estimates varied from 74% to 35% and 82% respectively in the 1002(h) area. These data clearly show the adaptability of the PCH to yearly variations in weather conditions and point out that calving distributions do vary widely.

Therefore, we strongly recommend that conclusions regarding the relative importance of the Jago highlands as a core-calving area be de-emphasized throughout the report.

Page 29, paragraph 3: Similar to calving distribution, caribou demonstrate wide variation in their selection and use of insect relief habitat. Although many groups move towards the coast, the report correctly points out that many also move to higher foothill and mountain areas for relief. We feel the report does not sufficiently recognize the wide variation in acceptable insect relief habitat, and thus places undue emphasis on the coastal areas. We acknowledge the relative importance of insect relief areas. We also point out that the Prudhoe Bay development pads and roads have actually created insect relief habitat and have not prohibited CAH access to coastal areas for insect relief. This section should clearly point out the favorable experience at Prudhoe Bay.

Pages 27-33, Other mammalian species. Population size and distribution data for other mammalian species in the 1002(h) area are summarized as follows:

Species	Population Density in 1002(h) Area*
Muskox	Approx. 476 individuals
Moose	Does not exceed 25
Dall Sheep	Very rare
Wolves	Does not exceed 5-10 individuals
Arctic Foxes	Common with annual fluctuations
Wolverines	Few - accurate figures are unavailable
Brown Bear	Approx. 108 individuals

*Population density statements taken from 1002(h) report, pages 29-33.

As can be clearly seen from these data, very few individuals of these species are found in the 1002(h) area. The report conclusions should be strengthened to point out the extremely low density of use for these species, and thus the low potential for any impacts on these species due to development.

Page 34, paragraphs 3 and 4: The report does not consider the results from the highly successful 1986 whaling season. During this season, Kaktovik took three whales and Nuiqsut took one whale, thus filling their respective quotas as established by the International Whaling Commission. These successful hunts took place while offshore drilling and drillship activity were allowed to occur during a portion of the fall bowhead migration. We feel this experience clearly documents the compatibility of offshore drilling activity with subsistence whaling.

We ask that these data be added to this section of the report.

Page 45, column 2: Statistics on recreational use of the 1002(h) area seem unduly inflated. Permit data on file with the USFWS indicate that 1983, 1984, and 1985 had only 6, 33, and 33 permitted users respectively for the 1002(h) area.

We ask that these figures be included in the report to emphasize the low frequency of recreational use for the area.

Page 46, paragraph 2: "The 1002(h) area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge."

This statement is contrary to the wildlife population data cited in the preceding parts of this chapter which point out the relatively low abundance of wildlife species and the relatively short period of use of the 1002(h) area.

We suggest deletion or at least clarification and quantitative justification for this statement.

Page 46, paragraph 3: This paragraph acknowledges the esthetics of the coastal plain area but fails to recognize that the easternmost portion of the ANWR Coastal Plain is currently designated as wilderness.

Even with full leasing under Alternative A, these 30 miles of coastal plain from the 1002(h) area east to the Canadian border and further into Canada will remain as wilderness, thus preserving the complete spectrum of arctic ecosystems represented in the Arctic Refuge. Furthermore, we believe that leasing and development will not lead to a permanent loss of esthetics.

We ask that acknowledgement be given in this section to the wilderness nature and designation of the coastal plain area from the Aichilik River east to the Canadian border.

Chapter VI - Environmental Consequences

General

We understand that the draft document is a legislative EIS largely following outline and contents mandated by NEPA. We would like to point out that many of the environmental consequences predicted to occur for the five alternatives are based on "worst case" evaluations. In May 1986 the NEPA-EIS guidelines were changed from a "worst case" assessment to one of "reasonably foreseeable." We feel that many of the major conclusions of significant effects carry the earlier "worst case" assessment to an extreme, and thus ask that the authors reconsider many of their conclusions in light of the "reasonably foreseeable" assessment.

Page 98, paragraph 2: We feel that the designation of USFWS Resource Category 1 for a portion of the calving habitat available to the Porcupine Caribou Herd is inappropriate. The 1002(h) report does not present adequate evidence to support this designation. Significant year-to-year variability in calving distribution has been recorded for the Porcupine Herd all across the coastal plain from well into Canada and west to the Canning River. Therefore, calving habitat is more appropriately represented as a true continuum across the coastal plain. Thus, the "unique and irreplaceable" nature required for designation as Resource Category 1 does not pertain.

Page 100, paragraph 2: We feel that the conclusions regarding relative impacts from potential discharges of reserve pit waters are overly severe and not substantiated by actual field monitoring data or current practice information from Prudhoe Bay areas. It is not appropriate for DOI to cite unavailable and unpublished data in support of these allegations. To the contrary, available data indicate that any impacts are extremely localized and limited to the immediate vicinity surrounding the pit. No effects have been observed in fish or wildlife species from active reserve pits and we have demonstrated that adequate technology exists to close pits in an environmentally safe manner.

Page 100, paragraph 5: This paragraph and the first item in the subsequent Unavoidable Consequences discussion fail to recognize the normal industry practice of closing-out (filling in) exploratory reserve pits upon completion of the well. With proper planning, there would be no need to mobilize and haul additional gravel. Even if it were, it would be unlikely that a new borrow pit would be opened.

Page 103, paragraph 5: Meehan (1986) is a draft report that contains a significant number of errors including many conclusions on (1) gravel spray and (2) dust. We also have significant additional concerns over the methods used and data interpretations. We request that all calculations, extrapolations and conclusions based on Meehan (1986) be omitted.

Page 106, paragraph 2: Data to support calving density in the pre-development Prudhoe Bay area are very sketchy. A general consensus exists that it never was a major calving area and, therefore, any conclusions regarding reduced calving density following development are unfounded.

We suggest this paragraph and Table VI-4 be amended to show this area as an historically low density calving area. Regardless of the pre-development data, the fact remains that this herd has continued to proliferate during the period of maximum development at Prudhoe Bay.

Page 106, paragraph 4: The 242,000 acres of calving habitat are proposed for designation as Resource Category 1 in accordance with FWS mitigation policy.

We feel strongly that this is an inappropriate designation and over-extension of FWS mitigation policy. We recommend that this designation be eliminated. See comment for page 98, paragraph 2, above.

Page 107, paragraph 2: Calculations of secondary modifications should be changed to exclude any data extracted from Meehan (1986).

Page 107, 108 and 109: These three pages of literature citations discuss the Prudhoe Bay caribou behavior studies in detail. Data are reported which discuss disturbance and displacement of caribou movement patterns throughout the field as a result of developmental activities.

We readily agree that some degree of modified behavior and displacement has occurred in response to habitat alterations in the Prudhoe field. However, as discussed in comments for page 28, paragraph 1, and again in the general comments above, habitat is not limiting caribou population growth for any Alaskan herds at the present time. Therefore, a degree of habitat loss as a result of development on the coastal plain will be inconsequential to growth and productivity of the herd. Thus, we would like to again point out that habitat is not currently limiting the growth of the Porcupine Herd and that the loss of habitat represented by likely development in the 1002(h) area will not impact growth or productivity of resident caribou.

Page 107, paragraph 5: "Whitten and Cameron (1985) found consistently low numbers..."

Change to read "Whitten and Cameron (1985) found consistently low numbers of caribou and generally low percentages of calves in the Prudhoe Bay oilfield 1978-82. One of several explanations offered is possible displacement by oilfield activities." Gavin (1979) also found very low percentages of calves and total caribou in this Prudhoe Bay oilfield area prior to and during initial oilfield development (1970-79). White et al. (1975) suggests that the high percentage of wet and moist areas near Prudhoe Bay makes this area less attractive to caribou.

Page 108, paragraph 3: Although the absolute density for the PCH is almost 14 times greater than the CAH and the Western Arctic almost 15 times greater than the CAH, none of these herds approach the carrying capacity of their respective ranges (Bergerud et al. 1984). Therefore, any arguments against extrapolation of CAH data to the PCH based on relative densities on the fact that the PCH may occupy coastal plain habitat in higher densities than the CAH are not valid. (See comment to pages 107-109, above.)

We ask that the above point be clearly made in the conclusions of environmental impacts for Alternative A.

Page 108 paragraph 7: "Based upon the work of Dau and Cameron (1985), caribou are displaced approximately 2 miles out from development...within this 2 mile area of influence are about 357,000 acres of the total core calving grounds in the 1002(h) area."

This statement is a misrepresentation of the study conclusions. In fact, the relationship between calves and distance from the road (Milne Pt.) is statistically insignificant. Dau and Cameron did find fewer maternal groups near the road than away from it, but the partial displacement was for 2 kilometers, not 2 miles.

Additionally, their data show a high degree of year-to-year variability -- so much so that they had to resort to a mathematical transformation of their data in order to show stabilized variances so a test of significance could be run. Their data also show that non-maternal caribou were not displaced by the road corridor and that "partial displacement" was shown within a zone of 0-3 km.

The USFWS uses these data to imply that a complete displacement of all caribou groups occurred out to 2 miles. This is a gross over-extrapolation of the data and we ask that this section be rewritten to more properly reflect the study results.

Regardless of the conclusions regarding partial displacement, a comparison of the study data from 1978 to 1985 clearly documents an increased density of animals through the period of maximum development in the area. We feel this increased density clearly demonstrates that the CAH has continued to grow and thrive concurrently with the development of the oil field. This conclusion must be noted in any discussion of the Dau and Cameron data.

Page 108, paragraph 7: Repeat of comment for page 106, paragraph 4, above.

Page 110, paragraph 3 and 4: Available literature clearly shows that caribou can and do readily acclimate to aircraft overflight noise. CAH animals throughout the Prudhoe Bay area characteristically show little disturbance to typical overflights. Any perceived negative effects can be readily mitigated by maintaining a 500 foot elevation. Also, the experience with the central Alaskan Delta herd, where calving grounds are located next to overflight, bombing and strafing areas, further documents the acclimation of these animals to aircraft noise.

Thus, we ask that this section be rewritten to more properly reflect the acclimation of caribou to aircraft.

Page 111, item no. 10: Reduction of surface occupancy in the insect relief habitat to 3 miles from the coast.

In the Kuparuk Oilfield, experience has shown that 3/4 mile of reduced occupancy from the coast is sufficient to ensure adequate insect relief habitat. This distance appears sufficient since actual insect relief habitat is the coast line proper, shallow coastal water, offshore islands and coastal bluffs -- a relatively narrow band. Once this narrow band is provided, the second requirement is to provide for relatively free movement along the coastline. Elevated pipelines and other normal mitigation measures similar to

those applied in the Kuparuk oilfield have proven effective in allowing passage. Thus, this stipulation for an arbitrary three mile reduced surface occupancy zone should be changed to reflect the currently proven experience of 3/4 mile.

Page 112,paragraph 2: Neither the CAH nor PCH are at carrying capacity for their respective ranges and, therefore, incremental habitat loss due to development of the coastal plain can be expected to result in only minimal displacement of the herd. See comment pages 107-109, above.

Page 112, paragraph 3: "A major change in distribution...could occur if the 1002(h) area were fully developed...nearly 80% of coastal insect relief habitat could be affected if development proves to be a barrier to caribou movements."

Although the conclusions of this paragraph are preceded with "could" and "if", the statements are still gross over-generalizations with no basis in fact. The extensive Prudhoe Bay experience has simply proven that these statements are false. The Kuparuk oilfield experience clearly shows that caribou can and do readily move across developmental structures. Proven mitigation measures such as elevated pipelines and crossings ensure that access to insect relief habitat will remain and thus projections such as 80% loss of available relief habitat are unfounded.

These gross generalizations have no basis in scientific fact and should be removed from the report.

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Page 112, paragraph 4: "...could result in major population decline and change in distribution of 20-40 percent...this estimate is uncertain."

Although this projection is followed by the uncertainty statement, we feel strongly that this statement is completely unfounded and unsupportable. No data are provided to support this estimate and we are given no basis for its determination. This paragraph substantially undermines the credibility of the assessment of caribou impacts in the 1002(h) report. We conclude from substantial scientific data that the estimate is nothing more than pure speculation and urge that the entire paragraph be deleted from the final report.

Page 114, paragraphs 1 and 2: We feel that the conclusions regarding potential developmental effects on muskox are unnecessarily severe and unfounded. While it is true that very little data characterizing muskox responses to oilfield development are available, it is also true that the muskox has shown ready adaptability to human presence and has even been semi-domesticated in several areas. This adaptability to human presence will significantly reduce the worst-case conclusions implicated in the DEIS.

Several experimental farming programs have been successfully initiated in Alaska and Canada to domestically raise muskox for their high quality qiviut, or underwool, to be used in the knitting industry. Obviously, their adaptability to constant human presence in these situations significantly reduces concerns over occasional and distant disturbances from developmental interests. Limited observations of muskox response to oil exploration

activities in Greenland indicate that muskox respond by a gradual and temporary avoidance to seismic activities.

We ask that this section of the report be rewritten to properly reflect the adaptability of muskox to human presence and thus reduce the severity of the projected effects.

Page 122, paragraph 2: Recently conducted extensive monitoring in the Lisburne field provides data to reduce concerns over geese and brant displacement. Avian monitoring has shown that a brant colony has successfully nested in this area since the 1970's with no decrease in productivity. The density of geese and swans using this area has not changed from pre-construction (1983-84) to post-construction (1985). Geese broods actually cross roads and pipelines into the Lisburne area. Brant continuously utilize a marsh at the mouth of the Putuligayuk River within 400m of one of the busiest roads on the North Slope. Snow geese occasionally move into the Lisburne area to feed and rear young, often immediately next to main roads. Also, white-fronted geese often nest close to roads.

We ask that this section be modified to include these important new data from Murphy et al. 1986. "Lisburne terrestrial monitoring program - 1985. The effects of the Lisburne development project on geese and swans."

Page 126, paragraph 1: We support the conclusion that only minor to negligible effects on coastal fishery resources or fishery habitat will occur. Experience at Prudhoe Bay has provided a significant volume of data to support his viewpoint. These data should be reviewed and incorporated into the final report.

Page 126, column 2, paragraph 5: We also support the conclusions of minor to negligible impacts on endangered and threatened animal species such as bowhead and grey whales and the peregrine falcon. We feel that the transient nature of their presence on the coastal plain and the history of developmental interaction in the Prudhoe Bay field clearly demonstrate the lack of meaningful impacts on these species.

Page 131, column 2, paragraph 4: We would like to underscore the relatively low value of the coastal plain as recreational habitat. History of use indicates that only a handful of individuals have actually utilized the coastal plain for recreation, either hunting, fishing or camping. It is extremely expensive to reach the area; a trip from the Lower 48 costs thousands of dollars and requires special custom air charter flights. Wet and moist ground conditions make hiking unenjoyable during the 8-10 week "summer." Extreme cold and darkness during a large part of the year further reduce recreational use.

We ask that these perspectives be added to this section of the report.

Page 129, column 2, paragraph 4: Based on the preceding conclusions of negligible to minimal effects on wildlife populations as a result of development, there remains no reason to assume that major effects on subsistence uses will occur. Therefore, we ask that this paragraph be deleted.

Page 134, paragraphs 6 and 7: See comment above for page 112, paragraph 4.

Page 143, paragraph 6: See comment above for page 6, column 2, paragraph 5.

Pages 145-147, Summary of Recommended Mitigation

Stipulation 2: Design all bridges and culverts to handle at least 50-year flood events.

Comment: Insert "permanent" before the word bridges.

Stipulation 3: Use ice or gravel-foam-timber pads, where feasible, for exploration wells.

Comment: There may be limited use for ice pads; however, the choice of pad material must ensure a safe and successful completion of the operations plan.

Stipulation 5: Prohibit off-road vehicle use within 5 miles of all pipelines, pads, roads, and other facilities, except by local residents engaged in traditional uses or if otherwise specifically permitted.

Comment: Prohibiting all activities in all seasons is unnecessarily restrictive. This stipulation should be limited to summer season only and not be applied to research, surveying, seismic work, etc. approved by USFWS.

Stipulation 6: Limit oil exploration, except surface geology studies, to November 1-May 1 (exact dates to be determined by Refuge Manager). Cease exploration activities and remove or store equipment at an approved site by May 15. Local exceptions may be made.

Comment: Seasonal restriction might be appropriate for intensive human activity such as construction but this stipulation should allow activities less likely to interfere with animal behavior to continue. Activities in this category would be those largely confined to the drill pad to include drilling and testing of wells and minimum helicopter airlift support. When recognizing that such prohibition cannot reasonably be applied during any subsequent development activities, USFWS should allow those activities to be conducted as part of an approved research program to determine actual effects on wildlife and to develop better mitigation techniques if needed for development. Restriction on drilling and testing could cause exploratory wells to take two or more years to complete, which extends environmental exposure, may compromise well safety and control, and significantly increases the cost of the well.

Stipulations 8, 9 & 10: Elevate pipelines to allow free passage of caribou in areas without ramps or buried sections.

Place ramps over pipelines at natural crossings or where development tends to funnel animals.

Bury pipelines where possible.

Comment: Stipulations 8, 9, and 10 appear to prefer buried pipelines. Burial of pipelines is unnecessary where elevation and ramping are used to accommodate movements of animals. Buried pipelines are not environmentally preferred on the North Slope due to permafrost. Moreover, burying causes more environmental impact initially and during abandonment. Suggest adopting the current SOA policy: To minimize impacts on caribou, pipelines must be consolidated to the extent feasible and must be designed, sited and constructed to allow safe passage of caribou. Adequate elevation, ramping or burial of pipelines will be required in areas identified by (Department of Fish and Game) USFWS as important caribou movement zones.

Stipulation 11: Separate roads and pipelines 400-800 feet, depending on terrain, in areas used for caribou crossing.

Comment: The combination of roads near pipelines is considered a deterrent to caribou crossing, primarily when there is high human use (traffic) of the road, therefore, it is unnecessary to have all roads separate from pipelines. This policy conflicts with the basic desire to consolidate facilities. A preferable wording of this stipulation may be "separate high use trunk roads and pipelines 400-800 feet, ..."

Stipulation 12: Restrict surface occupancy in the zone from the coastline inland 3 miles to marine facilities and infrastructure necessary to support activities outside the restricted zone.

Comment: This restriction could preclude access to and development of significant reserves. Temporary exploration facilities and essential production facilities should be allowed on a site-specific basis.

Stipulation 14: Close areas within 3/4 mile of high-water mark of specified water courses to permanent facilities and limit transportation crossings. Gravel removal may occur on a site-specific basis.

Comment: A 3/4 mile buffer is an excessive restriction. Maximum effort to protect critical riparian habitat should be required; however, essential production facilities should be allowed on a site-specific basis.

Stipulation 21: Close area within 5 miles of development and associated infrastructure to hunting, trapping and discharge of firearms.

Comment: Subsistence trapping without firearms should be allowed.

Stipulation 23: Define range of the candidate plant Thlaspi arcticum. Minimize surface occupancy in immediate vicinity of areas identified as supporting the plant. Position pads, collecting lines, and associated roads at least 1/2 mile from candidate plant locations.

Comment: It appears that a feasible and prudent effort to avoid significant disturbance of the plant would be reasonable; 1/2 mile buffer appears excessive and unnecessary.

Stipulation 24: Construct docks and causeways so that fish movements are not impeded and lagoon water chemistry is basically unchanged.

Comment: Policy needs to focus on potential impacts; suggest wording "... and lagoon water chemistry not be altered to a degree which causes significant adverse effects on marine populations."

Stipulation 25: Establish time and area closures or restrictions on surface activity in areas of wildlife concentration during muskox calving, April 15-June 5; caribou calving, May 15-June 20; caribou insect harassment, June 20-August 15; snow goose staging, August 20-September 27 and overwintering and spawning.

Comment: This stipulation should specifically exclude restrictions on activities confined to an exploration drill pad such as drilling and testing being conducted in conjunction with a USFWS approved research program to determine effects on evaluation (key) species.

Stipulation 26: Acquire authority to establish time and area closures and minimum aircraft altitude of 2000 feet above ground level (AGL) during muskox and caribou calving and caribou insect harassment, April 15-August 15; and snow goose staging, August 20-September 25. At other times the minimum altitude generally will be 1000 feet AGL over areas of animal concentrations.

Comment: It is unnecessary to have time and area closures in addition to minimum altitude restrictions.

STIPULATIONS FOUND IN THE USFWS/ASRC AGREEMENT STIPULATIONS (APPENDIX 2)

Stipulation: Exploration activities will be supported only by ice roads, winter trails, existing road systems and air service.

Comment: This stipulation should recognize the need for barges and boats for marine support.

Stipulation: The operator shall not significantly alter the banks of streams, rivers, or lakes while conducting exploration activities. Crossings of stream, river, or lake banks shall utilize a low angle approach or, if appropriate, snow bridges. If snow bridges are utilized for bank protection, they shall be free of dirt and debris and shall be removed after use or prior to breakup each year, whichever occurs first.

Comment: The need for the removal of ice bridges after use or before breakup is not readily apparent. If the intent is to prevent flooding, the stipulation should so state, and allow alternatives such as selective or partial removal of ice bridges.

Stipulation: Reserve pits shall be rendered impermeable by a design of the operator's choice, other than reliance upon permafrost.

Comment: For below-grade (excavated) designed pits, permafrost provides an impermeable barrier. Suggest deleting the words "other than reliance upon permafrost." This stipulation should defer to existing reserve pit regulation in this matter.

Stipulation: All hydrocarbons discharged into flare and relief pits shall be removed and properly disposed of as soon as practicable during the winter but prior to spring breakup, except that during periods of thaw such removal shall occur within 72 hours of discovery.

Comment: This language from the COE AAP Special condition C is under revision by the COE to read: "Hydrocarbons discharged into relief pits, flare pits, or reserve pits shall be contained and properly disposed of as soon as practicable. Removal shall minimize waste generation and all hydrocarbons which are removed shall be disposed of in a manner consistent with all pertinent regulations."

Stipulation: When an exploratory well bottom hold depth will not exceed 10,000 feet true vertical depth, the well shall be drilled from an ice pad with piling support for the drill rig; and

Comment: Stipulations should allow the use of pad material which will ensure a safe and successful completion of the overall exploratory operations plan. Bottom hole depth may not be the most important criteria in determining a proper pad. This stipulation should be reworded to read: "When an exploratory well program can be safely accomplished from an ice pad, it is preferred that the well be drilled from an ice pad with piling support for the drill rig ..."

Stipulation: The Regional Director is authorized to designate within ASRC Lands special caribou calving and post-calving special areas that will be closed to all exploration activities for such periods from May 1 through August 31 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect caribou calving and post-calving activities, including but not limited to, relief from insects. The Regional Directory may shorten the period of closure or reduce the area closed if it is determined that caribou are not using the area.

Comment: Special area stipulations should be modified to allow continued exploration drilling and testing while conducting research programs to determine the effects on these species (see our comments on Stipulation #6 of the 1002h report).

Stipulation: The Regional Director is authorized to designate within ASRC Lands specific snow goose staging special areas that will be closed to all exploration activities for such periods from August 20 through September 10 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect snow goose staging. The Regional Directory may shorten the period of closure or reduce the area closed if it is determined that snow geese are not using the area.

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Comment: Special area stipulations should be modified to allow continued exploration drilling and testing while conducting research programs to determine the effects on these species (see our comments on Stipulation #6 of the 1002h report).

Stipulation: The Regional Director is authorized to designate within ASRC Lands specific waterfowl nesting habitat special areas that will be closed to all exploration activities for such periods from May 25 through August 1 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect waterfowl nesting habitat. The Regional Director may shorten the period of closure or reduce the area closed if it is determined that waterfowl nesting is not occurring within the area.

Comment: Special area stipulations should be modified to allow continued exploration drilling and testing while conducting research programs to determine the effects on these species (see our comments on Stipulation #6 of the 1002h report).

Stipulation: Sand and gravel extraction, processing or storage sites shall not be located within the active floodplains of water courses as defined in the Gravel Removal Guidelines Manual for Arctic and subArctic Floodplains (WSFWS 1980), unless there are no feasible and prudent alternatives. In the event that there is no feasible and prudent alternative to sand and gravel extraction, processing or storage within the active floodplain of water courses, and in the event that such sand and gravel extraction, processing or storage otherwise satisfies the environmental protection safeguards of these stipulations, sand and gravel extraction, processing or storage in active floodplains shall be

undertaken in accordance with the provisions of the above-referenced Guidelines, to the extent practicable.

Comment: Suggest language consistent with 1002 Report Stipulation 7 which limits the application of the prohibition to major fish-bearing rivers.

COMMENTS BY EXXON COMPANY, U.S.A.

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

Report and Recommendation to the Congress of the United States and Legislative Environmental Impact Statement

Anchorage, Alaska

January 5, 1987

My name is Don Cornett. I am the Alaska Coordinator for Exxon Company, U.S.A. here in Anchorage. I am pleased to offer these comments on the draft 1002(h) report and recommendation to Congress. Exxon assisted in the development and endorses the detailed AOGA comments. In addition to those comments, I would like to offer Exxon's perspective on the report and recommendation.

Exxon strongly supports the Department of Interior's proposal that the Congress authorize the Secretary to lease the entire 1002(h) area for oil and gas exploration and development. We agree with the report's overall conclusion (page 2) that "Development can proceed on the coastal plain and generate similar minimal effects" to those experienced at Prudhoe Bay and TAPS.

Our endorsement of the DOI conclusions regarding negligible or minimal impacts on the environment and resident biota is based on the following points:

Prudhoe Bay and TAPS

The environmental experience gained from development of the coastal plain at Prudhoe Bay demonstrates that oil field development can co-exist with wildlife resources. Experience with carefully applied mitigation measures as well as innumerable lessons learned and technology developed at Prudhoe Bay and from construction of the Trans-Alaska Pipeline System (TAPS) have proven that adverse effects on the environment can be minimized or eliminated.

Caribou

We agree that the Porcupine Caribou Herd is an international resource and that proven mitigation measures should be applied to ensure minimal effects of development on continued growth of the herd. We would like to caution the report's authors against unnecessarily drawing "worst case" conclusions. Our experience on the coastal plain at Prudhoe Bay with the Central Arctic Herd has proven oil field development can co-exist with a healthy and rapidly expanding herd. Over 15 years of monitoring data have clearly shown that even with development of the largest oil field in the U.S., the Central Arctic Herd has continued to proliferate and that sufficient habitat for calving, summer range and insect relief still exists. Similarly, the Porcupine Caribou Herd, as with the majority of circum-polar caribou herds, does not now approach the carrying capacity of its range. Thus, we believe that ample habitat is available to accommodate oil field development and continued growth of the Porcupine Caribou Herd.

Other Fish and Wildlife Species

As noted in the draft EIS report, extensive field monitoring of the other fish and wildlife species present on the coastal plain and immediately offshore provides ample data to support the conclusions of minimal to negligible effects on these species as a result of proposed leasing.

Mitigating Measures

We would like to caution the Department that the economic cost of developing any oil and gas reserves in the coastal plain will be high and the mitigating measures imposed can play a large role in the costs. We believe that reasonable measures can and should be implemented to protect the resources. some of the proposed measures, however, are unnecessary to protect fish and wildlife resources and could result in significantly increased costs, delays in exploration and development, and reduced recovery of any oil and gas.

We are particularly concerned with seasonal prohibitions on exploratory activities and with broad prohibitions of surface facilities on large areas of land, such as along the coast or major rivers. Over the past 15 years, Exxon has drilled 13 exploratory wells on the coastal plain in the Point Thomson and Canning River areas, immediately to the west of the 1002(h) area. A lot of this activity was conducted during the summer and there were no significant adverse effects to fish and wildlife resources or their habitat. This exploration experience clearly demonstrates that the technology and operating practices exist to explore for oil and gas resources in a safe and environmentally sound manner in the ANWR Coastal Plain throughout the year. I-44

In summary, we would like to acknowledge the five years of extensive field work by over 50 professional scientists in the DOI who stand behind the Secretary's recommendation in this report. Additionally, Exxon's experience on the Arctic Coastal Plain in the Prudhoe Bay and Point Thomson areas confirms our confidence that leasing, exploration and development of the ANWR Coastal Plain can proceed without significant deleterious effects to the environment or wildlife resources.

Thank you for the opportunity to comment.

COMMENTS BY EXXON COMPANY, U.S.A.

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

Report and Recommendation to the Congress of the United States and Legislative Environmental Impact Statement

Washington, D.C.

January 9, 1987

COMMENTS BY EXXON COMPANY, U.S.A.

Arctic National Wildlife Refuge, Alaska,
Coastal Plain Resource Assessment
Report and Recommendation to the Congress of the United States
and Legislative Environmental Impact Statement

Washington, D. C.
January 9, 1987

My name is Mike Johnson. I am the Manager of Exxon Company, U.S.A.'s Offshore and Alaska Exploration Division. It is my pleasure to be here today to offer these comments.

EXXON'S POSITION

145 Exxon strongly endorses the Department's preferred recommendation of full leasing of the coastal plain of the Arctic National Wildlife Refuge (ANWR). It is our judgment that this recommendation is well supported, and we very much oppose the other alternatives for three very important reasons. First, we believe there may be significant undiscovered hydrocarbon potential in the 1002 area. Second, the national need for oil and gas is best served by timely assessing and developing that potential. And third, we are confident that the environment can be appropriately protected while industry explores and, hopefully, develops the area. In my remarks today I would like to expand on each one of these three points.

HYDROCARBON POTENTIAL

Turning first to that of hydrocarbon potential, we know that the ANWR Coastal Plain lies between Prudhoe Bay, the largest oil field in North America to the west, and the numerous Canadian oil and gas fields in the Mackenzie River Delta and Beaufort Sea to the east. Our analyses suggests that the geologic conditions found in these major oilfields also exist in 1002 area. This judgment, though certainly not definitive, is based on a spectrum of hard data and is thus more than mere speculation. We have analyzed well control to the west and east, and, on the ANWR Coastal Plain itself, we have studied surface outcrops, oil seeps and seismic data. We believe that the 1002 area is indeed one of the few highly prospective untested frontiers left in the United States with the potential for substantial oil volumes that in a high side case could be on a par with Prudhoe Bay.

NATIONAL NEED

Next I'd like to address the need for timely development of domestic energy reserves. Exxon believes it is in this country's best interest to diligently explore potentially significant resources. We applaud the report drafters for recognizing the vital contributions that ANWR could make to the nation, namely: reducing our increasing dependency on foreign oil; generating positive economic impacts in Alaska as well as the Lower 48 states; and improving our long term balance of trade. Of equal significance, we concur with the report's conclusion that the exploration process should start now, since even under an accelerated schedule, production of any commercial resources would not start until at least the year 2000. By that time, according to the most recent NPC forecast, the United States will almost certainly be importing well over half of the oil being consumed. Also, by the year 2000, Alaska's North Slope production, according to the Alaska Department of Revenue forecast, will likely have declined from approximately 2 million BOPD to about 600,000 BOPD. As you may be aware, the 2 million barrels now produced from the North Slope account for nearly 20% of all U.S. production. Certainly ANWR by itself could not fully offset domestic production decline, but it could significantly mitigate it. At the same time, it is unlikely that the decline can be reversed by only exploring other frontier or high potential areas to the exclusion of ANWR.

For example, the California OCS appears attractive, but access is obstructed. The deepwater GOM holds promise, but exploration is incomplete and production technology will be expensive and needs further refinement. And much of the Beaufort and Chukchi Seas offshore the North Slope may not ultimately be viable due to the harsh environmental conditions and resultant high operating costs.

ENVIRONMENTAL

Finally, we recognize the significance of the existing ANWR environment. We also recognize that exploration and development of the ANWR Coastal Plain can only proceed in a manner that ensures appropriate safeguards for the environment, including the fish, wildlife and their habitat. Data collected from numerous impact studies on Prudhoe Bay facilities and the 800-mile long TransAlaska Pipeline, argue, however, for a more optimistic estimate of the potential environmental impacts from ANWR development than indicated in the 1002(h) report. Independently, our experts feel that the expressed impact concerns regarding caribou calving, etc., represent "worst case" and thus improbable scenarios, rather than the "most likely" outcomes which existing data indicate would be much less severe and of shorter duration. We believe that the safe history of oil and gas activities on Alaska's North Slope and in refuges elsewhere in this country, conclusively indicates that environmental conservation and mineral resource development are compatible. The companies associated with these operations, including Exxon, have worked hard and successfully to develop the expertise and technology to properly act in this environment. Common sense directs that industry's actions would be equally responsible in the ANWR Coastal Plain.

SUMMARY

To sum up. Exxon feels that on balance, the data and analyses argue conclusively for the recommended alternative of full leasing. The incentives - high potential and national need - are there, and the downside of environmental impact is limited. Other alternatives only postpone an already lengthy process of discovery and development which the nation's interest dictates must proceed today rather than tomorrow. The no-action alternative is clearly unacceptable because it is incompatible with energy needs and proven environmental compatibility.

It is our hope that this matter be ultimately judged on its merits, for if it is, we are confident the best interests of our country, and thus those of all of us, its citizens, will be properly served. I am grateful for the opportunity to speak. I hope that my support will contribute to the implementation of the DOI's recommendation of full leasing of the ANWR Coastal Plain.

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Don E. Cornett

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Anchorage, Alaska 99501

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☒ I am speaking for Exxon Co USA

(please enter name of organization you represent)

COMMENTS BY EXXON COMPANY, U.S.A.

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
COASTAL PLAIN RESOURCE ASSESSMENT

REPORT AND RECOMMENDATION TO THE CONGRESS OF THE UNITED STATES AND LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

ANCHORAGE, ALASKA
JANUARY 5, 1987

My name is Don Cornett. I am the Alaska Coordinator for Exxon Company, U.S.A. here in Anchorage. I am pleased to offer these comments on the draft 1002(h) report and recommendation to Congress. Exxon assisted in the development and endorses the detailed AOGA comments. In addition to those comments, I would like to offer Exxon's perspective on the report and recommendation.

Exxon strongly supports the Department of Interior's proposal that the Congress authorize the Secretary to lease the entire 1002(h) area for oil and gas exploration and development. We agree with the report's overall conclusion (page 2) that "development can proceed on the coastal plain and generate similar minimal effects" to those experienced at Prudhoe Bay and TAPS.

Our endorsement of the DOI conclusions regarding negligible or minimal impacts on the environment and resident biota is based on the following points:

Prudhoe Bay and TAPS

The environmental experience gained from development of the coastal plain at Prudhoe Bay demonstrates that oil field development can co-exist with

wildlife resources. Experience with carefully applied mitigation measures as well as innumerable lessons learned and technology developed at Prudhoe Bay and from construction of the Trans-Alaska Pipeline System (TAPS) have proven that adverse effects on the environment can be minimized or eliminated.

Caribou

We agree that the Porcupine Caribou Herd is an international resource and that proven mitigation measures should be applied to ensure minimal effects of development on continued growth of the herd. We would like to caution the report's authors against unnecessarily drawing "worst case" conclusions. Our experience on the coastal plain at Prudhoe Bay with the Central Arctic Herd has proven oil field development can co-exist with a healthy and rapidly expanding herd. Over 15 years of monitoring data have clearly shown that even with development of the largest oil field in the U.S., the Central Arctic Herd has continued to proliferate and that sufficient habitat for calving, summer range and insect relief still exists. Similarly, the Porcupine Caribou Herd, as with the majority of circum-polar caribou herds, does not now approach the carrying capacity of

ITS RANGE. THUS, WE BELIEVE THAT AMPLE HABITAT IS AVAILABLE TO ACCOMMODATE OIL FIELD DEVELOPMENT AND CONTINUED GROWTH OF THE PORCUPINE CARIBOU HERD.

OTHER FISH AND WILDLIFE SPECIES

AS NOTED IN THE DRAFT EIS REPORT, EXTENSIVE FIELD MONITORING OF THE OTHER FISH AND WILDLIFE SPECIES PRESENT ON THE COASTAL PLAIN AND IMMEDIATELY OFFSHORE PROVIDES AMPLE DATA TO SUPPORT THE CONCLUSIONS OF MINIMAL TO NEGLIGIBLE EFFECTS ON THESE SPECIES AS A RESULT OF PROPOSED LEASING.

MITIGATING MEASURES

WE WOULD LIKE TO CAUTION THE DEPARTMENT THAT THE ECONOMIC COST OF DEVELOPING ANY OIL AND GAS RESERVES IN THE COASTAL PLAIN WILL BE HIGH AND THE MITIGATING MEASURES IMPOSED CAN PLAY A LARGE ROLE IN THE COSTS. WE BELIEVE THAT REASONABLE MEASURES CAN AND SHOULD BE IMPLEMENTED TO PROTECT THE RESOURCES. SOME OF THE PROPOSED MEASURES, HOWEVER, ARE UNNECESSARY TO PROTECT FISH AND WILDLIFE RESOURCES AND COULD RESULT IN SIGNIFICANTLY INCREASED COSTS, DELAYS IN EXPLORATION AND DEVELOPMENT, AND REDUCED RECOVERY OF ANY OIL AND GAS.

WE ARE PARTICULARLY CONCERNED WITH SEASONAL PROHIBITIONS ON EXPLORATORY ACTIVITIES AND WITH BROAD PROHIBITIONS OF SURFACE FACILITIES ON LARGE AREAS OF LAND, SUCH AS ALONG THE COAST OR MAJOR RIVERS. OVER THE PAST 15 YEARS, EXXON HAS DRILLED 13 EXPLORATORY WELLS ON THE COASTAL PLAIN IN THE PT. THOMSON AND CANNING RIVER AREAS, IMMEDIATELY TO THE WEST OF THE 1002(H) AREA. A LOT OF THIS ACTIVITY WAS CONDUCTED DURING THE SUMMER AND THERE WERE NO SIGNIFICANT ADVERSE EFFECTS TO FISH AND WILDLIFE RESOURCES OR THEIR HABITAT. THIS EXPLORATION EXPERIENCE CLEARLY DEMONSTRATES THAT THE TECHNOLOGY AND OPERATING PRACTICES EXIST TO EXPLORE FOR OIL AND GAS RESOURCES IN A SAFE AND ENVIRONMENTALLY SOUND MANNER IN THE ANWR COASTAL PLAIN THROUGHOUT THE YEAR.

IN SUMMARY, WE WOULD LIKE TO ACKNOWLEDGE THE 5 YEARS OF EXTENSIVE FIELD WORK BY OVER 50 PROFESSIONAL SCIENTISTS IN THE DOI WHO STAND BEHIND THE SECRETARY'S RECOMMENDATION IN THIS REPORT. ADDITIONALLY, EXXON'S EXPERIENCE ON THE ARCTIC COASTAL PLAIN IN THE PRUDHOE BAY AND PT. THOMSON AREAS CONFIRMS OUR CONFIDENCE THAT LEASING, EXPLORATION AND DEVELOPMENT OF THE ANWR COASTAL PLAIN CAN PROCEED WITHOUT SIGNIFICANT DELETERIOUS EFFECTS TO THE ENVIRONMENT OR WILDLIFE RESOURCES.

THANK YOU FOR THE OPPORTUNITY TO COMMENT.
DEC/153

COMMENTS BY EXXON COMPANY, U.S.A.

Arctic National Wildlife Refuge, Alaska,
Coastal Plain Resource Assessment
Report and Recommendation to the Congress of the United States
and Legislative Environmental Impact Statement

Washington, D. C.
January 9, 1987

My name is Mike Johnson. I am the Manager of Exxon Company, U.S.A.'s Offshore and Alaska Exploration Division. It is my pleasure to be here today to offer these comments.

EXXON'S POSITION

I-50 Exxon strongly endorses the Department's ~~preferred~~ recommendation of full leasing of the coastal plain of the Arctic National Wildlife Refuge (ANWR). It is our judgment that this recommendation is well supported, and we very much oppose the other alternatives for three ~~very~~ important reasons. First, we believe there may be significant undiscovered hydrocarbon potential in the 1002 area. Second, the national need for oil and gas is best served by timely assessing and developing that potential. And third, we are confident that the environment can be appropriately protected while industry explores and, hopefully, develops the area. In my remarks today I would like to expand on each one of these three points.

HYDROCARBON POTENTIAL

Turning first to that of hydrocarbon potential, we know that the ANWR Coastal Plain lies between Prudhoe Bay, the largest oil field in North America to the west, and the numerous Canadian oil and gas fields in the Mackenzie River Delta and Beaufort Sea to the east. Our analyses suggests that the geologic

conditions found in these major oilfields also exist in 1002 area. This judgment, though certainly not definitive, is based on a spectrum of hard data and is thus more than mere speculation. We have analyzed well control to the west and east, and, on the ANWR Coastal Plain itself, we have studied surface outcrops, oil seeps and seismic data. We believe that the 1002 area is indeed one of the few highly prospective untested frontiers left in the United States with the potential for substantial oil volumes that in a high side case could be on a par with Prudhoe Bay.

(PAUSE)

NATIONAL NEED

Next I'd like to address the need for timely development of domestic energy reserves. Exxon believes it is in this country's best interest to diligently explore potentially significant resources. We applaud the report drafters for recognizing the vital contributions that ANWR could make to the nation, namely: reducing our increasing dependency on foreign oil; generating positive economic impacts in Alaska as well as the Lower 48 states; and improving our long term balance of trade. Of equal significance, we concur with the report's conclusion that the exploration process should start now, since even under an accelerated schedule, production of any commercial resources would not start until at least the year 2000. By that time, according to the most recent NPC forecast, the United States will almost certainly be importing well over half of the oil being consumed. Also, by the year 2000, Alaska's North Slope production, according to the Alaska Department of Revenue forecast, will likely have declined from approximately 2 million BOPD to about 600,000 BOPD. As you may be aware, the 2 million barrels now produced from the North Slope account for nearly 20% of all U.S. production. Certainly ANWR by itself could not fully offset domestic production decline, but it could significantly mitigate

it. At the same time, it is unlikely that the decline can be reversed by only exploring other frontier or high potential areas to the exclusion of ANWR.

For example, the California OCS appears attractive, but access is obstructed. The deepwater GOM holds promise, but exploration is incomplete and production technology will be expensive and needs further refinement. And much of the Beaufort and Chukchi Seas offshore the North Slope may not ultimately be viable due to the harsh environmental conditions and resultant high operating costs.

(PAUSE)

ENVIRONMENTAL

Finally, we recognize the significance of the existing ANWR environment. We also recognize that exploration and development of the ANWR Coastal Plain can only proceed in a manner that ensures appropriate safeguards for the environment, including the fish, wildlife and their habitat. Data collected from numerous impact studies on Prudhoe Bay facilities and the 800-mile long TransAlaska Pipeline, argue, however, for a more optimistic estimate of the potential environmental impacts from ANWR development than indicated in the 1002(h) report. Independently, our experts feel that the expressed impact concerns regarding caribou calving, etc., represent "worst case" and thus improbable scenarios, rather than the "most likely" outcomes which existing data indicate would be much less severe and of shorter duration. We believe that the safe history of oil and gas activities on Alaska's North Slope and in refuges elsewhere in this country, conclusively indicates that environmental conservation and mineral resource development are compatible. The companies associated with these operations, including Exxon, have worked hard and successfully to develop the expertise and technology to properly act in this

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environment. Common sense directs that industry's actions would be equally responsible in the ANWR Coastal Plain.

SUMMARY

To sum up, Exxon feels that on balance, the data and analyses argue conclusively for the recommended alternative of full leasing. The incentives - high potential and national need - are there, and the downside of environmental impact is limited. Other alternatives only postpone an already lengthy process of discovery and development which the nation's interest dictates must proceed today rather than tomorrow. The no-action alternative is clearly unacceptable because it is incompatible with energy needs and proven environmental compatibility.

(PAUSE)

It is our hope that this matter be ultimately judged on its merits, for if it is, we are confident the best interests of our country, and thus those of all of us, its citizens, will be properly served. I am grateful for the opportunity to speak. I hope that my support will contribute to the implementation of the DOI's recommendation of full leasing of the ANWR Coastal Plain.

24.DTS(p11)

GEOPHYSICAL SERVICE INC.
POST OFFICE BOX 2803 • HOUSTON, TEXAS 77001

06 February 1987

U.S. Fish and Wildlife Service
Department of the Interior
18th and C Streets, Northwest, Room 2343
Washington, D.C. 20240

Attention: Division of Refuge Management

Ladies and Gentlemen:

Enclosed please find comments offered by the GSI ANWR Exploration Group in response to your request for comments on the Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment dated November 1986.

The Draft Resource Assessment allows us to make specific the concern that we have repeatedly expressed in general terms about the Department's handling of proprietary geophysical data. We are pleased to have had this opportunity to express our concerns, and we hope that our comments will be received in the spirit of cooperation with the Department in which they are offered. We are unanimously supportive of the Department's recommendation to open the entire 1002 Study Area to oil and gas leasing. Since we believe that adequate protection of proprietary data rights is critical to the health and success of the oil industry and on that success depends the success of any leasing program, we see our comments as supporting and not opposing the Department's goals in ANWR.

This submission is made on behalf of those companies named on the last page of the comments.

Yours truly,

GEOPHYSICAL SERVICE INC.

Lonnie D. Brooks, Manager
Western U.S. Marketing

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A SUBSIDIARY OF TEXAS INSTRUMENTS INCORPORATED

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COMMENTS OF THE ANWR SURVEY GROUP

The Arctic National Wildlife Refuge Seismic Survey Group ("ANWR Survey Group") appreciates this opportunity to submit comments on the "Draft Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment" ("draft report") released in November, 1986. The ANWR Survey Group consists of the 22 energy companies which funded, designed, and conducted -- through their contractor, Geophysical Service Inc. (GSI) -- the 1984 and 1985 seismic surveys of the Arctic National Wildlife Refuge ("ANWR") study area as mandated by Congress under Section 1002 of the *Alaska National Interest Lands Conservation Act* ("ANILCA"), 16 U.S.C. 3142.

The ANWR Survey Group wishes to compliment the Interagency Advisory Work Group for their fine job in preparing the draft report. Our member companies strongly support the Secretary's recommendation that Congress permit leasing in the ANWR Coastal Plain for oil and gas development and urge that a final report be issued as expeditiously as possible.

Nevertheless, the ANWR Survey Group is deeply concerned over the Interagency Advisory Work Group's decision to release confidential processed geophysical data in the draft report. These data pertain to areas within the ANWR as well as areas outside of the ANWR. The public release of processed geophysical data contravenes Congress' express mandate that "any processed, analyzed and interpreted data and information shall be held confidential by the Secretary for a period of not less than two

years following any lease sale including the area from which the information was obtained." 16 U.S.C. 3142(c).

Each of the companies which comprise the ANWR Survey Group may submit comments on the draft report and the Secretary's recommendation under separate cover. These comments submitted on behalf of the group as a whole focus solely on the issue of geophysical data disclosure and reflect the unanimous position of the undersigned members of the Group that the release of processed geophysical data in the draft report was contrary to law.

The ANWR Survey Group respectfully requests that the Interagency Advisory Work Group refrain from further disclosure of processed geophysical data and information whether such data and information pertain to the ANWR or not. No processed, analyzed or interpreted data and information pertaining to the ANWR may be released until two years after a lease sale including the area from which the information was obtained has been held. No raw, processed, analyzed or interpreted data and information pertaining to areas outside of the ANWR may be released without the express written consent of the ANWR Survey Group.

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DISCUSSION

I. SECTION 1002 OF ANILCA EXPRESSLY PROHIBITS THE DISCLOSURE OF ANY PROCESSED GEOPHYSICAL DATA AND INFORMATION AT THIS TIME.

Section 1002(e)(2) of ANILCA requires inter alia that the Secretary:

> (B) shall require that all data and information (including processed, analyzed and interpreted information) obtained as a result of carrying out the plan shall be submitted to the Secretary; and
>
> (C) shall make such data and information available to the public except that any processed, analyzed and interpreted data or information shall be held confidential by the Secretary for a period of not less than two years following any lease sale including the area from which the information was obtained.

16 U.S.C. 3142(e)(2)(B),(C).

Congress enacted these provisions to encourage private companies to finance the costly seismic exploration of the ANWR. As a further incentive to private exploration, Congress prohibited the Secretary from approving any plan submitted by the U.S. Geological Survey ("U.S.G.S.") unless private parties were unwilling to explore or would not provide sufficient information to make an adequate report. 16 U.S.C. 3142(e)(2).

However, Congress recognized that private entities would not invest in ANWR exploration unless they were permitted to protect their proprietary interest in data obtained through their efforts. The importance of Congress' promise to protect this proprietary interest cannot be underestimated. The only benefit which accrues to a company which financed ANWR data collection is the ability to use it in lease sale decisionmaking. If ANWR data were made available to all comers regardless of whether they contributed toward its collection there would be no incentive for any company to contribute.

Thus, a significant portion of the value of the data to any given company lies primarily in its proprietary nature rather than in its content per se.

This principle is simply illustrated. Seismic data showing that an area is or is not prospective has virtually no inherent value. But the companies that own it know that the area is one on which they should or should not bid. Conversely, companies that do not own the data must either spend money to acquire it or risk bidding on a non-prospective tract. If those data are made public, the situation is reversed. The companies that did not acquire the data from the permittee get it for free, giving them a substantial competitive advantage over the companies that paid for the data in the first place.

Recognizing this to be the case, Congress amended Section 1002(e)(2) in an attempt to further protect the proprietary interest of companies which financed ANWR data collection. The amendment states:

> ... Provided, That the Secretary shall prohibit by regulation any person who obtains access to such data and information from the Secretary or from any person other than a permittee from participation in any lease sale which includes the areas from which the information was obtained and from any commercial use of the information. The Secretary shall require that any permittee shall make available such data to any person at fair cost.

The amendment is not a substitute for the Secretary's obligation to maintain the confidentiality of any processed, analyzed and interpreted data and information. It is directed at companies which receive raw geophysical data and information which is the only form in which ANWR data and information may presently be released.

As can be seen, the amendment allows raw data to be made available to those who desire to use it during the debate regarding the future status of ANWR but takes away from any recipient of the data, the right to participate in any future lease sale and thus any competitive advantage that recipient might otherwise have obtained from the data.

A. Data Processed by U.S.G.S. Must Remain Confidential by Virtue of Section 1002 of ANILCA

As shown above, Section 1002 requires the Secretary to keep "... processed, analyzed and interpreted data ... confidential for a period of not less than two years following any lease sale including the area from which the information was obtained."

The protection afforded by ANILCA Section 1002(e)(2)(C) must be viewed not only within the context of the other provisions of ANILCA but also in the context of other related statutes.

The Trade Secrets Act (18 U.S.C. § 1905) prohibits all agencies from disclosing "information concern[ing] or relat[ing] to trade secrets, processes, operations, style of work, or apparatus" unless "authorized by law". The Act has been described as "providing a standard by which to judge the legality of proposed agencies disclosures ... to create a federal right of non-disclosure." Chevron Chemical Company v. Costle, 641 F.2d 104, 115 (3d Cir. 1981). See also Chrysler Corporation v. Brown, 441 U.S. 281, 306 (1979).

ANILCA provides the statutory authority for certain disclosures of data and information which would otherwise undoubtedly be considered trade secrets. ANILCA Section

1002(e)(2)(B) requires that a permittee submit all data and information obtained as a result of carrying out an Exploration Plan to the Secretary. ANILCA Section 1002(e)(2)(C) empowers the Secretary to make such data available to the public except that any processed, analyzed or interpreted data or information must be held confidential for a period of not less than two years following any lease sale including the area from which the information was obtained. Thus ANILCA provides plenary authority for disclosure of "raw data" but only limited authority to disclose processed, analyzed or interpreted data after a minimum period of years. Although the Secretary must, at some point make raw data available, the statute contains no time limits, conditions or procedures governing the Secretary's release of that data. Similarly, although the Secretary must hold processed, analyzed and interpreted information confidential for a minimum period, he may lengthen that term indefinitely at his discretion.

The plain language of Section 1002(e)(2) prohibits disclosure of "any processed, analyzed [or] interpreted data and information ..." The term "any" is clear and unambiguous: it describes something which is "unmeasured in amount, number or extent." Read in this context, it certainly describes all processed, analyzed or interpreted data which is submitted by a permittee under Section 1002(e)(2)(B) or derives from data which was obtained as a result of carrying out an exploration plan.

This interpretation is also supported by the grammatical construction of Section 1002(e)(2)(C). Had the drafters intended

to limit the protections afforded to processed, analyzed and interpreted data to only that processed, analyzed and interpreted data submitted by the permittee to the Secretary they could easily have done so by merely modifying the protection to state "any [of such data which is] processed ... etc." or "any processed, analyzed or interpreted data ... [submitted by the permittee] ..."

In the absence of these limitations, however, one is required to interpret the word "any" as including all processed, analyzed and interpreted data in the Secretary's possession.

The legislative history of Section 1002 fully supports this conclusion. While the legislative history supporting initial enactment of Section 1002(e)(2) does not address the scope of confidentiality protection, Congress addressed the evil arising from the unauthorized release of data in the 1982 amendments, stating:

> Language in the current law requires the Secretary to make such data and information obtained in private exploration available to the public. Since this allows companies that don't directly finance the exploration to get the information and data from the Secretary at little or no expense, there is no incentive for a company to explore. In essence then, nonparticipating companies could reap a windfall. Comments to the Department of Interior on this matter from prospective explorers suggest that private industry will not explore absent the change agreed to by the managers. The Congressional Budget Office in 1980 reported that the cost to the government to conduct the exploration was estimated at more than $61 million. Because the exploration effort has been mandated by an act of Congress, either the government or private industry must bear the expense. This amendment will thus save the government this expense.

> The effect of the language is to put all commercial interests on an equal footing by denying any company that gets data and information from the Secretary or any party other than a permittee from participating in a subsequent lease sale of land within the ANWR, unless the permittee is financially compensated at fair cost for such data or information.
>
> At the same time, this language preserves the right of public access to this data for the purpose of full public discussion and debate regarding whether the ANWR should be opened to lease.

H. Conf. Rep. 97-978, 97th Cong. 2d Sess. to accompany H.R. 7356 at 27. The Conference version of the amendment was adopted without debate by both houses and signed into law.

Although the Secretary was already prohibited from disclosing processed, analyzed or interpreted data and information, Congress was concerned that raw data which was releasable would be processed or otherwise used commercially by entities which did not finance the exploration effort. It was feared that these "freeloaders" would create a disincentive for other companies to finance exploration.

The amendment added by the Congress in direct response to this concern was extremely broad. It prohibits any person who has access to any data from any person other than the permittee from (1) participating in any lease sale involving the areas from which the data were obtained, and (2) from making any commercial use of the data whatsoever.

Because the Secretary holds the raw data and the data processed, analyzed and interpreted by the permittee, he is in a unique position, akin to a fiduciary. His knowledge of the

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processing methods used by the permittee and other parties gives him valuable commercial information regarding processing techniques and philosophies beyond that derived merely from viewing a single sample of processed data. Because of his unique position, it is likely that any processing done by the Secretary will be nothing more than a good quality compilation of the data already submitted and could provide a product very similar to that paid for by the permittee. Even more importantly, the Secretary is uniquely positioned to interpret and analyze data already submitted in processed form by the permittee. Should that ultimate end product be released, there could well be nothing of value left to protect. Also, the disclosure of any processed data would provide similar clues as to the processing preferences of the permittee or third parties. Further, release of data processed by the Secretary using processing methods similar or identical to those used by the permittee would destroy any commercial value the permittee's processed data would otherwise have gutting the protections afforded by the 1982 amendment.

Thus, public release of any privately acquired data whether federally processed or not subverts Congress' stated intention to protect the legitimate interests of those who took a risk in financing exploration. It renders the 1982 protection virtually unenforceable since the agency has no way of monitoring access to processed, analyzed or interpreted data once it has entered the public domain.

The regulations also support this conclusion. 50 C.F.R. 37.53(e) provides:

> Any permittee or other person submitting processed, analyzed or interpreted data or information to the Regional Director shall clearly identify them by marking the top of each page bearing the words "PROCESSED, ANALYZED AND INTERPRETED DATA OR INFORMATION ..."

50 C.F.R. 37.54(a) provides in relevant part:

> The Department shall withhold from the public all processed, analyzed and interpreted data or information obtained as a result of carrying out exploratory activities and submitted by the permittee or a third party.

(Emphasis added.)

In essence, the statutory and regulatory scheme requires anyone that processes information obtained from the program to submit the processed product to the Secretary, who is, in turn, required to hold it confidential. This is fully consistent with the Department's prior statement that the primary purpose of Section 1002 is the collection of data to be used by the Executive and Legislative branches in deciding what conclusions to draw and recommendations to make in the report required by Section 1002(h).

Obviously, given this statutory and regulatory coverage, there is no circumstance under which data could be processed by a third party and the processed, analyzed and interpreted product not be required to be submitted to the Secretary. The Secretary, is, in turn, required even by the Secretary's unduly narrow interpretation of his own regulations, to hold that material confidential. In this context, it cannot be the case that

Congress or the Secretary intended to create a class of private persons who are exempt from submitting their processed data to the Secretary. Since the regulations require that all data submitted be held confidential, no privately processed data would be subject to public disclosure by the Secretary. Given the breadth of the protection afforded private explorers, it does not appear rational that the Secretary, acting as fiduciary for all privately processed data in his possession, would be able to process and release the data himself.

The only exception to these wide-ranging confidentiality provisions is created by 50 C.F.R. 37.45. This Section prohibits the U.S.G.S. from asserting confidentiality over processed, analyzed or interpreted data but only when those data are collected by the U.S.G.S. itself under a Special Use Permit. Such a permit can only be issued where no private entity has submitted a plan for the area involved which meets established guidelines and the information which would be obtained is needed to make an adequate report under Section 1002(h). 50 C.F.R. 37.45 does not address the confidentiality of data collected by a private permittee but processed by the U.S.G.S.

As shown, the plain meaning of the statute, its grammatical construction, and its legislative history do not contemplate any exception to the prohibition on releasing privately collected, federally processed data.

B. Expenditure of Public Funds Does Not Transform Confidential Industry Data Into Public Data.

Section 1002(e)(2) does not merely protect data and information which was submitted by a permittee in processed, analyzed or interpreted form. There is no evidence that Congress contemplated that the confidentiality protection could apply this narrowly.

The Department has asserted that the expenditure of public funds for the processing of raw data extinguishes the permittee's confidentiality interest in the resultant processed data. That conclusion is unsupported by authority and, when placed against the provisions of the Trade Secrets Act, 18 U.S.C. 1905, ANILCA, the ANILCA regulations, and general tenets of intellectual property law, it is clearly erroneous.

True enough, data which is collected and processed wholly at the expense of the U.S.G.S. has been exempted from ANILCA's confidentiality requirements by regulation. 50 C.F.R. 37.45. The preamble to this regulation states:

> GS and its contractors and subcontractors have been exempted from the provisions dealing with processed, analyzed and interpreted data or information, as data acquisition, processing, analysis and interpretation done by [Geological Survey] or on its behalf is financed by public funds and, therefore, the Department has no intention of withholding such data and information from the public.

48 Fed. Reg. 16855 (April 19, 1983) (emphasis added).

However, it clearly does not apply where data acquisition is undertaken by a private permittee. By protecting processed,

analyzed and interpreted data from potential misuse, Congress desired to stimulate privately funded exploration of the ANWR.

Although this exception is not authorized by statute, it is not inconsistent with Congress' intent. The U.S.G.S. can only conduct exploration in the event that no private parties were willing to do so. Consequently, the competitive concerns underlying ANILCA Section 1002(e)(2)(C) do not apply. However, where private explorers mount a multi-million dollar effort to acquire data which is subsequently processed for U.S.G.S. on the Secretary's behalf, competitive concerns resurface. This is especially true since acquisition expenses account for 80 to 90 percent of the total cost of the project. Thus, release of data which is privately acquired but processed by U.S.G.S. is no less harmful to the permittee than release of privately processed data. In fact, the Secretary's unique ability to compile and evaluate data from all possible sources renders the release of his interpretations the most harmful of all.

The expenditure of public funds for the processing of data which is acquired by private entities has no bearing on the releasability of the resultant data. Congress has expressly declined to authorize the release of any processed, analyzed and interpreted data until at least two years after a lease sale has occurred. The Trade Secrets Act independently prohibits the agency from releasing such data and ANILCA does not authorize its release until at least that point in time.

C. Disclosure of U.S.G.S. Processed Data Will Vitiate the Protections Sought to be Provided by the 1982 Amendment.

The 1982 amendment to ANILCA barring companies which obtain raw data from the Secretary from bidding at an ANWR lease sale is addressed in regulations published at 50 C.F.R. 37.54(d).

> Commercial use by any person of data or information obtained as a result of carrying out exploratory activities and disclosed pursuant to this section is prohibited. No person shall obtain access from the Department ... to any data or information obtained as a result of carrying out exploratory activities and submitted by the permittee or a third party until such person provides the Department with a statement certifying that person's awareness of the prohibitions contained in this paragraph and the disqualification [from bidding at lease sales] ...

In commenting on this regulation, members of the ANWR Survey Group also sought additional controls on the release of raw data. The Department responded to these concerns in the preamble to the Final Rule but failed to make the requested changes.

> No changes have been made to [the definitions of raw and processed data] because of the intervening amendment ... The Service considers the commenter's concerns about the harm that could be done to the competitive positions of permittees should their seismic tapes be made available to the public and their competitors as raw data and the consequent disincentive that the Service's disclosure provisions provided to participation in the exploration program to have been mooted by the [amendment]. [The amendment] should restore the economic incentive needed by industry to participate in exploration of the coastal plain. According to its legislative history, the purpose of [the amendment] is to put all commercial interests on an equal footing by denying any company that gets data and information from the Department or from any party other than a permittee from participating in a subsequent lease sale of the land to which such data and information pertain.

48 Fed. Reg. 16840 (April 19, 1983).

The Department sought to implement the 1982 amendment by seeking from each party requesting data a certification of his awareness of the prohibitions on bidding contained in the statute. Such a certification would provide the Department not only with a list of requestors (who would presumably be barred from participating in upcoming lease sales) but also with a statement from the requestor which would be used to demonstrate that, even absent the prohibitions contained in the 1982 amendment, the requestor had waived any right it might have had to participate in an ANWR lease sale.

Obviously, the general release by publication of data processed by U.S.G.S. gives the general public, including the direct competitors of the survey group members, access to valuable seismic data, which, had they requested it from the Department, would have triggered the restrictions contained in the 1982 amendment. Further, since the data are released by publication, the Department has no record of those potential bidders that have received data nor any statement by them waiving their right to bid. Thus, the entire objective of the 1982 amendment is vitiated by publication.

Apparently in an attempt to reduce the potential commerciality of the processed data published in the draft ANWR report, certain identifying data were deleted from the processed seismic sections contained in Plate 5. For instance, the precise

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locations of the ends of the published sections have been deleted along with the locations of the individual shotpoints. Despite this attempt, enough identifying information was included, inadvertently or otherwise sufficient to locate the geologic features identified in those sections with sufficient precision to make the data very commercial.

For example, several of the sections are published in their entirety and the line identification numbers are shown. The precise location of these lines are available to the public on maps submitted in conjunction with the exploration plans. Further, some of the sections are tied to existing wells outside the refuge. Since the location of these wells is precisely known, the location of structures within the refuge may be easily extrapolated.

In short, to the extent that U.S.G.S. processed data has been published, its confidentiality and hence its value to the survey group has been irrevocably compromised. Since a small amount of the data has actually been published, the group's competitive position has already been severely damaged. Further, disclosure of data as yet undisclosed will render the group's investment of over $40 million virtually worthless. Thus, should it become apparent that further unauthorized disclosure of U.S.G.S. processed data is intended, the group will be forced to consider whether legal action is appropriate to enjoin it.

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II. NO DATA WHICH PERTAINS TO AREAS OUTSIDE OF THE ANWR MAY BE RELEASED IRRESPECTIVE OF ITS FORM.

Another data disclosure problem, potentially even more serious than the disclosure of U.S.G.S. processed data, has also arisen as a consequence of the publication of the draft report. That problem is the disclosure of data collected outside the refuge boundary pursuant to State of Alaska permits but submitted to the Department in order to aid its evaluation of ANWR.

At the time that the exploration plans were submitted, the applicable regulations required that the permittee submit to DOI "all data and information obtained as a result of carrying out exploratory activities." 50 C.F.R. 37.53(a).

Each submission was required to contain:

> 1) An accurate and complete record of each geophysical survey conducted under the permittee's permit, ...
>
> 2) All seismic data developed under the permit.

50 C.F.R. 37.53(b).

The regulations define certain terms used above as follows:

> (i) "Exploratory activities" mean ... seismic exploration ... of the coastal plain ... and any other type of geophysical exploration of the coastal plain which involves or is a component of an exploration program for the coastal plain involving surface use of refuge lands ... .
>
> (p) "Raw data and information" means all original observations and recordings in written or electronic form ... obtained during field operations.
>
> (w) "Special use permit" means a revocable nonpossessory privilege issued in writing ... authorizing the permittee to enter and use

> the refuge for a specified period to conduct exploratory activities ...

50 C.F.R. 37.2.

Thus, the regulations require the submission of only data collected as a result of "exploratory activities" and those activities are limited by definition to the exploration of the coastal plain or other types of geophysical exploration of the coastal plain involving the surface use of refuge lands. Given this framework, it would have been impossible for a prospective permittee to infer from the regulations that it would be required to submit (and thus possibly subject to public disclosure) data collected outside of the coastal plain.

Apparently, however, Departmental officials became aware through informal discussions with group members that data would be collected outside the refuge in order to provide an integrated data base to the group members. However, no communications were made by the Department to the group that the Department expected to receive any off-refuge data until the Record of Decision ("ROD") was issued regarding the approval of the exploration plan. It stated:

> (8) Copies of any well tie-in data obtained during the surveys will be provided to the Government. The Government will protect the proprietary nature of these data.

ROD I Conditions of Approval, 1 C (8) at p. 7 (emphasis added).

It did not mention the submission of other data collected outside the refuge. The Special Use Permit itself, however, states:

> 22. In addition to data obtained from the coastal plain, the permittee shall submit to

> the [Government] all data obtained during this program which ties to adjacent areas.

Special Use Permit 83-C10, Special Conditions 22.

Obviously, the Department's authority to require the collection and authorize release of geophysical data in this instance is limited by the plain language of the statute and the rules for activities conducted within the ANWR. Indeed, the Department cannot even authorize, let alone require, the collection of data on state lands or in state waters.

Further, geophysical data is generally exempt from disclosure under the Freedom of Information Act, 5 U.S.C. § 552 ("FOIA"), and would undoubtedly be considered confidential "trade secrets" pursuant to 18 U.S.C. § 1905 (the "Trade Secrets Act"). That is, seismic data is generally to be held confidential by government officials unless its release is authorized by statute as opposed to most other types of data collected by the government, which are subject to disclosure unless prohibited by statute.

In view of the general exemption of seismic data from disclosure (discussed more fully above) express statutory authorization is required to release seismic data in the government's possession. However, ANILCA jurisdiction pertains only to data collected in the ANWR itself and no other statute authorizes release of these data especially since they were obtained on state lands rather than federal lands. Thus, no statute authorizes release of off-refuge data and any further release would constitute a violation of 18 U.S.C. 1905.

The significance of this problem is heightened by the fact that much of the off-refuge data in question was collected in State of Alaska waters offshore of the ANWR from the eastern edge of Camden Bay to an area eastward of the boundary of the Coastal Plain survey area. This area is to be offered for lease in State of Alaska Sales 50 and 55, currently scheduled for June, 1987 and June, 1988. Industry interest in the sale is high and the group is aware that many companies who were not members of the ANWR survey group are interested in bidding. By contrast review of off-refuge data is not necessary to informed debate over the conclusions drawn in the draft report.

In spite of this, the Department published some off-refuge data in the draft report. In spite of the express representation that "the Government would protect the proprietary nature" of well tie data contained in the ROD, extensive well tie data are published in Plate 4 of the report and are illustrated on lines 84-1, 84-5, 85-2 and 85-8, while offshore, state water data are apparently published on lines 85-8, 84-10 and 85-1. In addition, Line 85-1 projects into the State of Alaska lease sale 55 area. These disclosures are not only unauthorized but in the case of well tie data constitute a blatant breach of promise for which the Department is clearly liable.

As in the case of U.S.G.S. processed data there is no way that the competitive harm that disclosure has already caused can be undone. Further, as in the case of U.S.G.S. processed data,

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the group will be forced to consider the appropriateness of legal action to enjoin any further releases of off-refuge data in order to prevent further competitive harm.

CONCLUSION

Congress enacted ANILCA's prohibitions on the release of privately collected geophysical data in order that the companies that funded the seismic survey of the ANWR would not be required to forfeit their investment. Concomitantly, the passage of the 1982 amendment signaled Congressional concurrence in the position that carefully controlled disclosure of raw data, but not processed data, would enable those who desired it to participate fully in the ANWR debate.

However, the Department has released processed data by publication in direct violation of Section 1002, completely vitiating the statutory protection. Further, it has breached its promise to protect the confidentiality of well-tie data and has released highly proprietary data collected outside the ANWR without statutory authority and in direct violation of 18 U.S.C. 1905 -- data which is unnecessary to informed public debate but which is essential to companies wishing to participate in State of Alaska Sales 50 and 55.

We trust that the Department will understand the seriousness of its past actions and take steps to ensure that they will cease. The recommendations contained in the draft report and its analysis of the issues are generally commendable and, as demonstrated in the public hearings in Anchorage and Washington many members of the survey group have actively supported the

Department's position. It would be a shame were that relationship to be marred by continued Departmental violations of its own guarantees of confidentiality.

Geophysical Service Inc. is the geophysical contractor and the authorized representative of the following companies of the GSI ANWR Exploration Group who have authorized submission of these comments:

AMERADA HESS CORPORATION

AMOCO PRODUCTION COMPANY

ARCO ALASKA, INC.

CHAMPLIN PETROLEUM CO.
(a subsidiary of Union Pacific Corporation)

CHEVRON U.S.A. INC.

CONOCO INC.

ELF AQUITAINE PETROLEUM

EXXON COMPANY, U.S.A.
(a Division of Exxon Corp.)

KERR-McGEE CORPORATION

MARATHON OIL COMPANY

MOBIL OIL CORPORATION

MURPHY OIL USA, INC.

PETROFINA DELAWARE, INCORPORATED

PLACID OIL COMPANY

SHELL WESTERN EXPLORATION AND PRODUCTION INC.

STANDARD ALASKA PRODUCTION COMPANY

SUN EXPLORATION AND PRODUCTION COMPANY

TENNECO OIL COMPANY

TEXACO INC.

UNOCAL

UNION TEXAS PETROLEUM CORPORATION

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JOHN M. STUCKEY
OF COUNSEL

February 9, 1987

U.S. Fish and Wildlife Service
Department of the Interior
18th and C Streets, Northwest, Room 2343
Washington, D.C. 20240

Attention: Division of Refuge Management

Ladies and Gentlemen:

On Friday, February 6, 1987, this office transmitted the comments of the Arctic National Wildlife Refuge Seismic Survey Group on the Draft ANWR Report and Environmental Impact Statement via U.S. mail.

I-64 Regrettably, the comments enclosed were but a draft and not the final comments. Please find enclosed the final comments. We would ask that these comments labelled "Corrected Comments of the ANWR Survey Group" be substituted for those you will receive in the mail.

We regret this error and hope that you will not be inconvenienced by our request.

Sincerely yours,

Nathan S. Bergerbest

Enclosure

/CORRECTED/

COMMENTS OF THE ANWR SURVEY GROUP

The Arctic National Wildlife Refuge Seismic Survey Group ("ANWR Survey Group") appreciates this opportunity to submit comments on the "Draft Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment" ("draft report") released in November, 1986. The ANWR Survey Group consists of the 22 energy companies which funded, designed, and conducted -- through their contractor, Geophysical Service Inc. (GSI) -- the 1984 and 1985 seismic surveys of the Arctic National Wildlife Refuge ("ANWR") study area as mandated by Congress under Section 1002 of the Alaska National Interest Lands Conservation Act ("ANILCA"), 16 U.S.C. 3142.

The ANWR Survey Group wishes to compliment the Interagency Advisory Work Group for their fine job in preparing the draft report. Our member companies strongly support the Secretary's recommendation that Congress permit leasing in the ANWR Coastal Plain for oil and gas development and urge that a final report be issued as expeditiously as possible.

Nevertheless, the ANWR Survey Group is deeply concerned over the Interagency Advisory Work Group's decision to release confidential processed geophysical data in the draft report. These data pertain to areas within the ANWR as well as areas outside of the ANWR. The public release of processed geophysical data contravenes Congress' express mandate that "any processed, analyzed and interpreted data and information shall be held confidential by the Secretary for a period of not less than two

years following any lease sale including the area from which the information was obtained." 16 U.S.C. 3142(c).

Each of the companies which comprise the ANWR Survey Group may submit comments on the draft report and the Secretary's recommendation under separate cover. These comments submitted on behalf of the group as a whole focus solely on the issue of geophysical data disclosure and reflect the unanimous position of the undersigned members of the Group that the release of processed geophysical data in the draft report was contrary to law.

The ANWR Survey Group respectfully requests that the Interagency Advisory Work Group refrain from further disclosure of processed geophysical data and information whether such data and information pertain to the ANWR or not. No processed, analyzed or interpreted data and information pertaining to the ANWR may be released until two years after a lease sale including the area from which the information was obtained has been held. No raw, processed, analyzed or interpreted data and information pertaining to areas outside of the ANWR may be released without the express written consent of the ANWR Survey Group.

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DISCUSSION

I. SECTION 1002 OF ANILCA EXPRESSLY PROHIBITS THE DISCLOSURE OF ANY PROCESSED GEOPHYSICAL DATA AND INFORMATION AT THIS TIME.

Section 1002(e)(2) of ANILCA requires inter alia that the Secretary:

> (B) shall require that all data and information (including processed, analyzed and interpreted information) obtained as a result of carrying out the plan shall be submitted to the Secretary; and
>
> (C) shall make such data and information available to the public except that any processed, analyzed and interpreted data or information shall be held confidential by the Secretary for a period of not less than two years following any lease sale including the area from which the information was obtained.

16 U.S.C. 3142(e)(2)(B),(C).

Congress enacted these provisions to encourage private companies to finance the costly seismic exploration of the ANWR. As a further incentive to private exploration, Congress prohibited the Secretary from approving any plan submitted by the U.S. Geological Survey ("U.S.G.S.") unless private parties were unwilling to explore or would not provide sufficient information to make an adequate report. 16 U.S.C. 3142(e)(2).

However, Congress recognized that private entities would not invest in ANWR exploration unless they were permitted to protect their proprietary interest in data obtained through their efforts. The importance of Congress' promise to protect this proprietary interest cannot be underestimated. The only benefit which accrues to a company which financed ANWR data collection is the ability to use it in lease sale decisionmaking. If ANWR data were made available to all comers regardless of whether they contributed toward its collection there would be no incentive for any company to contribute.

Thus, a significant portion of the value of the data to any given company lies primarily in its proprietary nature rather than in its content per se.

This principle is simply illustrated. Seismic data showing that an area is or is not prospective has virtually no inherent value. But the companies that own it know that the area is one on which they should or should not bid. Conversely, companies that do not own the data must either spend money to acquire it or risk bidding on a non-prospective tract. If those data are made public, the situation is reversed. The companies that did not acquire the data from the permittee get it for free, giving them a substantial competitive advantage over the companies that paid for the data in the first place.

Recognizing this to be the case, Congress amended Section 1002(e)(2) in an attempt to further protect the proprietary interest of companies which financed ANWR data collection. The amendment states:

> ... Provided, That the Secretary shall prohibit by regulation any person who obtains access to such data and information from the Secretary or from any person other than a permittee from participation in any lease sale which includes the areas from which the information was obtained and from any commercial use of the information. The Secretary shall require that any permittee shall make available such data to any person at fair cost.

The amendment is not a substitute for the Secretary's obligation to maintain the confidentiality of <u>any</u> processed, analyzed and interpreted data and information. It is directed at companies which receive raw geophysical data and information which is the only form in which ANWR data and information may presently be released.

As can be seen, the amendment allows raw data to be made available to those who desire to use it during the debate regarding the future status of ANWR but takes away from any recipient of the data, the right to participate in any future lease sale and thus any competitive advantage that recipient might otherwise have obtained from the data.

A. <u>Data Processed by U.S.G.S. Must Remain Confidential by Virtue of Section 1002 of ANILCA</u>

As shown above, Section 1002 requires the Secretary to keep "... processed, analyzed and interpreted data ... confidential for a period of not less than two years following any lease sale including the area from which the information was obtained."

The protection afforded by ANILCA Section 1002(e)(2)(C) must be viewed not only within the context of the other provisions of ANILCA but also in the context of other related statutes.

The Trade Secrets Act (18 U.S.C. § 1905) prohibits all agencies from disclosing "information concern[ing] or relat[ing] to trade secrets, processes, operations, style of work, or apparatus" unless "authorized by law". The Act has been described as "providing a standard by which to judge the legality of proposed agencies disclosures ... to create a federal right of non-disclosure." <u>Chevron Chemical Company v. Costle</u>, 641 F.2d 104, 115 (3d Cir. 1981). <u>See also Chrysler Corporation v. Brown</u>, 441 U.S. 281, 306 (1979).

ANILCA provides the statutory authority for certain disclosures of data and information which would otherwise undoubtedly be considered trade secrets. ANILCA Section

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1002(e)(2)(B) requires that a permittee submit all data and information obtained as a result of carrying out an Exploration Plan to the Secretary. ANILCA Section 1002(e)(2)(C) empowers the Secretary to make such data available to the public except that any processed, analyzed or interpreted data or information must be held confidential for a period of not less than two years following any lease sale including the area from which the information was obtained. Thus ANILCA provides plenary authority for disclosure of "raw data" but only limited authority to disclose processed, analyzed or interpreted data after a minimum period of years. Although the Secretary must, at some point make raw data available, the statute contains no time limits, conditions or procedures governing the Secretary's release of that data. Similarly, although the Secretary must hold processed, analyzed and interpreted information confidential for a minimum period, he may lengthen that term indefinitely at his discretion.

The plain language of Section 1002(e)(2) prohibits disclosure of "any processed, analyzed [or] interpreted data and information ..." The term "any" is clear and unambiguous: it describes something which is "unmeasured in amount, number or extent." Read in this context, it certainly describes all processed, analyzed or interpreted data which is submitted by a permittee under Section 1002(e)(2)(B) or derives from data which was obtained as a result of carrying out an exploration plan.

This interpretation is also supported by the grammatical construction of Section 1002(e)(2)(C). Had the drafters intended

to limit the protections afforded to processed, analyzed and interpreted data to only that processed, analyzed and interpreted data submitted by the permittee to the Secretary they could easily have done so by merely modifying the protection to state "any [of such data which is] processed ... etc." or "any processed, analyzed or interpreted data ... [submitted by the permittee] ..."

In the absence of these limitations, however, one is required to interpret the word "any" as including all processed, analyzed and interpreted data in the Secretary's possession.

The legislative history of Section 1002 fully supports this conclusion. While the legislative history supporting initial enactment of Section 1002(e)(2) does not address the scope of confidentiality protection, Congress addressed the evil arising from the unauthorized release of data in the 1982 amendments, stating:

> Language in the current law requires the Secretary to make such data and information obtained in private exploration available to the public. Since this allows companies that don't directly finance the exploration to get the information and data from the Secretary at little or no expense, there is no incentive for a company to explore. In essence then, nonparticipating companies could reap a windfall. Comments to the Department of Interior on this matter from prospective explorers suggest that private industry will not explore absent the change agreed to by the managers. The Congressional Budget Office in 1980 reported that the cost to the government to conduct the exploration was estimated at more than $61 million. Because the exploration effort has been mandated by an act of Congress, either the government or private industry must bear the expense. This amendment will thus save the government this expense.

> The effect of the language is to put all commercial interests on an equal footing by denying any company that gets data and information from the Secretary or any party other than a permittee from participating in a subsequent lease sale of land within the ANWR, unless the permittee is financially compensated at fair cost for such data or information.
>
> At the same time, this language preserves the right of public access to this data for the purpose of full public discussion and debate regarding whether the ANWR should be opened to lease.

H. Conf. Rep. 97-978, 97th Cong. 2d Sess. to accompany H.R. 7356 at 27. The Conference version of the amendment was adopted without debate by both houses and signed into law.

Although the Secretary was already prohibited from disclosing processed, analyzed or interpreted data and information, Congress was concerned that raw data which was releasable would be processed or otherwise used commercially by entities which did not finance the exploration effort. It was feared that these "freeloaders" would create a disincentive for other companies to finance exploration.

The amendment added by the Congress in direct response to this concern was extremely broad. It prohibits any person who has access to any data from any person other than the permittee from (1) participating in any lease sale involving the areas from which the data were obtained, and (2) from making any commercial use of the data whatsoever.

Because the Secretary holds the raw data and the data processed, analyzed and interpreted by the permittee, he is in a unique position, akin to a fiduciary. His knowledge of the

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processing methods used by the permittee and other parties gives him valuable commercial information regarding processing techniques and philosophies beyond that derived merely from viewing a single sample of processed data. Because of his unique position, it is likely that any processing done by the Secretary will be nothing more than a good quality compilation of the data already submitted and could provide a product very similar to that paid for by the permittee. Even more importantly, the Secretary is uniquely positioned to interpret and analyze data already submitted in processed form by the permittee. Should that ultimate end product be released, there could well be nothing of value left to protect. Also, the disclosure of any processed data would provide similar clues as to the processing preferences of the permittee or third parties. Further, release of data processed by the Secretary using processing methods similar or identical to those used by the permittee would destroy any commercial value the permittee's processed data would otherwise have gutting the protections afforded by the 1982 amendment.

Thus, public release of any privately acquired data whether federally processed or not subverts Congress' stated intention to protect the legitimate interests of those who took a risk in financing exploration. It renders the 1982 protection virtually unenforceable since the agency has no way of monitoring access to processed, analyzed or interpreted data once it has entered the public domain.

The regulations also support this conclusion. 50 C.F.R. 37.53(e) provides:

> Any permittee or other person submitting processed, analyzed or interpreted data or information to the Regional Director shall clearly identify them by marking the top of each page bearing the words "PROCESSED, ANALYZED AND INTERPRETED DATA OR INFORMATION ..."

50 C.F.R. 37.54(a) provides in relevant part:

> The Department shall withhold from the public all processed, analyzed and interpreted data or information obtained as a result of carrying out exploratory activities and submitted by the permittee or a third party.

(Emphasis added.)

In essence, the statutory and regulatory scheme requires anyone that processes information obtained from the program to submit the processed product to the Secretary, who is, in turn, required to hold it confidential. This is fully consistent with the Department's prior statement that the primary purpose of Section 1002 is the collection of data to be used by the Executive and Legislative branches in deciding what conclusions to draw and recommendations to make in the report required by Section 1002(h).

Obviously, given this statutory and regulatory coverage, there is no circumstance under which data could be processed by a third party and the processed, analyzed and interpreted product not be required to be submitted to the Secretary. The Secretary, is, in turn, required even by the Secretary's unduly narrow interpretation of his own regulations, to hold that material confidential. In this context, it cannot be the case that

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Congress or the Secretary intended to create a class of private persons who are exempt from submitting their processed data to the Secretary. Since the regulations require that all data submitted be held confidential, no privately processed data would be subject to public disclosure by the Secretary. Given the breadth of the protection afforded private explorers, it does not appear rational that the Secretary, acting as fiduciary for all privately processed data in his possession, would be able to process and release the data himself.

The only exception to these wide-ranging confidentiality provisions is created by 50 C.F.R. 37.45. This Section prohibits the U.S.G.S. from asserting confidentiality over processed, analyzed or interpreted data but only when those data are collected by the U.S.G.S. itself under a Special Use Permit. Such a permit can only be issued where no private entity has submitted a plan for the area involved which meets established guidelines and the information which would be obtained is needed to make an adequate report under Section 1002(h). 50 C.F.R. 37.45 does not address the confidentiality of data collected by a private permittee but processed by the U.S.G.S.

As shown, the plain meaning of the statute, its grammatical construction, and its legislative history do not contemplate any exception to the prohibition on releasing privately collected, federally processed data.

B. Expenditure of Public Funds Does Not Transform Confidential Industry Data Into Public Data.

Section 1002(e)(2) does not merely protect data and information which was submitted by a permittee in processed, analyzed or interpreted form. There is no evidence that Congress contemplated that the confidentiality protection could apply this narrowly.

The Department has asserted that the expenditure of public funds for the processing of raw data extinguishes the permittee's confidentiality interest in the resultant processed data. That conclusion is unsupported by authority and, when placed against the provisions of the Trade Secrets Act, 18 U.S.C. 1905, ANILCA, the ANILCA regulations, and general tenets of intellectual property law, it is clearly erroneous.

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True enough, data which is collected and processed wholly at the expense of the U.S.G.S. has been exempted from ANILCA's confidentiality requirements by regulation. 50 C.F.R. 37.45. The preamble to this regulation states:

> GS and its contractors and subcontractors have been exempted from the provisions dealing with processed, analyzed and interpreted data or information, as data acquisition, processing, analysis and interpretation done by [Geological Survey] or on its behalf is financed by public funds and, therefore, the Department has no intention of withholding such data and information from the public.

48 Fed. Reg. 16855 (April 19, 1983) (emphasis added).

However, it clearly does not apply where data acquisition is undertaken by a private permittee. By protecting processed,

analyzed and interpreted data from potential misuse, Congress desired to stimulate privately funded exploration of the ANWR.

Although this exception is not authorized by statute, it is not inconsistent with Congress' intent. The U.S.G.S. can only conduct exploration in the event that no private parties were willing to do so. Consequently, the competitive concerns underlying ANILCA Section 1002(e)(2)(C) do not apply. However, where private explorers mount a multi-million dollar effort to acquire data which is subsequently processed for U.S.G.S. on the Secretary's behalf, competitive concerns resurface. This is especially true since acquisition expenses account for 80 to 90 percent of the total cost of the project. Thus, release of data which is privately acquired but processed by U.S.G.S. is no less harmful to the permittee than release of privately processed data. In fact, the Secretary's unique ability to compile and evaluate data from all possible sources renders the release of his interpretations the most harmful of all.

The expenditure of public funds for the processing of data which is acquired by private entities has no bearing on the releasability of the resultant data. Congress has expressly declined to authorize the release of any processed, analyzed and interpreted data until at least two years after a lease sale has occurred. The Trade Secrets Act independently prohibits the agency from releasing such data and ANILCA does not authorize its release until at least that point in time.

C. Disclosure of U.S.G.S. Processed Data Will Vitiate the Protections Sought to be Provided by the 1982 Amendment.

The 1982 amendment to ANILCA barring companies which obtain raw data from the Secretary from bidding at an ANWR lease sale is addressed in regulations published at 50 C.F.R. 37.54(d).

> Commercial use by any person of data or information obtained as a result of carrying out exploratory activities and disclosed pursuant to this section is prohibited. No person shall obtain access from the Department ... to any data or information obtained as a result of carrying out exploratory activities and submitted by the permittee or a third party until such person provides the Department with a statement certifying that person's awareness of the prohibitions contained in this paragraph and the disqualification [from bidding at lease sales] ...

In commenting on this regulation, members of the ANWR Survey Group also sought additional controls on the release of raw data. The Department responded to these concerns in the preamble to the Final Rule but failed to make the requested changes.

> No changes have been made to [the definitions of raw and processed data] because of the intervening amendment ... The Service considers the commenter's concerns about the harm that could be done to the competitive positions of permittees should their seismic tapes be made available to the public and their competitors as raw data and the consequent disincentive that the Service's disclosure provisions provided to participation in the exploration program to have been mooted by the [amendment]. [The amendment] should restore the economic incentive needed by industry to participate in exploration of the coastal plain. According to its legislative history, the purpose of [the amendment] is to put all commercial interests on an equal footing by denying any company that gets data and information from the Department or from any party other than a permittee from participating in a subsequent lease sale of the land to which such data and information pertain.

48 Fed. Reg. 16840 (April 19, 1983).

The Department sought to implement the 1982 amendment by seeking from each party requesting data a certification of his awareness of the prohibitions on bidding contained in the statute. Such a certification would provide the Department not only with a list of requestors (who would presumably be barred from participating in upcoming lease sales) but also with a statement from the requestor which would be used to demonstrate that, even absent the prohibitions contained in the 1982 amendment, the requestor had waived any right it might have had to participate in an ANWR lease sale.

Obviously, the general release by publication of data processed by U.S.G.S. gives the general public, including the direct competitors of the survey group members, access to valuable seismic data, which, had they requested it from the Department, would have triggered the restrictions contained in the 1982 amendment. Further, since the data are released by publication, the Department has no record of those potential bidders that have received data nor any statement by them waiving their right to bid. Thus, the entire objective of the 1982 amendment is vitiated by publication.

Apparently in an attempt to reduce the potential commerciality of the processed data published in the draft ANWR report, certain identifying data were deleted from the processed seismic sections contained in Plate 5. For instance, the precise

locations of the ends of the published sections have been deleted along with the locations of the individual shotpoints. Despite this attempt, enough identifying information was included, inadvertently or otherwise sufficient to locate the geologic features identified in those sections with sufficient precision to make the data very commercial.

For example, several of the sections are published in their entirety and the line identification numbers are shown. The precise location of these lines are available to the public on maps submitted in conjunction with the exploration plans. Further, some of the sections are tied to existing wells outside the refuge. Since the location of these wells is precisely known, the location of structures within the refuge may be easily extrapolated.

In short, to the extent that U.S.G.S. processed data has been published, its confidentiality and hence its value to the survey group has been irrevocably compromised. Since a small amount of the data has actually been published, the group's competitive position has already been severely damaged. Further, disclosure of data as yet undisclosed will render the group's investment of over $40 million virtually worthless. Thus, should it become apparent that further unauthorized disclosure of U.S.G.S. processed data is intended, the group will be forced to consider whether legal action is appropriate to enjoin it.

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II. NO DATA WHICH PERTAINS TO AREAS OUTSIDE OF THE ANWR MAY BE RELEASED IRRESPECTIVE OF ITS FORM.

Another data disclosure problem, potentially even more serious than the disclosure of U.S.G.S. processed data, has also arisen as a consequence of the publication of the draft report. That problem is the disclosure of data collected outside the refuge boundary pursuant to State of Alaska permits but submitted to the Department in order to aid its evaluation of ANWR.

At the time that the exploration plans were submitted, the applicable regulations required that the permittee submit to DOI "all data and information obtained as a result of carrying out exploratory activities." 50 C.F.R. 37.53(a).

Each submission was required to contain:

> 1) An accurate and complete record of each geophysical survey conducted under the permittee's permit, ...
>
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> (i) "Exploratory activities" mean ... seismic exploration ... of the coastal plain ... and any other type of geophysical exploration of the coastal plain which involves or is a component of an exploration program for the coastal plain involving surface use of refuge lands ... .
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> (p) "Raw data and information" means all original observations and recordings in written or electronic form ... obtained during field operations.
>
> (w) "Special use permit" means a revocable nonpossessory privilege issued in writing ... authorizing the permittee to enter and use

> the refuge for a specified period to conduct exploratory activities ...

50 C.F.R. 37.2.

Thus, the regulations require the submission of only data collected as a result of "exploratory activities" and those activities are limited by definition to the exploration of the coastal plain or other types of geophysical exploration of the coastal plain involving the surface use of refuge lands. Given this framework, it would have been impossible for a prospective permittee to infer from the regulations that it would be required to submit (and thus possibly subject to public disclosure) data collected outside of the coastal plain.

Apparently, however, Departmental officials became aware through informal discussions with group members that data would be collected outside the refuge in order to provide an integrated data base to the group members. However, no communications were made by the Department to the group that the Department expected to receive any off-refuge data until the Record of Decision ("ROD") was issued regarding the approval of the exploration plan. It stated:

> (8) Copies of any well tie-in data obtained during the surveys will be provided to the Government. The Government will protect the proprietary nature of these data.

ROD I Conditions of Approval, 1 C (8) at p. 7 (emphasis added).

It did not mention the submission of other data collected outside the refuge. The Special Use Permit itself, however, states:

> 22. In addition to data obtained from the coastal plain, the permittee shall submit to

> the [Government] all data obtained during this program which ties to adjacent areas.

Special Use Permit 83-C10, Special Conditions 22.

Obviously, the Department's authority to require the collection and authorize release of geophysical data in this instance is limited by the plain language of the statute and the rules for activities conducted within the ANWR. Indeed, the Department cannot even authorize, let alone require, the collection of data on state lands or in state waters.

Further, geophysical data is generally exempt from disclosure under the Freedom of Information Act, 5 U.S.C. § 552 ("FOIA"), and would undoubtedly be considered confidential "trade secrets" pursuant to 18 U.S.C. § 1905 (the "Trade Secrets Act"). That is, seismic data is generally to be held confidential by government officials unless its release is authorized by statute as opposed to most other types of data collected by the government, which are subject to disclosure unless prohibited by statute.

In view of the general exemption of seismic data from disclosure (discussed more fully above) express statutory authorization is required to release seismic data in the government's possession. However, ANILCA jurisdiction pertains only to data collected in the ANWR itself and no other statute authorizes release of these data especially since they were obtained on state lands rather than federal lands. Thus, no statute authorizes release of off-refuge data and any further release would constitute a violation of 18 U.S.C. 1905.

The significance of this problem is heightened by the fact that much of the off-refuge data in question was collected in State of Alaska waters offshore of the ANWR from the eastern edge of Camden Bay to an area eastward of the boundary of the Coastal Plain survey area. This area is to be offered for lease in State of Alaska Sales 50 and 55, currently scheduled for June, 1987 and June, 1988. Industry interest in the sale is high and the group is aware that many companies who were not members of the ANWR survey group are interested in bidding. By contrast review of off-refuge data is not necessary to informed debate over the conclusions drawn in the draft report.

In spite of this, the Department published some off-refuge data in the draft report. In spite of the express representation that "the Government would protect the proprietary nature" of well tie data contained in the ROD, extensive well tie data are published in Plate 4 of the report and are illustrated on lines 84-1, 84-5, 85-2 and 85-8, while offshore, state water data are apparently published on lines 85-8, 84-10 and 85-1. In addition, Line 85-1 projects into the State of Alaska lease sale 55 area. These disclosures are not only unauthorized but in the case of well tie data constitute a blatant breach of promise for which the Department is clearly liable.

As in the case of U.S.G.S. processed data there is no way that the competitive harm that disclosure has already caused can be undone. Further, as in the case of U.S.G.S. processed data,

the group will be forced to consider the appropriateness of legal action to enjoin any further releases of off-refuge data in order to prevent further competitive harm.

CONCLUSION

Congress enacted ANILCA's prohibitions on the release of privately collected geophysical data in order that the companies that funded the seismic survey of the ANWR would not be required to forfeit their investment. Concomitantly, the passage of the 1982 amendment signaled Congressional concurrence in the position that carefully controlled disclosure of raw data, but not processed data, would enable those who desired it to participate fully in the ANWR debate.

However, the Department has released processed data by publication in direct violation of Section 1002, completely vitiating the statutory protection. Further, it has breached its promise to protect the confidentiality of well-tie data and has released highly proprietary data collected outside the ANWR without statutory authority and in direct violation of 18 U.S.C. 1905 -- data which is unnecessary to informed public debate but which is essential to companies wishing to participate in State of Alaska Sales 50 and 55.

We trust that the Department will understand the seriousness of its past actions and take steps to ensure that they will cease. The recommendations contained in the draft report and its analysis of the issues are generally commendable and, as demonstrated in the public hearings in Anchorage and Washington many members of the survey group have actively supported the

Department's position. It would be a shame were that relationship to be marred by continued Departmental violations of its own guarantees of confidentiality.

Geophysical Service Inc. is the geophysical contractor and the authorized representative of the following companies of the GSI ANWR Exploration Group who have authorized submission of these comments:

AMERADA HESS CORPORATION	MURPHY OIL USA, INC.
AMOCO PRODUCTION COMPANY	PETROFINA DELAWARE, INCORPORATED
ARCO ALASKA, INC.	PLACID OIL COMPANY
CHEVRON U.S.A. INC.	SHELL WESTERN EXPLORATION AND PRODUCTION INC.
CONOCO INC.	STANDARD ALASKA PRODUCTION COMPANY
ELF AQUITAINE PETROLEUM	SUN EXPLORATION AND PRODUCTION COMPANY
EXXON COMPANY, U.S.A. (a Division of Exxon Corp.)	TENNECO OIL COMPANY
KERR-McGEE CORPORATION	TEXACO INC.
MARATHON OIL COMPANY	UNOCAL
MOBIL OIL CORPORATION	UNION TEXAS PETROLEUM CORPORATION

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DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name ROGER C. HERRERA

Mailing Address P.O. Box 196612

ANCHORAGE, AK 99519-6612

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☒ I am speaking for STANDARD ALASKA PRODUCTION Co

(please enter name of organization you represent)

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TESTIMONY OF

STANDARD ALASKA PRODUCTION COMPANY

ON THE

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

FOR THE

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

January 5, 1987

PRESENTED BY:

ROGER C. HERRERA

MANAGER EXPLORATION AND LANDS

Mr. Chairman:

My name is Roger Herrera and I am representing the Standard Alaska Production Company with whom I am employed as Manager of Exploration and Lands.

The 1002(h) report has two great attributes which are not often seen in environmental impact statements - it is short and readable. The authors are to be complimented because these praiseworthy characteristics have probably resulted in the report having been read in its entirety by a large number of people. The nature of the decision to be made regarding the Coastal Plain of Arctic National Wildlife Refuge obviously demands a careful and dispassionate assessment of the knowledge gained from the six years of concentrated study in the area. It is our opinion that the 1002(h) report sets out that information in a meaningful and relatively balanced way. It is an adequate document to make judgments on the issue.

You have previously heard testimony from the Alaska Oil and Gas Association. Standard Alaska Production Company was involved in the preparation of that statement and endorses it in its entirety. We believe that the Coastal Plain of ANWR must be opened in full to responsible leasing, exploration, development, and oil production (Alternative A). Only in that way will our future state and national interests be adequately considered. We must plan to boost our domestic

reserves and production, and at the same time indulge in responsible conservation if we are to preserve our lifestyle.

The Coastal Plain of ANWR figures prominently both as a possible source of major oil supplies and as means to assuage man's yearnings for the aesthetics of solitude, scenery, and wildlife.

Without Coastal Plain oil it is perhaps pertinent to mention that the aesthetic experience of wilderness that is perceived to be the alternate goal to development will be available only to an elite few. It is also reasonable to mention that the tens of thousands of Americans and other visitors who have enjoyed a once-in-a-lifetime trip to the North Slope in the past decade have done so because of the development of Prudhoe Bay. Prudhoe Bay has not destroyed their arctic experience, it has made it possible, unique, and memorable. A small point, but one worth remembering.

One aspect of the report requires comment at this stage namely the bias recognizable in the chapters dealing with caribou. This bias has lead to an emphasis on a proposed mitigation measure, the utilization of the Fish and Wildlife Service mitigation policy.

In discussing the inappropriateness of this policy in Alaska, reference must be made to the recently initialed U.S./ Canadian Porcupine Caribou Agreement of December 3, 1986.

The Fish and Wildlife Service mitigation policy was deliberately excluded by the U.S. Government from that Agreement. If the use of the mitigation policy is unacceptable to the Government in its efforts to achieve conservation of the Porcupine Caribou herd in conjunction with the Government of Canada, what justification is there to impose it on industry in order to achieve exactly the same results on the Coastal Plain?

The Fish and Wildlife Service mitigation policy and some of the biological conclusions in the report result from an assumption that fish and wildlife populations using the ANWR Coastal Plain are indiscriminately limited by habitat availability. There is no evidence to support this assumption and, in fact, the report does not cite or discuss any evidence to justify that position.

Nesting birds on the North Slope are in general much more influenced by weather than they are by habitat, and there are no examples of mammal population size or productivity which has been limited by North Slope habitat availability. Caribou abundance is believed to approximate prehistoric levels in the North American Arctic, and it is generally accepted that caribou productivity is limited principally by

wolf predation on the fall, winter, and spring ranges, augmented by human harvest. It is therefore not logical to suggest that animal species distribution or abundance would change in any biological, meaningful way as a result of the limited, low-density oilfield construction approach used in Arctic Alaska. Recent bird studies (Troy et al 1986) and fish studies (Craig 1986) support this conclusion, and the steadily increasing caribou populations during the period of oilfield development also indicate that habitat is not a confining factor.

The only biologically effective approach to assessing and mitigating any effects of development on wildlife is to determine how industry activities will alter population-limiting factors for each species of concern, and then to apply mitigative measures that avoid those limiting factors. That is quite different from and more practical than the Fish and Wildlife Service policy of preserving "habitat value". Such a policy usually translates into protecting land from change, or ensuring that all change is "natural". This ignores Arctic biology and makes policy dominant over biology. It imposes a particular point of view on the real world without determining whether the real world conforms with the imposed viewpoint.

In this case the policy is flawed and should be scrapped in Alaska. Likewise some of the proposed mitigating measures which result from the policy are unnecessary and often

counter-productive. Many of the mitigating measures that have been proposed have been proven to be effective on the North Slope and are fully supported by Standard Alaska Production Company. Our aim with regard to environmental protection is the same as the Department of Interior's, but we feel strongly that the end result of oil production with minimum and acceptable environmental impact cannot be achieved using the Fish and Wildlife mitigation policy in the Arctic.

Two other points about the caribou sections of the report: First, the report would be greatly strengthened and balanced if reasonable use had been made of the information and analysis of the expert caribou Canadian biologists, Bergerud Jakimchuk and Bamfield. Their work has been largely ignored in the draft LEIS and the dismissal of the dissident views of Bergerud on Page 110 as "widely disputed" is a distortion unworthy of the authors. Second the so-called core calving areas of the Porcupine herd and the "space constraints" which the caribou are supposedly subjected to at that time of the year, ignore the fact that many tens of thousands and in some years, hundreds of thousands of Porcupine Caribou calve in Canada. The maps in the report are misleading and less than scientific in not depicting the full calving range.

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It is our intention, Mr. Chairman, to comment in detail on this and other issues in a separate written submission which we hope will be carefully considered.

TESTIMONY OF

THE STANDARD OIL COMPANY

ON THE

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

FOR THE

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

January 9, 1987

Washington, D.C.

PRESENTED BY:

ROGER C. HERRERA

MANAGER EXPLORATION AND LANDS

STANDARD ALASKA PRODUCTION COMPANY

Mr. Chairman:

My name is Roger Herrera and I am Manager of Exploration and Lands for the Standard Alaska Production Company. Today I am presenting testimony for The Standard Oil Company.

Standard is the largest producer of oil from the state of Alaska and has been present as an explorer and producer in Alaska since the late 1950's. The 1002(h) report has drawn on many scientific and technological studies carried out by or for Standard Oil as is recognized by the bibliography. Based on our long experience of operating in the Arctic, we believe the report is thorough, balanced and fair in its description of the coastal plain ecosystem and assessment of scenarios of development. It needs some modification in the caribou section to make it more realistic, and it does not justify some of the proposed mitigation measures, especially the use of the Fish and Wildlife Service mitigation policy. That policy, which concentrates on preserving habitats rather than populations of animals, cannot benefit wildlife in Alaska. Alaska, in particular the North Slope and coastal plain, is unique in having more habitat than animal species can ever occupy. Consequently, administrative efforts to protect habitat above all does little or nothing to benefit populations such as caribou, polar bear, musk oxen, etc. The concept and practice of mitigation is akin to motherhood and totally accepted by my company, but I know from 25 years experience in the Arctic that the Fish and Wildlife Service mitigation policy is a poor protective mechanism and it should be changed.

The success of our mitigation efforts in the past is perhaps measured by the results of a recent public opinion poll in Alaska (Dittman Nov. 1986). 86% of the respondents thought that the oil industry has operated in an environmentally safe manner at Prudhoe

Bay. Only 5% gave negative replies. That accolade was earned not because of protective envrironmental regulations and stipulations, although they obviously played a part, but principally because the operating oil companies pursued a philosophy of care for the environment and the animals. This was done for two reasons. First and foremost, because we are human beings too and have the same appreciation of wilderness and the asthetics of scenary or seas of caribou as anyone else. Secondly, there is a clear logic and self-interest in not doing things wrong in the Arctic. A simple example is an oil spill on a gravel pad or the tundra. The spill itself cost the value of the oil—perhaps a few dollars, but the cost of clean up is usually measured in thousands, tens of thousands, or millions of dollars. The incentive not to spill oil quickly becomes very clear, as does the incentive to design better equipment to prevent oil spills.

It is perhaps worth mentioning, in passing, that the statistics on oil spills contained in the report are no doubt correct and represent the facts of life of working outside at 40 or 50° F below zero in a harsh environment. What is not mentioned is the fact that the vast majority of those spills occur on gravel pads or roads and that all of them are totally cleaned up.

A recognition of this effort is seen in the figure of 83% of Alaskan respondents (Nov. '86 Dittman poll) who believe that the oil industry can operate safely in wildlife refuges in Alaska.

The success of future development on the coastal plain of ANWR will be achieved in two ways. One, by continuous and friendly consultation and coordination between industry, native residents and refuge managers and other Fish and Wildlife Service personnel, and secondly, by repeating and enhancing the philosophy and practice which has worked so well at Prudhoe, Kuparuk, Milne Point and Endicott. Surely those two requirements are not beyond our capability?

Before closing let me mention some aspects of the report that require attention. The maps depicting caribou calving areas are less than truthful and if they have been

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used to arrive at the conclusions on caribou concentrations, etc, those conclusions must be wrong. Caribou calving areas have been mapped annually deep into Canadian territory, and not to depict the total calving area on the maps is unscientific and akin to joining the flat earth society. This should be rectified.

The three mile buffer zone precluding development factilities at the coast to protect caribou insect relief areas is unnecessary. Caribou use of that zone is sporadic and ephemeral and southern areas of the coastal plain are much more important to the herd than the northern fringe.

Standard Oil supports Alternative A. We appreciate the opportunity to testify and will submit detailed written comments in due course.

Shell Western E&P Inc.
A Subsidiary of Shell Oil Company

Thomas F. Hart
President

P.O. Box 576
Houston, Texas 77001

February 2, 1987

Director
U.S. Fish and Wildlife Service
Division of Refuges
United States Department of Interior
Room 2343, Main Interior Building
18th and C Streets
Washington, D.C. 20240

Dear Sir:

SUBJECT: ARCTIC NATIONAL WILDLIFE REFUGE - RESOURCE ESTIMATE

Shell Western E&P Inc., a subsidiary of Shell Oil Company, appreciates this opportunity to comment on the draft proposal for opening the coastal plain of the Arctic National Wildlife Refuge to oil and gas leasing, development and production.

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Shell Western supports the Department of the Interior's "Alternative A" recommendation, full leasing of the "1002" study area. We concur with the DOI's statement that this area is an outstanding oil and gas frontier and could contribute significantly to our domestic energy supplies.

In this era of rapidly increasing oil imports, it is imperative that the United States look toward the future when the need for domestic sources of oil and gas may be critical, and remember what occurred in the 1970s when OPEC manipulated the market to our disadvantage. Surely, the American people and their representatives in Congress do not wish a reenactment of those circumstances in the future. If we can find, develop and produce the potentially vast resources on the ANWR coastal plain, we can lessen the potential impact of an OPEC-induced energy disruption 10 to 15 years from now, and beyond.

Further, Shell Western endorses the detailed comments on the assessment offered by the Alaska Oil and Gas Association and the American Petroleum Institute, of which we are a member.

We do, however, wish to make a specific comment regarding the price premises used in the report. On page 72, Table III-4, entitled "Significant Economic Assumptions," states that the most likely crude oil market price in the year 2000 (1984$) would be $33/BBL, and that an optimistic price would be $40/BBL. This range of prices, when corrected to 1986$, using the GNP deflator, is $35 to $42.50.

We would like to offer an alternative price scenario which is used in a National Petroleum Council report on U.S. Oil and Gas Outlook, published in October 1986, and which was suggested by the Department of Energy to be the basis for the outlook report. This range of "plausible prices" is between $21 and $36 (1986$). A copy of the letter suggesting this range is attached. We believe this price projection is more realistic than that currently contained in the 1002 report and we urge the Department of Interior to consider using it in the final report submitted to Congress.

Thank you for this opportunity to comment.

Sincerely,

Thomas F. Hart

MBD:DK

Enclosure

CRA08703302

Department of Energy
Washington, DC 20585

May 14, 1986

Mr. James L. Ketelsen
Chairman and Chief Executive Officer
Tenneco Incorporated
Tenneco Building
Post Office Box 2511
Houston, TX 77001

Dear Mr. Ketelsen:

Immediately following the April 22, 1986, meeting of the National Petroleum Council (NPC) Committee on U.S. Oil and Gas Outlook, the Coordinating Subcommittee met. A prime agenda item was to discuss critical path items for the study examining the primary factors affecting the Nation's future supply and demand of oil and gas.

It was agreed that the Department of Energy would provide two oil price cases intended to suggest a range of plausible prices as assumptions for the purpose of this study. In response, we would propose the following simplified cases:

1. Case A -- Starting at $12 per barrel in 1986 and increasing by four percent per year to about $21 per barrel in the year 2000.

2. Case B -- Starting at $18 per barrel in 1986 and increasing by five percent per year to about $36 per barrel in the year 2000.

These oil prices are expressed in 1986 dollars and should be interpreted as the U.S. Composite Refiner Acquisition Cost.

We appreciate the efforts of you and the other NPC members on this most important study.

Sincerely,

Donald L. Bauer
Acting Assistant Secretary
for Fossil Energy

cc:
Marshall Nichols

U.S. Oil & Gas Outlook

An Interim Report of the National Petroleum Council

October 1986

James L. Ketelsen, Chairman
Committee on U.S. Oil & Gas Outlook

Comments of

THE STANDARD OIL COMPANY

on the

Draft Legislative Environmental Impact Statement

for the

Arctic National Wildlife Refuge, Alaska

Coastal Plain Resource Assessment

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COMMENTS OF STANDARD OIL COMPANY

ON THE

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

FOR THE

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

February 6, 1987

SUMMARY COMMENTS
OF THE
STANDARD OIL COMPANY
ON THE
DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT
FOR THE
ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
COASTAL PLAIN RESOURCE ASSESSMENT

The Standard Oil Company has prepared detailed analytical comments on the draft report plus line by line suggestions, corrections and comments. These comments are presented in two sections: general comments and specific comments, and include considerable detail on the subjects mentioned below.

Standard Oil Company identified several major weaknesses which require special attention in the final LEIS. Nevertheless the report clearly supports our recommendation to lease the ANWR coastal plain under Alternative A.

Our comments and observations include:

ALTERNATIVE A

- Alternative A - full leasing - offers the greatest potential benefit of the leasing options with significantly more resource potential (3.2 billion barrels versus 2.6 billion) than Alternative B.

- Delay in leasing the so-called "core calving area" has significant negative impacts: the area as depicted in the draft report covers three geological prospects (two of them of large size - 30 X 7 miles and 21 X 4 miles), which are said to have potential for the presence of the prospective Sadlerochit sandstone reservoir intervals - the principal reservoir at Prudhoe Bay.

- The U.S. domestic energy situation is even more serious than that portrayed in Chapter VII of the report and the contribution of ANWR's potential resources are greater than depicted.

- Projections on the economic impact of the development of the ANWR coastal plain's hydrocarbon resources may be underestimated by the DOI, given major trends in the oil industry and energy picture during the past 18 months.

THE CARIBOU CORE CALVING AREA

- There is no single, fixed, "core" calving area used by the Porcupine caribou herd and uniquely necessary for its continued well-being.

- The Porcupine herd shows no fidelity to a specific area in the coastal plain for calving.

- The Porcupine herd calves annually in greatly varying locations within an approximate 200-mile east-west area stretching from the Canning River in Alaska to the Babbage River in the Yukon Territory.

- In any given year, the majority of the Porcupine herd will calve outside of the supposed "core" area. Concentrations may not occur inside the "core" area at all. In 1982 and 1986, for example, nearly all calving occurred in Canada.

- The "core" area near the Jago River was defined by FWS on the basis of frequency of overlap of mapped calving concentration areas, not on the basis of actual densities of caribou.

- There is no firm basis for defining a "core" calving area; the FWS criterion of overlap was arbitrary: mapped concentrations had to overlap in at least 5 of 14 years (only 36% percent of the time). It is thus very inappropriate to imply that this area is "critical" to the continued existence of the caribou and warrants designation as Resource Category 1, which would essentially preclude any oil and gas development.

- The methodology and data analysis was flawed in defining the "core" calving area: (1) there are no data to provide a quantitative basis for the density criteria of 50 caribou/square mile (many areas had densities of less), and (2) the maps of calving concentrations used by FWS vary from the originals and appear to have been misplotted.

UNREALISTICALLY NEGATIVE PREDICTIONS OF THE 1002 REPORT

Flawed assumptions and methodology have resulted in environmental impact conclusions that are consistently extreme . Problems include:

- Application of the FWS Mitigation Policy, which assumes habitat is limiting to the wildlife populations of concern in ANWR; this is not supported by the scientific evidence;

- The habitat-based approach, stemming from that policy, has been used to assess impacts by simply overlaying very general "maps of fish and wildlife areas" with hypothetical development scenarios. The results were used to quantify predictions of wildlife habitat losses, disturbances, and even mortality. Such a methodology applied to Prudhoe Bay would predict major decreases in wildlife populations. The Prudhoe Bay experience shows that this does not occur.

- Unrealistic assumptions of concurrent development for 3 major fields. If three fields of different sizes were discovered simultaneously (which is highly unlikely), the largest field would inevitably be developed first. The development of Prudhoe Bay in 1977, Kuparuk in 1981 and Lisburne in 1987 illustrates this. They were all discovered in 1968-1969.

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- Impact conclusions which appear to ignore existing laws and regulations that currently govern oil and gas activities.

- Use of non-primary, out-dated, out-of-context, or incomplete documentation upon which the report's conclusions were based.

"SPHERES OF INFLUENCE"

- Every structure, road or facility has been assigned an arbitrary "sphere of influence" on wildlife (e.g. caribou, muskox). It is assumed that total displacement of animals occurs from these areas. This is not realistic

- Furthermore, it is assumed that passive facilities sited within the so-called "core" calving area could cause a decline of 20-40% of the PCH . There is no justification for this conclusion.

- Experience at Kuparuk shows that calving caribou are not significantly displaced by facilities, and their reproductive success is not diminished.

INSECT HARASSMENT AND USE OF THE COAST FOR RELIEF

- The 1002 report emphasises insect harassment and the importance of insect-relief habitat to caribou, stating that insect harassment is one of the primary driving forces in the annual caribou cycle.

- The report describes the coastal strip of the 1002 area as critically important insect relief habitat and concludes that east-west roads and pipelines will essentially block access to this habitat with detrimental consequences to the caribou population.

- These conclusions are in error because:

  -- Annual migration cycles do not correlate with insect conditions in many years.

  -- Coastal areas are generally visited for only a short period of time. Some years they are not visited at all.

  -- Blockage of migration is a non-issue since pipelines and roads can be built to permit passage, and traffic controls can be implemented as necessary. (Prudhoe Bay has clearly not proved to be an impediment to the Central Arctic caribou herd.)

  -- It is doubtful that even a major (hypothetical) loss of the coastal fringe habitat would prove to be of significant consequence to the Porcupine herd.

THE USFWS MITIGATION POLICY

- The FWS Mitigation Policy forms the basis for biological assessments and proposed mitigation approaches in the draft report. The FWS policy assumes, as a basis for analysis, that the size and growth potential of wildlife populations are limited by habitat availability. The validity of this principle in the Arctic is not supported by scientific evidence. Therefore, habitat-based conclusions and mitigation recommendations in the draft report are generally unrealistic.

- A better approach to mitigation is to focus on population limiting factors. Mechanisms by which the size and growth of a population are linked should be identified and then managed to achieve a desired population level.

- Population-limiting factors acting on arctic wildlife vary with species. Such factors include shortness of the summer snow-free period, predation, severe winter conditions, and characteristics of winter range used by migratory species when absent from the Arctic. Availability of high value habitat -- the basis for the FWS Mitigation Policy -- has not been shown to limit most arctic wildlife species.

EXISTING REGULATORY STRUCTURE AND INDUSTRY PRACTICES

- The report fails to review the existing regulatory framework governing petroleum leasing, exploration, development, and production in arctic Alaska, creating an impression that these activities occur in a regulatory vacuum. The report also fails to document current (and evolving) industry practices that routinely accomplish significant mitigation of potentially adverse environmental effects.

RECOMMENDATIONS OF THE STANDARD OIL COMPANY

The Draft ANWR Coastal Plain Resource Assessment establishes a basis for the production of a credible final report to Congress supporting full leasing (Alternative A) of the ANWR coastal plain, with the following recommended revisions:

1. Update of Chapter VII to reflect probable effects of the 1986 price collapse on future U.S. energy reserves and the contribution of potential ANWR petroleum resources;

2. Re-evaluation of the caribou literature and revision of analyses relating to the "core calving area" concept, the "sphere of influence" hypothesis, and the importance of insect relief in driving the caribou annual cycle;

3. Modification of impact assessment methods to eliminate over-simplified analyses based on "reductions in habitat value"; examination of known population-limiting factors acting on caribou and other wildlife species of concern;

4. Revision of development scenarios to reflect a sequential series of oilfield developments rather than assumed concurrent developments, with corresponding revision of environmental assessments and conclusions;

5. A critical review of applicability of the FWS Mitigation Policy as applied to the North Slope of Alaska and species of concern, including caribou, muskoxen, polar bear, snow geese, and arctic char; and

6. Review and documentation of the existing regulatory framework and standard industry practices in arctic Alaska, and revision of environmental assessments and mitigation recommendations to reflect these.

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INDEX OF COMMENTS PROVIDED BY STANDARD OIL COMPANY

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT
ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
COASTAL PLAIN RESOURCE ASSESSMENT

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INTRODUCTION

Standard Oil Company has conducted a thorough review and analysis of the Draft Arctic National Wildlife Refuge (ANWR) Coastal Plain Resource Assessment and Legislative Environmental Impact Statement (LEIS) published by the U.S. Department of the Interior in November 1986. We commend the authors for producing a report that is brief and readable. Based on our long experience of operating in the Arctic, we believe the report reasonably represents the substantial body of baseline information which will be helpful to support decisions regarding future leasing on the coastal plain.

We find that the authors need to modify caribou discussions to make assessments of environmental consequences more realistic, and that it does not justify some of the proposed mitigation measures. We question in particular the appropriateness of the application of the U.S. Fish and Wildlife Service (FWS) Mitigation Policy to the Arctic, and the use of that policy as the basis for assessments of potential environmental consequences of petroleum development on the ANWR coastal plain. We have attempted in our general and specific comments to explain the biological difficulties inherent in applying the FWS Mitigation Policy to the Arctic, and to provide substantive information that will assist the authors with a reevaluation of caribou issues.

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We believe that the ANWR coastal plain must be opened in full to responsible petroleum leasing, exploration, development, and production (Alternative A), and that Alternative A is entirely compatible with sound management and conservation of the Nation's fish and wildlife resources. Only in this way will our future national interest be responsibly served.

Our review comments are presented in two major sections, General Comments and Specific Comments. Under General Comments, we address issues that apply to the entire draft report, to major sections, or to subjects that receive prominent treatment. Under Specific Comments, we provide a detailed review organized by chapter, page, column, paragraph, and line.

GENERAL COMMENTS

1. U.S. FISH AND WILDLIFE SERVICE MITIGATION POLICY

The draft report contains flaws in biological assessment that apparently stem from inappropriate application of the U.S. Fish and Wildlife Service's (FWS) nationwide Mitigation Policy (FWS 1981) to the Arctic. Biological assessments presented in the draft report follow a standardized habitat-based approach which, as explained below, has no real basis for use in arctic environments where habitat availability is not known or thought to limit most wildlife populations (for evidence, see General Comment No. 2). This habitat-based approach leads to easy, unrealistically extreme predictions of reductions in habitat value across large tracts of land and even of potential declines in wildlife populations. The draft report's almost total reliance on habitat availability as the basis for biological assessments casts serious doubt on the validity of the report's conclusions and mitigation recommendations.

The draft report's use of the FWS Mitigation Policy in an arctic context leads to a case of reverse logic. It places policy first, and biology last. The text (pp. 95-98) suggests that first, a decision was made to apply the FWS Mitigation Policy to potential petroleum development on the ANWR coastal plain. Second, because that policy is based on the assumption that habitat availability limits any wildlife species under review, this assumption was implicitly adopted as the rationale governing biological assessments of potential development-related effects on coastal plain wildlife, including the majority of vertebrate species which are present only during the brief arctic summer. Third, habitat-based mitigation goals and recommendations were adopted. The problem with this reasoning is that it starts with policy, not with biology. It imposes a particular point of view on the real world without first determining whether the real world conforms with the imposed viewpoint.

The FWS Mitigation Policy is intended for nationwide application and does not take geographic differences into account. It establishes a standardized approach to biological impact assessment based on the concept that habitat

availability limits (or is likely to limit under foreseeable and probable circumstances) the size and biological productivity of wildlife populations in their "natural" state, i.e., in the absence of human influence. FWS biologists know that this is not always so. It is often true in the tropics, and sometimes true in temperate regions. However, most evidence (see General Comment No. 2) indicates that arctic (polar/subpolar) habitat availability does not limit the size or productivity of most bird and mammal populations that use arctic (polar/subpolar) regions during part or all of the year.

If the FWS mitigation policy and its habitat-based assessment/mitigation approach are considered applicable to the Arctic in general and the 1002 area in particular, the report should be revised to present a clear rationale and supporting evidence for this assertion.

2. *HABITAT-BASED ASSESSMENTS OF BIOLOGICAL CONSEQUENCES*

As noted above, biological assessments and conclusions presented in the draft report are based, apparently for reasons of policy, on the implicit assumption that wildlife populations using the ANWR coastal plain are limited by habitat availability. This assumption is never stated outright, but for the draft report's habitat-based assessment approach to make sense, the assumption must be there. It is doubtful that the authors have systematically examined the proposition, and it seems clear that they have not thought about population-limiting factors or reviewed available scientific literature elucidating such factors. There is no a priori reason to suppose the assumption to be true; yet evidence or even logic supporting its validity is neither cited nor discussed.

Obviously, sufficient habitat (as space, food, cover, etc.) is a precondition for the existence of any plant or animal population, but habitat availability does not necessarily regulate or limit population size and growth rate. As discussed in greater detail below, animal populations may be limited by a great variety of other factors (e.g., snow-free season too short to allow consistently successful reproduction from year to year, direct mortality through predation or from severe winter conditions) that prevent animal

numbers from ever approaching habitat carrying capacity. Although a habitat-based approach to biological assessment is clearly applicable to geographic areas where habitat availability is known to limit year-round resident wildlife populations (e.g., tropical and some temperate regions), the applicability of such an approach to the Arctic Coastal Plain has yet to be demonstrated or even convincingly suggested. Thus a critical reading of Chapter VI, Environmental Consequences, indicates that its entire biological basis may be erroneous, casting serious doubt on the validity of biological conclusions and mitigation recommendations contained therein.

Because this is such an crucial point, with important implications for how biological impact assessment should be conducted in the Arctic, we wish to discuss it at some length. There is no biological principle and no available evidence that would lead one to presuppose that habitat availability is likely to limit populations of most bird and mammal species inhabiting the ANWR coastal plain during any part of the year. Therefore, it does not make sense to use this assumption as justification for predicting adverse effects of oilfield development on wildlife populations. Yet this unexamined assumption serves as the primary basis for biological assessments and predictions presented in the draft report. Analyses of direct and indirect reductions in habitat value are used to suggest that population declines may result from oilfield development, when the described reductions in habitat value -- were they actually to occur in the manner and at the magnitudes stated in the draft report -- would most likely have no detectable effect on reproductive rates, recruitment rates, physical condition, abundance, sex/age composition, or overall distribution of wildlife populations inhabiting the 1002 area at any time of the year.

We make this assertion because in the Arctic, the availability of habitat has not been shown or convincingly suggested to be the factor limiting most wildlife populations. Evidence (discussed below) clearly indicates that most animal populations in the Arctic are well below the carrying capacities of their habitats and are prevented by various limiting factors from ever reaching those carrying capacities. Major habitat losses on a regional scale would be required to lower carrying capacities to the point that animal

numbers would be limited as a consequence. For habitat availability to become a population-limiting factor in the ANWR 1002 area, major habitat losses far beyond those predicted in the draft report would have to occur.

The following discussions briefly review evidence for population-limiting factors acting on a few examples of wildlife species using the Alaskan Arctic Coastal Plain.

A. Mammals

We have found no evidence that arctic populations of large mammals are limited by habitat availability, except in cases involving island introductions of reindeer and muskoxen not subject to hunting and predation (e.g., Klein 1968, Smith 1984). Continental caribou populations are probably limited by wolf and other predation augmented by human harvest (Bergerud et al. 1984), and herds calving on the Arctic Coastal Plain have steadily increased during the period of oilfield development. Mainland caribou herds (including the Porcupine, Central Arctic, and Western Arctic) typically have less than 2 individuals per square mile of the area over which they range (Bergerud 1980). Several estimates of numbers of caribou that could (theoretically) be supported on various caribou ranges are available. Bergerud (1980) reported that the carrying capacity of the region over which the Fortymile herd in Alaska ranges is about 13 animals per square mile. A simulation model for the Kaminuriak herd in Canada (Walters et al. 1975) also predicted a density limitation on food at about 13 animals per square mile. A similar model for the Porcupine herd in Alaska and Canada indicated that food depletion might occur at 35 caribou per square mile (Walters et al. 1978). Measurements of vascular plant production and caribou consumption rates in the Prudhoe Bay area indicated that 1 caribou per square mile using the range year-round would consume at most about 1.5% of the annual vascular plant production (calculated from White et al. 1975), a large proportion of which is high-quality caribou forage. These estimates indicate that existing arctic ranges could support many more caribou than currently exist, and that range carrying capacities are unlikely

ever to be approached unless predation and hunting are severely curtailed in the future [see Bergerud et al. (1984)].

As a further indication that mainland caribou populations seldom, if ever, reach the carrying capacities of their ranges: reindeer (the same species as caribou, Rangifer tarandus) introduced to islands relatively free of predation and hunting pressures have reached population levels far exceeding those of mainland caribou in North America. On St. Paul Island in the Bering Sea, introduced reindeer reached a density of 49 per square mile before declining from over-grazing (Scheffer 1951). On St. Matthew Island, an entirely different study found that introduced reindeer peaked at 47 per square mile before declining (Klein 1968). On South Georgia Island in the South Atlantic, introduced reindeer reached 58 per square mile before declining [calculated from Leader-Williams (1980)]. All these herds, and apparently also one in West Greenland where predation and hunting were absent (Roby 1980), eventually declined because of food shortages that would not have occurred had the herds been reduced in the normal fashion by predation and hunting.

Some biologists have suggested that caribou herd declines in North America in the early 1900s were caused by winter forage (mainly lichen) destruction by forest fires (Edwards 1954, Scotter 1967). But more rigorous analyses (e.g., Klein 1967, Henshaw 1968, Miller 1971, Bergerud 1974, Kelsall and Klein 1979, Roby 1980) suggest that starvation or even observable debilitation in caribou in winter is rare except in populations isolated from predators and prevented from dispersing to unoccupied habitats. In Newfoundland, where caribou access to forage in winter is frequently hampered by some of the most severe snow and ice conditions in North America, there has been no evidence that any population parameter has been influenced by winter food availability (Bergerud 1971).

In the case of muskox populations in the High Arctic, climatic extremes are thought to result in die-offs and reproductive failures that, in the absence of hunting, impose an upper limit on muskox numbers before range carrying capacities are reached (Gunn 1984). Where a formerly steady hunting pressure has been relieved through human resettlement, muskox populations have rapidly

expanded (Gunn et al. 1984). Mainland Canadian and Alaskan muskox populations were sharply reduced by hunting with the introduction of firearms to the North in the nineteenth century (Gunn 1984). Recent introductions to formerly occupied range have, with regulated constraints on hunting pressure, resulted in rapid population growth (Gunn 1984). Thus in comparatively moderate climatic zones such as the 1002 area, it is conceivable that if an enforced ban were imposed on hunting and predators were eliminated or consistently reduced over the long term, descendants of introduced muskoxen might reach range carrying capacity at some future time. However, it seems unlikely that existing limiting factors would be artificially suppressed through such intensive management controls, because there would be no useful purpose in raising muskox population levels to range carrying capacities.

B. Birds

Migratory birds nesting in the 1002 area are generally at or near the northern limit of their range. The population-limiting factor operating on most of these ground-nesting species is the density-independent influence of the short arctic summer. North Slope habitat is considered marginal for birds because the short and highly variable snow-free period can sharply reduce nesting success, especially for waterfowl (McKnight and Hilliker 1970, King 1970).

Although food supplies are abundant in the Arctic and competition for food is generally low (Ogilvie 1978), late snow-melt, a late snowstorm, or an early first snowstorm can impair reproductive success regardless of how much habitat is available or how many birds are using it. Thus weather exerts a large density-independent influence on reproductive success that is ameliorated in more southerly regions where the snow-free period is consistently longer. This may explain why the majority of (or perhaps all) bird species nesting on the Arctic Coastal Plain are found to nest in greater numbers and higher densities in more temperate places such as the Yukon-Kuskokwim Delta, the Tetlin-Northway area, and the Canadian prairie pothole region (King 1970, Bellrose 1976, Johnson et al. 1985; see Table 1). The marginal climatic character of the Arctic Coastal Plain may also account for the typically lower productivity of North Slope nesters compared to the same species nesting

elsewhere. In tundra swans, for example, percent young-of-year measured in winter for swan groups breeding in northern Alaska and the Northwest Territories, Canada, is typically lower than for swans breeding in the Yukon-Kuskokwim Delta and farther south (Lensink 1973, Bellrose 1976). Brood sizes of Alaska North Slope swans are typically lower than those of swans nesting in the Yukon-Kuskokwim Delta (King 1970, Wilmore 1974).

[Note: Raptors are an exception to the general principle that bird populations nesting in the Arctic are subject to density-independent limits imposed by the length of the snow-free period. Raptors (e.g., gyrfalcon, peregrine falcon, golden eagle) tend to be limited by availability of suitable nesting sites (see review by Newton 1979). Some cliff-nesting sites can shelter breeding adults and their young from snow accumulation and allow successful fledging under prolonged adverse weather conditions. Even raptors, however, can be subject to prevention of successful clutch production or fledging by severe summer climatic constraints.]

C. Fish

In the case of the five anadromous fish species associated with the 1002 area (including arctic char, a 1002 evaluation species), availability of overwintering habitat (deep, unfrozen pools in river channels) -- i.e., not coastal marine habitat -- probably limits productivity and abundance [see review by Craig (1987)]. As long as overwintering pools are identified and left unchanged, free passage is maintained, and entrainment of eggs or young is avoided, no changes in fish populations are expected to result from onshore petroleum development structures or activities within the 1002 area. The measures necessary to accomplish these objectives are already standard civil engineering practice in Alaska.

Table 1. Very general estimates[1] of numbers of commonly-breeding waterfowl on the Arctic Coastal Plain of Alaska and elsewhere. Estimates based on general information presented in Bellrose (1976), King (1970), and Johnson et al. (1985). (Note: Most geese of all species summering on the Arctic Coastal Plain are non-breeders.)

	ESTIMATED NUMBERS OF BREEDING BIRDS					
	Alaska, Arctic Coastal Plain (ACP)	Alaska, Yukon-Kuskokm. Delta	Alaska, Entire State	North America (Winter Populations)	ACP Nos. As % Alaska	ACP Nos. As % North America[2]
Canada Goose	1,000	80,000	125,000	>2 mill.	0.8	0.05
L. White-Fr. Goose	5,800	80,000	100,000	200,000	5.8	2.90
Snow Goose	100-200	0	100-200	1.3 mill.	100.0	0.02
Brant	5,000	75,000	100,000	>300,000	5.0	1.70
Tundra Swan	1,000	40,000	--?--	90,000	2.5	1.10
Oldsquaw	50,000-100,000	290,000	590,000	3-4 mill.	16.9	2.50

1 These estimates are made solely for the purpose of illustrating the present discussion and should not be otherwise used or cited.

2. Percentages of estimated winter populations.

3. BIOLOGICAL ASSESSMENT PROCEDURE

The described procedure (p. 95, col. 2, par. 3 and 4) by which environmental consequences were determined appears to be flawed for several reasons, as explained below. If the procedures described in the draft report were not, in fact, those used to arrive at conclusions concerning potential biological consequences of petroleum exploration and development within the 1002 area, the text should be revised to provide clarification.

A. Apparent use of small-scale maps

Wildlife use areas shown on Plates 1-3 are vague and general, and are mapped at an extremely small scale. Although they may be helpful in providing the public with a general idea of wildlife use areas within the 1002 area, these maps are not appropriate to serve as the basis for a professional analysis of biological issues or to support professional review of the draft report. If -- as indicated on p. 95, col. 2, par. 3 -- the maps shown in Plates 1-3 were indeed used to develop an assessment of potential development effects on wildlife, the results can have no real usefulness. If larger-scale, location-specific maps were used, the text should be revised to say so.

B. Inappropriately precise use of hypothetical development scenarios

The draft report states, "Maps of fish and wildlife use areas (pls. 1-3) were overlaid with full and limited development scenarios (fig. V-1). This allowed measurement of direct habitat loss or alteration. Determinations were then made as to the nature and magnitude of direct and indirect habitat losses, disturbance, mortality, and other potential effects" (p. 95, col. 2, par. 3). In reality, overlaying fish and wildlife use maps (even if superior to Plates 1-3) with the full and limited development scenarios shown in Figure V-1 (p. 90) was pointless because, as the draft report properly acknowledges, "Alternatives A and B depict hypothetical infrastructures", and "any prediction as to the various stages of development at any given time on the 1002 area would be highly speculative and perhaps misleading" (p.95, col. 2, par. 4). Yet the text states that this procedures was in fact used to measure

"direct habitat loss or alteration" and apparently to quantify the "magnitude of direct and indirect habitat losses, disturbance, mortality, and other potential effects" (p.95, col. 2, par. 3). It is difficult to see how such measurements, especially determinations of disturbance and mortality, could have been made using the described approach, or how any substantive conclusions could have been reached. The described assessment approach can only shake the critical reader's confidence and cast doubt on all biological conclusions presented in Chapter VI.

C. Indiscriminate use of habitat as the basis for biological assessments

Most important, the text implicitly assumes, for reasons unstated, that predicting "direct and indirect habitat losses" is a biologically appropriate means of assessing probable development effects on wildlife inhabiting the 1002 area (pp. 95-98). This relates to the concept, discussed in General Comment 3.B, that overlaying maps of general wildlife use areas with hypothetical oilfield layout plans, and then inferring changes to habitat, is a valid basis for predicting a wide range of effects on wildlife. In reality, habitat change is only one of many factors that can affect animal populations. Availability of arctic habitat has not been shown or even suggested to limit populations of most wildlife species that live in the Arctic during part or all of the year [and is likely to do so primarily in the case of anadromous fish, raptors, and possibly other bird species that combine (1) highly exclusive nesting territories with (2) nesting range confined exclusively or predominately to the Arctic]. On the Arctic Coastal Plain of Alaska, a habitat-based approach to assessing potential effects of development on wildlife may miss the mark entirely. Where habitat availability is likely to be a contributory factor in limiting the productivity of a species -- e.g., arctic and red-throated loons (Davis 1972, Johnson et al. 1975, Bergman and Derksen 1977, Derksen et al. 1981) or dunlin (Holmes and Pitelka 1968, Holmes 1970) -- loss or alteration of habitat is one of several factors that can be appropriate for predicting development-related effects on the species in question. However, for species where there is no evidence that habitat availability is or is likely to be a population-limiting factor -- e.g., caribou (Bergerud 1986, Bergerud et al. 1984) -- a predominately habitat-based

approach is clearly inappropriate. This is especially true when factors unrelated to habitat (e.g., mortality on winter range in other geographic areas) are ignored or de-emphasized as a result of applying an across-the-board habitat-based approach as a matter of policy.

D. Apparent misunderstanding of population-limiting factors

The only biologically meaningful approach to assessing and mitigating effects of development on wildlife is -- first -- to determine systematically how project activities and structures will affect population-limiting factors for each species of concern, and -- second -- to apply mitigative measures that avoid or offset project effects on those limiting factors. If an automatically applied habitat-based approach happens to be effective for a species, this is because one or more population-limiting factors happens to involve habitat.

It is in keeping with the national trend of FWS, codified in the FWS Mitigation Policy (FWS 1981; p. 12, col. 2, par. 2 and 3; pp. 97-98), to think largely in terms of preserving "habitat value" -- an approach that usually translates into protecting land from change, or ensuring that all change is "natural". This represents a departure from the more conventional but tried-and-true approach of managing fish and wildlife populations through limiting factors (which may include habitat components requiring protection).

The latter approach -- managing (or mitigating) through limiting factors -- is superior because it is reality-oriented. One first identifies, to the extent that available knowledge allows, the key factor or factors that really do regulate a population by limiting its productivity and growth. Having done so, one can then establish concrete objectives and procedures based on managing those limiting factors to achieve or sustain the desired population growth rate and size.

In geographic regions where habitat-based mitigation or management approaches have been shown successfully to stabilize wildlife populations or reverse their declines, the reason has been that the availability of one or several

habitat components (food, three-dimensional space, cover, etc.) is limiting to the species in question. This is often true for specialized species occupying a relatively narrow niche of habitat parameters (e.g., greater and lesser prairie chickens, Kirtland's warbler) and tends to be more common in the tropics (e.g., quetzals and other trogons, toucans, hornbills, etc.) than in temperate or especially polar regions, where (in the latter case) few examples of wildlife (e.g., raptors, anadromous fish) are known to be limited strictly by habitat availability.

4. UNREALISTICALLY EXTREME PREDICTIONS

The draft report presents unrealistically negative assessments of biological consequences as the norm. Extreme predictions result from two procedures employed to develop assessments: first, the use of "indirect" reductions in habitat value as the primary basis for predicting adverse biological effects of development; and second, an assumed development scenario based on concurrent construction of oilfield facilities. Because of their important bearing on the draft report's conclusions, we have chosen to discuss these approaches at length.

A. Indirect reductions in habitat value

Outright loss of habitat (e.g., by covering tundra with gravel) is clearly too narrow an approach to allow a realistic assessment of potential development effects on wildlife, as many effects of development are not mediated through habitat at all. In recognition of this fact, the FWS Mitigation Policy (FWS 1981) formally introduced the term "habitat value". Inclusion of this term in a policy context is highly significant because the term has no specific definition. It can therefore be used to embrace factors that are not really habitat-related -- for example, noise, aircraft overflights, traffic, construction activities -- in a way that appears to link them with habitat through the idea of "value". This means that if a road or pipeline is to be built across a stretch of tundra, a vast expanse of untouched land on either side can be determined to lose "habitat value" because of the potential of the linear structure to impede access by an unpredictable number of animals.

Likewise, one can take a map, draw a circle of any radius around a structure or center of human activity, and declare all land inside the circle to have "reduced habitat value". A huge land area may remain untouched, yet be factored into an additive scheme used to formulate a mitigation requirement.

Through the "habitat value" concept, human activities or structures of any kind can be translated into a specific tract of land with exact boundaries to be protectively regulated. This maintains a formal, although tenuous, consistency with the habitat-based principle of the FWS Mitigation Policy, allowing mitigation to be defined in terms of acres or hectares of specific land areas to be avoided by development or compensated for through agreements involving other, separate tracts elsewhere -- and providing legally precise boundaries and acreages for permit stipulations and record-keeping.

In the draft report, reductions in habitat value are predicted to occur in any of three ways: (a) direct habitat modification; and also indirect habitat modification through (b) displacement of wildlife or (c) blockage of their access to habitat.

Direct habitat modification: The draft report limits predictions of direct habitat modification primarily to caribou. On p. 106, col. 1, par. 5, the report states that "direct modification of caribou habitat could total approximately 5,650 acres." On p. 107, col. 1, par. 2, the report further states that "secondary modification of habitat... could occur on approximately 7,000 acres, of which nearly 1,800 acres is in Resource Category 1.... Total modification of caribou habitat attributable to direct and secondary changes would occur on about 12,650 acres, or 0.8 percent of the 1002 area, and 1.3 percent of the core calving area (Resource Category 1 habitat)." These acreage estimates impart a tone of precision to the report; yet there is no explanation of how they were derived, no citation of another report containing the information, not even reference to another chapter of the 1002 report (e.g., Chapter IV) which might be expected to provide acreages to be affected by oilfield development. Where did these acreages come from? Do they somehow relate to the hypothetical development scenarios shown in Plates 1, 2, and 3? Using numbers in this way, without explaining or citing their origin, is

confusing and can be misleading. The final report should be revised to provide clarification on this point.

In any case, the estimated portion of the "core" calving area predicted to be modified by oilfield development -- 1.3 percent -- would be too small to constitute, in itself, a threat to annual calving success. The draft report argues that a more important adverse effect on caribou would result from displacement of animals from or blockage of their access to calving and insect-relief habitats purportedly required to maintain the herd, i.e., indirect losses of habitat value, as discussed below.

Displacement: The draft report frequently uses this term to infer a reduction in "habitat value" for wildlife through their behavioral avoidance of development activities. The quantification of predicted adverse effects on most species (e.g., caribou, muskox, snow goose) is based on the idea that such displacement will be absolute, and that all land involved will undergo a complete and irretreivable loss in habitat value, i.e., will be avoided entirely and receive no use. In other words, the report's evaluation of environmental consequences is based on an unrealistically extreme and biologically improbable concept. Yet this approach is never stated as a working assumption by the authors. The reader must discover it by a close analysis of the text and tables.

Species-by-species discussions in the draft report indicate that "displacement" is the primary means through which the authors predict adverse effects on wildlife populations from oilfield development within the 1002 area. Because predicting the actual degree of such displacement (assuming it were to occur) would not be feasible, the authors use a "sphere of influence" concept to develop what at first appear to be precise acres and boundaries amenable to treatment under the FWS Mitigation Policy. In the case of caribou, for example, Table VI-5, p. 107, presents acres and percentages in a format that superficially appears to consist of "hard numbers". In fact, as stated in the table, the acreages represent areas "potentially influenced by development". The problem with this type of analysis is that it bases an absolute, black-and-white picture on very tenuous grounds. This can be highly misleading. For example, the study by Dau and Cameron (1985) from which the

2-mile sphere of influence on caribou was inferred does not find that calving caribou avoided any structure or activity by a distance of 2 miles. It reports a vague but statistically describable trend of increasing density of cows and calves with distance from the Milne Point road. There is no 2-mile effect specifically mentioned in the paper or evident in the data presented, and no apparent justifiction for inferring a "sphere of influence" within which habitat would receive no use, i.e., lose all value. (See General Comment 6.G for discussion in greater detail.) Evidence (e.g., Shank 1979, Jakimchuk 1980, Curatolo et al. 1982) shows that the extent to which caribou avoid a road will depend more on the frequency of traffic on that road than on the mere presence or absence of the road itself.

The text accompanying Table VI-5 (p. 107) is misleading, in that it stretches "Area (acres) potentially influenced by development" (Table VI-5) into "complete loss of habitat values" (p. 108, col. 2, par. 5). In applying this extreme approach to the 242,000-acre "core calving area" defined on p. 28, col. 1, par. 3 and in Plate 2A, the authors conclude that "An approximately 2-mile displacement of caribou out from petroleum facilities would include loss of 32 percent of the most critical PCH core calving areas (Table VI-5)" (p. 108, col. 2, par. 5). However, the authors fail to point out that such an absolute displacement of caribou (or other wildlife) by North Slope oilfield development has not been documented and was not reported in the Dau and Cameron (1985) study from which the 2-mile displacement was inferred. They are presenting an extreme and highly improbable prediction as the norm for analysis, but do not say so.

A similar picture is painted for muskoxen. Table VI-6, p. 113, again assumes (on a different basis) "a 2-mile sphere of influence", indicating that with full (or limited) leasing, the "Percent of Arctic Refuge range influenced by development" would be 53 (or 52) percent of the 211,000-acre range said to receive high use "seasonally or year-round, with calving". As with caribou, the authors stretch their conclusion to the limit, stating:

> "Table VI-6 shows that habitat values could be lost or greatly reduced throughout about one-third (256,000 acres) of the muskox range within the 1002 area. Habitats used for high seasonal or year-round use, including calving, would be disproportionately affected; muskoxen would be displaced

from approximately 53 percent of those habitats. Habitat values could be lost on nearly 75 percent of the high use habitats in which calving occurs. Such a high percentage of loss in valuable calving habitat could have a major negative influence on herd productivity" (p. 113, col. 2, par. 1).

As with caribou, there is an implicit assumption, for the purpose of the analysis, that all muskoxen would be "displaced" , i.e., lose "habitat value", from a large percentage of their range on the coastal plain. The analysis is based entirely on acreage potentially affected, not on numbers of animals potentially involved.

The muskox conclusions presented in the draft report cannot be justified on the basis of the evidence cited. The authors state, "From the reports of Russell (1977) and Reynolds and LaPlant (1985), a 2-mile sphere of influence was assumed in calculating the range which could be affected by full leasing" (p. 113, col. 1, par. 2 through col. 2, par. 1, line 3). Using this approach, the authors indicate that habitat value could be "lost or greatly reduced throughout about one-third (256,000 acres) of the muskox range within the 1002 area" (p. 113, col. 2, par 1). However, the reports cited by the authors do not support their conclusion. Those reports document observations of muskox groups near winter seismic surveys. Reynolds and LaPlant (1985) state, "Muskoxen apparently were not displaced from areas of traditional use in 1984. All muskoxen observed were within or near use areas documented in 1982-1984." These authors continue, "Information from movements of radio-collared animals also showed that muskoxen did not move long distances in response to seismic surveys" and conclude that "Any movements caused by the presence of seismic activities probably did not exceed the range of daily movements which occur in undisturbed conditions."

Reynolds and LaPlant (1985), Urquhart (1973), Beak Consultants Ltd. (1976), and Jingfors and Lassen (1984) all report that muskoxen sometimes show local, transient movements away from seismic trains. As Reynolds and LaPlant (1985) conclude, "Movements away from lines were apparently of relatively short duration and herd or population size did not appear to be affected." None of these authors reports a 2-mile "sphere of influence" from within which muskoxen remove themselves. In fact, the cited reports document an absence of

lasting effects on muskoxen from winter seismic trains, a conclusion reinforced by the work of McLaren and Green (1985) documenting reactions of wild muskoxen to snowmobile activity. To translate local and transient avoidance reactions by wildlife into a generalized loss of habitat value "throughout about one-third (256,000 acres) of the muskox range within the 1002 area", and to postulate "a major negative influence on herd productivity" (i.e., reductions in reproductive rates or in rates of calf recruitment into the adult population) seems unwarranted and misleading.

Again for snow geese, the draft report presents a similar table of specific acreages (Table VI-7, p. 122), this time based on alternative 1.5- and 3-mile "spheres of influence", and states in the accompanying text: "Habitat values could be lost on up to 45 percent of the preferred staging area on the 1002 area and 27 percent of the total preferred staging area in the Arctic Refuge with an assumed 3-mile displacement. A 1.5-mile displacement would result in lost habitat values on nearly 31 percent of the preferred staging area within the 1002 area and up to 18 percent of the total preferred staging area within the Arctic Refuge" (p. 121, col. 2, par. 2).

In all these cases, the problem is the same: displacement within a defined "sphere of influence" will not necessarily result in all animals avoiding the entire area. To base the evaluation of environmental consequences of 1002 area petroleum development on this extreme and biologically inappropriate foundation introduces a strong bias that skews the analysis and conclusions.

Blockage of access to wildlife: Primarily in the case of caribou, potential structural barriers (roads and pipelines) are presented as a mechanism by which habitat value will be reduced or eliminated. The argument is that if some unpredictable number of caribou were to avoid crossing a linear corridor, the entire acreage on the other side of the corridor would be reduced in habitat value. As with displacement, the reduction in habitat value is calculated on the basis of the land area on the other side of the corridor, not on documented observations of actual caribou crossing success. The simplistic conclusion is that some very large number of acres would be reduced in habitat value due to the presence of a linear structure. The draft report

concludes: "Eighteen percent (294,000 acres) of the 1002 area, including KIC/ASRC lands, used for insect-relief and other purposes by the PCH lie north of the proposed pipeline/road corridor.... If caribou refuse to cross through any development areas, the 294,000 acres would be unavailable as habitat. That area encompasses 52 percent of total insect-relief habitats. This would mean that all coastal insect-relief habitats within the 1002 area, except for a small area in the eastern portion, would become unavailable under full development" (p. 109, col. 2, par. 4).

As with the case for "displacement", the blockage argument assumes that all caribou would fail to cross the corridor. All acreages and percentages presented in the text (pp. 105-109) are based on this premise, along with all conclusions concerning loss of habitat value. A biologically more appropriate assessment procedure would be to base predictions on observed rates of crossing success reported in the scientific literature. There is an abundance of published evidence documenting that a small proportion of caribou in a group might be deterred by a pipeline or road (especially if traffic is present), while the remaining, larger number of animals would cross successfully (e.g., Banfield 1954; Davis et al. 1977; Roseneau 1979; Cameron and Whitten 1980; Fancy 1982, 1983; Fancy et al. 1981; Curatolo et al. 1982; Robus 1983; Bergerud et al. 1984; Russell and Martell 1985). In the case of the 1002 area, where careful attention will be given to the design and operation of roads and pipelines to facilitate caribou crossings, the draft report's conclusions seem particularly far-fetched.

B. Assumed concurrent construction of oilfield facilities

The development scenario presented in the draft report as the basis for biological assessments contains a major failing: it assumes that all aspects of oilfield development will proceed concurrently. The development scenario

is based on a variety of information contained in Chapter IV (pp.75-87). This chapter gives readers much information on what might be required to develop potential oil and gas fields in ANWR, but it does not address the issue of how activities might proceed. In Chapter VI, the authors chose to perform biological analyses "as if concurrent development were to take place" (p. 95, col. 2, par. 4 and p. 97, col.1, par.1). The authors state that this approach was taken because "any prediction as to the various stages of development at any given time in the 1002 area would be highly speculative and perhaps misleading" (p. 95, col. 2, par. 4, l. 14-16). We can hardly agree with this. In fact, contrary to the authors' position, we suggest that it is more misleading and considerably less accurate to base analyses on obviously unrealistic "all or nothing" concepts than on informed judgments that attempt to take into account more realistic scales and sequences of events. [Many readers are almost certain to conclude that all development stages will in fact proceed concurrently.]

As common sense and knowledge of previous development (e.g., the Prudhoe Bay and Kuparuk oilfields) would indicate, the authors should recognize that development in ANWR will follow a logical progression of events wherein certain types and levels of activities will occur in certain places over varying (sometimes relatively short) time-spans. In reality, caribou and other wildlife will, in many cases, be encountering these activities "one at a time" (or at least not all at once). For example, camps and other infrastructure components may be built at one location to support the first "find", and then several years later at another distant location to support another find (i.e., similar to Prudhoe Bay and Kuparuk). Similarly, a system of production roads and wells may be built in one locale, during which time there will be high levels of activity, and then, after the wells are in place and on line, the kinds and levels of activities will change markedly (many fewer people, vehicles, etc.). Caribou and other wildlife will probably have to contend with activities at only a few locations in any one year, and the locations will undoubtedly shift numerous times over the years. Development occurring sequentially along these lines is a very different matter in terms of assessing potential effects on caribou compared to development occurring in many areas all at once.

Development scenarios are valuable tools for helping assess potential effects of proposed actions, but to be useful models, they must not only incorporate the best information available (both engineering and biological), but also take into account how events might be expected to unfold. Despite many unknowns, development scenarios should still be as realistic and logical as possible. Unrealistically assuming concurrent, large-scale developments in ANWR while at the same time failing to take into account how some activities might proceed, (e.g., general timing and duration of events, differences between actual construction vs. operation) seriously calls into question many of the conclusions and predictions presented in the draft report.

5. DOCUMENTATION

Much of the documentation throughout biological sections of the draft report refers to non-primary references, and some references are outdated or cited out of context. In general, considering the extensive research conducted in the 1002 area over the past 5-7 years, the amount of data collected, and the time available for intensive review, we found biological documentation to be poor or non-existent for many important points, and often incomplete in crucial ways.

For example, p. 109 (col. 1, par. 3 and col. 2, par 1-3) includes a brief discussion of "the varying successes of caribou in crossing roads and pipelines associated with Prudhoe Bay [and other oilfield] facilities". This discussion generally concludes that roads and pipelines tend to deter crossings by caribou, except in cases of oestrid fly harassment not relevant to the 1002 area analysis (see discussion below). Several papers are cited in support of this negative conclusion. However, most of the cited papers document local behavioral variations observed in caribou when moving near structures, and none documents a definite blockage of free passage by a road or pipeline that resulted in an adverse effect on caribou. Some of the papers cited could be used equally to support the conclusion that roads and pipelines have only a minor influence on caribou movements (e.g., Curatolo et al. 1982; Fancy 1982, 1983), and a considerable body of work by other authors reporting little or no effect of roads, pipelines, or other structures on caribou

crossing success is ignored (e.g., Banfield 1954, Davis et al. 1977, Roseneau 1979, Cameron and Whitten 1980, Fancy et al. 1981, Robus 1983, Bergerud et al. 1984, Russell and Martell 1985). Moreover, there is a failure to note that in no instance has a behavioral modification by caribou in response to a structure been documented to produce any effect on herd size, physical condition of animals, or productivity of a population.

We suggest that a more balanced treatment of the caribou access issue might state:

> In studies involving the effects of the Kuparuk pipeline and associated roads and traffic on caribou movements and behavior, Curatolo et al. (1982) and Robus (1983) found that caribou showed little or no reaction to traffic-free gravel roads, crossing them consistently and frequently. However, when traffic was present, caribou exhibited negative responses which were in direct relation to the proximity of the vehicles (Curatolo et al. 1982). Cameron and Whitten (1980) found that light traffic, minor construction activities, road repairs, etc. in the Kuparuk Development Area had no detectable effect on caribou crossings of roads and use of adjacent areas. In general, caribou cross roads and railroads freely if traffic levels are low, but tend to avoid transportation corridors with heavy traffic (Klein 1971, Curatolo et al. 1982, Mahoney 1982, Northcott 1984). The tendency of caribou to cross a road with traffic or pass near an active drilling site appears to be greatly influenced by the relative level of insect harassment; the greater the degree of insect harassment, the lesser the tendency to be deterred by traffic or other human activities (Cameron and Whitten 1980, Fancy et al. 1981, Robus 1983).

Similar problems involving misinterpretation of cited information are evident in the draft report's discussions of behavioral avoidance by caribou. The draft report states:

> "Behavioral avoidance of development areas displaces caribou from preferred habitats of traditional use.... Avoidance of oil development and other human activity by caribou has been reported by numerous investigators (Dau and Cameron, 1985; Cameron and others, 1979; Whitten and Cameron, 1983; Fancy and others, 1981; Urquhart 1973; Wright and Fancy 1980)....Displacement of the CAH from historic calving grounds in response to oil development at Prudhoe Bay has been documented (Dau and Cameron, 1985; Cameron and Whitten, 1979)" (p. 107, col. 2, par. 2).

In fact, none of the referenced papers presents evidence for large-scale displacement of caribou from habitat or for displacement of caribou from "historic" calving grounds. The cited authors report localized, transient

behavioral avoidance of human activities and structures by caribou. What this really means is that caribou tend in some cases (e.g., parturient cows) to maintain a variable distance between themselves and centers of oilfield activity (e.g., Dau and Cameron 1985), and that caribou tend to steer clear of structures when moving through a developed area (e.g., Fancy et al. 1981). All such findings are expected, unsurprising, and generally accepted, and none suggests that large areas of habitat have been abandoned by or made inaccessible to caribou as a result of oilfield development. Moreover, we have found no evidence that the Prudhoe Bay oilfield area was in the past a calving concentration area for the Central Arctic caribou herd. It is therefore misleading to infer that low-density calving currently observed in the Prudhoe Bay area represents a change from past conditions, and that the change is a consequence of oilfield development, especially in light of the fact that caribou of the Central Arctic herd presently calve in and around the Kuparuk oilfield (Cameron and Whitten 1979, 1980; Robus 1983) without any detectable adverse effect on that steadily growing caribou population.

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An additional, related problem concerning biological documentation within the draft report is that authors are sometimes cited out of context. For example, on p. 109, col. 1, par. 2, the authors cite Helle and Tarvainen (1984) and Davis and Valkenburg (1979) out of context. This paragraph discusses insect harassment and its observed effects on caribou during the post-calving period on the ANWR coastal plain. At that time and location, caribou are exposed to harassment by biting mosquitoes. However, the cited references and the draft report's descriptions of supposed extreme consequences to caribou survival all concern infestation by oestrid flies. Oestrid fly harassment of Porcupine herd caribou tends to occur later in the season and predominately southeast of the 1002 area after the majority of caribou have vacated the coastal plain. The issue of insect harassment relative to 1002 area development should be kept strictly in its proper context, i.e., relief from biting mosquitoes, not warble flies and nose bots (oestrid flies).

In a number of instances, relevant literature has been overlooked. For example, McLaren and Green (1985) published in a major journal (Arctic) a useful study quantifying reactions of wild muskoxen to snowmobile activity

that should help form a basis for the muskox discussion on pp. 112-113. These workers found that muskox responses to snowmobile harassment trials were complex and may have been dependent on variables such as herd size, age structure, sex of animal, wind direction, windspeed, and topography. Noise levels appeared to be an especially influential variable, and inconsistent degrees of habituation were observed. In addition, this report documents measured distances at which first reactions and closest approaches occurred.

It has been noted above (General Comment 4.A) that certain papers (Dau and Cameron 1985 for caribou, Reynolds and LaPlant 1985 and Russell 1977 for muskoxen) are cited in the draft report as the basis for postulating "spheres of influence" within which wildlife displacement occurs. Indeed, this concept is the primary assumption on which biological assessments and quantitative conclusions concerning potential impacts of oilfield development on these species are based. Yet none of the cited authors presents evidence supporting a specific zone of caribou or muskox avoidance that could serve as the basis for the quantitative, all-or-nothing assessments presented in the draft report (i.e., Table VI-5, p. 107, and Table VI-6, p. 113). The results of Dau and Cameron (1985) are discussed in greater detail in General Comment 6.G.

6. CARIBOU

One can make an assertion on the basis of intuition or on the basis of evidence. Upon reviewing the evidence of actual experience, we find that no adverse effects of Alaskan petroleum exploration or oilfield development on caribou herd size or productivity have been documented. The published scientific literature clearly shows that during the period of oilfield development in arctic Alaska since about 1976, caribou herds in the region have steadily increased. None has declined. The evidence shows that carefully planned and managed petroleum exploration and oilfield development in the Arctic are compatible with caribou.

We have carefully reviewed sections of the draft report pertinent to caribou and have identified a considerable number of inappropriate assertions and conclusions. The following sections identify and discuss some of the more important problems found in the draft report's treatment of caribou.

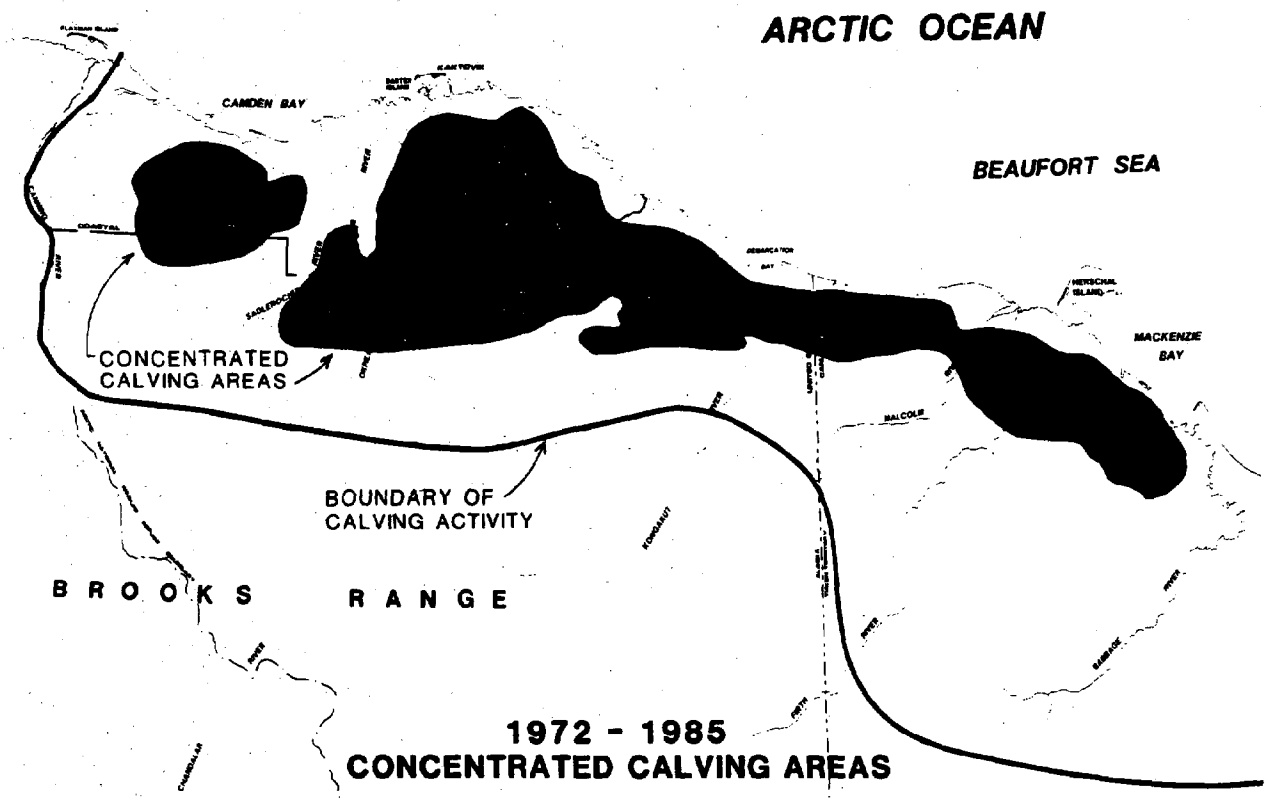

Figure 1. Areas of concentrated and general calving activity of the Porcupine Caribou Herd, 1972-1985. Solid areas were identified as being used by 'concentrations' of calving caribou in at at least one of 14 years; the solid line marks the approximate boundary of calving activity during the same period. Note that concentrated calving takes place in a broad area extending about 200 miles from east to west and from the foothills to near the coast. See Figure 2 for yearly patterns. [Based on data provided by D.G. Roseneau (1972-1981) and by U.S. Fish and Wildlife Service (1982-1985)].

A. The Porcupine caribou herd calving grounds

No single, fixed location is used consistently from year to year by the Porcupine caribou herd (PCH), and no such location is "unique and irreplaceable on a national basis or in the ecoregion" (Table VI-3, p. 98) from the standpoint of habitat value or other biological criteria. Figure 1 shows the area used in at least one year by concentrations of calving caribou, as well as the area used by cows that were more dispersed. These might be termed the "principal calving area" and the "general calving area". Together they form a large continuum of calving habitat extending from approximately the Canning River in Alaska nearly to the Mackenzie Delta in the Yukon Territory, Canada.

Calving females comprising a varying portion of any caribou herd do tend to concentrate briefly in one or more areas in the spring of any given year. Lent (1966) and Valkenburg and Davis (1986) described such areas for the Western Arctic herd and the Steese-Fortymile herd, respectively. "Core" or "concentrated" calving areas may or may not be consistent from year to year (Valkenburg and Davis 1986); consistency of use may, for example, depend on annual snowdepth patterns (Lent 1980). PCH calving concentrations vary annually in number and location, sometimes falling within the same general area, other times varying by hundreds of miles (Roseneau et al. 1975). Calving occurs primarily in the uplands along the northern sides of the Sadlerochit, Romanzof, British, and Richardson mountains, a region extending approximately from the western boundary of ANWR at the Canning River to the western Mackenzie Bay area in the Yukon Territory, an east-west distance of over 200 miles and an area exceeding 6,500 square miles. In 1982, for example, the majority of the PCH calved east of the United States-Canada border in the Yukon Territory, completely outside ANWR (FWS 1983), and FWS investigators, citing Roseneau et al. (1975), stated "this pattern of spring range use has been noted several times previously" (FWS 1983). In any given spring, there are often (but not always, e.g., 1973, possibly 1980; see Fig. 2) one to several areas where the densities of parturient cows are higher than elsewhere in the PCH calving range (D. Roseneau 1986, pers. comm.). These concentrations may be several hundred miles apart, some in Alaska, some in the

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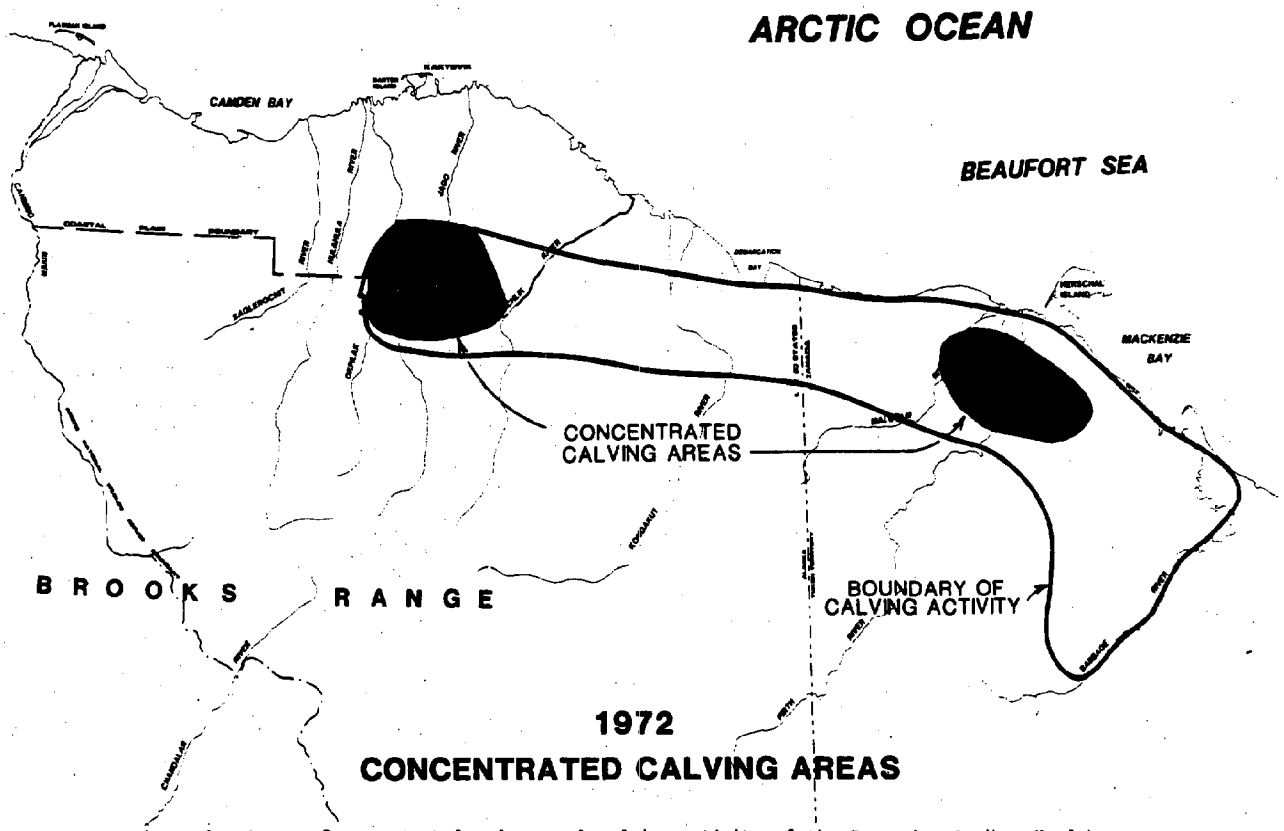
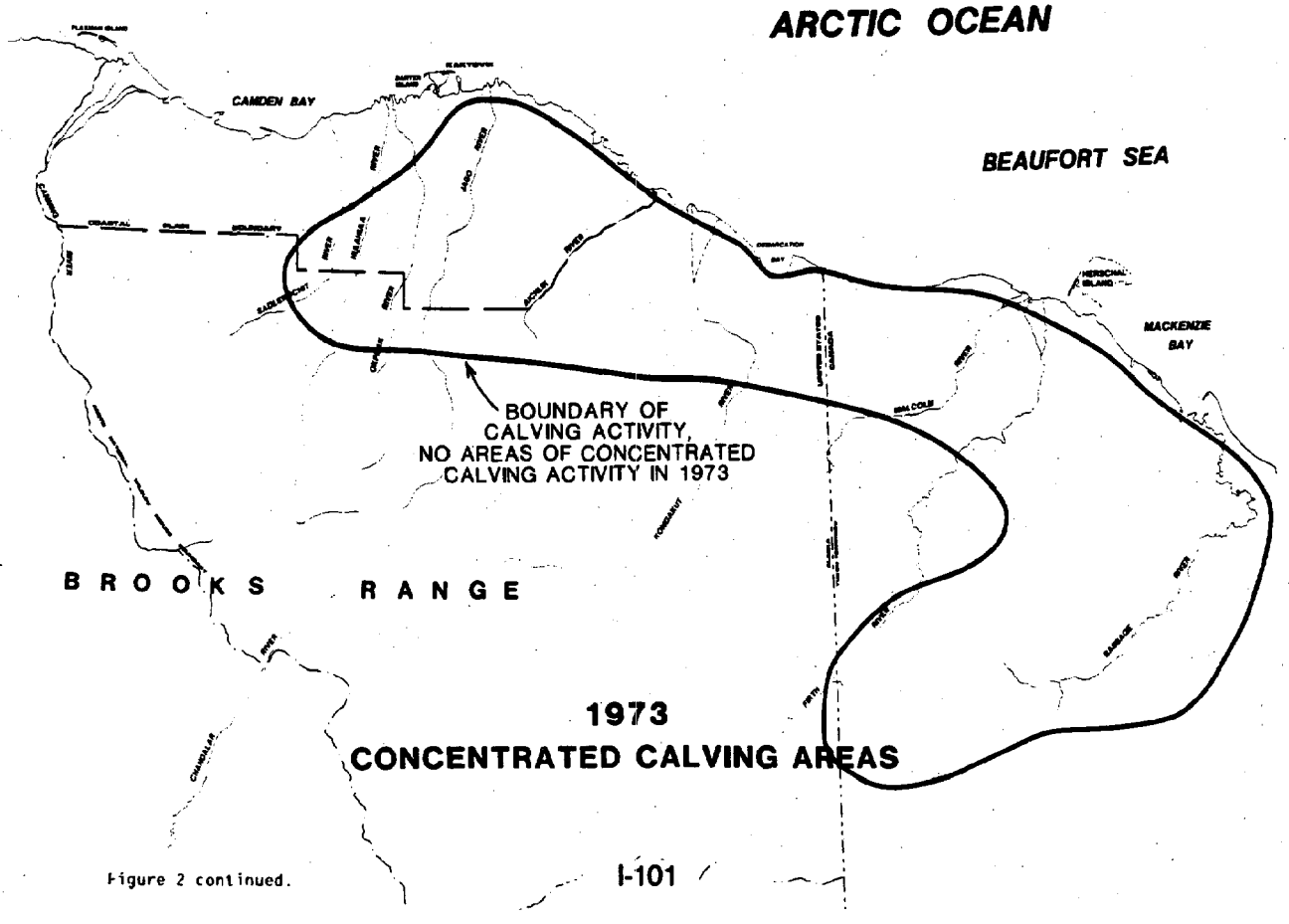


Figure 2. Areas of concentrated and general calving activity of the Porcupine Caribou Herd by year, 1972-1985. Solid areas were identified as being used by 'concentrations' of calving caribou; the solid line marks the boundary of calving activity. Note the large amount of annual variability in the location of concentrations of calving caribou. In some years (1973 and 1980) no calving concentrations were observed. [Based on data provided by D.G. Roseneau (1972-1981) and by U.S. Fish and Wildlife Service (1982-1985)].



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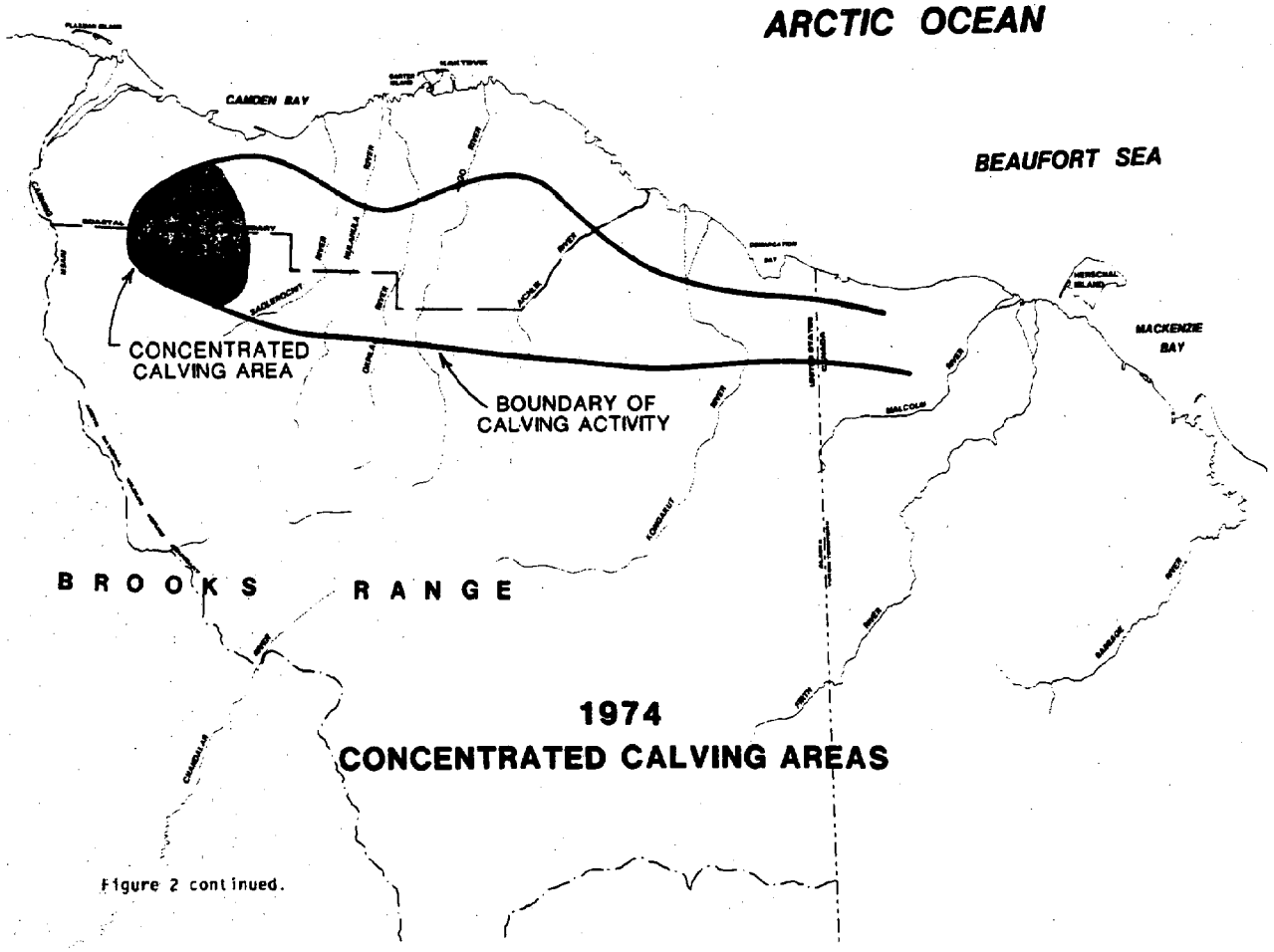

1974
CONCENTRATED CALVING AREAS

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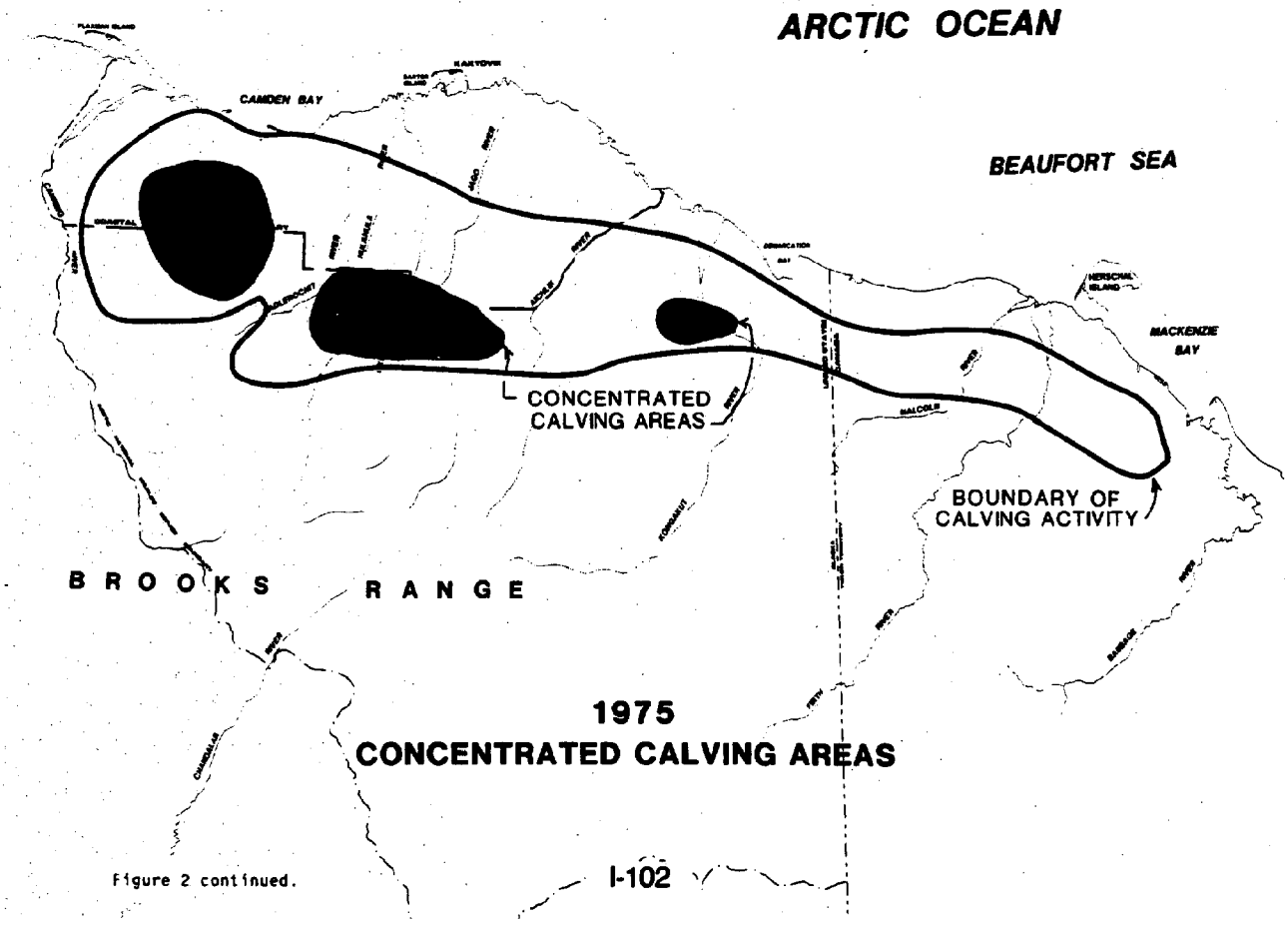

1975
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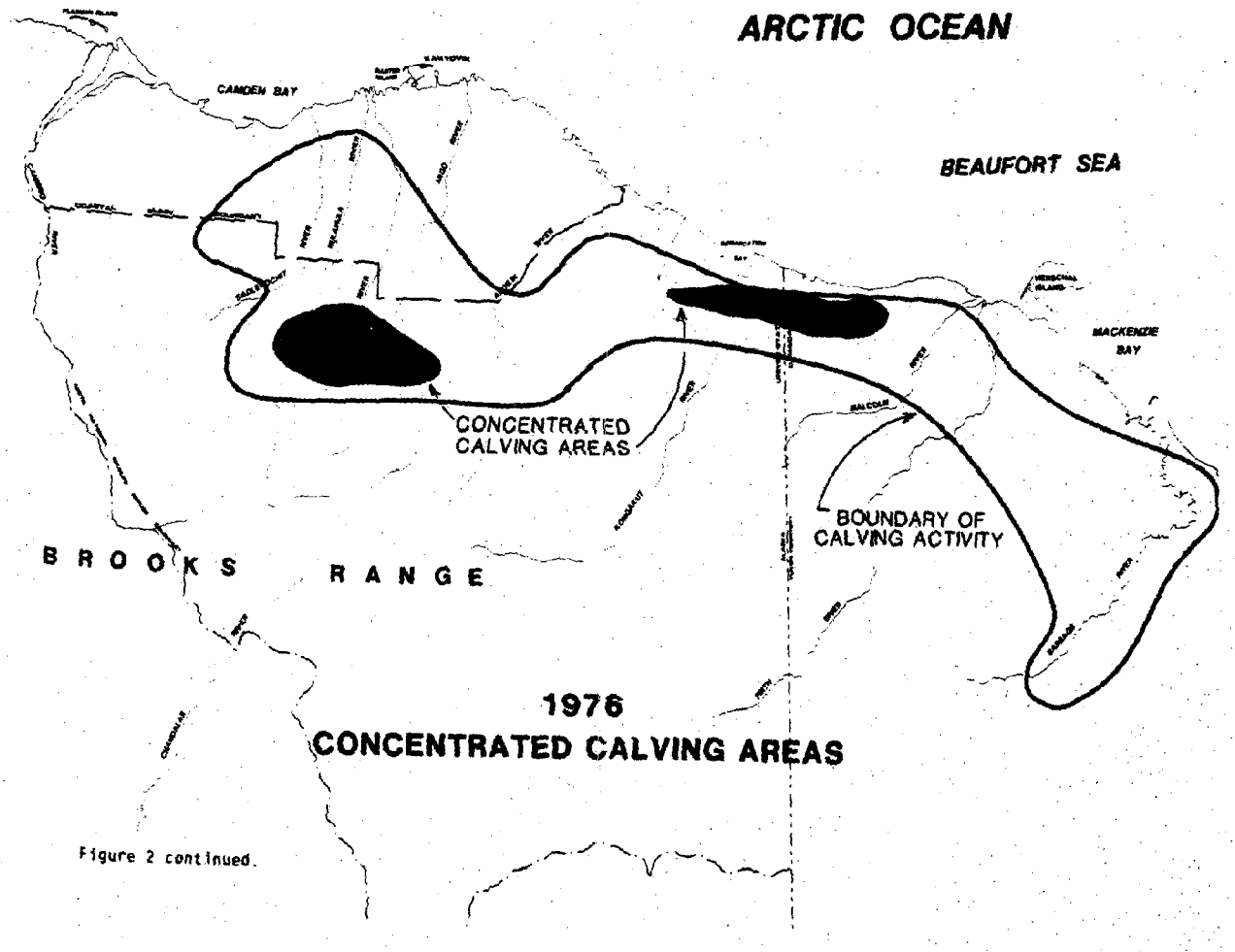

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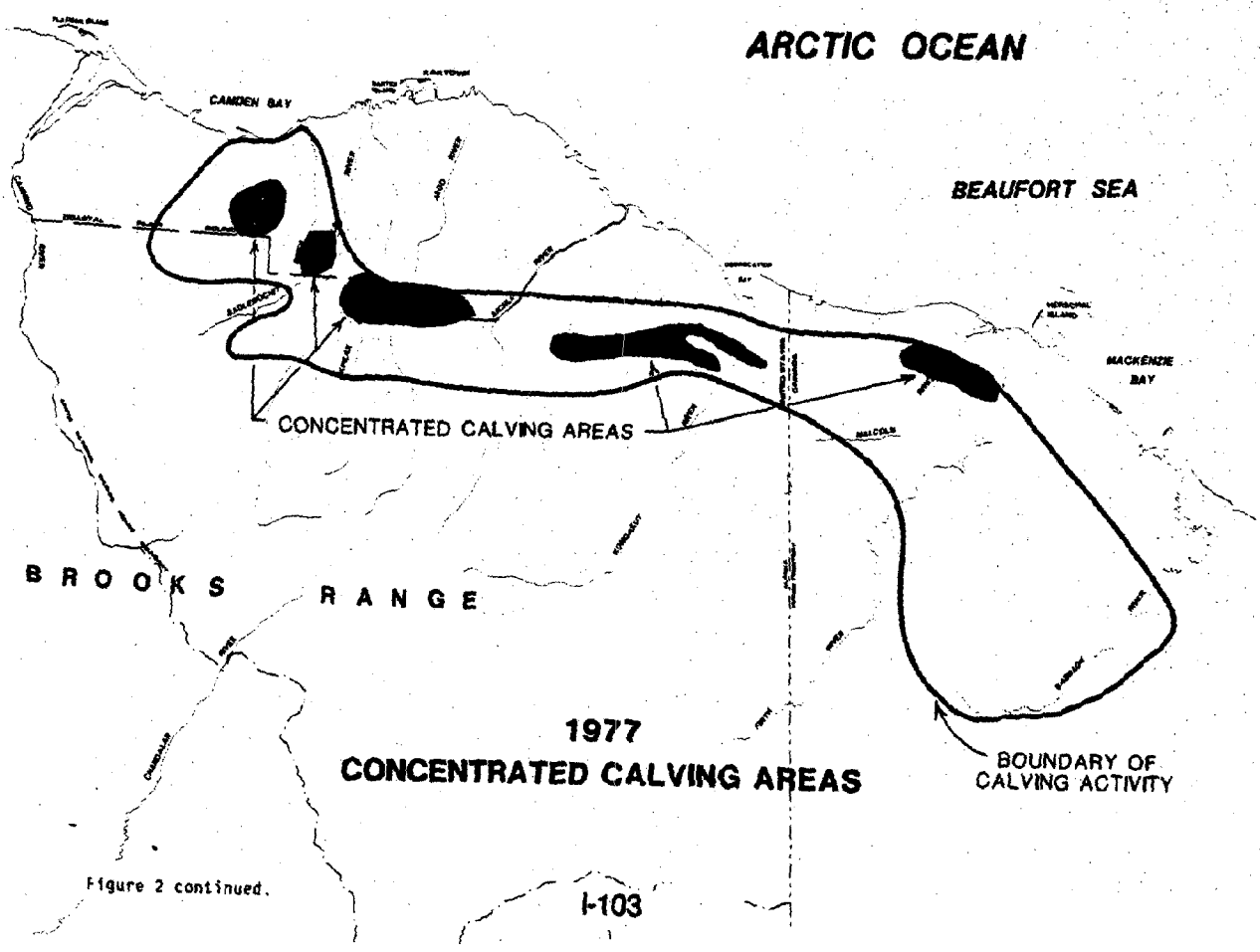

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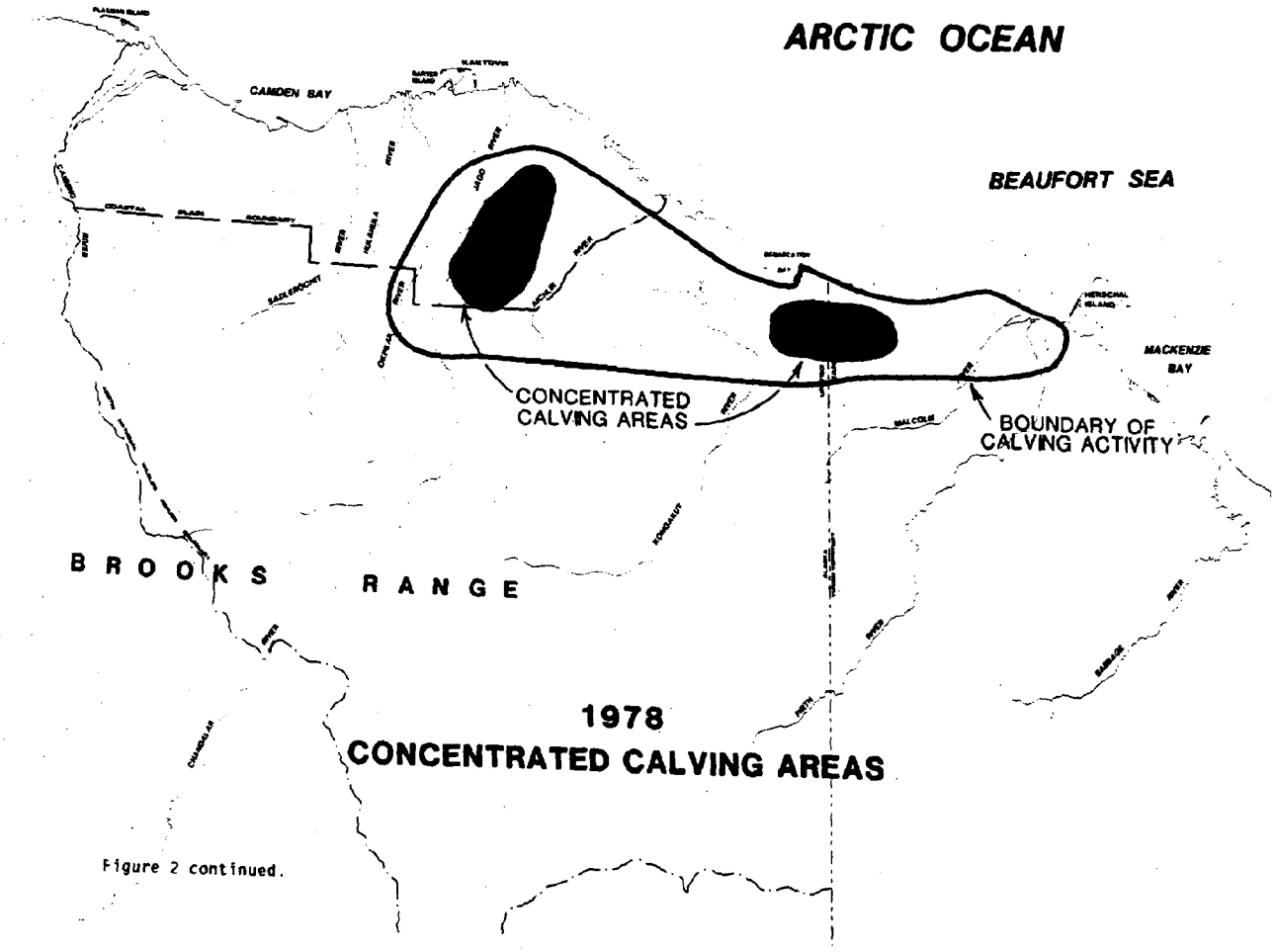

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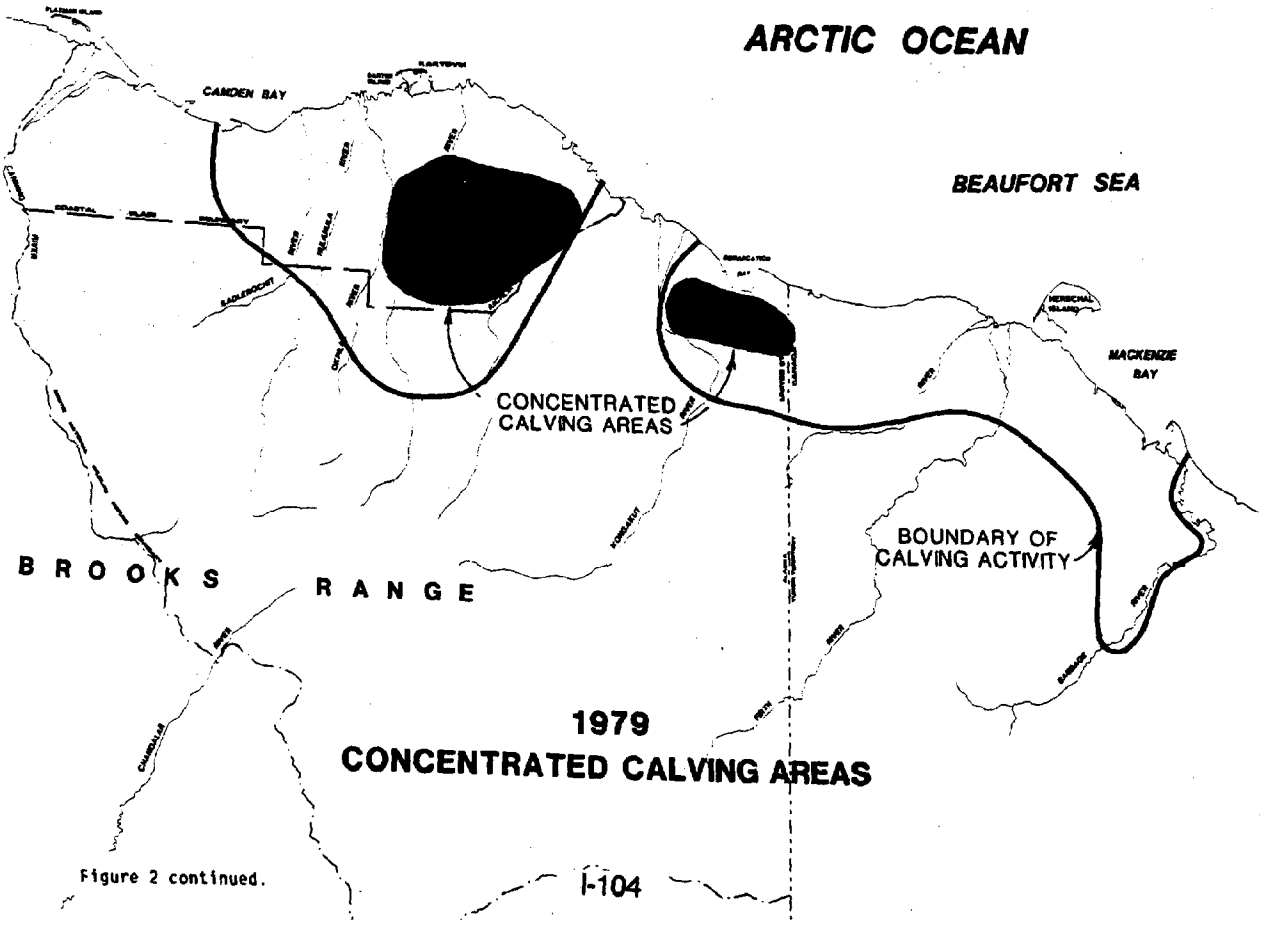

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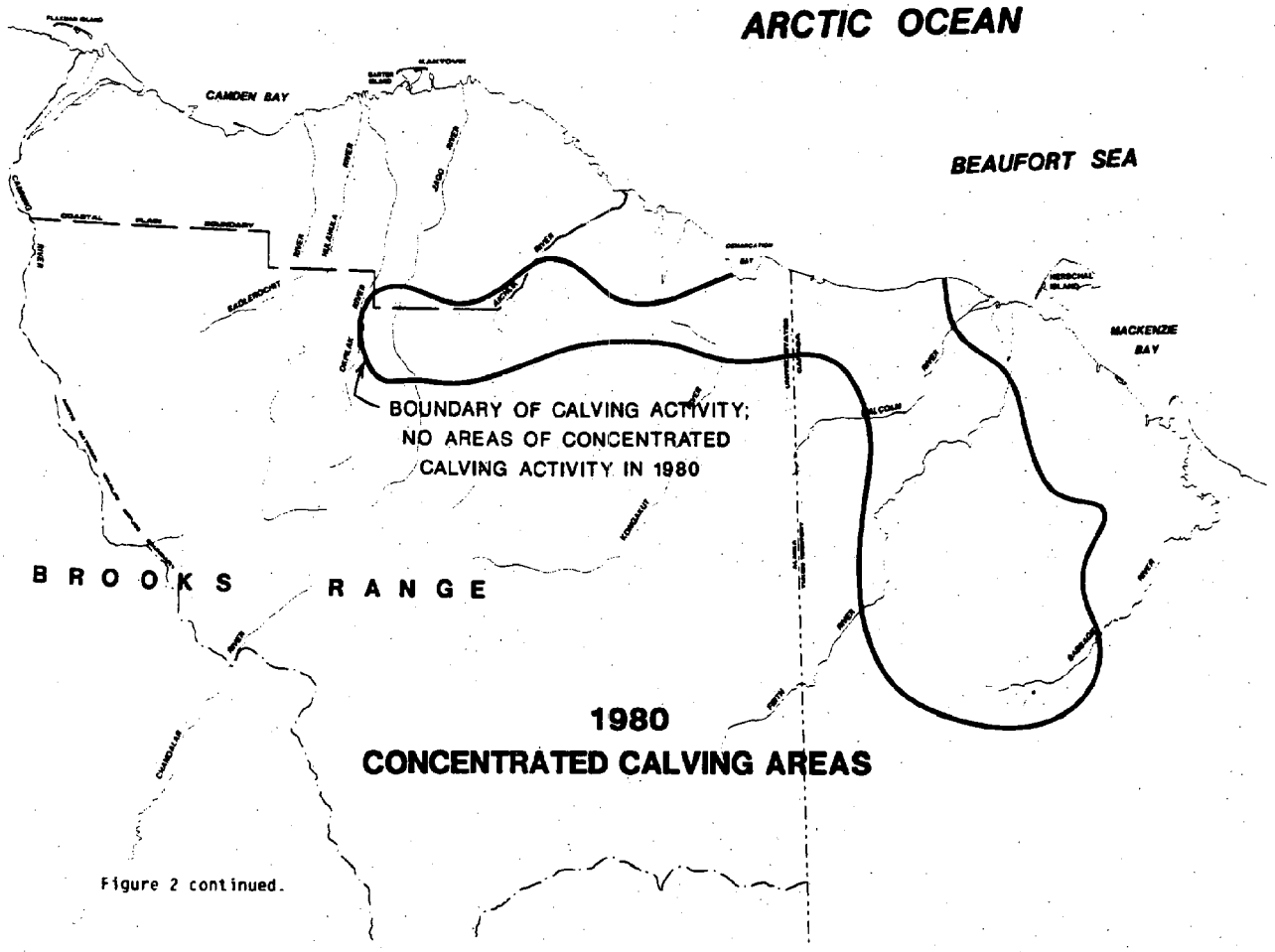

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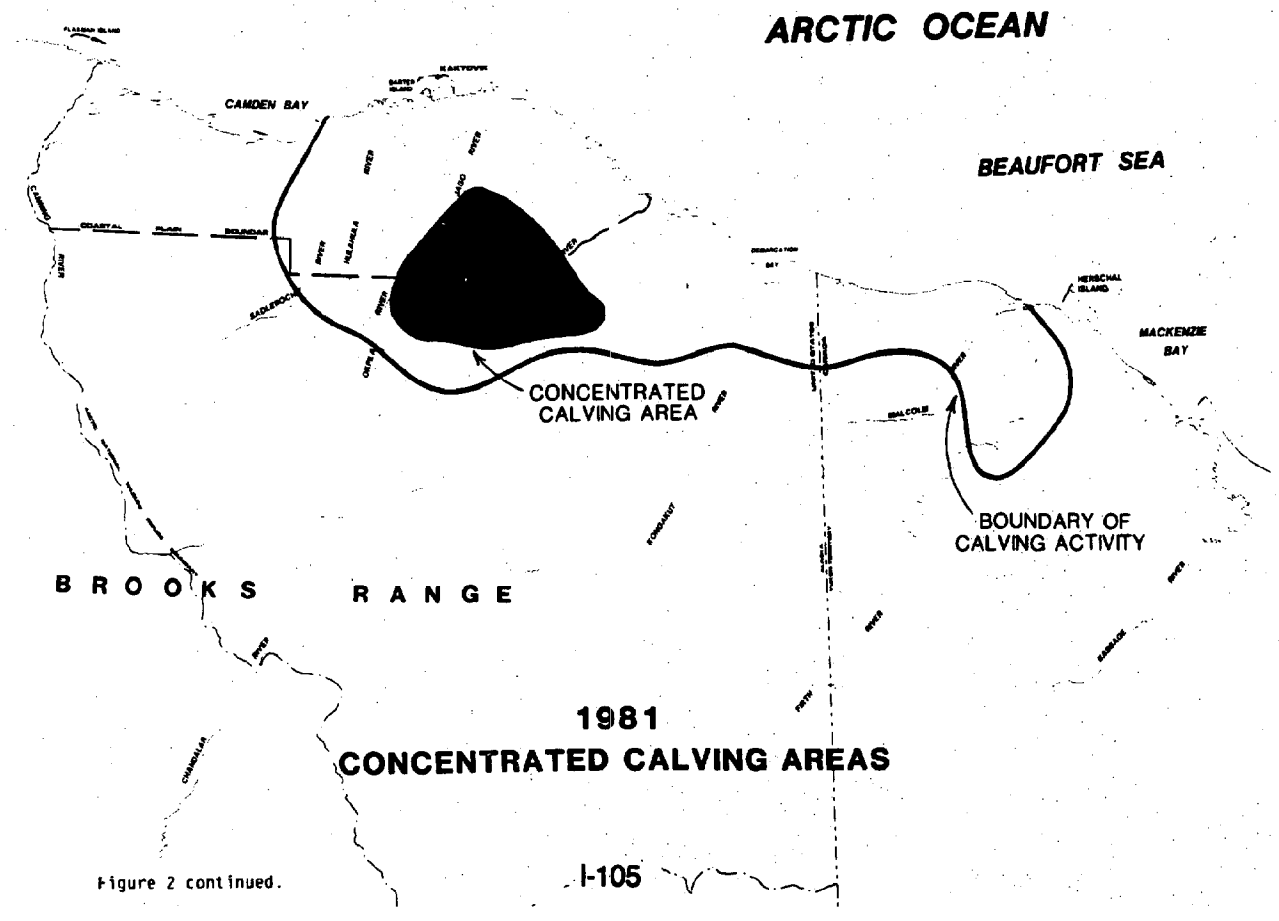

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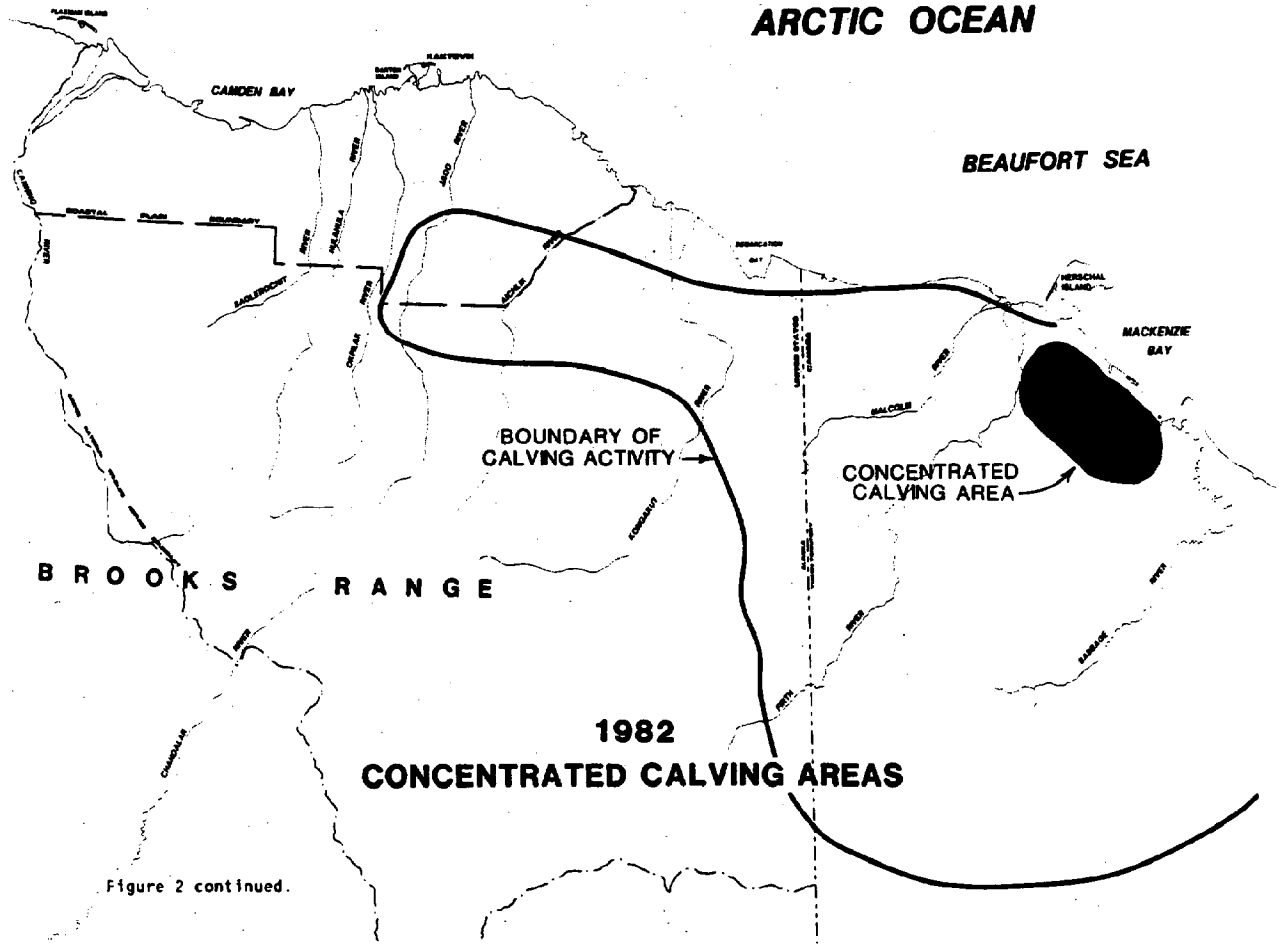

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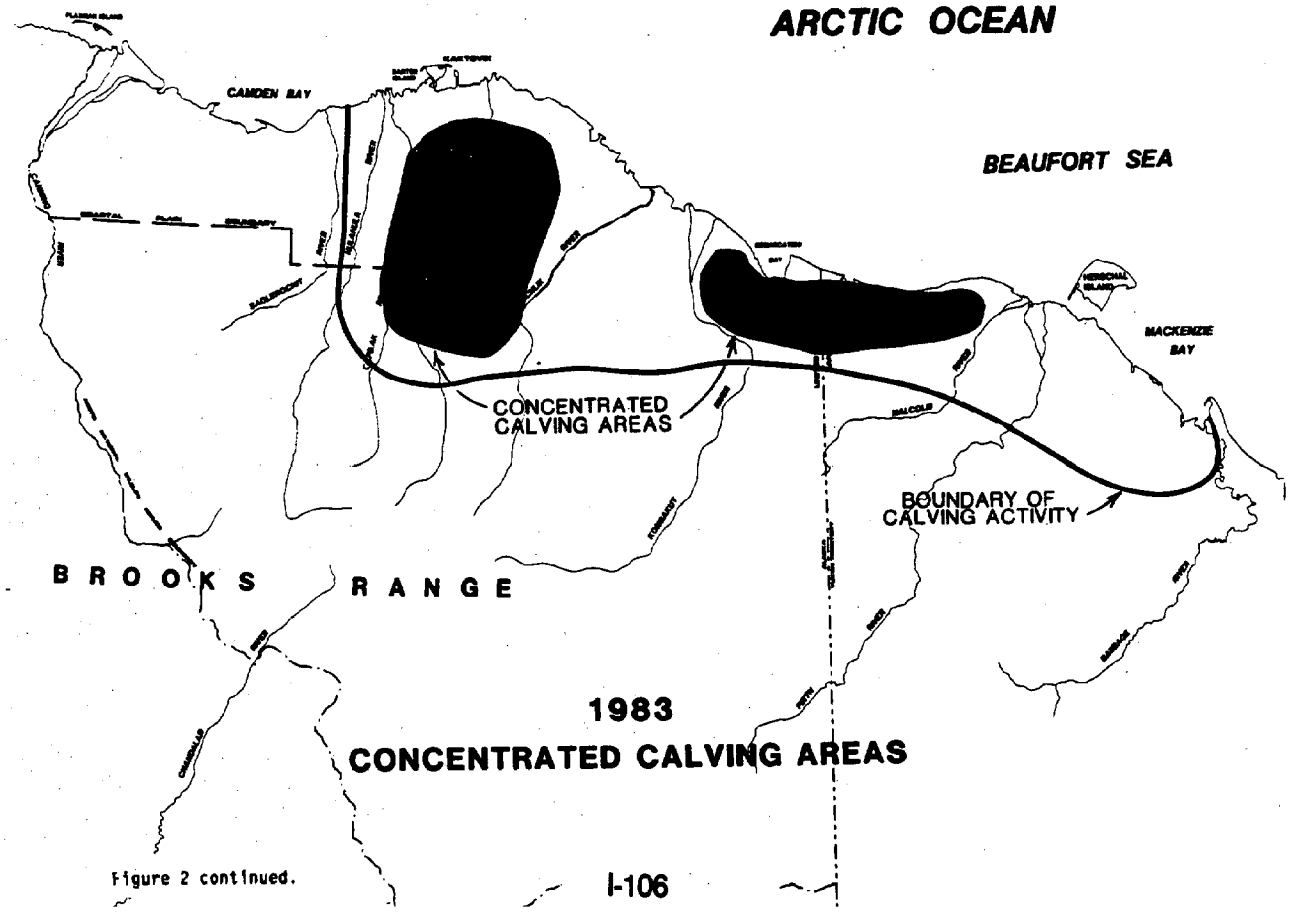

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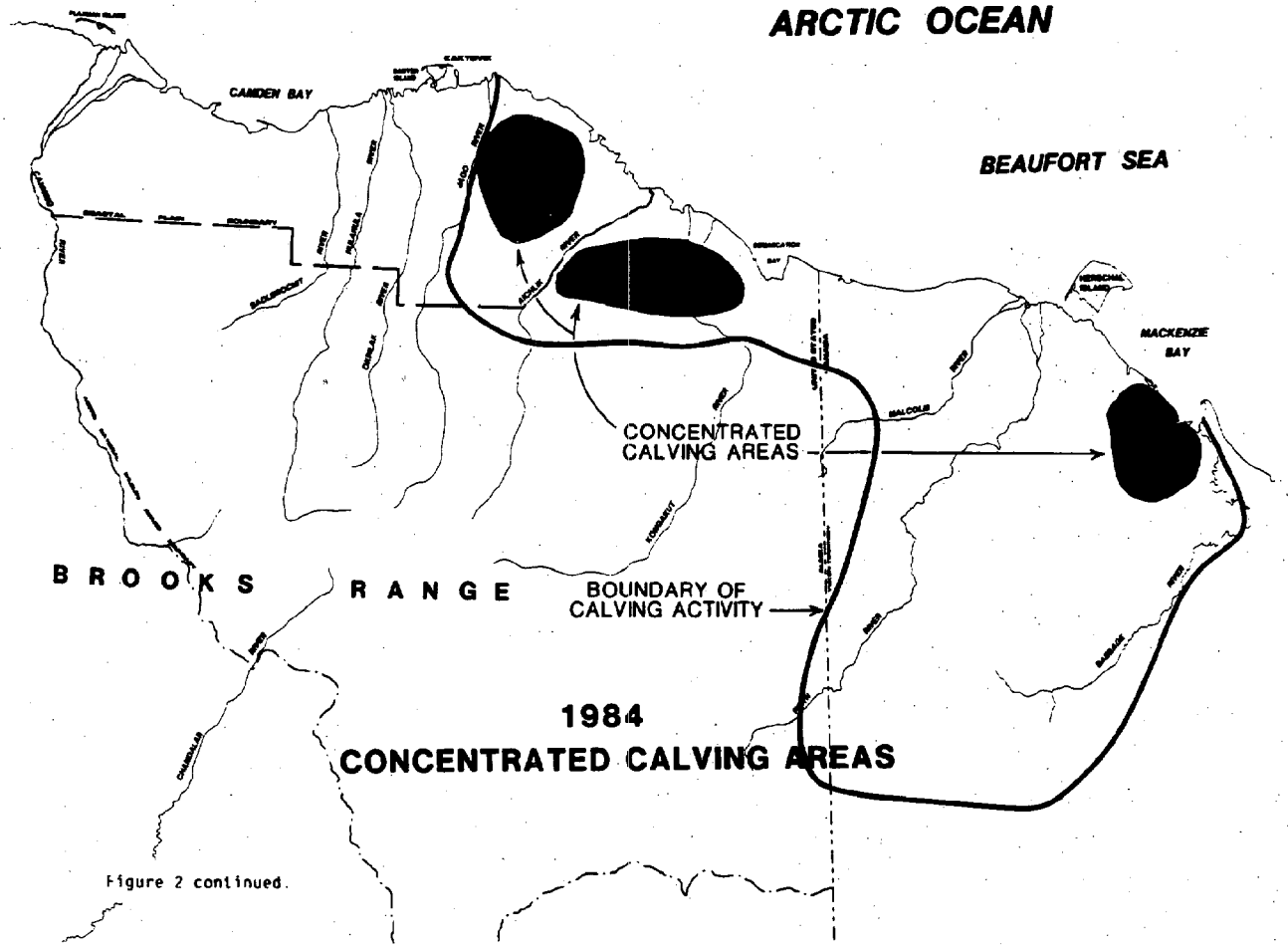

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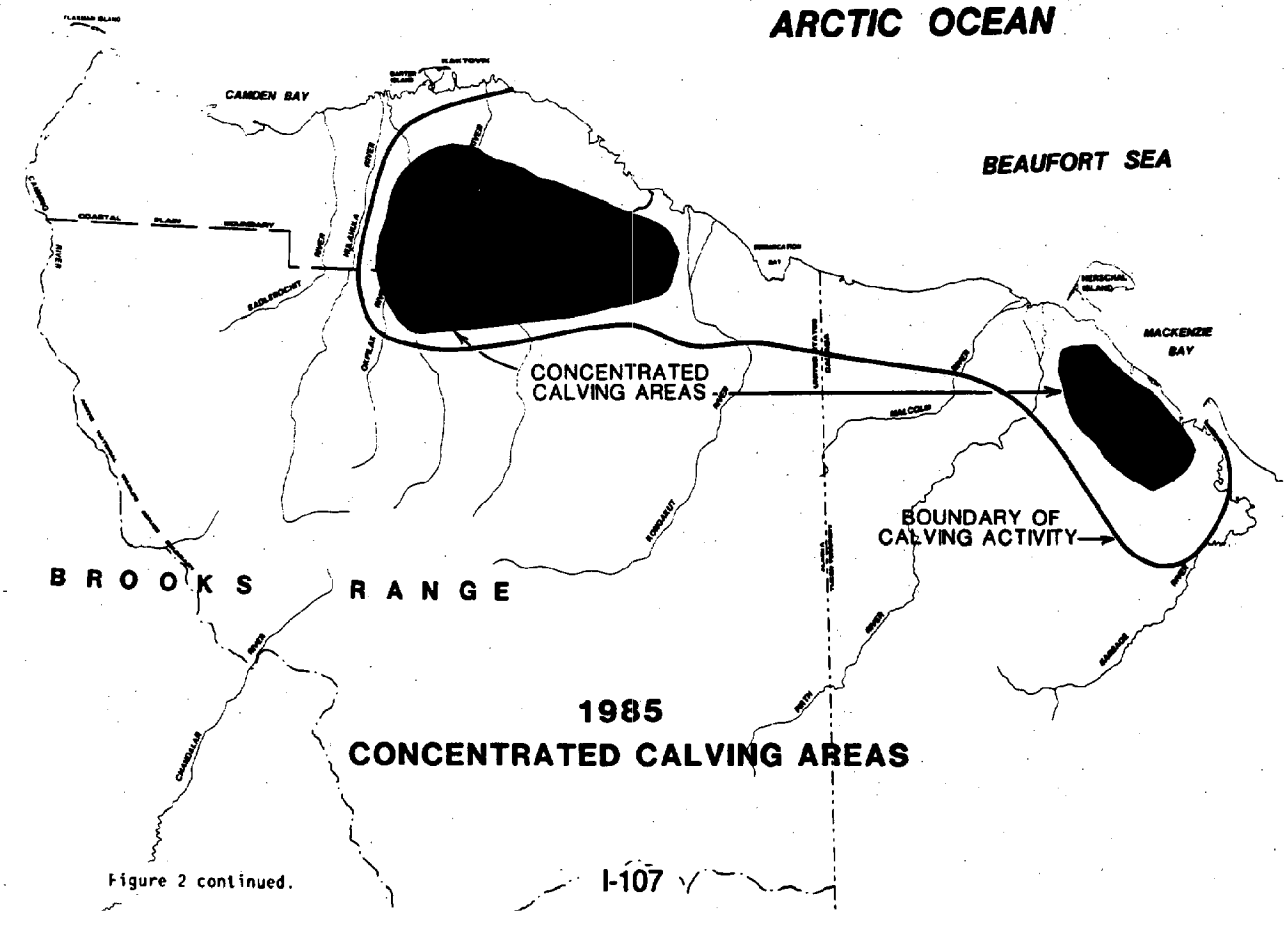


Figure 2 continued.

Yukon Territory, and may vary greatly in location and number from one year to the next, while remaining inside the herd's principal calving area. The idea of a "core" calving area consisting of a specific tract of habitat with definable boundaries is unfounded. It is reasonable, however, to delineate a broad area within which a high proportion of total calving consistently occurs every year; this area is shown in a general but accurate way in Figure 1 of the caribou section of the Initial ANWR Baseline Report (FWS 1982). There is no dependable means to predict the locations of high-density calving concentrations based on locations from past years (D. Roseneau 1986, pers. comm.), and no fixed tract of "core calving habitat" that might be lost as a result of oilfield development.

Methods: In attempting to map a "core" calving area, it is not sufficient simply to overlay general vicinities of varying concentrations of caribou cows and calves from different years and interpret a place where an arbitrary number of such areas happens to overlap as a "core" calving area. This approach, used to define the "core" area shown in Plate 2A and discussed on pp. 28 and 108, creates the misleading impression of a consistently recurring calving concentration that becomes increasingly dense towards a particular tract of land at its center, when in fact it indicates only frequency of occurrence of cows and calves in unknown and probably quite variable concentrations. The superimposed shapes differ greatly from year to year; there is no biological reason to suggest that a place where some of these shapes happen to overlap is somehow special, and certainly none to justify classifying such a location as Resource Category 1, i.e., "unique and irreplaceable on a national basis or in the ecoregion" (Table VI-3, p. 98). The proposed Resource Category 1 location, intended for an official designation protecting habitats that are rare or biologically very important, is defined solely by the criterion of overlap in at least 5 out of 14 years, or 36 percent of the years of record. This criterion has no evident biological significance and is unexplained by the authors; in fact, it appears to be arbitrary. Had a more likely criterion been used -- for example, overlap in at least 7 of the 14 years, or 50 percent -- the "core" area would be about half the size described by the authors. The lack of a logical criterion or biologically meaningful rationale for defining the area provides no justification for its proposed designation as Resource Category 1.

The following discussion presents a more detailed overview of PCH calving concentrations and their variability within the 1002 area. It was prepared by D. G. Roseneau in response to our request for detailed information on PCH calving distribution. Mr. Roseneau was the principal investigator for the Alaskan component of the first systematic studies of the Porcupine herd and its annual cycle, distribution, and range use, conducted from 1972 through 1977.

"The draft report presents information on the distribution and locations of Porcupine herd calving concentrations that have occurred north of the Romanzof and Sadlerochit mountains between the Kongakut and Canning rivers in Alaska (which is appropriate). However, no comparative data are given for the remainder of the large international calving grounds in Alaska (i.e., between the Kongakut River and the international boundary) and Canada (i.e., north of the Old Crow Flats between the international boundary and the Blow River drainage). Also, the considerable year-to-year variation that has occurred in the distribution of calving animals within the large international calving grounds (i.e., during 1972-1985; Fig. 1, 2) is not adequately addressed. There is strong evidence (FWS 1986) that the herd has increased from roughly 100,000 animals in the early 1970s to an estimated 180,000 animals in 1986 despite these sometimes large annual shifts in calving distribution. [Comments on annual variations in calving distribution are limited to one sentence stating that the distribution of caribou on the calving grounds varies considerably from year-to-year (p. 28, col. 1, par. 3), and a brief comment that calving tends to exhibit a more northern distribution in years of early snowmelt, and a more eastern and southern distribution in years having late springs (p. 28, col. 2, par. 2).] Reporting only locations of calving concentrations found west of the Kongakut River while largely ignoring past annual variations in calving distribution does not provide a balanced perspective of the calving grounds. It de-emphasizes the substantial extent of calving that occurs outside the 1002 area in the remainder of Alaska and in Canada, and fails to illustrate that the herd has used a broad and varied region of northeastern Alaska and the northern Yukon Territory north of treeline for calving while increasing in size (Fig. 2).

"[Note: It is generally accepted that, as caribou herds increase or decrease in size, they tend to expand or contract over their range. For this reason, one should also expect the principal calving area of the PCH to expand and contract over time.]

"Information is also presented implying that there is a relatively small, specific, fixed 'core calving area' that is both critical to the survival of the herd and specifically sought out by large elements of the herd year after year (e.g., see text on p. 28, Table VI-5 on p. 107, and Plate 2A). This concept is unfounded. Caribou are a highly migratory, versatile species capable of handling a variety of sometimes harsh, rapidly changing

and often widely varying conditions in their environment. The annual variations that have occurred in wintering areas, migratory routes (spring, fall, post-calving, and early winter), calving areas, and post-calving areas of large herds are examples of the ability of caribou to utilize successfully more than just one specific, fixed area for all of these events during their life cycle.

"[Note: Papers such as Valkenburg and Davis (1986) showing annual variations in calving distribution in the Steese-Fortymile caribou herd, and Davis et al. (1985) reporting rapid growth of the Delta caribou herd despite habitat changes in its calving grounds, have not been cited.]

"Given a 15-year data set (1971-1985), it is possible to: a) define the broad limits encompassing all calving (i.e., the general calving grounds) by overlaying the data and plotting the extreme points where calving has occurred during the years of record (Fig. 1); b) define a somewhat smaller region encompassing the majority of calving (i.e., the primary calving grounds) by overlaying the data and plotting the limits of the areas that have contained the majority of calving over the years (Fig. 1); and c) recognise that, over time and from year-to-year, one or more concentrations of calving animals may occur anywhere within the boundaries of the primary calving grounds, dependent on snow conditions (including those found along spring migration routes), weather events, proximity to wintering locations (which also are variable from year to year), and herd size. It is also possible to go one step farther and determine the frequency of use of one area vs. another within the primary calving grounds by overlaying maps of known calving concentrations, as was done for the analysis presented in the draft report (Plate 2A). However, the fact that one area has been used more frequently than another by annually varying proportions of calving cows does not mean that there is one particular, small, fixed, unique 'core' area within the primary calving area that most of the animals seek out every year, and that is so critical to the herd's survival that loss of any or all of it will result in a population decline (as is strongly implied in the draft report).

"The authors estimate that the large international calving grounds include about 8.9 million acres (13,900 square miles, a reasonable estimate). They then identify a 2,117,000 acre (3,308 square mile) international area of 'concentrated calving'[1], and a small 311,000 acre (486 square mile) international "core calving area" (the equivalent of a 22 mile x 22 mile square area)[2]. About 242,000 acres (378 square miles) (78%) of the 311,000 acre core area are reported being in the 1002 area, and the remainder (69,000 acres, or 108 square miles) (22%) are apparently located east of the 1002 area in Alaska and in northwestern Canada. The portion of the 'core' area occurring within the 1002 area is illustrated by Plate 2A.

"Plate 2A tends to be misleading. The plotted concentrations were of varying densities (sometimes greater than 50 cows[sic]/square mile, sometimes less), but they were clearly discernable as concentrations in contrast to the more scattered distribution of animals in surrounding areas. The mapped concentrations also represent differing proportions of

the total cows in the herd within years, and also between years, because the herd has been growing. The overlaid data on concentrations, without density information attached, really show frequency-of-occurrence of the presence of these concentrations. However, the red areas of greatest overlap representing the presence of caribou in nine out 14 years are called areas of greatest concentration (Plate 2A), which was not necessarily the case. Similarly, the pattern of ever-darkening overlays in itself tends to suggest increasing densities, not simply greater frequencies of occurrence. The 1002 'core' area is equivalent to an area only 19.5 miles x 19.5 miles in size. There is no doubt (nor disagreement) that this and other portions of the upper Jago River drainage have been used frequently by concentrations or portions of concentrations of calving animals over the years. [The process of sublimation begins reducing snow cover in the uplands along the northern flanks of the Romansof and British mountains during late winter and early spring. Upland areas between the Aichilik and Hulahula rivers often become relatively snow-free at about the time parturient cows begin reaching the area.] However, as mentioned above, year-to-year use has been by varying proportions of the herd's calving cows. Using only frequency information to highlight one small, fixed area in the calving grounds, and assuming that it (along with the small remaining portion of the 'core' that occurs outside the 1002 area) holds the key to increases or decreases in a large, dynamic caribou herd that gives no indication of being limited by habitat availability, is not a very desirable approach and may not be in the best interest of the herd. It is quite possible that the Porcupine herd could continue to prosper without part or even all of this area. In contrast, carefully preserving "habitat values" in this area while perhaps paying less attention to the remainder of the calving grounds will hardly guarantee that the herd will maintain its size or grow. Given past variations in calving concentration areas, likely future variations in calving areas, and the fact that many cows often continue to move westward shortly after having given birth, all of the primary calving grounds deserve to receive equal attention."

[NOTES]

[1][The 2,117,000 acre international area of concentrated calving was apparently determined by: a) plotting and overlaying all of the major concentrations of calving animals found during the nine years for which data are reported; b) drawing new boundaries encompassing any resulting overlapping concentrations; and c) measuring and summing these new areas, and combining them with measurements and sums of any remaining area.]

[2][The 311,000 acre international core calving area was apparently determined by: 1) stating that a core calving area is "...a location to which pregnant cows have shown a strong fidelity as traditionally favored calving habitat"; and 2) measuring and summing all areas within the 2.1 million acre international area in which concentrated calving occurred in at least five of the nine data years.]

B. Density of caribou in calving concentration areas

The draft report states (p. 28, col. 1, par. 3) that "areas where caribou were present during calving at a density of at least 50 caribou/square mile [during 1972-85] were identified as concentrated calving areas" (presumably referring to mainly calving cows plus a few yearlings, and not including neonates). On p. 106, col. 1, par. 4, the report further states that the 242,000-acre "core" calving area proposed as Resource Category 1 was defined specifically on the basis that "More than 50 caribou/ sq mile have been present during calving in at least 5 of 14 years (1972-85) for which detailed data exist (pl. 2A)". In reality, no known "detailed data" on calving densities from 1972 through 1977 were ever collected or have ever existed (D. Roseneau 1987, pers. comm.). Indeed, no known quantitative data of any kind on calving densities were collected during those years. Furthermore, we have been unable to confirm the existence of any quantitative data on PCH calving densities collected from 1978 through 1985. If there are quantitative data supporting the density claims, they should be made available for review.

The principal investigator who conducted the research from 1972-1977 estimated and mapped the approximate "boundaries" of PCH calving concentration areas while observing them from an aircraft; his determinations were subjective and involved no quantitative criterion or actual counts (D. Roseneau 1987, pers. comm.). Roseneau believes that some areas that he identified as concentrated calving areas contained densities much lower than 50 cows/square mile, while others consisted of much higher densities. Apparently the first mention of the density criterion of 50 caribou/square mile was made in the final report of the Caribou Impact Analysis Workshop held in November 1985 (Elison et al. 1986). That report indicated, without documentation, that the 50 caribou/square mile criterion had been applied since 1981 (not 1972). However, there is no direct information on density of caribou on the calving grounds in any of the FWS ANWR Update Reports (FWS 1983, 1984, 1985, 1986). Therefore, we are unable to confirm that the criterion of 50 caribou/square mile was in fact used for objective identification and mapping of calving concentration areas in any year.

For 1982, however, it is possible to make a rough calculation of the density of caribou in the concentrated calving area south of Herschel Island, Yukon Territory. Whitten and Cameron (1983), on the basis of 5,900 cows that were actually counted, estimated that 23,400 cows may actually have calved within the high density area. Measuring on the inside of the thick crayon line that marks the boundary of the high density calving area on the authors' original map, one can calculate an area of about 1,000 square miles, for a density of calving cows of 23.4/square mile, not 50/square mile. Thus it is only by measuring on a small-scale map and back-calculating that it is feasible to estimate the density of cows that probably occurred in the area of concentrated calving in 1982. Data are not made available in the ANWR Update Reports to allow such calculations for 1983, 1984, and 1985.

In 1983, PCH calving distribution was studied by Whitten et al. (1984). Among their objectives was the measurement of variations in calf mortality and in calf mortality factors between core and peripheral areas. Whitten et al. make no mention of their criterion for distinguishing a "core" calving area from other calving areas. Calving caribou were located by tracking radio-collared animals, but no density data were reported.

For the 1984 calving season, Whitten et al. (1985) again conducted research on the PCH calving grounds. These workers report number of caribou seen and percent calves, but do not provide information about densities of caribou in areas of concentrated calving or elsewhere.

Nowhere in the ANWR Update Reports is there documentation of research conducted that would have permitted a density of calving caribou to have been calculated (e.g., systematic surveys, vertical aerial photographs). The term "concentrated calving area" appears to have always been subjective, never quantitative and objective.

We at first assumed, given the draft report's lack of specific information on this point, that the stated density criterion of 50 caribou/square mile (p. 28) was applied in usual fashion to parturient cows or cow-calf groups. Upon inquiry, however, we were informed that the criterion of 50 caribou/square

mile included both cows and calves (A. Rappaport 1987, pers. comm.). If the density criterion includes calves, the criterion is misleading and introduces uncertainty in comparing mapped calving concentrations shown for different years or by different workers. The inclusion of calves within the density figure surprised several biologists. [Ten of twelve biologists polled assumed that the density criterion referred only to cows.] Because of the high, variable mortality rates suffered by calves, it is usual practice to omit them from counts (e.g., counts made during photo-censuses), except where they are of particular interest (e.g., calves per 100 cows). Other workers (e.g., Parker 1972) have reported densities on calving grounds in terms of cows only.

If calves are included in counts, the actual percentage of the total that they comprise will vary depending on pregnancy rates, percent parturient cows, neonatal mortality rates, and percent calves missed during surveys (which will be greater than the percent of adults that are missed). Thus, the proportion of cows in the counts will vary considerably from year to year. The inclusion of calves in density figures also makes it impossible to compare results from studies using cows only. If one were interested in density of caribou on the calving grounds in the context of range stocking density, the numbers would be useless because calves do not graze on vegetation. Or if one wished to compute the minimum number of cows in areas of concentrated calving, the inclusion of calves would make the figure meaningless. Also, if one wished to make an inference about the number of caribou selecting a particular portion of range, the inclusion of calves in the density figure would be misleading because calves obviously do not select range areas. There are valid reasons to base index counts solely on cows. Thus, if calves and cows were included in the density figures, the results should be revised to reflect cows only.

In summary, the draft report clearly states that the density of 50 caribou/square mile has been used as the criterion defining a core calving area. This implies that there is a clear, objective, quantitative difference separating concentrated calving areas from general calving areas. With critical examination, however, this distinction blurs. There do not appear to be any objective, quantitative data that were used to determine the boundaries of areas of concentrated calving, including the composite 242,000-acre tract

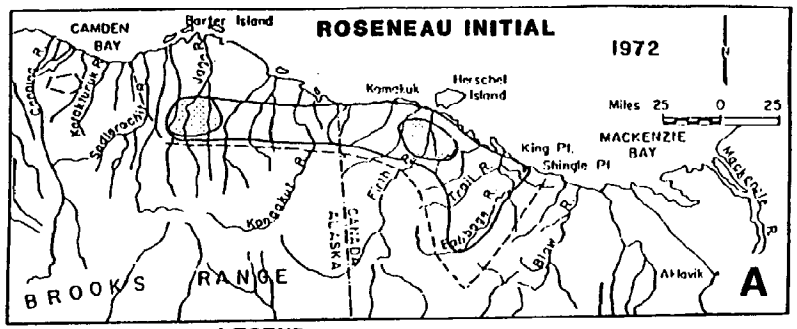
proposed for Resource Category 1 designation. The reality is that PCH calving can and does take place throughout the ANWR coastal plain from approximately the Canning River to the Babbage River. Although parts of the 1002 area are used regularly by calving caribou, there appear to be no data that meet the criteria stated in the draft report to define a "core" calving area [i.e., "More than 50 caribou/sq mi", "present during calving in at least 5 of 14 years (1972-85) for which detailed data exist"]. Therefore, no "core" calving area can be delineated without altering the criteria.

C. Size and location of calving concentration areas

There are serious limitations in the data that were available to plot the location and areal extent of concentrated calving areas, particularly for 1972-1981 (Plate 2A). Maps of calving concentrations observed in those years (Fig. 3) were prepared by D. G. Roseneau (1987, pers. comm.) to show variability in calving area locations and were never intended to be used for precise mapping of calving concentrations. The original map scale (1 inch = 50 miles) is far too small to have permitted the data to be replotted accurately to a larger scale map. [Unfortunately, much of the original data was lost in an office fire, and thus more detailed information about the location of the calving concentration areas is not available.]

Several problems have been identified with the maps of PCH calving concentration areas shown in Plate 2A. In addition to relatively small plotting errors that can be expected, there are substantial errors that have caused mapped calving areas to become larger in size, to change shape, and to "migrate" (about 16 miles in one case for 1977) (Fig. 3).

We believe that the following sequence of events probably describes what happened during the plotting of the data. First, the original calving concentration maps for 1972-1981 received by FWS from Roseneau (Fig. 3) were enlarged slightly and a base map was drawn, only slightly different from the originals provided. [Note the general similarity in style of the maps. The error of showing the Babbage River flowing directly into Mackenzie Bay rather than into Phillips Bay, the similarity of the representations of the Canning

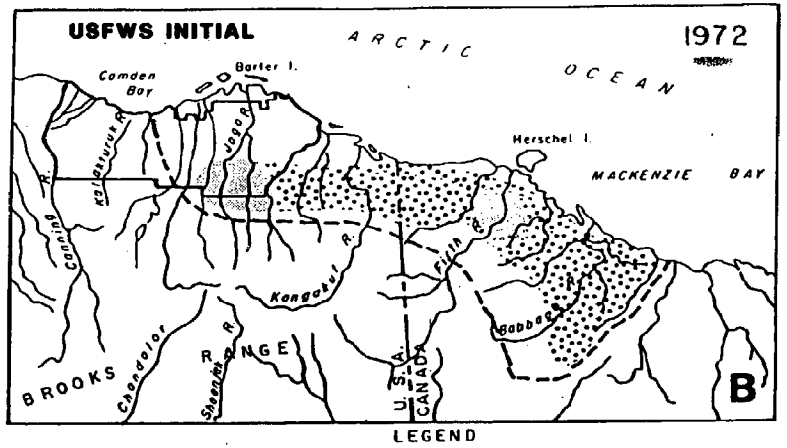


LEGEND

—— Boundary enclosing major calving activity.

---Boundary enclosing light scattered calving.

Area of major concentration of calving activity.



LEGEND

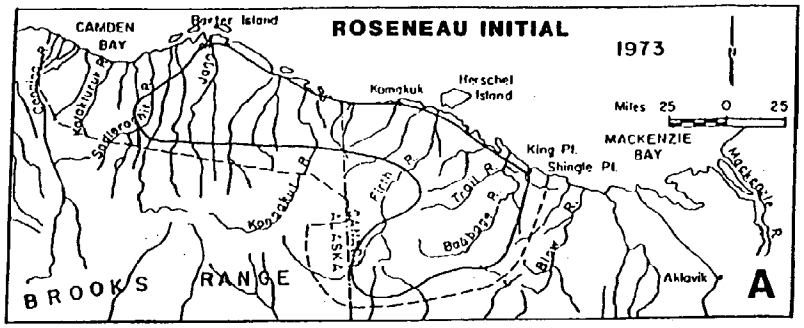
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3. Maps of distribution of calving caribou prepared by D.G. Roseneau (A) and by U.S. Fish and Wildlife Service (B) for 1972-1981. Data from 1972-1977 were collected by D.G. Roseneau, who also assembled the data for 1978-1981 from other sources. Because the original field data were lost in an office fire, the maps shown in panel A for each year are the only source of information on the location of calving caribou for 1972-1981. The USFWS apparently based maps in panel B on the originals in panel A by redrafting the map base and hand transferring the data; note that there are changes in shape and size of the areas shown in panel A compared with the original in panel A. Maps in panel B were apparently enlarged and entered into the USFWS computer data files, which in turn were the basis of the concentrated calving areas shown in Plate 2A of the draft report

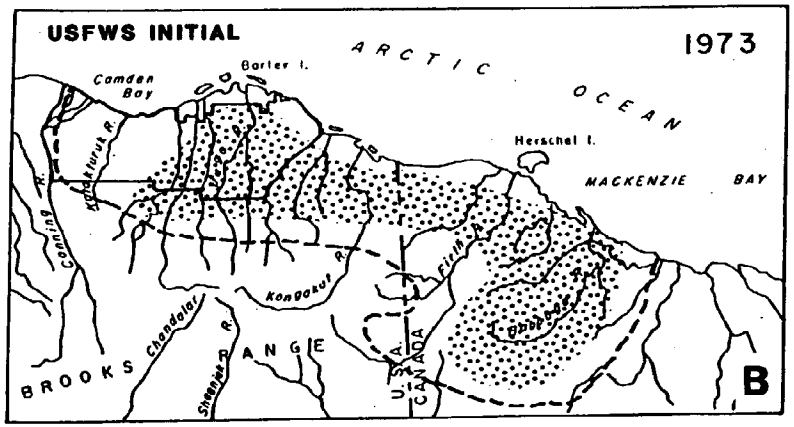


LEGEND

—— Boundary enclosing major calving activity.

---Boundary enclosing light scattered calving.

Area of major concentration of calving activity.



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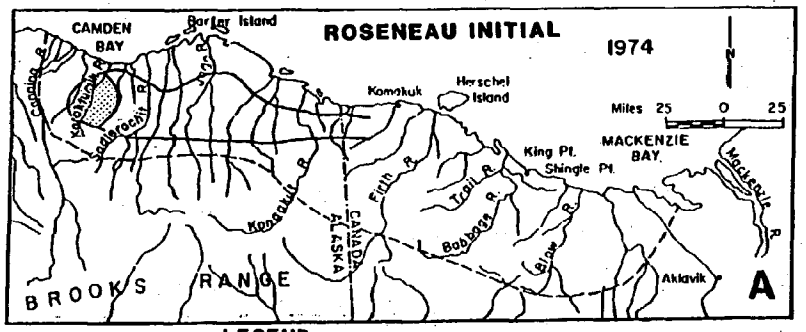
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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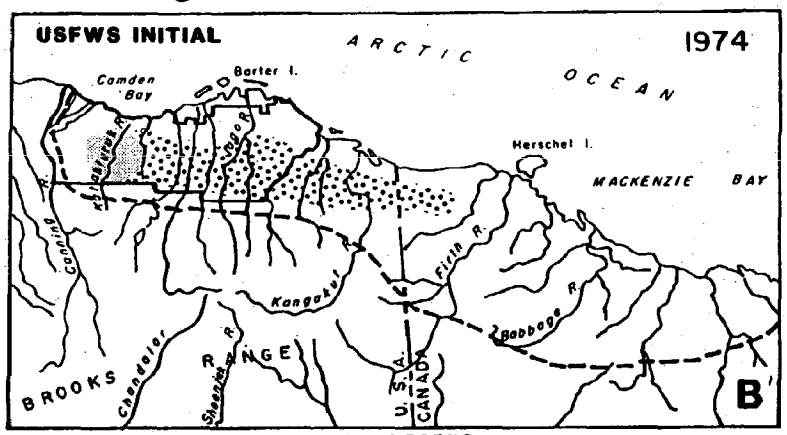
Area of major concentration of calving activity.



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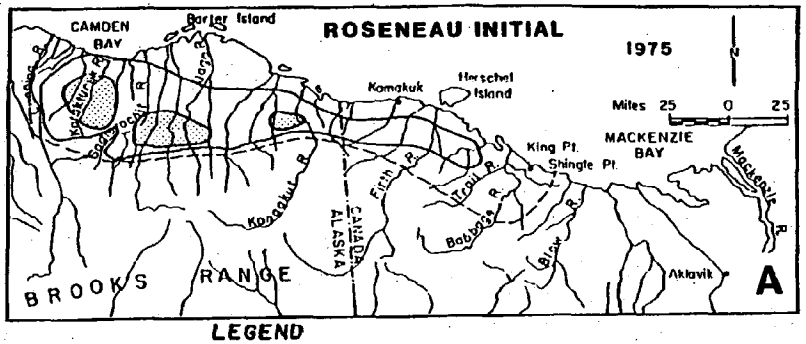
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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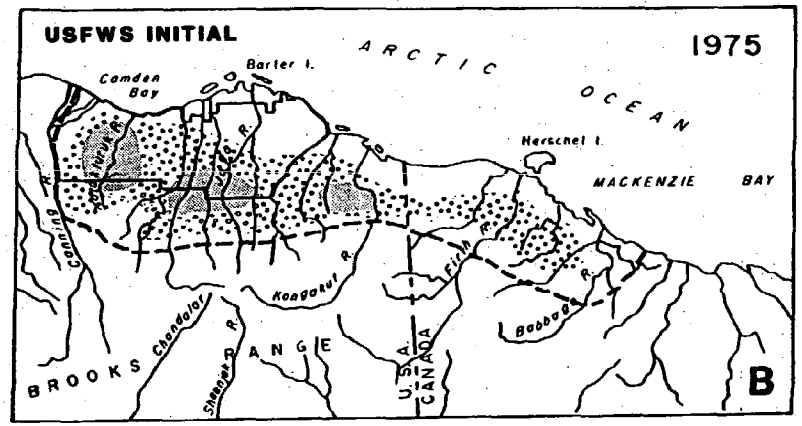
Area of major concentration of calving activity.



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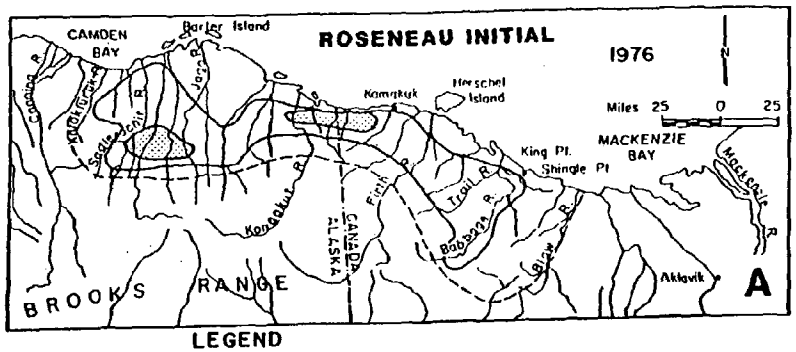
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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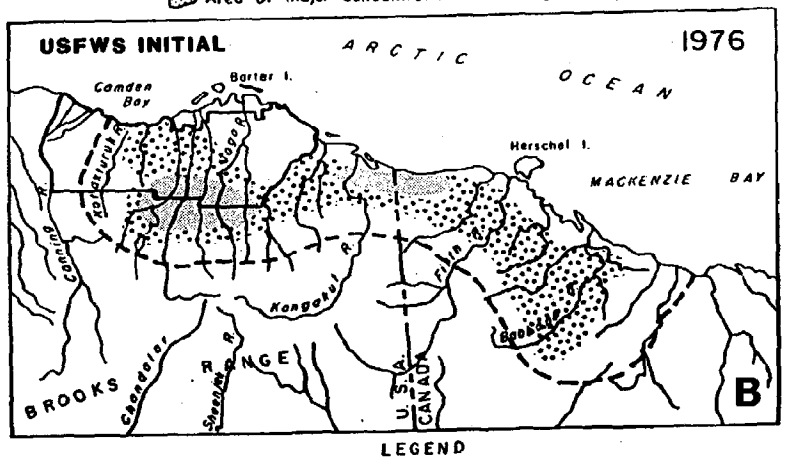
Area of major concentration of calving activity.



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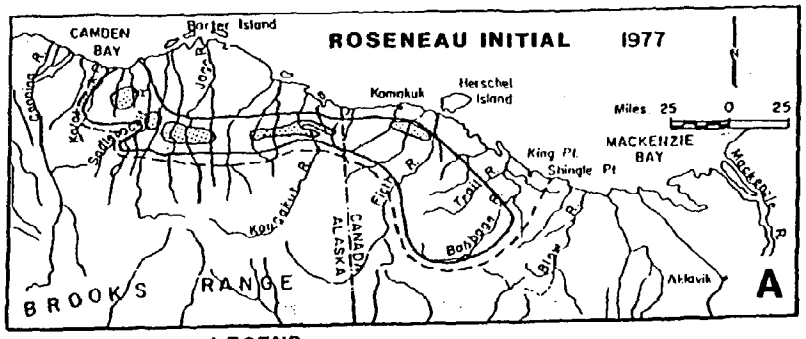
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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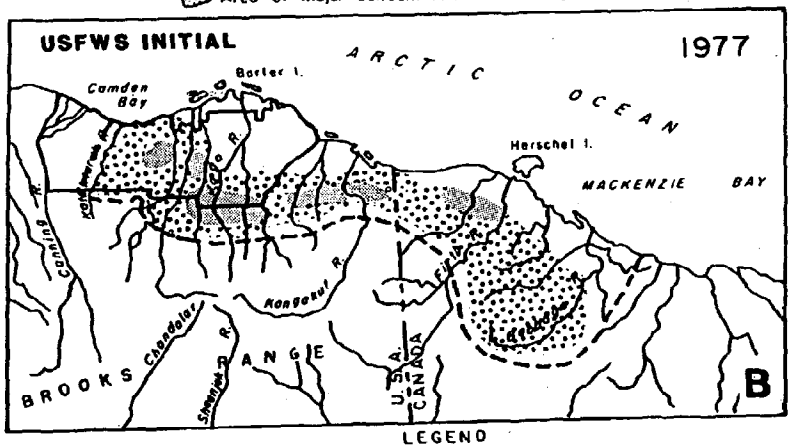
——Boundary enclosing major calving activity.

---Boundary enclosing light scattered calving.

Area of major concentration of calving activity.



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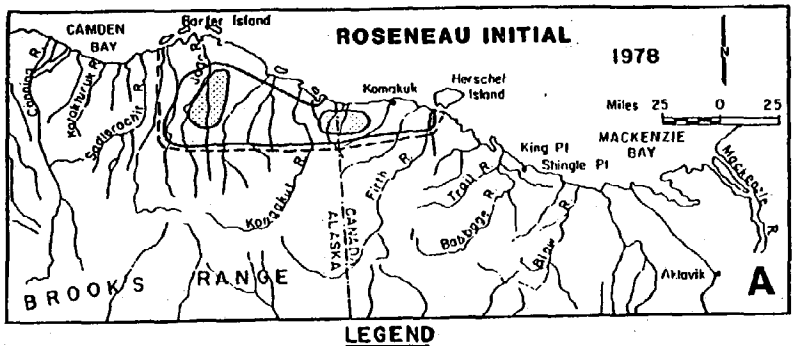
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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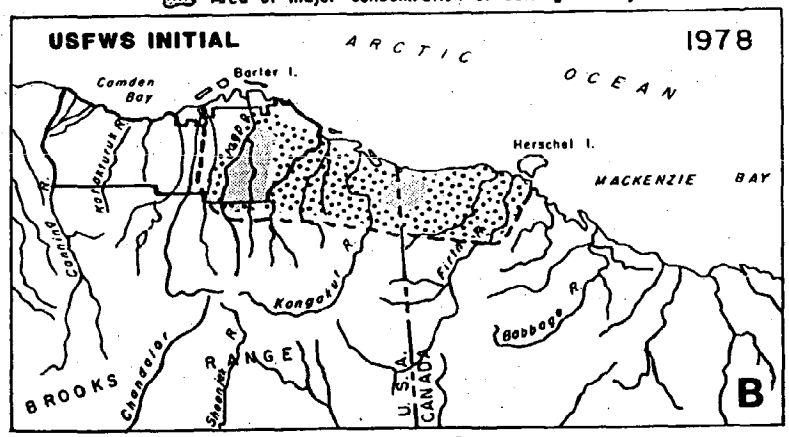
Area of major concentration of calving activity



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ANWR STUDY AREA

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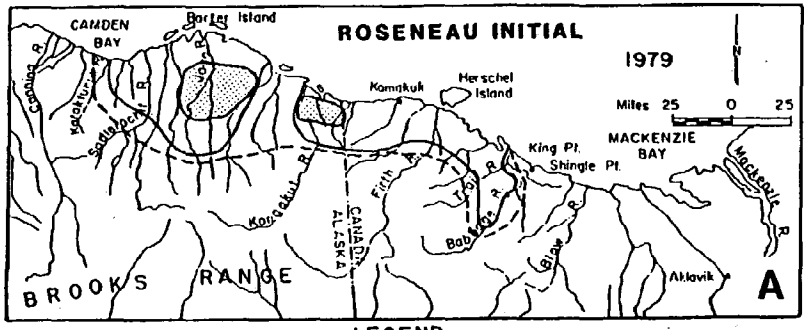
AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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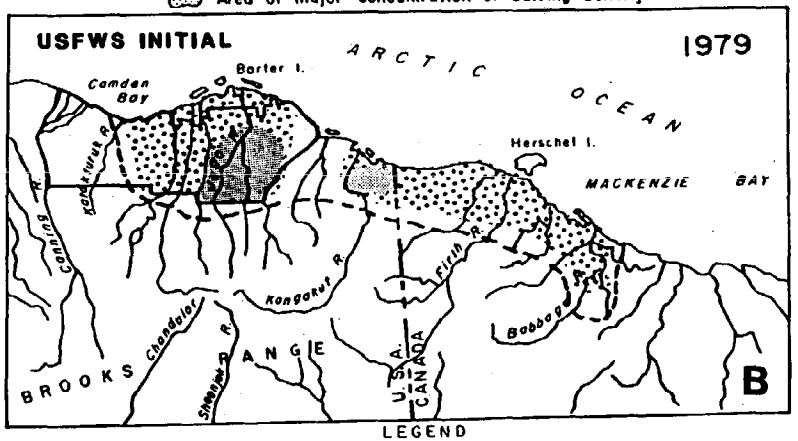
--- Boundary enclosing light scattered calving.

Area of major concentration of calving activity



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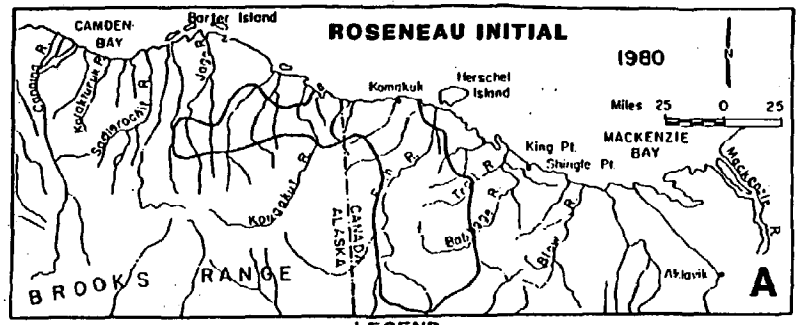
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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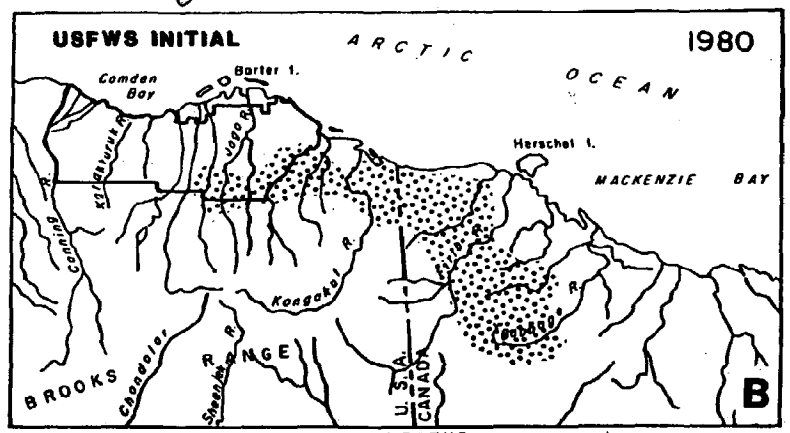
Area of major concentration of calving activity.



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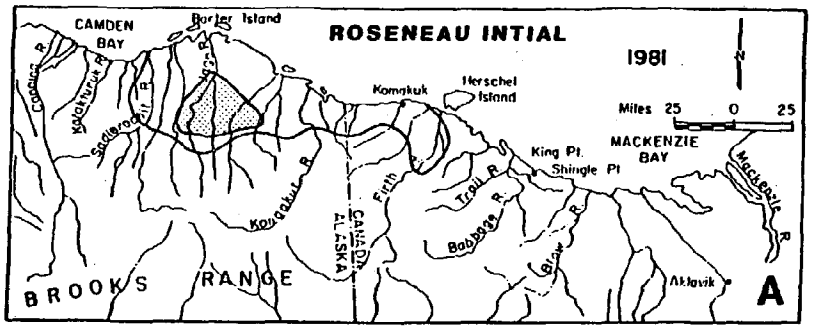
ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

MAJOR CALVING ACTIVITY

AREA OF MAJOR CONCENTRATION OF CALVING ACTIVITY

Figure 3 continued.



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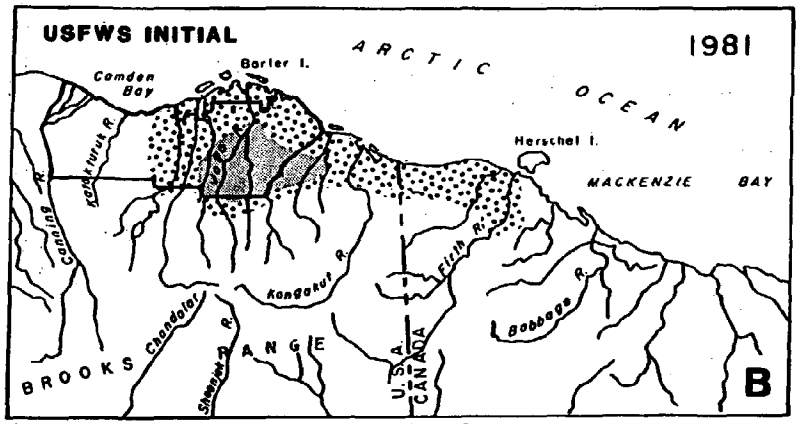

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ANWR STUDY AREA

BOUNDARY ENCLOSING LIGHT SCATTERED CALVING

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Figure 3 continued.

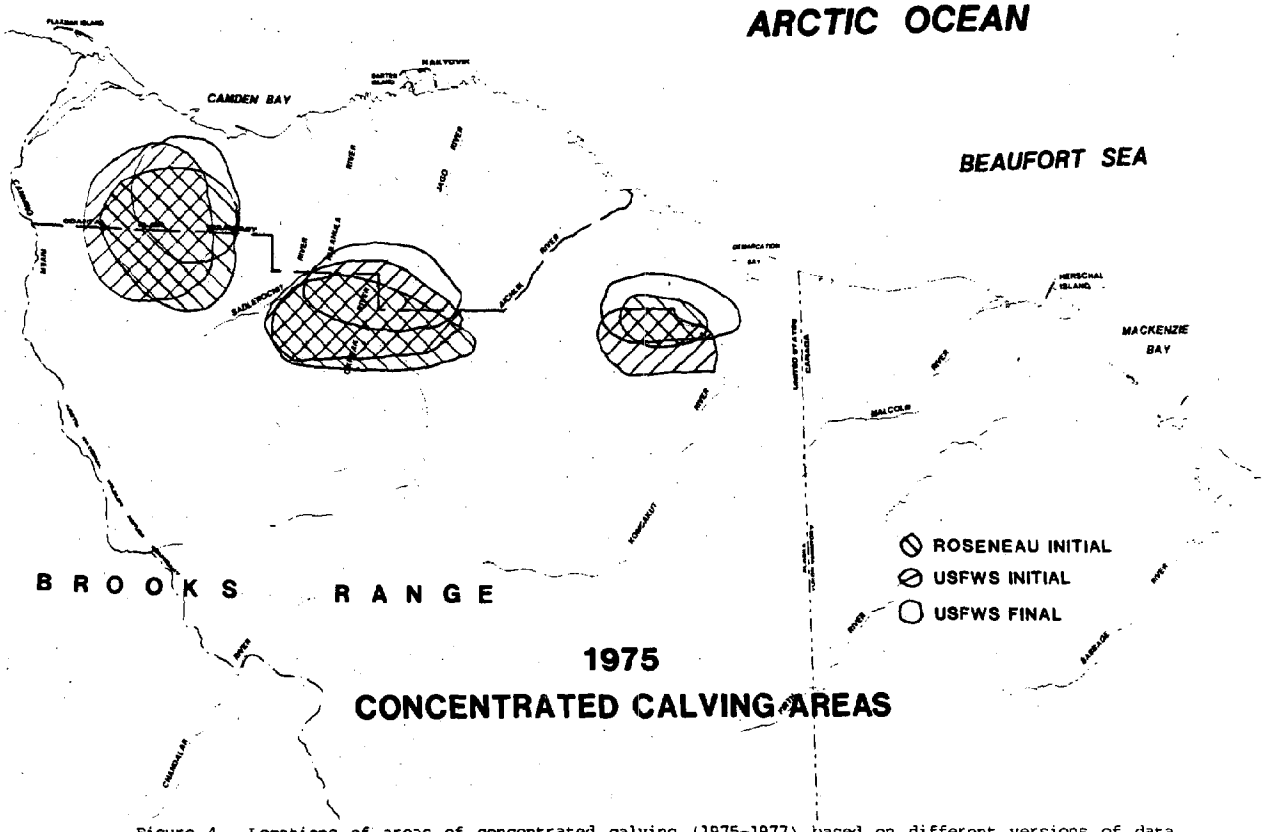
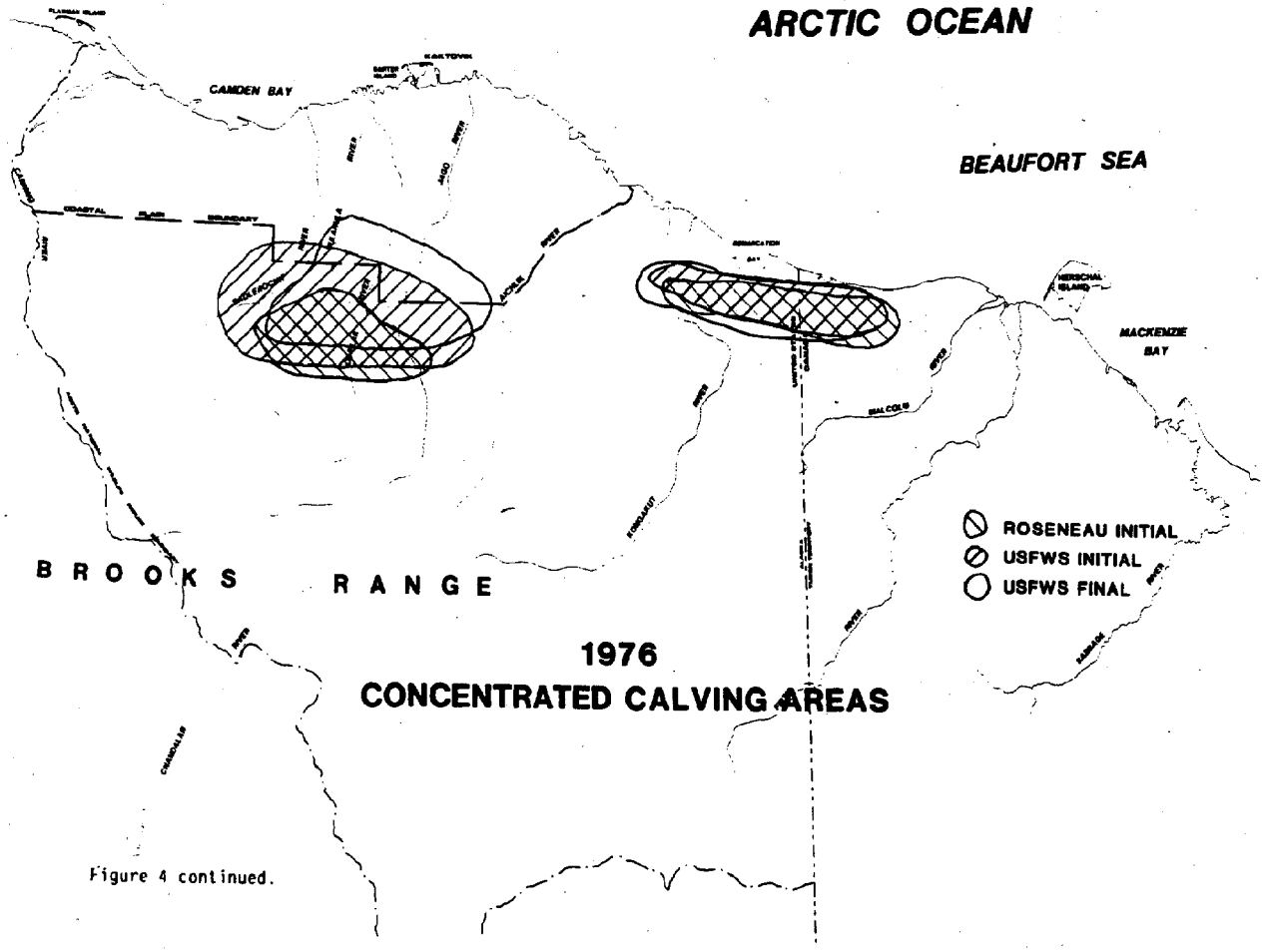


Figure 4. Locations of areas of concentrated calving (1975-1977) based on different versions of data provided by D.G. Roseneau. The data as shown in Figure 3 have been plotted, as have the data from the USFWS data files. Note the substantial differences between the locations derived from the original maps, compared with those from the Initial Baseline Report (USFWS 1982), and the final USFWS maps.

River delta, and other features suggest a common origin of these maps.] Second, the original data from the Roseneau maps were copied by hand onto the new bases (Fig. 3). A comparison of the two sets of maps will reveal several changes in depicted calving concentration areas, some of the changes large, others small, in all years. Some of the larger changes apparently occurred in the 1977 data. Third, the replotted data were apparently transferred to 1:250,000-scale maps, digitized, and entered into the FWS computer file. Finally, the information was replotted by computer to indicate the degree of overlap and to define the "core calving area" shown in Plate 2A. of the draft report.

With the assistance of D. G. Roseneau, Standard replotted the locations of calving concentration areas using Roseneau's original small-scale maps (Fig. 2). Mr. Roseneau made additional adjustments to make the representations more accurate. We believe that these maps are the most accurate representation of the calving concentrations for 1972-1981. The revised maps have been made available to FWS at a scale of 1:250,000.

The years 1975, 1976, and 1977 will serve to indicate the magnitude of the alterations that have crept into the draft report's analysis of locations of PCH calving concentration areas. Figure 4 shows three different representations of the same information: 1) an accurate transfer of data from the original maps (Fig. 3); 2) the version presented in the ANWR Initial Baseline Report (FWS 1982) (Fig. 3); and 3) the version from FWS computer files which formed the basis of Plate 2A in the draft report. It is clear that there are substantial differences between these three versions, and that there are significant problems associated with transferring data from very small-scale maps to larger-scale maps. The larger-scale maps (Plate 2A) cannot responsibly be used for any purpose other than to provide a general indication of areas that have received higher than average use by calving caribou in some years. It is inappropriate to state that these areas accurately represent locations where caribou were present in densities equal to or greater than 50 animals/square mile, or to designate a specific tract formed by composites of such areas as a special resource category with assumed site characteristics that are "unique and irreplaceable on a national basis".



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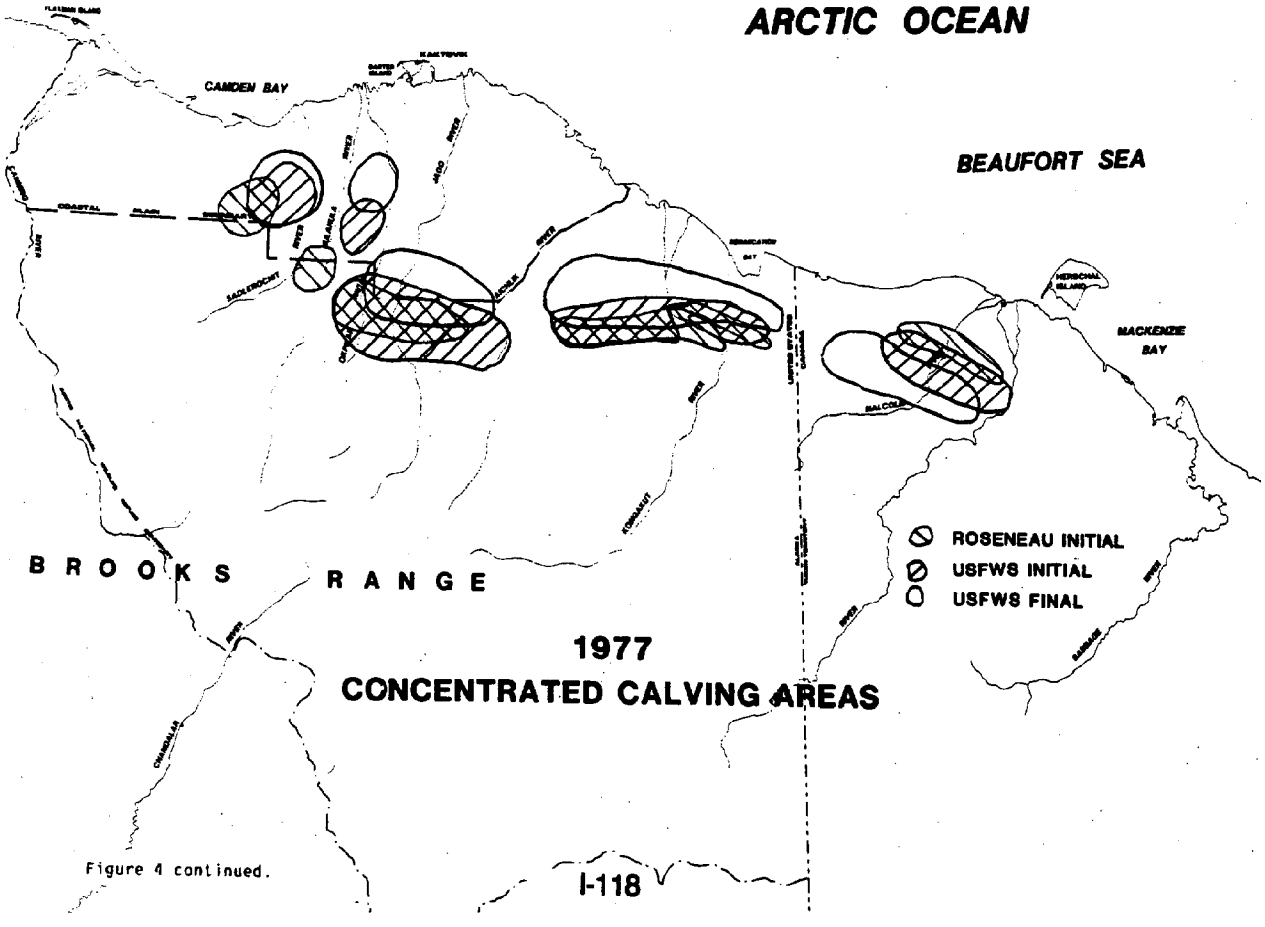

Figure 4 continued.

D. The question of insect harassment

The draft report emphasizes insect harassment and the importance of insect-relief habitat to caribou. The authors state that "The insect season is a period of extreme natural harassment and one of the primary driving forces in the annual caribou cycle" (p. 109, col. 1, par. 2).

We do not accept the latter assertion. Indeed, we believe that the preponderance of available evidence, while not conclusive, clearly indicates that insect harassment and the use of insect relief habitat are not primary driving forces in the annual cycle of caribou and do not exert a major influence on caribou aggregatory behavior or migratory movements. The following discussion of these points has been provided by D. G. Roseneau in response to our request for detailed information.

> "*Certainly harassment by insects*, including mosquitoes, oestrid flies and, in some areas, blackflies, has an effect on caribou. However, environmental factors, including insect harassment, are thought to be most important over the long term as evolutionary selective forces and over the short term as modifiers of daily behavior patterns, activities, and movements (e.g., Curatolo 1975)[1]. *Insect harassment clearly does modify* the day-to-day activity patterns, behavior, and movements of caribou, but it does not in itself serve as a primary driving force in the annual life cycle (i.e., insect harassment tends to operate on an intermittent, short-term, local level -- not at a higher level on the longer-term, larger-scale events making up the annual life cycle). Evidence that insects (especially mosquitoes) are the primary cause of post-calving caribou coming together in large aggregations just before beginning their post-calving migrations is weak. *Similarly, evidence that insects* (especially mosquitoes) actually cause migrations is weak. There is evidence that *insects may* aid in forming and maintaining aggregations, and also evidence that some insects (especially oestrid flies) play a role, possibly an important role, in encouraging caribou to disperse over their late summer ranges.
>
> "Large herds tend to be in near-constant motion and the annual cycle is characterized by periods of strong, forceful *movements* (e.g., spring, post-calving, fall, and early winter migrations) interspersed with periods of weaker, less directed movements (essentially pauses that include *times* of calving, formation of post-calving aggregations, August dispersal, and wintering). These annual movements are thought to be largely traditional in nature and largely functions of the species' gregarious habits and social behavior (e.g., Lent 1966, Curatolo 1975). Indeed, observation of the Porcupine caribou herd (PCH) suggests that this is likely (i.e., that major events, such as the actual coming together of large numbers of

post-calving caribou and migrations, occur regardless of the presence of insects and are therefore *more likely associated with the gregariousness* and social behavior of caribou than with short-term modifiers such as insects).

"In 1972, mosquitoes became very abundant on the Alaskan summer range of the PCH as far north as the Beaufort Sea coast as early as about 10 June (Roseneau et al. 1974). [1972 was the year of greatest insect abundance during the period from 1972 through 1977.] Despite an early emergence of insects (primarily mosquitoes) inland and numerous *warm, sunny days, the* herd made no concerted effort to vacate the foothill zone (contrary to assumptions that have been made suggesting that insects regularly 'drive' caribou out of inland zones). Instead, most animals stayed inland for about three weeks after insect emergence and two weeks after calving, slowly coalescing in larger and larger groups. By about 20 June larger aggregations were beginning to form, but these growing concentrations stayed inland until 30 June (Roseneau and Stern 1974). Then, within the next two days (i.e., by the evening of 2 July, well after insect harassment began inland) most groups moved rapidly to the coast near Camden Bay where they joined, forming one massive, classic post-calving aggregation. Within 24 hours (i.e., on 3 July), the post-calving migration was well underway. The animals moved rapidly eastward a few miles south of the coast (where insects were numerous) to as far east as Barter Island, and then turned southeastward (i.e., inland) toward the Aichilik River foothills, where not only mosquitoes, but also oestrids, tended to be even more abundant. *Over* 40,000 animals continued east through the foothills of the lower Kongakut and Clarence river drainages and entered Canada in about seven days (i.e., by the evening of 10 July). About 30,000 other animals left the foothills, entered the coastal lowlands east of the Kongakut River, reversed direction, and returned to the lower Jago River floodplain by the evening of 10 July. The animals that entered Canada traveled steadily through the British Mountains at about 10 miles per day, usually traveling at night, and during the day were intensely harassed by insects (both mosquitoes and oestrids). *During* the day, the migrating animals usually paused, hill-topping and obviously making use of locally available insect-relief habitat during mid-day (McCourt et al. 1974). Regardless of periods of on-going harassment by insects, these animals soon (on 21 July) crossed the headwaters of the Blow River, arriving in the upper Driftwood drainage (where insects, including oestrids, tend to be abundant) by the last few days of the month.

"The animals that returned to the Jago River were also harassed intensely by insects. Even so, as they turned back near Demarcation Bay, they did not move the short distance to the coastline where they could have actually found relief from insects along the beaches of the bay. As they traveled westward near the coast between the Turner and Jago rivers, they were attacked steadily by swarms of mosquitoes and nose bots, and most responded in classic fashion -- e.g., shaking heads, thrusting muzzles into water or mud, occasionally jumping. They did gain some relief from harassment by trotting steadily into a *westerly breeze*. However, as they continued moving, they did not shift their travel corridor to the actual coastline (often only 0.5-1.0 mile away) and thus bypassed many areas

(e.g., beach-bluffs, beaches and gravel spits, shore-fast ice) clearly affording better relief. [At one point, it can be added, the investigators gave up and walked about 0.5 mile to the coast to enjoy brief insect relief for themselves before attempting to rejoin the caribou farther inland.]

"The 'Jago group' remained in Alaska for about one month. Within a few days after reaching the river, the concentration broke into smaller groups of several hundred to several thousand individuals, and gradually dispersed along the coast between Camden and Demarcation bays. During the first two weeks while these groups paused near the coast, they often made use of the local shoreline in classic fashion for insect relief. Then some animals began drifting back into Canada both coastally and inland, while many others moved inland -- through areas still containing relatively large concentrations of insects -- to the uplands near Peter and Schrader lakes, where they made use of local hilltops for insect relief before also drifting eastward into Canada.

"In contrast to 1972, conditions in 1973 were considerably cooler on the PCH's summer range in Alaska (Roseneau et al. 1974), and insects were lower in abundance that summer than in most years during 1972-1977. The differences between 1972 and 1973 help provide insight into the question of insects driving major events in the caribou annual cycle such as post-calving aggregations and migrations. Mosquitoes began emerging inland during late June, and finally became noticeable on the coastal plain during the first few days of July (initial numbers were very low). Mosquito numbers remained relatively low both inland and near the coast as late as 8 July, and did not reach concentrations resembling those seen the previous year until about mid-July, after post-calving Porcupine caribou had left Alaska. Despite the general absence of insects both in the inland foothills and on the coastal plain, post-calving movements of caribou were nearly identical to the post-calving movements seen the previous year.

"Post-calving aggregations began coalescing in the southern lowlands by about 20 June. (Caribou were distributed broadly and were already utilizing lowland areas, and had been for some time, because snowcover had been light and, despite cooler conditions, had begun to disappear much earlier than during the previous year.) By 1 July, post-calving animals were moving rapidly north to the coast between Camden Bay and Barter Island, and most of them formed a massive, classic aggregation spreading several miles inland by the early morning of 3 July (Roseneau et al. 1974). A steady, forceful, eastward migration began almost immediately: it was underway by the late morning of 3 July. The animals paralleled the coast, staying within a narrow corridor about two miles inland, and vanguard elements arrived just south of Beaufort Lagoon by early morning on 4 July. By the next day at Beaufort Lagoon, the migrating animals began moving inland away from the insect-free zone toward the foothills of the Aichilik and Kongakut drainages, where mosquitoes were still relatively scarce on hilltops, but more abundant in the valley bottoms where oestrids were also present. A massive concentration of 72,000-87,000 animals moved through the lower valley of the Kongakut

River, pausing in valleys of the Clarence drainage during the evening of 8 July, and crossing into Canada on 9 July. These animals continued moving rapidly southeastward, away from the relatively insect-free coastal plain near the international boundary and into the warmer British Mountains, where insect concentrations were considerably greater. These caribou entered the relatively warm upper Driftwood drainage by 23 July and were exposed to substantial concentrations of insects (see Doll et al. 1974).

"Thus in both 1972 and 1973, regardless of notable differences in insect emergence dates and in insect abundance between the two summers, the Porcupine herd followed the same basic, traditional pattern of post-calving aggregation and migration. In 1972, the worse insect year, most post-calving caribou stayed inland, coalescing into increasingly large groups in the presence of large numbers of insects, then moved rapidly to the coast well after insects had emerged at the coast, aggregated briefly coastally, and then turned inland, traveling for many days through heavily insect-infested regions of Alaska and Canada, and making use of local insect-relief areas while continuing to migrate farther southeastward in Canada. (Animals that turned back west into Alaska and paused near the coast also made use of locally available insect-relief habitat before moving back eastward into Canada.) In contrast, in 1973 -- a relatively insect-free year -- large numbers of caribou began coalescing inland despite an absence of insects, moved rapidly to the coast well before insects had emerged at the coast, briefly formed large coastal aggregations as insects were just beginning to emerge, and migrated enmass inland into Canada, abandoning a broad, essentially insect-free zone in Alaska in exchange for a substantially insect-infested region of Canada."

[NOTE]

[1][Curatolo (1975) stated that caribou appear to have a relatively high tolerance to mosquitoes and that mosquito harassment acts as a modifier of ongoing caribou activity. He also believed that mosquitoes have very little effect on initiating (i.e., actually causing) post-calving migrations. However, he believed that oestrids do have a role in dispersing caribou during the August (late summer) dispersal.]

E. Importance of the coast as insect-relief habitat

The following discussion was prepared by D. G. Roseneau in response to our request for detailed information.

"The authors of the draft report emphasize the importance of the coastal fringe as insect-relief habitat (e.g, see Plate 2A), and state:

> 'A greater concern, relative to the location of potential barriers under the full leasing scenario, would be inhibiting movements for the large post-calving aggregations which annually occur on the 1002 area as they move between inland feeding areas and coastal insect-relief habitats' (p. 109, col. 1, par. 2).

"The importance of the coastal fringe as important insect-relief habitat, including implications that large numbers of post-calving caribou go to the coast regularly for the purpose of using it for relief from insects, as well as concerns that the Porcupine herd might somehow be placed in jeopardy if large aggregations were prevented from reaching insect-relief habitats, are over-emphasized and are not necessarily consistent with most data (see preceding discussion). PCH caribou typically make use of a wide variety of local habitat types for insect relief, including hilltops, river bars, river banks, and floodplains, in addition to the kinds of habitat afforded by the coastal fringe (e.g., coastal bluffs, beaches, barrier islands, shore-fast ice) as conditions warrant on summer range. In most years, large post-calving aggregations have spent very little time actually at the coast. Usually, large numbers of animals gather inland, move rapidly to the coast in a few days, and then, after briefly 'stacking up' at the coast, migrate rapidly away from it after only a few more days. [This was true even in 1972, one of the worst insect years on record.] Moreover, in years when post-calving migrations generally followed the coast, most of the animals remained one or two miles inland, generally ignoring the nearby beach-bluffs, beaches, spits, and remnant shore-fast areas affording better relief from insects (although some migrating animals have used these areas during short pauses in the eastward movement). [Examples of years when migrating caribou stayed inland from coastal insect-relief areas include 1972 (for initial movements only; see exception below), 1973, 1974, 1975, and 1979.] In at least two years, post-calving aggregations did not visit the coast at all (in 1976, when many smaller aggregations formed and stayed well inland along over 100 miles of the front of the Brooks Range and northern British Mountains, where insects were generally more numerous than in the coastal zone; and in 1981, when many smaller aggregations formed and stayed inland along the Sadlerochit and Romanzof mountains).

"[An exception to the above pattern occurred in 1972, when a large element of the cow-calf segment turned back near the international boundary after being joined by many newly arriving bulls (one possible reason for the turn-around). These animals, totalling about 30,000 individuals, returned to the Jago River, and then dispersed between Camden and Demarcation bays. While pausing near the coast for about two weeks, many of these animals did indeed seek relief from insects in coastal habitats.]

"In some recent years, large numbers of post-calving caribou have remained in Alaska somewhat longer and later than during previous years. [The first instance occurred in 1977 when post-calving animals remained between the Hulahula and Aichilik rivers until about late July.] However, even in several of these years, most animals visited the coast only for relatively short times. [The few exceptions have been years when elements of the herd have turned back west as in 1972. Examples include 1977 and 1983 (a year having some similarity to 1972).] In general, based on available information, it is doubtful that even relatively major (hypothetical) losses of coastal fringe habitats would prove to be of more than minor consequence to the Porcupine herd.

"It should be noted that the depiction of insect-relief habitat in Plate 2A is very general. Also, areas of insect-relief habitat include many of the river corridors between the Brooks Range and the Beaufort Sea; these are not shown. Not all areas that are perceived by humans to be potential insect-relief habitat are used by caribou to any great extent, and not all areas shown in the 'major insect-relief zone' of Plate 2.A are actually used by caribou."

F. The question of differences between herds

The following discussion was prepared by D. G. Roseneau in response to our request for detailed information.

"The authors indicate that caution must be used when drawing analogies between the Central Arctic herd (CAH) and the Porcupine caribou herd (PCH). We agree completely. However, the most relevant differences between the two herds involve relative herd sizes and contrasts in range geography. Other perceived differences (e.g., abilities to habituate) are likely to be of less importance. Both herd size and range geography are important considerations because they may have considerable bearing on how caribou respond to development on their ranges. As indicated in the draft report, the CAH is a relatively small herd ranging in summer north of the Brooks Range across a very broad coastal lowland and upland area extending many miles east and west. In contrast, the PCH is a very large herd ranging in summer across a much narrower coastal lowland and upland area between the Brooks Range and the Beaufort Sea. Large herds tend to undertake longer, more direct, and more forceful movements than those of small herds, and the generally widespread, weaker, and less forceful movements of the CAH must be taken into account when attempting to interpret responses to oil development, including reactions to physical structures and human activities. The much larger size of post-calving aggregations and the greater momentum and inertia of post-calving migrations of PCH animals may result in different levels of response to similar activities. These differences may not necessarily be adverse. For example, large migrating aggregations of PCH animals might be less hesitant when approaching structures, and might cross roads and pipelines more readily than has been seen near Prudhoe Bay (where information on interactions between the pipeline corridor and 'large' groups is still limited to observations of groups consisting of less than 1,000 animals; see Smith and Cameron 1985). Also, after lead animals in large groups cross potential barriers, remaining animals, including caribou in following groups, might tend to pay less attention to the perceived obstacles and continue moving along the established route with less hesitation. On the other hand, if the lead animals in large, forcefully migrating groups are deflected, it is possible that the groups might travel farther than would smaller groups of similarly deflected caribou. However, it should be understood that even very large deflections would not necessarily produce adverse effects on the caribou population."

G. Response of caribou to oilfield development

The draft report's analysis of potential effects of development on calving caribou are based primarily on conclusions attributed to a study comparing densities of caribou cows and calves before and after construction of an oilfield road on the Arctic Coastal Plain: "Dau and Cameron (1985), in what may be the most systematic study of caribou displacement by oil development, reported that maternal groups showed measurable declines in habitat use within approximately 2 miles on either side of the Milne Point road in the central Alaskan arctic" (p. 107, col. 2, par. 2). However, examination of the cited paper shows that Dau and Cameron (1985) did not refer to decreased habitat use within 2 miles of the Milne Point road, and that their study is so confounded by uncontrolled variables that it is quite impossible to make any conclusive interpretation of their results.

Figure 5 presents graphs from the Dau and Cameron paper showing the relationship between the square root of the density of all caribou and also of calves only, and distance from the road. The data points shown are the means of four years; no information about year-to-year variability is given. The data were collected by helicopter surveys conducted during the four years prior to road construction (1978-1981) and the four years following road construction (1982-1985). The intent, of course, was that the first four years' data would serve as a control against which to compare caribou distribution after the road was in place and development had begun.

Use of the square root transformation and of calculated regression lines (Fig. 5) gives the impression that caribou density was evenly distributed within 6 km of the alignment prior to construction of the road, but afterwards was low near the road and high away from it. If we take the graphs in Fig. 5 at face value, an effect relating to the presence of the road appears to continue out to at least 6 km. However, removing the square root transformation gives quite a different picture (Fig. 6). Examination of the non-transformed data leads to four observations:

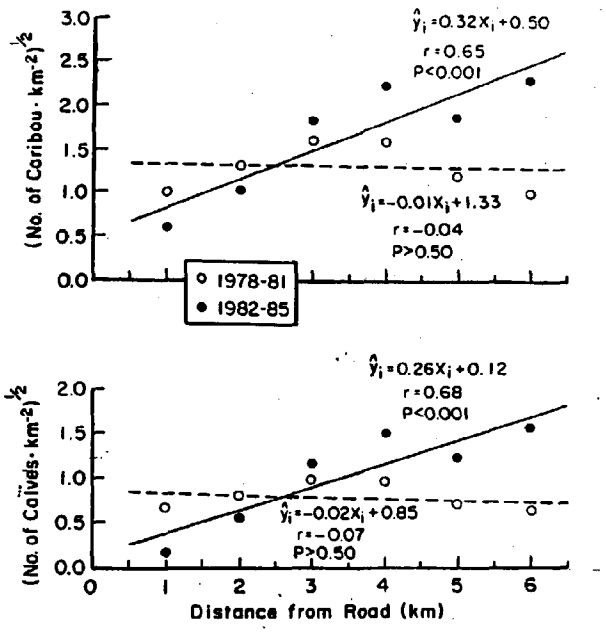

Figure 5. Graphs from Dau and Cameron (1985) showing relationship between the square root of the density of caribou to distance from the road leading to the Milne Point oilfield. Data from 1978-1981 were collected prior to construction of the road; data from 1982-1985 were collected after the road had been built. Note that the data points shown are square roots of the four-year means. Values for individual years have not been made available by the authors and consequently, the annual variability is unknown.

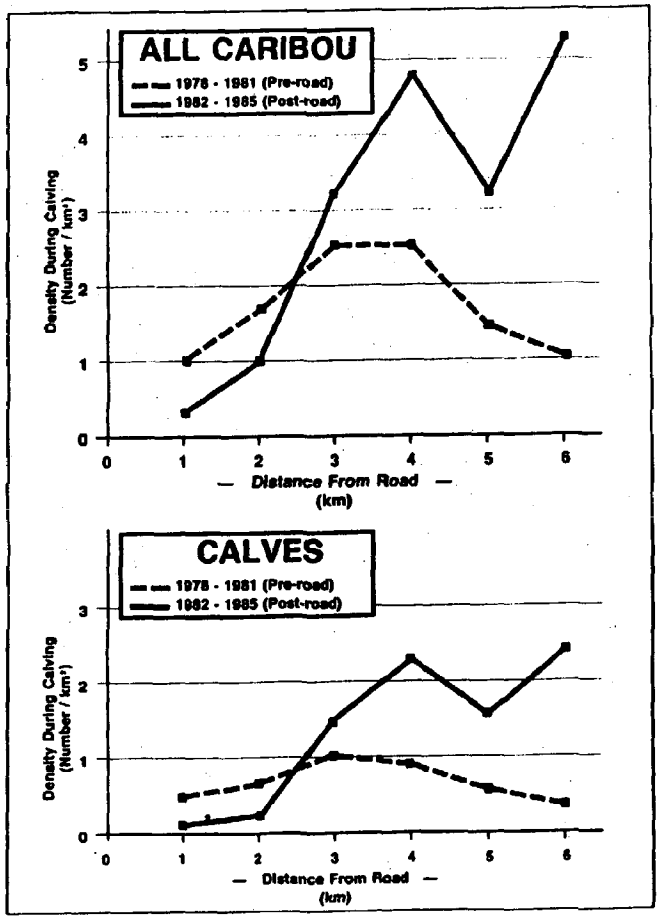

Figure 6. A replotting of the data in Figure 5 to show approximate actual values. Because the authors have not made the original data available, values were obtained by reading the square roots in Figure 5 and squaring them. Shown are the four-year means; variances are not known. [Note added in proof: R. Cameron, Alaska Department of Fish and Game, has provided the actual four-year means. They are not significantly different from those shown in Figure 6.]

1. In both four-year periods, the data from 1-3 km show the same trend, i.e. increasing density away from the road alignment. The fact that this trend existed both before and after the road was constructed suggests that some other factor (e.g., topography) may have influenced the distribution of caribou.

2. The densities shown for the 1-3 km interval are the four-year means; no information on year-to-year variability is given. Assuming that there was a normal amount of variability, it is almost certain that the data from both four-year periods overlap and are not statistically different.

3. The real differences in the data sets appear to be in the 4-6 km interval.

4. From inspection of the curves, it is apparent that there were roughly twice as many caribou in the study area (i.e., the 1-6 km zone) following road construction than before.

Finally there are two other factors that confound interpretation of the Dau and Cameron (1985) data. The authors apparently assumed that the density of calving caribou would be the same in both four-year periods. This implies an assumption on their part that 1) the population was constant in size, 2) that the distribution was essentially the same, and 3) that snowmelt and weather conditions were practically identical. In fact, the Central Arctic herd roughly trebled (i.e., from 5,000 to 15,000) in size during the period over which the study took place, and snowmelt and weather conditions differed between years, as did the distribution of calving caribou.

What explains the pattern seen in Figure 6? It is impossible to know. Dau and Cameron's (1985) study is too unclear to permit a conclusion to be drawn, and there is no scientific basis to conclude from their study that any displacement of caribou resulted from the road and associated activity. If the numbers out to 6 km are compared, it is clear that there were about twice as many caribou in the area after the road was constructed than there were

before. Clearly, it is inappropriate for the draft report to base predictions of potential caribou displacement from the "core calving area" on the Dau and Cameron study.

During the period 1981-1986 surveys of the calving distribution of the Central Arctic Herd have been conducted (RRCS, 1985; R.M. Jakimchuk 1986, pers. comm.). Figure 7 shows areas of major usuage by calving caribou. It is clear that although calving densities may be lower immediately adjacent to areas of active oilfield operations, caribou continue to calve in the region where they have traditionally done so.

The most important point is that whatever the exact response of the Central Arctic Herd to oilfield activities, the herd has grown rapidly. Clearly, and contrary to may earlier predictions, whatever the effect of oilfield activities on individual caribou, there have been no detectable population-level effects. The herd has more than quadrupled in size since development began in the early 1970s. Nor is this situation unique: several other herds are thriving in the presence of considerable human activity (Bergerud et al. 1984). The only effect of human activity that has clearly been capable of seriously lowering caribou numbers is direct mortality from excessive hunting.

[It should be recognized that traffic in the 1002 area will be appropriately controlled during periods when calving animals are present near oilfield developments, and that construction will be timed to avoid periods when calving and post-calving caribou are present.]

7. WATER AND GRAVEL AVAILABILITY

Throughout the 1002 draft Report there are numerous references to gravel and water shortages with the implication that there are no known means by which these resources can be obtained in quantities sufficient to support exploration and development operations. The Report overstates potential problems in both cases.

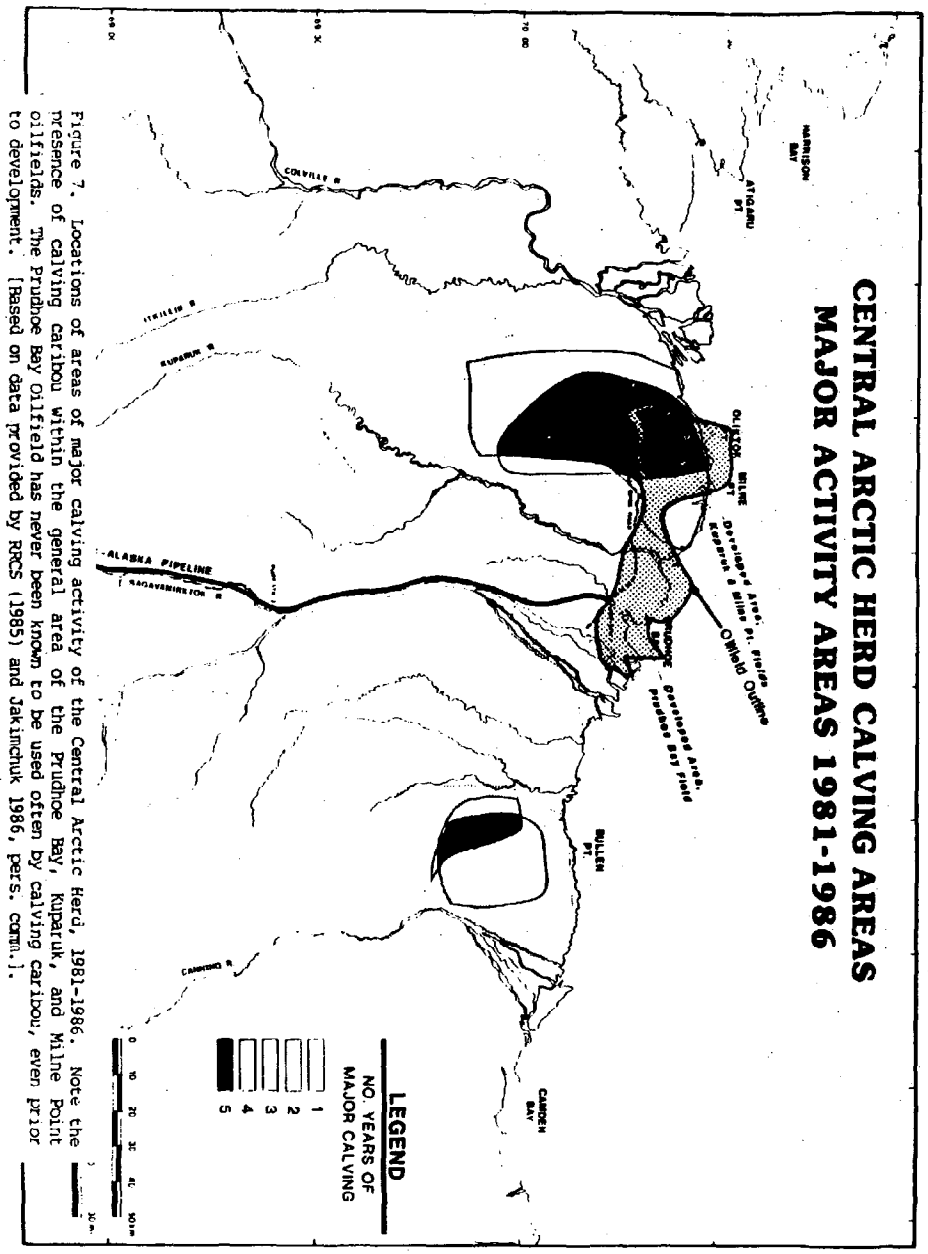

Figure 7. Locations of areas of major calving activity of the Central Arctic Herd, 1981-1986. Note the presence of calving caribou within the general area of the Prudhoe Bay, Kuparuk, and Milne Point oilfields. The Prudhoe Bay Oilfield has never been known to be used often by calving caribou, even prior to development. [Based on data provided by RRCS (1985) and Jakimchuk 1986, pers. comm.].

A. Water

Lack of readily available water resources is acknowledged, however its significance is repeatedly overemphasized. The availability of fresh water is not a problem unique to the 1002 area. Over 250 exploration wells have been drilled in the North Slope arctic desert. Methods developed to satisfy water requirements elsewhere in the arctic will be applicable to activities in ANWR. Just as water availability varies by location, solutions to providing water will have to be considered on a site by site basis. Examples of methods that will be contemplated include creating deep pools in river/stream beds, creating deep pools in lakes, desalination of sea water, erecting snow fences to trap snow which could be used with snow melters, insulating lakes to keep them from freezing to bottom, and the conversion of gravel extraction pits to reservoirs. Water availability will not limit industry's ability to operate in the region.

B. Gravel

With respect to the availability of gravel, the information in the document is actually contradictory. On page 20 the report acknowledges that "valleys of larger streams are underlain by the large quantities of coarse sand and gravel." The Executive Summary (page 6) states however that gravel is in very limited supply. Again on page 75, it is reported that specific sources of gravel have not been identified. On page 84, the Report reads: "The availability of adequate gravel supplies on the 1002 area is uncertain." Not only do these inconsistencies require correction, but also information gathered during past geophysical surveys needs to be evaluated and reported. Geophysical operators conducting the surveys were painfully aware during their two seasons of drilling all over the 1002 area that virtually the entire region is underlain in the very near surface (75' holes) with gravel. Drill logs containing this information were available to the government as were samples from all the holes.

It is logical that this area of the North Slope harbors significant gravel resources. The Brooks Range mountains are at their closest to the Beaufort

Sea and the shorter steeper gradient streams and rivers carry a significant load of gravel throughout their length. No river such as the Colville intercepts the north-trending drainage to deprive the coastal streams of discharge and gravel load. At Prudhoe Bay, further west, gravel resources have been more than adequate to sustain both onshore and nearshore petroleum development. The basic geomorphological setting, and recent geotechnical data from the Coastal Plain, clearly lead to the conclusion that there are available gravel resources. Gravel can be utilized without significant adverse environmental impacts and is more than adequate to support major petroleum development.

8. AIR AND WATER QUALITY

Existing oil and gas development at Prudhoe Bay and Kuparuk has not resulted in any significant impacts to air and/or water quality. The existing regulatory structure affords numerous opportunities for state and federal resource agencies, in addition to the issuing agency, to review projects and make recommendations for modifications and/or permit conditions and stipulations which minimize the potential for air and water quality impacts. The existing regulatory structure is sufficient to ensure similar protection for the environmental resources in ANWR. Prior to recommending any additional regulatory authorities, a careful review of the existing requirements should be conducted to identify potential gaps, if any, in coverage of environmental concerns. Any recommendation for new authorities should be specific to these identified gaps in coverage and not duplicate existing programs, since the existing regulatory framework already is duplicative and cumbersome. This perspective is supported in the following discussion.

A. Air quality

The discussion of air quality in the 1002 Report is brief and generally correct however a thorough analyses of the multitude of air quality data available from North Slope operations is not given. Air quality data on the Arctic Coastal Plain has been consistently good, always better than national standards even downwind of oil and gas development. Emission

sources can cause a localized increase in the ambient air quality above background levels at Prudhoe Bay and Kuparuk, however federal PSD review in conjunction with atmospheric dispersion modeling studies and aerometric monitoring programs indicate compliance. The diminimus impact of the relatively large development is below the regulated emission limits of the U.S. Environmental Protection Agency (EPA) and the Alaska Department of Environmental Conservation (ADEC). Regional air quality has not been degraded by the existing oil and gas development.

The primary source of air emissions from North Slope oil and gas production facilities results from the operation of natural gas-fired turbines and heaters. Since the fuel used by all permanent facilities is low sulfur natural gas, the emissions of sulfur dioxides are minor. The H_2S content of fuel gas as measured over the past 8 to 10 years has varied from 10 to 15 ppm resulting in extremely low SO_2 emissions which are well within the National Ambient Air Quality Standards (NAAQS) as well as the PSD Increments. Likewise, the emissions of TSP, CO and HC are also extremely low and well within NAAQS. The only criteria pollutants emitted in significant quantities from North Slope facilities are oxides of nitrogen.

The gas-fired turbines, most of which are in the 30 to 35 MHP range, produce the majority of the NO_2 emissions. Best Available Control Technology (BACT) limits were established at the New Source Performance Standard (NSPS) limit of 150 ppm NO_2 for gas-fired turbines during PSD permitting in the early 1980's. A variety of types of turbines operating on the North Slope have been compliance tested. These turbines have met permit limits and generally produce emissions well below the required limits (See Table 2).

Ambient air monitoring was conducted on the North Slope by the Prudhoe Bay Unit from April 1979 through March 1980 to determine the ambient air quality on the North Slope of Alaska when there was approximately 600 MHP of gas fired turbine capacity and 770 MMBTU/hour of gas fired heater duty

in operation. The results of this study are summarized in the Table 3. All measured ambient air quality levels were well below the applicable National Ambient Air Quality Standards (NAAQS).

Due to PSD - permitted increases in heater and turbine capacity, two one-year ambient air quality monitoring programs, developed in cooperation with the EPA Region X and the Alaska Department of Environmental Conservation (ADEC), were begun on the North Slope during 1986 to assess post construction ambient air impacts due to oil and gas production facilities. Both the Kuparuk River Unit (KRU) and the Prudhoe Bay Unit (PBU) instituted air monitoring programs to assess the air quality at each respective unit's maximum air quality impact location as well as a location representative of background air quality levels.

In the PBU the station placed at the maximum ground level impact receptor is directly downwind from a facility that operates thirteen 35 MHP gas-fired turbines, the largest single concentration of emission sources on the North Slope. Data acquired to date from this monitoring effort has not identified air emission levels even approaching NAAQS. Table 4 summarizes the preliminary data from the two ongoing monitoring programs.

In summary, there is sufficient air quality data demonstrating that oil and gas production activity on the north slope does not detrimentally affect arctic air quality and that north slope facilities are well within the NAAQS.

TABLE 2

Measured Turbine Emission Levels

At Prudhoe Bay, Alaska

Turbines	Capacity	Allowable NO_x Rate ppm (@15% O_2)	Allowable NO_x Rate lb/MMBtu	Actual NO_x Rate ppm (@15% O_2)	Actual NO_x Rate lb/MMBtu
Ruston-RB 2500	2.5 MHP	150	0.56	73	0.27
Ruston-RB 5000	4.9 MHP	153	0.57	83	0.31
GE-MS 5001	25.0 MHP	150	0.56	66	0.25
GE-MS 5001P	34.0 MHP	167	0.62	102	0.38
GE-MS 5002R	33.5 MHP	208	0.77	181	0.67
GE-M 5352	35.0 MHP	173	0.64	100	0.37
GE-M 3142(J)	14.6 MHP	162	0.60	121	0.45
Cooper Rolls - RB 211-24	29.1 MHP	205	0.76	146	0.54
Solar Mars	13.0 MHP	198	0.74	135	0.50
Solar Centaur	3.95 MHP	164	0.61	98	0.36
Sulzer	7.7 MHP	150	0.56	143	0.53

Table 3

Measured Pollutant Levels (ug/m^3)

At Prudhoe Bay, Alaska

from April 1979 through March 1980

Pollutant	Monitor Location: Drill Site 9	Monitor Location: Well Pad A	National Ambient Air Quality Standards: Primary	National Ambient Air Quality Standards: Secondary
Nitrogen Dioxide				
1 Hour Maximum	84.0	125.0	---	---
Annual Arith. Mean	3.5	4.0	100	100
Ozone				
1 Hour Maximum ++	113.0	113.0	235	235
Annual Arith. Mean	51.0	47.5	---	---
Carbon Monoxide				
1 Hour Maximum +	3430.0	3120.0	40,000	40,000
8 Hour Maximum +	946.0	856.0	10,000	10,000
Annual Arith. Mean	133.0	171.0	---	---
Sulfur Dioxide				
3 Hour Maximum +	13.0	25.3	---	1,300
24 Hour Maximum +	9.5	9.3	365	---
Annual Arith. Mean	0.4	0.5	80	---
Total Suspended Particulates				
24 Hour Maximum +	112.0	294.0	260	150
Annual Geo. Mean	6.7	11.4	75	60

Source: Radian Corporation, 1981.

\+ Not to be exceeded more than one per year.

++ Ozone standard is attained if the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is equal to or less than one.

Table 4
Ambient Air Monitoring Results
North Slope Alaska
1986

Prudhoe Bay Unit Ambient Air Monitoring Results

	October	November	December	First Quarter
Maximum Impact Site				
Central Compression Plant				
O_3 (ug/m^3)	49	54.9	51	51
NO_2 (ug/m^3)	15	13.2	15	15
SO_2 (ug/m^3)	7.9	7.9	7.9	7.9
Background Site				
Well Pad A				
O_3 (ug/m^3)	52.9	56.8	56.9	54.2
NO_2 (ug/m^3)	7.5	7.5	7.5	7.5

Kuparuk River Unit Ambient Air Monitoring Results

	July	August	September	First Quarter
Maximum Impact Site				
Kuparuk River Unit CPF-1				
O_3 (ug/m^3)	37	37	39	35
NO_2 (ug/m^3)	17	15	9	11
SO_2 (ug/m^3)	2.6	2.6	2.6	3
Background Site				
Kuparuk River Unit DS1-F				
O_3 (ug/m^3)	39	35	49	37
NO_2 (ug/m^3)	6	9	2	4

B. Water quality

The existing regulatory framework applicable to exploration and development activities provides for a comprehensive review of essentially all phases of every project and ensures adequate consideration of environmental concerns, especially those related to protection of water quality. For example, if one wanted to construct a gravel pad and reserve pit in a wet tundra area and drill a well on that pad, the following permits, authorizations, plans and approvals would be required before the construction could proceed (Note that this is not an exhaustive list of the potential requirements, but a sample of the types of permitting procedures typically required):

1.) Federal (U.S. Army Corps of Engineers)
Section 404 Discharge of Dredge or Fill to Waters of the U.S.

The Corps has asserted Section 404 jurisdiction over wet tundra (as "Waters of the U.S") since 1979. This section of the Clean Water Act requires that a Public Interest review be conducted including an evaluation of the project against the 404 (b)(1) guidelines promulgated by the EPA. These guidelines contain specific consideration of water quality concerns.

The Fish and Wildlife Coordination Act provides for the formal involvement of applicable federal resource agencies in reviewing and providing comment on federal actions such as the Corps' 404 permit. Therefore, at a minimum, the Fish and Wildlife Service, EPA and National Marine Fisheries Service are given the opportunity to provide comments and recommendations regarding this permit. In addition, the EPA has ultimate veto authority over Corps 404 actions.

If the project being permitted is determined to be "major", the National Environmental Policy Act (NEPA) may require the

preparation of an Environmental Impact Statement (EIS), such as was the case with the Endicott Development Project. (An oil field 20 miles northeast of Prudhoe Bay.)

2.) State (Alaska Department of Environmental Conservation)
Section 401 Water Quality Certification for the Section 404 Permit.

The State has formal review and approval authority for actions such as the Corps' 404 Permit described above. One mechanism is through the 401 Water Quality Certification process. The Corps' must receive 401 certification before the 404 permit can be issued. This process provides for consideration of the project in terms of its effect on State Water Quality Standards and contains a mechanism for issuing a conditional certification. That is, the State can affix stipulations regarding reserve pit construction and operation to the 401 certification to provide for protection of surface water quality.

3.) State (Division of Governmental Coordination [DGC])
Alaska Coastal Management Program (ACMP) Consistency Determination

The State recently developed new permitting procedures which provide for a comprehensive State review of projects involving a Federal and a State permit, or two or more State permits. These procedures provide formal involvement of the Departments of Natural Resources (DNR), Fish and Game (ADFG), and Environmental Conservation (ADEC). The Division of Governmental Coordination (DGC) within the Office of Management and Budget (OMB) acts as the coordinator for the State review process. Additionally, the new program regulations provide for formal involvement of the affected Coastal Management District, in this case the North Slope Borough (NSB).

The ACMP contains specific policies and procedures regarding the evaluation of the environmental effects of a given project. Alaska uses the mechanism of conditional consistency concurrences--a project may be deemed consistent if certain stipulations are incorporated. This provides an additional regulatory mechanism for the State to respond to environmental concerns regarding potential surface water impacts.

All of the above permits, reviews and mechanisms for affixing stipulations for a given project result basically from the one requirement for a 404 permit. This one regulatory requirement triggers two federal and two State review mechanisms and affords a comprehensive review of any potential surface water problems from the proposed project. In addition to this suite of requirements, the following are additional regulatory requirements for the same given project (Again, this is not an exhaustive list of the potential requirements):

4.) Federal (Bureau of Land Management [BLM])
Exploratory Drilling and/or Development Plan Approval
Permit to Drill, Deepen or Plug Back

The application requirements for these permits and plan approvals include the preparation of numerous plans describing how the construction of facilities will proceed, how various waste streams will be handled, how the site will be rehabilitated. Additionally, an oil Spill Prevention, Containment and Countermeasure (SPCC) Plan is prepared and submitted with the application. The SPCC plan addresses the environmental setting of the facility, potential sources of oil/hydrocarbon discharges, location and description of response equipment, preliminary restoration plans, handling of spill cleanup materials.

5.) State (DGC)
ACMP Consistency Determination

The BLM permits/approvals described above require an ACMP Consistency Determination. This program and its implementation were discussed previously.

6.) Federal (BLM)
Authorization for Disposal of Produced Water

Water produced from oil and gas wells must be disposed of in accordance with approved authorization from the BLM.

7.) State (DGC)
ACMP Consistency Determination

The BLM authorization described above requires an ACMP Consistency Determination. This program and its implementation were discussed previously.

8.) State (ADEC)
Solid Waste Disposal Permit

The State has produced new regulations tailored more specifically to the drilling fluids disposal issues than in the past. These new regulations are nearing promulgation and include consideration of the differences created by the presence of permafrost. The focus of the new regulations will be on efficient fluid management practices to reduce the volumes of water in the reserve pit. A more specific monitoring program will be required for the detection of potential seepage problems.

It must be recognized, however, that there are existing regulations requiring a Solid Waste Disposal Permit for a disposal site such as reserve pits. Although the new regulations are more specific regarding information requests pertinent to reserve pits, the existing regulations require substantial information submittals including, but not limited to, the following:

- Description of the proposed development and operating procedures and ways that water pollution will be controlled

- Evaluation of the site's leachate generation and water pollution potential based on waste quantity and type, site geology, hydrology, and other physical conditions

- Discretionary requirement for the determination of surface water quality near the proposed site.

Thus, reserve pits have been regulated in the past and are becoming subject to more specific requirements that are tailored to the special conditions required for reserve pits in permafrost areas.

9.) State (DGC)
ACMP Consistency Determination

The Solid Waste Disposal Permit, like the other State permits mentioned previously, would require an ACMP Consistency Determination that provides a mechanism for affixing additional stipulations and requirements on the construction and operation of the reserve pit. This determination would involve the Departments of Environmental Conservation, Natural Resources, and Fish and Game, the Division of Governmental Coordination and the North Slope Borough.

10.) Federal (EPA)
NPDES Permit for Wastewater Discharge to Surface Waters

The National Pollutant Discharge Elimination System is a permitting system for point source discharges of wastewater to surface waters of the U.S. This program is administered by the EPA.

11.) State (ADEC)

401 Water Quality Certification for the NPDES Permit

The State must issue a certification that the Federal permit would not violate the State Water Quality Standards.

12.) State (DGC)

ACMP Consistency Determination

The NPDES Permit and the State 401 Water Quality Certification mentioned above are both subject to the ACMP Consistency Determination requirements discussed previously.

13.) North Slope Borough (NSB)

Development Permit

The North Slope Borough's Land Management Regulations require a development permit for oil and gas activities.

In addition to the above listing of requisite permits and authorizations for the relatively simple example of a single drill pad, there are numerous programs, processes, methods and procedures that regulate other aspects of the construction/production of this facility. There will be the listing of environmental protection requirements that will be imposed as conditions for allowing the ANWR to be leased. Also, there will be the listing of environmental protection requirements that will be imposed as conditions of the lease sale ("Notice to Lessees"). Not mentioned specifically above are the state and federal environmental protection programs covering oil spills and hazardous substances control (Toxic Substances Control Act [TSCA], Comprehensive Environmental Response, Compensation and Liability Act [CERCLA], Hazardous Substances Control Act), the Migratory Bird Treaty Act, the Endangered Species Act, the Resource Conservation and Recovery Act (RCRA).

The simplified example of a single gravel drilling pad also does not include considerations for what it would take for permits and authorizations for the necessary gravel and water sources, and access to the pad. A thoughtful and careful analysis of the existing regulatory framework for oil and gas exploration and development activities should be undertaken prior to formulating any recommendations on additional regulatory authorities.

SPECIFIC COMMENTS

CHAPTER 1 - PURPOSE AND NEED FOR THIS REPORT

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INTRODUCTION

9 2 3 This paragraph discusses the recreational and aesthetic values of the Coastal Plain and implies that it is more "unique" than any other coastal area of the Arctic. The Coastal Plain does provide varied wildlife viewing scientific and recreational opportunities; but so do many other arctic areas. Care should be taken not to be so subjective as to classify the aesthetic value of this area "unique" without qualifying that every region along the coast is "unique" in its own right. The Coastal Plain figures prominently both as a possible source of major oil and gas supplies and as a means to assuage man's yearnings for the aesthetics of solitude, scenery and wildlife. (See comments on p. 45, c. 2, ¶ 5-6.)

This same paragraph mistakenly implies that the 1002 area is valued for it's threatened arctic peregrine falcon habitat. In fact it provides only minimal, and very poor habitat for the peregrine falcon.

10 1 1 2-3 The information available on both the resource potential of the region and the wildlife resources is extensive. The nature of the decision to be made obviously demands careful and

*NOTE: Comments are listed by page, column, paragraph, and line.

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dispassionate assessment of the knowledge gained from six years of concentrated study. It is our opinion that even though the caribou sections need reworking (see our general comments) this is an adequate document on which to judge the issue of leasing.

BASELINE STUDY OF FISH AND WILDLIFE RESOURCES

11 1 3 It would be more accurate to describe the baseline work performed by the Fish and Wildlife Service (FWS) as inventories rather than studies. These inventories provided an extensive basis for what we believe to be a thorough, and for the most part, a reasonable description of the coastal plain ecosystem and assessment of scenarios of development. To do the impact analyses, FWS has necessarily drawn from many scientific and technological studies carried out elsewhere in the arctic, as recognized by the bibliography. In a few areas, however, conclusions are based on one or two studies that have not been critically reviewed when other studies, some peer-reviewed and published, were available. This is of particular concern with respect to the caribou impact analysis. Very significant decisions regarding the leasing of ANWR will be based on this report. It is imperative that FWS critically examine all the relevant information on which their impact analyses are based, and where appropriate, modify their predictions of environmental consequences.

See both our general and specific comments on caribou. We strongly believe that there is sufficient justification, based on the less-than-scientific nature of some assumptions and the less than critical examination of some of the research cited, for FWS to rewrite the sections dealing with caribou.

STANDARD FOR ENVIRONMENTAL PROTECTION

12 2 We fully support the concepts of avoiding and minimizing environmental impacts to the greatest extent possible which are

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embodied by the FWS Mitigation Policy. The Mitigation Policy as a whole, however, is not an effective standard for protection of wildlife in the arctic. The foundation of the FWS Mitigation Policy is the management of habitat as a means of protecting and managing the productivity of fish and wildlife populations. It is inappropriate to use a habitat-based system to manage a population when habitat availability has not been shown to be a mechanism by which that population is regulated. The policy is particularly inappropriate in the arctic where habitat has not been shown to be a limiting factor for most species, and this is particularly true with respect to caribou.

The only biologically effective approach to assessing and mitigating effects of development on wildlife is, first, to determine systematically how project activities and structures will alter population-limiting factors for each species of concern, and second, to apply mitigative measures that avoid or offset project effects on those limiting factors. If an automatically applied habitat-based approach happen to be effective for a species, this is because one or more population-limiting factors happens to involve habitat, not because there is anything uniquely important about the quantity of real estate available, per se. (see our general comments for a more complete discussion.)

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12 2 1-
13 1 2 In addition to identifying the FWS Mitigation Policy as the standard for impact analyses and mitigation recommendations, this section simply lists some of the major State and Federal regulations that would apply to exploration, development and production. The list should be much more extensive so that the reader has a clear understanding of the degree to which environmental protection is already guaranteed. Our general comments on water quality discuss some of the incredible number

of comprehensive regulatory programs governing oil and gas operations.

To assess adequately the potential environmental effects of leasing in the 1002 area (and necessary mitigation measures), it is essential that the report review, in detail, the regulatory framework and related permitting programs that regulate oil and gas activities. A legal analysis should be completed to determine which, if any, environmental concerns are not addressed by existing laws and regulations. This analysis should be incorporated in the evaluation of environmental consequences. At a minimum, such a review should include:

1. major permitting programs for each stage of petroleum development;

2. environmental protection measures built into those programs;

3. the authority of regulatory agencies to regulate oil and gas development to ensure environmental protection; and

4. the regulatory management schemes and experience of oil and gas activities in other wildlife refuges (e.g. Kenai National Wildlife Refuge).

Although the report states that the existing regulatory mechanisms are incorporated in the evaluation of potential environmental consequences, the worst-case predictions imply the contrary, i.e. a regulatory vacuum. It is essential for the reader and for the writers of the draft LEIS to appreciate how the regulatory framework works, especially on the North Slope of Alaska, in order to understand the environmental safeguards already provided. This would also eliminate the need for many of the proposed mitigation recommendations that

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duplicate either standard engineering practice or that are included as standard permit stipulations under existing regulatory programs.

[It is worth noting that OCS Lease Sale Environmental Impact Statements explicitly assume the safeguards of the existing regulatory framework in impact projections. Thus the need for any additional stipulations are more easily assessed and justified.]

ADDENDUM

13 bottom — It will be important in the Final LEIS to address the conveyance of approximately 20,000 acres to the Kaktovik Inupiat Corporation (KIC). Subsequent ANWR boundary changes will have to be reflected on reference maps. The importance of the exchange to the KIC shareholders and area residents should also be addressed.

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CHAPTER II - EXISTING ENVIRONMENT

PHYSICAL GEOGRAPHY AND PROCESSES

15 2 3 1 — An oil seep has also been identified at Brownlow Point.

17 1 1 6 — Are there not data available from Deadhorse?

19 1 2 4 — typo: unusually

20 2 4 — We concur that there are numerous sources of gravel in large quantities. The extensive gravel finds discovered during the two winters of geophysical exploration should also be discussed.

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WATER RESOURCES

21 1 3 1 — Since this draft report makes an issue of limited water resources, a map indicating the location of major water sources, including any depth or flow information should be made available and included in this section or an appendix.

22 1 2 2 — The word "must" should be changed to "may" as there are several different methods which can be used to obtain water in ANWR without having to rely solely on marine waters. The sentence should read: "...the adjacent marine waters may be viewed as a water source."

22 1 3-4 — Following is a new paragraph we suggest adding to the end of the section on Water Resources and before "Erosion and Mass Movement":

Although naturally occurring sources of fresh water for exploration and developmental use are scarce in the 1002 area, this is true throughout the North Slope. Methods by which water has been successfully extracted include:

(1) Excavating deep pools in river and stream beds;
(2) Excavating deep pools in lakes;
(3) Insulation of ponds to prevent freezing;
(4) Desalination of sea water;
(5) Erecting snow fences to trap snow which could be used with snow melters;
(6) Converting gravel extraction pits to reservoirs.

23 1 3-6 — This section on air quality is well written. It would be beneficial, however to clarify that all emission sources on the North Slope hold valid air permits from State and Federal agencies and are complying with emission limitations and ambient air quality standards. In fact, emissions fall well

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				below the limits set by EPA and ADEC. Air quality on the Arctic Coastal Plain is consistently good.
				BIOLOGICAL ENVIRONMENT
				VEGETATION
23	2	4	1-8	Thlaspi arcticum (arctic pennycress) has been under review for official designation as a threatened or endangered plant species since Murray (1980) first listed it. As a consequence, virtually every North Slope EIS produced since that time has conscientiously accorded it a token paragraph, although the species has never been legally protected. There has been no case that we are aware of in which arctic pennycress has been suggested to be threatened by development. Having reviewed the status of this species for the past six years, FWS should be in a position to (1) make a decision as to whether the species will or will not be legally protected by official designation as threatened or endangered, along with appropriate justification; and (2) provide a map showing its distribution at proper scale and in sufficient detail to assist decisions regarding potential development. What are the "Thlaspi arcticum stations" shown in Plate 1A? Do these represent specific areas where the species is known to occur? What legal status is proposed for these "stations"? Will development be prevented there even if the species in question is not legally protected? Please provide clear and explicit explanations on these matters.
25	2	2	14-18	This sentence is misleading. The way in which the sentence is constructed, implies that unvegetated floodplain islands differ from vegetated islands in that the latter have developed soils. This is sometimes true, but vegetated islands in early successional stages often have no developed soils and are

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				identical to unvegetated islands with respect to substrate composition.
25	2	2	21-22	As an extension of the previous comment we suggest changing the beginning of the sentence to: "Soils, when present, consist of...."
26	1	6	5	Remove final s from "soils".
26	2	4	21	Should "macro-invertebrates" be "micro-invertebrates"?
27	1	1	5-7	The boundaries of the Sadlerochit Spring Special Area shown in Plate 1A do not conform with the text description and appear to exaggerate the size of the Special Area. Because exploration activities are prohibited on a site-specific basis, the site boundaries should be clearly portrayed for the reader. A detailed and accurate map of the Sadlerochit Spring Special Area, either USGS topographic or photo-based, should be provided at 1:63,360 or other appropriate scale.
27	2	2		The list of International Treaties should be amended to include the recently initialed "Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd".
				CARIBOU
27	2	5		The information on herd size needs to be put in perspective. We suggest including the following: The Porcupine Caribou Herd (PCH) is currently the sixth largest herd in North America. It is surpassed in size by five other herds which are also increasing in size: The Western Arctic Herd (Alaska - now about 220,000-240,000), the George River Herd (Canada - about 600,000 in 1984), the Kaminuriak Herd (Canada - about 320,000), the Beverly Herd (Canada - about 285,000 in 1984) and the

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				Bathurst Herd (Canada - about 385,000 in 1984). [See Williams and Heard 1986, Heard and Calef 1986]
28	1	1	1-4	There will always be some degree of uncertainty in estimating the size of any population of wild animals. Sufficient data are available, however, to show that the difference between the population estimate from the early 1970s (approx. 100,000) and the current estimate (180,000) reflects population growth and not simply improved (or different) estimation techniques.
28	1	3		The Porcupine herd calves in many locations which vary from year to year within its international calving grounds. Areas in the general vicinity of the Jago River are indeed used for calving by some Porcupine caribou in most years, along with many other areas inside and outside the 1002 area boundaries. However, no comparative information is given for other calving areas throughout the remainder of the large international calving range. Reporting only calving concentrations within the 1002 boundaries while not showing the other areas used for calving in Alaska and Canada, and calling it "the core calving area", creates a false impression that this particular location is consistently used by the vast majority of parturient cows in the herd and is somehow much more important than other calving areas. The term "core calving area" should not be used to describe what is simply one of many annually varying calving concentration areas. The discussion should be revised and expanded to provide a more accurate perspective. [See "core calving area" discussion in General Comments.]
				It is not apparent that concentrated calving areas were in fact defined objectively as having a minimum of 50 caribou/sq. mi. Actual supporting data must be made available if the stated definition (50 caribou/sq. mi. in 5 or more of 14 years) is to be applied.

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28	2	1	2-3	"Most caribou migrate to reach the calving grounds of the 1002 area from Canada..." misleadingly implies that the majority of the Porcupine herd migrates to the 1002 area expressly to reach calving grounds located there. The statement should be revised to read: "Most caribou calving within the 1002 area migrate there from Canada...."
28	2	2		Snow ablation is the key term here, and should not be confused with "early" and "late" springs (which imply warmer and colder temperatures than average). For example, during the winter of 1971-1972 snowfall was heavy and in the spring of 1972 PCH calving took place inland in the foothill zone in spite of a very warm, early spring. The deep snow cover found across the lowlands initially restricted the caribou to inland areas. Even after the snow disappeared, the caribou remained inland and did not move to the Coastal Plain to calve. In contrast, snowfall was quite light during the winter of 1972-1973, and in the spring of 1973 calving was widely dispersed throughout both the inland uplands and northern coastal lowlands in spite of a much cooler, later spring. The shallow snowcover found in the lowlands did not initially restrict the caribou, and was soon gone in spite of the much cooler weather.
28	2	3		It is significant that the estimates of cows calving in various areas are extrapolations from relocation of radio-collared cows. Given the findings of Cameron et al. (1985) that at least 30%, and preferably 50%, coverage is needed during line-transect counts of animals to reduce sampling errors to reasonable levels, extrapolations based on only a few dozen radio-tagged cows may be highly inaccurate. It is an untested assumption that the radio-collared animals are evenly distributed throughout the PCH each year; they were not evenly distributed at the time of the original tagging. These extrapolations should be supported by other survey data, or

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				more information on ranges and variances should be provided. The use of such gross extrapolations is potentially misleading.
28	2	4		The comment about disturbance of cow-calf pairs within the first 24 hours of the calves' lives is more appropriate to the Environmental Consequences section.
29	1	1-2		These two paragraphs are somewhat contradictory in that paragraph 1 states that "post-calving movements show considerable annual variation", while paragraph 2 states that "The calving/post-calving area is an important identifiable habitat that has been used repeatedly...".
29	1	2		The calving/post-calving area is important, and is relatively small compared to the herd's range, but it also includes more than just the 1002 area and use within it has varied considerably over the years. It should be stated that approximately 1/3 of the calving/post-calving area falls within the 1002 boundaries. Without this clarification, the draft report infers that the 1002 area alone is the "important, identifiable habitat" referred to here.
29	1	3		The importance of insect-relief habitat is overemphasized. Post-calving PCH animals have formed dense aggregations regardless of the presence of insects. It is true that caribou respond to insects and seek relief from insects (and get it in a variety of habitat types), but data on movements of post-calving caribou to and from the coast do not always correlate with the presence of insects. It is true that movement to the coast is often rapid. If caribou are forced there by insects, however, and the purpose of their going is solely to seek relief from harassment by insects, they apparently have an ability to store up enough "relief" within just a few days to last them for several weeks. They often leave potential insect-relief areas along the coastal plain

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				after only one or two days. They then migrate inland to an area, which is often considerably more insect-infested. If remnant groups are left, or migrating elements of the herd reverse direction for some reason, these groups then often do use coastal insect-relief habitat. (D.G. Roseneau, 1987, pers. comm.)
29	1	4		It is very unlikely that access to insect-relief areas is "critical" to productivity. If it were, one questions whether many caribou would be present today. It is true that in most years the post-calving caribou leave Section 1002 lands and ANWR by mid-July. This migration has occurred in years when insects have been very abundant and in years when insects have been nearly absent. In several years, (e.g. 1972, 1973, 1974, 1975 and 1979) the caribou have left relatively insect-free coastal areas for more heavily insect-infested zones in the British Mountains and northeastern Old Crow Flats. In at least 2 years (1976, 1981), post-calving aggregations did not visit the coast at all, but remained well inland.
29	1	5		The Governments of Canada and the United States have recently initialed a joint agreement on the conservation of the PCH, that will have direct implications on activities in ANWR. As a practical matter, this agreement will carry great political weight on PCH issues. It is important that the Department of the Interior fully evaluate the legal obligations and authorities established by this Agreement in the Final LEIS. The implementation of the conservation section of the Agreement should be fully explained in light of both current U.S. laws and regulations protecting the species, and specific stipulations proposed in the draft LEIS for the 1002 area. In particular the authority and function of the newly created advisory board needs to be described in detail. Additionally, Chapter VI, Environmental Consequences, should be revised to reflect the protection afforded the caribou by the Agreement.

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29	1	6		This paragraph presents conflicting harvest statistics without explanation. it is suggested that the total annual harvest is 200-1000 at Arctic village, 25-75 at Kaktovik, plus an average of 1700 from Canada. Taking the larger figures, one obtains a total of 2775. However, LeBlond (1978) is cited as estimating an annual harvest of 3,000-5,000. These figures should be reconciled. It should also be noted that Kaktovik residents believe harvest and herd size will not be affected by leasing or its associated exploration and production, provided existing environmental regulations and practices remain in effect.
29	2	1	1-2	More recent estimates put the Central Arctic Herd (CAH) at approximately 17,000 in 1985 (Carruthers and Jakimchuk 1986).
29	2	1	3-7	The range of the CAH has included areas south of the continental divide in the past (e.g., elements of this herd wintered south of the divide in winters 1971-1972 and 1972-1973). During the winter of 1973-1974, these animals began wintering north of the divide (some records suggest they have done this in the past). [See Child 1973, Roseneau and Stern 1974, Roseneau et al. 1974.]
29	2	3	3-4	Very few CAH animals were seen calving in the 1002 area during the early and mid-1970s (often none). This appears to be a relatively recent event and is probably associated with increasing herd size. (See Roseneau and Stern 1974, Roseneau et al. 1974, Roseneau et al. 1975, Roseneau and Curatolo 1976)
29	2	3	6-9	At the oil industry/government caribou seminar held in Girdwood, Alaska, in October 1986, it was concluded that there was no evidence that calving had ever been a common occurrence in the Prudhoe Bay region, even prior to oil field development. In fact, some CAH caribou calve in the Kuparuk/Milne Point areas where oil fields have been

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				developed. The inference that caribou cannot calve near petroleum development should be removed.
29	2	4		Summering by CAH animals east of the Canning River also appears to be on the increase. Post-calving CAH animals made incursions into portions of this area in the early and mid-1970s, but their stay was relatively brief. Wintering by CAH animals also began increasing east of the Canning River after the mid-1970s.
29	2	5	1-3	This sentence repeats information given on p. 29, col. 1, par. 6, lines 3-6. Consolidate.
29	2	5	3-6	The text should note that the majority of PCH caribou taken for subsistence by Kaktovik residents are obtained inland from the coastal plain in the spring, and not within the 1002 area. Summer harvest along the coast is very minor.
MOOSE				
30	2	3		It is important to emphasize that most of the moose harvest takes place outside the 1002 area and should, therefore, remain unaffected.
WOLVES				
31	2	1		It is important to emphasize that most of the wolf harvest takes place outside the 1002 area and should, therefore remain unaffected.
ARCTIC FOXES				
31	2	2	2	Arctic fox dens are typically in dry tundra communities, especially dry microsites such as mounds, low hills, and south-facing ridges (see Chesemore 1967, 1969 and review by Underwood and Mosher 1982).

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POLAR BEAR				
33	1	3		Information is given on the size of the Beaufort Sea population (2,000 individuals), but no perspective is offered as to the number of bears that might comprise the segment of the population normally occurring in the ANWR region of the Beaufort Sea.
33	1	4	8	The phrase "...where 1-2 dens were found in 4 of the 5 years..." is ambiguous. We suggest revising as follows: "...where 1-2 dens were found in each of 4 years during the 5-year period between winter 1981-82, when the FWS..." etc.
33	1	4	13-14	"At least 15 dens were located in the 1002 area, 1951-85 (pl. 1E)." Plate 1E shows only 12 locations actually within the 1002 area, plus the 5 locations on the sea ice. We suggest revising this sentence to: "At least 15 dens were identified within or near the 1002 area, 1951-85 (pl. 1E)."
33	1	4	14-15	Revise sentence to: "Another five dens have been located on sea ice near the 1002 area."
33	1	5	1-2	On Plate 1E, boundaries of the confirmed coastal denning areas at the Staines and Canning rivers and at Marsh and Carter creeks seem to encompass inappropriately large areas relative to the identified den locations. It would help to explain in the text that the boundaries have been drawn to include associated areas of bluff habitat similar to that in which the dens were found (assuming that this is the case).
33	2	6	1-4	"Large numbers of polar bears may occur...". The use of "may" introduces ambiguity here. It would be clearer to say "Large numbers of polar bears have concentrated seasonally in some years along the coast..." if this is the case.

p.	c.	¶.	l.	
BIRDS				
34	1	5	5-6	Glaucous gulls have been reported to overwinter near the village of Kaktovik in recent years (W. Audi, Audi Air Inc., Kaktovik, 1986). This species should be added to the list of birds that occasionally overwinter. There is speculation that the availability of food at dumps and near marine mammal carcasses have enabled more gulls to overwinter in northern Alaska in recent years.
34	2	1	2	Bartels (1973) is an obscure and outdated reference; other more relevant work (e.g., Divoky 1978b, Bartels and Doyle 1984, Bartels and Zellhoefer 1983, Johnson et al. 1975) should also be cited as documentation for this statement.
34	2	2	8-9	"Smaller numbers are present until freezeup in late September or early October." Is this meant to imply that large numbers of birds use the lagoons after freezeup in late September-early October?
34	2	3		Productivity in lagoons generally is not higher than in adjacent offshore areas. Almost all primary production (and consequently secondary production) is derived from offshore marine waters (Campbell 1981, Schell et al. 1983, Schell 1984). The lagoon systems are important concentration areas for feeding waterbirds because prey tends to be more available in these shallow waters and because the birds can find protection from wind, waves and ice behind the spits and barrier islands.
SWANS, GEESE AND DUCKS				
35	1	3	4	Although the majority of these birds are from Banks Island, it should be remembered that several tens of thousands and several thousands of snow geese also come from two other colonies in

p.	c.	¶.	l.	
				Canada--Anderson River delta (10^4 birds) and Kendall Island (10^3)--and several hundred come from the one colony in Alaska--Sagavanirktok River delta (10^2 birds).
35	1	3	6-7	This statement is very intriguing. Have these few hundred birds that appear to occupy this small pocket of habitat been examined closely to see if they are neck-collared, i.e., are from the Sagavanirktok River Delta population, rather than the Banks Island population?
35	1	3	11	The maximum estimate of 325,000+ snow geese present in ANWR was not in 1976, but in 1978 (see Oates et al. 1985: Table 3, for a review of data from 1973 through 1984).
35	1	3	23-24	The snow geese feed extensively on the roots of several species of Eriophorum (cotton grass). During fall, these plants transfer energy (in the form of carbohydrates) from the leaves and stems to the underground roots (where energy reserves are stored over the winter in order to support initial above ground growth the following spring). These high energy roots dominate the diet of fall staging snow geese in the 1002 area.
35	1	4	6-7	Evidence from Canadian studies (Koski 1977a,b; T. Barry 1986, pers. comm.) indicate that these birds indeed do migrate east to the Mackenzie Delta and then south through the Canadian prairie provinces and into the western U.S. (Pacific and Central Flyways). Brant, however, fly west along the Alaskan Beaufort coast, then south through the Chukchi and Bering seas before arriving at Isembek Lagoon (Alaska Peninsula) to feed/stage for the fall flight to California and the west coast of Mexico.
35	1	4	11	This point is not documented. Although there are several reliable sources (Martin and Moitoret 1981, Derksen pers. comm.

p.	c.	¶.	l.	
				1986), no documentation is presented here for this very important piece of information.
35	2	2	3-4	This information is poorly documented. See Martin and Moitoret (1981), Richardson and Johnson (1981) and Johnson et al. (1975) for details of bird migration schedules along the Beaufort Sea coast.
35	2	3		This information is poorly documented. See Spindler (1978a,b, 1984), Brakney et al. (1985:309-361), Johnson (1984a), Johnson and Richardson (1981, 1982), Johnson et al. (1975).
35	2	4		This is very important information about spring and summer harvest of waterfowl, apparently by Kaktovik residents. It is important to underscore this harvest, especially because it may affect populations of brant and greater white-fronted geese, which are already severely depressed in the Pacific Flyway as a result of overhunting (see review paper by Raveling 1984).
SEABIRDS AND SHOREBIRDS				
35	2	5	11-12	Sabine's gulls typically nest in thermokarst marsh complexes at other locations along the Alaskan Beaufort Sea coast. It is very surprising to read that the Canning River delta is the only location in the 1002 area where they nest.
35	2	5	13	Black guillemots nest in abandoned buildings, in piles of drums, among driftwood and other debris on the barrier islands and spits along the Beaufort Sea coast. The wording here -- "Black guillemots breed only on the coastal beaches." -- is somewhat misleading.
36	1	1	1	Jaegers, especially parasitic jaegers, chase down adults as well as the young of small birds.

p.	c.	¶.	l.	
RAPTORS				
36	1	3		Gyrfalcons often begin frequenting nesting cliffs in March (e.g., courtship at the cliffs, etc.), and it is recommended that "...the first week of April..." be changed to "the first week of March. Rough-legged hawks are also closely tied to microtine populations and often vary considerably in local abundance.
36	1	3	3	The reference to the peregrine falcon infers that this threatened species is commonly present across the entire coastal plain. In fact, as it is pointed out on p. 38 of this draft report, only a few peregrines are found in the 1002 area and none is known to nest there. It is especially important with a species that is legally protected as "threatened", that the report not be misleading.
36	2	1	5-7	During fall, do the ptarmigan move south, back into the Brooks Range, from whence they came the previous spring? In other words, are the movements of ptarmigan cyclic--north onto the coastal plain in spring and summer and south into the mountains during fall and winter? This would seem to be a reasonable adaptation, but since no documentation is given its hard to tell if this is speculation or fact.
FISH				
36	2	4	1	The word "extreme" is not appropriate here. Its use implies something dramatic such as 'no mouth'. The term "extreme" would more accurately describe fish that live at great depth, in very hot water, air-breathers, live bearers, and those that 'fly'.
36	2	4	5-7	It is misleading to state that '...populations are easily affected by environmental change...' Arctic anadromous fishes

p.	c.	¶.	l.	
				have adapted to the particular constraints imposed on them (e.g. as a long-lived species with capability of repeat spawning, they can withstand the loss of a year-class). [See discussions by Craig (1987) and Craig and McCart (1976).]
36	2	6		Though some arctic cod may spawn in nearshore waters, they are also thought to spawn and overwinter over vast oceanic regions; thus, in a population sense the nearshore zone is not an "important" spawning and overwintering area for this species. It is incorrect to say that "The nearshore waters are important spawning and overwintering areas". Those species of fish that are of greatest concern to man for commercial, subsistence, or sports fish reasons neither spawn nor overwinter in nearshore waters.
37	1	Table		This table implies (from the heading) that the Sadlerochit River supports a population of pink salmon. However only a single pink has ever been caught in this drainage (Craig and Haldorson 1986, Smith and Glesne 1982).
SOCIOECONOMIC ENVIRONMENT				
39	1	2		Some Porcupine caribou are regularly taken by residents of Aklavik (where harvests have been on occasion, large), Arctic Red River and Ft. Macpherson in the Northwest Territories, Canada.
40	1	3		The caribou harvest figures given here differ from those given on p. 29, c. 1, ¶ 6.
42	2	2		It should be noted that although the NSB Coastal Management Plan has been approved by the State, it has to be approved by the Federal Government before it is effective. To date, it has not been approved.

p.	c.	¶.	l.	
43	1	2		Subsurface ownership is not clearly explained. Information in this paragraph appears to conflict with information regarding subsurface rights discussed in the section titled Land Status.
45	2	4		To provide a perspective on the relatively limited recreational usage of ANWR, it would be appropriate to compare these figures with other areas of the State.
45	2	5-6		It is good that this section discusses aesthetics as a separate
46	1	1-4		issue. Aesthetics is the basis for much of the opposition to leasing in the 1002 area. It is important for this reason to separate aesthetic feelings from biological issues and conclusions.
				It is also worth mentioning that without Coastal Plain oil, the aesthetic experience of wilderness that is perceived to be the alternate goal to development will be available only to an elite few. It is also reasonable to remember that the tens of thousands of Americans and other visitors who have enjoyed a once-in-a-lifetime trip to the North Slope in the past decade have done so because of the development of Prudhoe Bay. Prudhoe Bay has not destroyed their arctic experience, it has made it possible, unique, and memorable. A small point, but one worth recording.
46	1	1		This section regarding aesthetics states that, "With the exception of the two abandoned DEW Line sites on the coast, the entire 1002 area could meet the criteria." This statement ignores the use of the area by Kaktovik residents.
46	1	2		It is not clear that the 1002 area is the most biologically productive part of ANWR. The basis for such a statement must be fully explained and documented.

p.	c.	¶.	l.	
46	1	4		It is an overstatement to say that the aesthetic value of the 1002 area was temporarily reduced as a result of seismic exploration. Two surveys (1983/84 and 1984/85) were conducted in winter during little or no daylight with insignificant environmental effects.

CHAPTER III - ASSESSMENT OF OIL AND GAS POTENTIAL AND PETROLEUM GEOLOGY OF THE COASTAL PLAIN

49-73				Standard endorses the resource estimates as within a reasonable range, given the database available. As an addition, it might be helpful to include a detailed explanation of the resource calucation for the best documented prospect to illustrate the approach to a single building block in the overall resource estimate.

PRESTO MODEL INPUTS

70	2	3		The authors are to be complemented in explaining this aspect of "risk". Indeed additional explanation of risk and the marginal probability utilised in the Alaskan and National contexts would further enhance the reader's understanding of why the Coastal Plain ranks first in hydrocarbon potential of unexplored areas in the U.S.

CHAPTER IV - DEVELOPMENT AND TRANSPORTATION INFRASTRUCTURE

EXPLORATORY DRILLING

75	1	3	9-11	We fully support the caution provided here that until there have been exploratory and confirmation wells drilled, all resource estimates must be considered uncertain. Too often people want to attribute greater capability to geophysical

p. c. ¶. l.

technology than it warrants. It cannot be overemphasized that without drilling wells, the true oil and gas potential of the 1002 area will never be known.

75 2 1 5-9 It is incorrect to state that sources of gravel have not been identified. The drilling that was done during the two winters of seismic surveys indicated that virtually the entire region is underlain with gravel. All information from those surveys, including the sample cores, is available to the government for examination.

Additionally, this paragraph states that water sources are not readily available. Although this is correct, it should be clarified that this is common throughout most of the Arctic and has been successfully dealt with many times. Over 250 exploration wells have been drilled in the North Slope arctic desert.

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75 2 4 The exploration experience in NPR-A is worthwhile reviewing in this context. A variety of plays were tested in the 1970s program with a wide range of target depths. It is not necessarily true that a 12,000 foot exploratory well can be drilled in a single season. Further, the presumption that wells which cannot be drilled in a single winter season will require a multi-season effort should be evaluated on a case-by-case basis. If significant adverse impacts to wildlife can be avoided, then exploratory operations should be allowed to continue through the summer.

The costs of suspending and later reentering a well are very high for operational and logistical reasons. The recently drilled KIC well, for example, well cost approximately $50 million. If exploratory wells in ANWR continue to require 2 seasons and remain in the $50 million dollar range, the number of exploratory wells industry can afford will be limited. If the full potential of the area is to be realized, costs must be

kept within reason. The only way to do this with deep wells is to allow year-round drilling.

76 1 2 This paragraph should be rewritten to reflect the variety of options for mobilizing construction equipment and drilling rigs to exploration locations within ANWR. The assumption that exploration rigs would typically be transported to the drill site by Hercules 130 aircraft is not necessarily valid. Overland access could be utilized for most sites.

Heavy construction equipment is used to prepare the wellsite for the drilling operation and to prepare an airstrip for aircraft making crew changes, material supply, and if necessary, transport of a drilling rig and related equipment. Construction equipment may be transported to exploration locations by low-ground-pressure vehicles, or by trucks using ice roads. Once the equipment and crews arrive on site, construction begins for the drilling pad, airstrip and ice roads to water sources and pad construction material. The drilling pad can be constructed of a material excavated from the reserve and flare pit, ice, gravel-foam-timber, or other possible combinations with gravel being the preferred material due to thermal stability.

76 2 Although naturally occurring sources of fresh water for exploration and developmental use are scarce in the 1002 area, this is true throughout the North Slope. Methods by which water has been successfully extracted include:

(1) Excavating deep pools in river and stream beds;
(2) Excavating deep pools in lakes;
(3) Insulation of ponds to prevent freezing;
(4) Desalination of sea water;
(5) Erecting snow fences to trap snow which could be used with snow melters;

p.	c.	¶.	l.	
				(6) Converting gravel extraction pits to reservoirs.
76	2	3		The exploration pad described here is somewhat outdated.
76	1	4		There are not separate camps at exploration sites for construction and drilling operations. The paragraph should read:
				....The construction/drilling camp contains sleeping and eating accommodations for approximately 75 people, communication equipment, power generator units, storage space, shops, and offices.
				The last sentence in the paragraph pertaining to the construction camp should be deleted as it is not applicable.
76	1	4	8	An important aspect of the construction/exploratory drill camps has been omitted from this section. When discussing the physical equipment, no mention in made of built-in containment devices, (collection and drip pans) and impermeable protectors (such as impermeable pit liners). These are a planned and constructed part of all exploration and development facilities. Containment devices are placed under the vast majority of the equipment, work areas and structures, where there is any potential for leakage and/or spillage from fuel and chemical storage tanks, piping, skid facilities etc.
76	1	-5	1	The reserve pit designs may or may not (and frequently do not) include an excavated pit. The pit for an exploration site may be a temporary surface pit.
76	1	5		The purposes of the reserve pit are numbered incorrectly, and item (1) is misleading. It should instead read as follows: (1) to contain the used drilling muds, completion fluids and

p.	c.	¶.	l.	
				"cuttings" from the well, and (2) to contain formation fluids originating from a "kick".
76	1	6		The size of the reserve pit described in the draft document for a single exploration well is much larger than what has been found to be required for multiple development wells drilled in Prudhoe Bay. This paragraph should be rewritten as follows:
				Reserve pits for a single exploration well are built to contain approximately 5 bbls. of fluid per foot of hole drilled. A 12,000 ft. well would typically require a 60,000 bbl. reserve pit having dimensions approximately equal to 150 ft. x 150 ft. x 15 ft. deep. A 200-foot-square flare pit is excavated at the corner most distant from the drilling rig, in case it is needed for gas flaring during testing. The ice-rich material excavated from the reserve and flare pits may be used to level the drill pad or stockpiled for later use in pit reclamation following well abandonment.
76	1	Bottom		This paragraph should be added between the paragraphs at the bottom of column 1 and top of column 2.
				Following site preparation of the exploration location a drilling rig and related equipment is mobilized and rigged-up. Rigs can be moved to ANWR locations several different ways. The preferred method is to transport the rig and related equipment using Hercules C-130 cargo planes. A typical rig move would require, on average, 150 C-130 flights. Another method would be to barge a rig and related equipment to a coastal location during the summer months and move it to the exploration location in the winter by trucks using ice roads. A third, but more expensive alternative, would be to haul the rig and related equipment over tundra during the winter using low-ground-pressure vehicles towing sleds.

p.	c.	¶.	l.	
76	2	1	11-17	This paragraph mentions the lack of water resources in ANWR which is over stated and has already been discussed in previous sections. The water requirements to drill an exploration well as stated here are misleading. The water requirements referenced in this paragraph for drilling an exploratory well can be deleted and replaced as follows: ("The water requirements for drilling an exploratory well are approximately:") (1) 414,000 gals/mile of ice road construction and 4,200 gals/mile for daily maintenance (2) 2,500,000 gals/Hercules airstrip construction and 2,100 gals for daily maintenance (Note: The volume figure required for construction could be reduced if the airstrip was built on a frozen lake.) (3) 25,000 gals/day rig and domestic usage Water for the above requirements could be obtained from one of the following sources or a combination of the sources. See possibilities listed previously under page 76, column 2.
76	2	2-4		These three paragraphs (Three possible scenarios despite water shortages are: items 1-3) can be eliminated because the information has already been presented in previous paragraphs.
76	2	5		This paragraph should read:
77	1	1		.... One mile of ice road measuring 30 ft. wide and 6 inches thick generally requires about 414,000 gals. of water...except with a minimum thickness of 6 inches... A change from 1.5 acre-feet to the 414,000 gals. figure is required to stay consistent with previously discussed

p.	c.	¶.	l.	
				information. We suggest including road width and thickness to give the reader an idea of the road's dimensions. A 6-inch thick tundra ice airstrip is acceptable for use according to Pool Arctic Alaska personnel. Pool Arctic has had significant experience in airlifting arctic rigs in Alaska.
77	1	2		The initial portion of this paragraph should be rewritten to clarify the operation as follows: Drilling operations begin by installing the rig over the well location. Differential settlement due to thawing of the pad or surrounding permafrost from rig operations is minimized by laying timber under the rig so that cool air may circulate keeping the foundation as cold as possible. Actual well operations begin by augering a hole for the conductor casing 50 to 100 ft. below ground level. Conductor casing is run and cemented in place and diverter equipment installed. The well is spudded and the hole is drilled to a competent geological formation, usually to a depth of about 2,000 ft...
77	1	5	7	The term "arctic packed" will not be understood by people unfamiliar with arctic drilling terminology so it should be replaced as follows: ....Also the well is freeze protected with a low freeze point fluid and suspended...
77	1	5	11	The word "nonfreezing" should be replaced with "low freeze point" to read as follows: ....the low freeze point fluid in the upper part of....
77	2	1		In addition to sharing roads and airstrips, delineation wells can often share drilling pads and be drilled directionally, further reducing surface impacts.

p.	c.	¶.	l.	
77	2	3		While it may not be appropriate to include a detailed discussion of the existing regulatory framework here, inclusion of such a section elsewhere in this report is essential. There is a tendency in EIS documents to ignore the existing regulatory framework leaving the impression that oil and gas development proceeds in a regulatory vacuum once leasing takes place.
				PRODUCTION
78	1	4		Even a prediction of 10 years from the time of leasing to the time of production can be considered overly optimistic under the best of circumstances. The likelihood of optimum circumstances is small indeed. Given the lengthy permit acquisition process for exploration and especially development, and the possibility of indiscriminate seasonal operating restrictions, fifteen years could easily pass from the time of leasing to first production.
78	1	7	4	Replace "surface location" with "gravel pad" as single surface location in drilling terminology relates to a single well location. The sentence should read: ....Directional drilling allows multiple wells to be drilled from a single gravel pad (fig. IV-1)...
78	2	2	4	Eliminate the reference to a 2,000 ft. kickoff point and replace it with "kickoff points as shallow as 500 ft" to reflect Prudhoe Bay operating experience. The paragraph should read as follows: ....drilled with an angle of deviation between 0° and 45° from kickoff points as shallow as 500 ft....

p.	c.	¶.	l.	
79	1	1	3	Well spacing should range from 40 (not 50) to 320 acres.
79	1	3	9	Based on major production scenarios and enhanced recovery, the useful life of production support facilities is likely to be 40 or 50 years rather than the 20-30 years of main production.
80	1	3-4		Regarding water options, enhancement of existing lakes and river oxbows is another alternative that has been used in Prudhoe Bay Unit, (PBU) (e.g. ARCO's Colleen Lake). This also enhances fish and wildlife habitat by providing year-round deep water sources.
80	2	3	3	Small development areas would likely import the necessary fuel rather than construct an on-site crude-oil topping plant. Arco has one crude oil topping plant at Prudhoe Bay, which supplies a portion of the fuels utilized in PBU, however, a large quantity of fuel including unleaded gasoline is shipped in tanker trucks to the slope. In addition, the annual sealift frequently brings large fuel barge shipments, a portion of which is provided to the arctic villages.
80	2	4		This paragraph should be rewritten to include the area coverage mentioned in the subsequent paragraph, and to delete references to gathering facilities and flare stack which are located on a separate pad. It should read: ....The layout of a pad during drilling operations typically includes the following: drilling camp, fuel and water storage, one or two drilling rigs, drilling supplies, reserve pit, flare pit and production facilities, covering 20-35 acres.
80	2	5		"A pad thickness of 5 feet requires 160,000-285,000 cubic yards of gravel." should be deleted as the pad dimensions are not specified. It is difficult to quote volume requirements for gravel as the number of wells, the wellhead spacing, reserve

p.	c.	¶.	l.	
				pit size and production facility area requirements should be specified. This paragraph should begin as follows: "The drilling camp is similar...."
81	1	1	4	The reference to removing solids to a government-approved site such as an abandoned gravel pit or an offshore dump gives the impression that all solids must be removed which is incorrect. It should be rewritten to read as follows: ....disposal well. Hazardous solids and solids containing hydrocarbons must be removed to a government-approved site, such as an abandoned gravel pit.
81	1	1	6	Offshore dumping is not acceptable for hazardous solids and hydrocarbon bearing solids. Reference to it should be deleted (line 6). Additionally, the reference to a flare stack (line 6) should be deleted since it does not belong in this paragraph.
82	1	3	12-14	Given the certain and dramatic decline in production from existing North Slope fields before any new production from the 1002 area could possibly be made available, it is farfetched to discuss the construction of a new trunkline from Prudhoe Bay to Valdez.
82	1	7		Differential settlement can be monitored.
82	2	3	8	The concept of using existing gravel roads, pads and fill is practiced extensively throughout the PBU for flowline containment planning. In the case of actual spills, it has proven very useful. Maps are maintained and updated every year showing the local drainage around each pad and flowline in the Western Operating Area (WOA) of the PBU as part of Standard's contingency plan. Culverts and flowline casings can be identified and blocked to contain spillage or control flow in an area.

p.	c.	¶.	l.	
83	1	Fig IV-4		The five-foot clearance should be to the underside of the pipeline insulation, not the underside of the support beam (and/or pipe shoe). Gravel roads would typically have side slopes of 2:1 (not 1.5:1) which would be more typical for work pads.
83	2	2	7	The placement of values based on predetermined maximum quantity originated from negotiation stipulations rather than federal regulation (49 CFR 195.260).
84	1	1	14-15	Information on the extensive amount of gravel present throughout the region has been made available to the government as a result of the two winters of seismic surveys that were conducted for the purposes of evaluating the oil and gas resource potential. An evaluation of this information will show the statement here that "the availability of adequate gravel supplies on the 1002 area is uncertain" to be incorrect.
84	2	2	10-16	We suggest changing the wording as follows: "...contingency plan that, as a minimum, addresses all Federal Department of Transportation, Environmental Protection Agency and USCG and State Department of Environmental Conservation regulations." Siting six specific items of contingency planning in a resource assessment that are not consistent with federal and state requirements leads to confusion when stipulations are promulgated. Further, the operator may have difficulty complying with the specifics of the stipulation while adhering to existing laws and regulations in preparing and implementing a plan. "Site specific clean-up techniques" could be interpreted as very restrictive and of limited value if applied in the strictest form because of the variety of spills that are possible given the infinite variety of weather and ground conditions. Responses to what actually occurs could in fact be hampered by present plans which specify too much detail. If some specifics are desired, the paragraph could continue as

p.	c.	¶.	l.	
				follows, "...the regulations address: spill prevention and leak detection, spill detection, response and clean up. Notification procedures to all appropriate agencies, and restoration including remedial actions."
84	2	3	1-3	Leak detection systems for arctic use have limited capabilities. We suggest adding available arctic engineered and designed in line 1 between "include" and "automatic".
84	2	3	6	Aerial surveillance has limited application on the North Slope where ground access is available. PBU uses ground access for the flowlines throughout the field. Security and operator surveillance occurs daily.
85	1	3-5		A marine pipeline east-west (offshore) to transport ANWR crude
85	2			to TAPS is not a feasible option. Although the technology of offshore Arctic pipelines is advancing, their use will probably be confined to transporting offshore crude to shore. The report should only consider onshore pipelines.
85	2	4	1	Are automatic block values really the best design option for subsea pipelines?
85	2	4	6	Access for repair and maintenance during the "ice season" would be difficult. Recommend replacing "would not be possible" with "would be difficult"

CHAPTER V - ALTERNATIVES

ALTERNATIVE A - FULL LEASING OF THE 1002 AREA

p.	c.	¶.	l.	
89		1-2		We strongly support the Department of Interior's proposed recommendation that the entire 1002 area, Alternative A, be authorized for oil and gas exploration and production. Full leasing of the 1002 area is consistent with the national

p.	c.	¶.	l.	
				interest and can be accomplished without any deleterious effects on the area's wildlife resources.

ALTERNATIVE B - LIMITED LEASING OF THE 1002 AREA

p.	c.	¶.	l.	
91		1-2		Alternative B is based on the speculative premise that a traditional "core" calving area exists and is necessary for the maintenance of a healthy caribou herd. As discussed in our general comments, this concept is not supported by the literature and, in fact, the data shows considerable annual variability in the location of calving concentrations. We believe there is sufficient new, or not previously considered information available to FWS to justify reevaluating the concept of a "core" calving area, in which case Alternative B will also have to be reexamined.

ALTERNATIVE C - FURTHER EXPLORATION

p.	c.	¶.	l.	
92		1		We strongly oppose this alternative. Further exploration of this nature would make no positive contribution to the national energy situation. It would not find oil, and it would not provide enough new geological information to effect substantively any decision on leasing. Surface and regional geologic information already confirm that the area has oil potential. A critical evaluation of this potential will not happen until there is leasing. On-structure drilling is the only means by which the presence of oil can be verified and evaluated from a commercial perspective.
				It is also important to recognize the cost of operating in the Arctic and the constraints those costs will place on the extent of industry's exploratory efforts. The object of expensive exploratory drilling should be to find oil. Off-structure drilling will not enhance our knowledge sufficiently to justify the time, the expense, or the delay in the ultimate benefit of

p. c. ¶. l.

producing oil in ANWR. Alternative C is simply an expensive means of delaying the ultimate decision of whether or not to lease the Coastal Plain.

ALTERNATIVE D - NO ACTION

ALTERNATIVE E - WILDERNESS DESIGNATION

p. 92 through 94 Neither Alternative D or Alternative E would allow for confirmation of information indicating that substantial petroleum reserves exist in the 1002 area. These alternatives preclude reasoned planning for future national energy requirements and deny the nation the positive benefits that could come from oil and gas production on the Coastal Plain.

CHAPTER VI - ENVIRONMENTAL CONSEQUENCES

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ALTERNATIVE A -- FULL LEASING

CONSEQUENCES OF EXPLORATORY DRILLING

95 2 3 8-14 The described procedure by which environmental consequences were determined is inadequate for the following three reasons.

1. Wildlife use areas shown on Plates 1-3 are vague and general, and are mapped at an extremely small scale. Although they may be helpful in providing the public with a general idea of wildlife use areas within the 1002 region, these maps are not appropriate to support a professional analysis. If -- as stated in the subject text -- the maps shown in Plates 1-3 were indeed used to develop an assessment of potential development effects on wildlife, the results can have no real usefulness. If larger-scale, location-specific maps were used, the text should be revised to say so.

p. c. ¶. l.

2. Even if more specific wildlife use maps were used, overlaying them with the full and limited developement scenarios shown in Figure V-1 was pointless because, as the following paragraph (p. 95) states, "Alternatives A and B depict hypothetical infrastructures", and "any prediction as to the various stages of development at any given time on the 1002 area would be highly speculative and perhaps misleading". Moreover, the development scenarios shown in Figure V-1 are extremely schematic and drawn at a very small scale. Yet the text states that overlaying these two scenarios with the equally vague wildlife use maps "allowed measurement of direct habitat loss or alteration. Determinations were then made as to the nature and magnitude of direct and indirect habitat losses, disturbance, mortality, and other potential effects." It is difficult to see how such measurements, especially determinations of disturbance and mortality, could have been made using the described approach, or how any substantive conclusion could have been reached. The described assessment approach can only shake the critical reader's confidence and casts doubt on all biological conclusions reached in Chapter VI.

3. Finally, and most important, the text implicitly assumes, for reasons unstated, that predicting "direct and indirect habitat losses" is a biologically appropriate means of assessing probable development effects on wildlife inhabiting the 1002 area. This relates to the simplistic idea, discussed above, that overlaying maps of general wildlife use areas with hypothetical oilfield layout plans is a valid basis for predicting a wide range of effects on wildlife. In reality, habitat change is only one of many factors that can affect fish and wildlife populations. In the Alaskan Arctic, where habitat availability has not been shown or convincingly suggested to limit most animal species (and is likely to do so only in the cases of overwintering fish and some bird species that combine (1) highly exclusive nesting territories with (2) nesting range

limited exclusively or predominately to the Arctic Coastal Plain), a habitat-based approach to assessing potential effects of development on wildlife may miss the mark entirely. Where habitat availability is likely to be an important factor in limiting the productivity of a species -- e.g., arctic and red-throated loons (Davis 1972, Johnson et al. 1975, Bergman and Derksen 1977, Derksen et al. 1981) or dunlin (Holmes and Pitelka 1986, Holmes 1970) -- loss or alteration of habitat is one of several factors that can be appropriate for predicting development-related effects on the species in question. For species where there is no evidence that habitat availability is or is likely to be a population-limiting factor -- e.g., caribou (Bergerud 1986, Bergerud et al. 1984) -- a predominately habitat-based approach is clearly inappropriate. This is especially true when factors unrelated to habitat (e.g., predation or human harvest on winter range in other geographic areas) are ignored or de-emphasized as a result of applying an across-the-board habitat-based approach to all species.

95 2 4 8-9 We would agree that the consideration of three simultaneous developments represents a worst case scenario and in actual fact is extremely unlikely. As a result, the environmental consequences predicted on the basis of this three development scenario are highly speculative and overstated. They have not, however, received the benefit of proper qualification. It is incumbent upon the authors to include appropriate caveats and cautionary statements throughout this chapter to avoid any misunderstanding that the environmental consequences are statements of facts.

97 1 3 6-7 As discussed in our general comments, we believe application of the FWS Mitigation Policy to be inappropriate precisely because it does focus "especially on losses of habitat value". We do not mean to imply that habitat is not vitally important to all

wildlife populations. But, from the standpoint of providing realistic impact analyses and effective protection for animals in the arctic, the focus should be on population management and the mitigation of variables that are known to influence animal movements and behavior. This position is supported by Mulé (1982:131) who states that, "habitat assessment for (these) large herbivores would be more effective and meaningful if the populations were examined as the primary units of study."

Mulé (1982) conducted a study to evaluate the appropriateness of wildlife habitat assessment techniques in Alaska. The study, funded by FWS through the Institute of Arctic Biology, University of Alaska, Fairbanks, was based on the assumption that to mitigate effectively the impacts from large scale natural resource development projects, one has to mitigate the "habitat losses accruing from such projects" (Mulé, 1982, p.1). The study was designed to "experimentally examine the effectiveness of the Terrestrial Habitat Evaluation Criteria (HEC) Handbook-Alaska for evaluating wildlife habitat in Alaska" (Mulé, 1982, p.7). In this respect, it used a far more refined habitat evaluation technique than the overlaying of maps and gross measurement of acres that FWS has used for the habitat evaluations in the 1002 draft report. Its findings, however, are pertinent because the concept and habitat evaluation procedures Mulé used are an out growth of the FWS Mitigation Policy and because his evaluation species included moose and caribou.

The habitat models tested did not perform at acceptable levels of accuracy, and Mulé concluded that Habitat Evaluation Procedure (HEP) models are reasonable only in theory for those species of animals that are habitat specialists and/or have very small home ranges with habitat requirements that are simple enough to model. Interestingly, the models with the most problems and greatest inaccuracies were those for moose,

caribou and mink, emphasizing that fact that HEP type approaches are "simply not workable" (Mulé, 1982, p. 130) for large mobile herbivores, such as moose and caribou, or for predators and omnivores.

The problem he came across is the same one that invalidates the habitat approach to impact assessment used in the 1002 draft report. Large mobile herbivores "are habitat generalists that range over wide areas, utilize a variety of habitat types (often seasonally), and exhibit complex social and behavioral patterns." (Mulé, 1982, p. 130) Habitat evaluations cannot incorporate the complexities introduced by non-habitat variables that influence habitat generalists such as caribou. The problem is that "in addition to habitat, their populations in Alaska may be limited by non-human and human predation, weather, disease, parasites, or any other number of other density dependent and density independent factors. Attempts to model habitat relationships for these and other such species are frought with difficulties." (Mulé, 1982, p. 130) [Emphasis added.]

Maurer (1986) shares Mulé's concern that one cannot rely on quantitative habitat models to make impact predictions. One of the major points made by Maurer is that even rigorous models depend on specific sets of data collected under a restricted set of conditions and therefore will be of limited generality and limited use. Although his conclusions were drawn after attempting to predict habitat quality for grassland birds using density/habitat correlations, they are relevant to the concept of using habitat quality in impact predictions and management plans. In his concluding recommendations for management, Maurer emphasizes that all methods of quantifying habitat must be properly verified; and that as the models are more widely applied, they must be updated. Regardless, he cautions that even "an updating strategy may not be entirely effective in

producing more reliable models, particularly when those models are highly data sensitive" (Maurer, 1986).

The real issue of concern, however, is whether or not habitat "value", or habitat conditions can be relied upon as valid indicators of population status and of potential impacts to wildlife associated with said habitat. In reference to this issue, Maurer concludes:

> "Perhaps of greater concern to the manager is the possibility that populations of species may not be as closely tied to habitat conditions as has been thought previously. Although some species appear to be associated consistently with some habitat variables (Noon et al. 1980), many recent studies have demonstrated a great deal of variation in habitat associations among geographic locations (Collins 1983a,b; Shy 1984). Even among study sites in close proximity, several researchers have documented significant variation in use of habitat for foraging (Maurer and Whitmore 1981, Franzreb 1983, Mannan and Meslow 1984)....The results of the present study should raise serious questions regarding the use of qualitative models, such as HEP, in monitoring and predicting the response of bird species (and perhaps other wildlife species) to changes in their habitats. If rigorous, data-intensive models can perform poorly, it is likely that subjective, poorly documented qualitative models also will present serious problems in their use as predictors of habitat quality (Bart et al. 1984)" (Maurer, 1986). [Emphasis added.]

97 2 2 The policy implimentation and step down process has been uneven and often subjective and impractical in Alaska. An apparent bias towards acreage concerns and compensation has largely ignored and under valued genuine mitigation efforts through improved project design and protective field practices.

98 1 2 The designation of FWS Resource Category 1 for the "core calving area" is inappropriate for several reasons. The habitat in question is not "unique or irreplaceable".

p. c. ¶. l.

Biologically based methods have not been used to define a "core" calving area for the Porcupine herd. And, there is no evidence for a unique area of "core calving habitat" with definable special characteristics that might somehow be irreplaceably lost as a result of oilfield development. We refer you to our general comment #6A for a full discussion of this issue.

The primary reason stated for the Resource Category classifications of ANWR lands is that they are recommended by policy. Once again FWS has relied on policy rather than to base their rationale on biological assessments.

The other problem with classifying this area as Resource Category 1 is the mitigation "goal" of NO LOSS of existing habitat value, and the policy guideline specifying that FWS recommendations regarding activities in the area will be that "all losses of existing habitat be prevented". Typically, in Alaska, this has meant no loss of acres and resulted in the recommendation that no development be allowed in a Resource Category 1 area. This is contradictory to Interior's recommendation to lease all of the 1002 area. Either it would have to be recognized and acknowledged by FWS that oil and gas development activities do not produce habitat degradation for caribou; or some special consideration would have to be granted under the policy allowing or endorsing a waiver from this mitigation goal.

98 2 #4 The assumptions (subparagraph 4) state that the land-use stipulations for exploration drilling on KIC/ASRC lands would continue to be in effect for all oil and gas operations in the 1002 area. This assumption implies that a very broad, comprehensive set of stipulations would apply to all future activities. Frequently, stipulations applicable for seismic and/or exploration activities cannot be economically or

logically implemented for all production facilities. An example would be the placement of impermeable type liners under exploration facilities during temporary operations. These types of liners may or may not be applicable or feasible for permanent production skids. Additionally, the designs of production skids may or may not include contiguous containment structures, depending on the risk potential of the operation in the skid. Additionally, if the KIC/ASRC land use stipulations are to be applied to all 1002 area leases, they should be printed in full for both public review and for public awareness of existing protective measures that will mitigate many potential impacts.

99 1 6 9 "Minor fuel spills could also occur." These spills would be cleaned up with no effects, or at most brief, and minimal effects.

99 2 2 This paragraph does not present an accurate picture. We suggest that it be rewritten as follows:

Exploratory drilling requires construction equipment to prepare a stable drilling pad, reserve pit, road to the water source(s) and airstrip. When the wellsite is completed, the drilling rig and support equipment is transported in with Hercules C-130 aircraft or trucks using ice roads, depending on distances between well locations.

99 2 4 The 15 million gallons of water needed to drill one exploratory well has been discussed in previous sections. To maintain consistency, this paragraph should be changed to read as follows:

Water requirements for exploration operations are estimated to be as follows:

p.	c.	¶.	l.	
				(1) 414,000 gals/mile ice road construction 4,200 gals/mile for daily maintenance (2) 2,500,000 gals/Hercules C-130 airstrip 2,100 gals/airstrip for daily maintenance (3) 25,000 gals/day drilling operations and domestic use Although naturally occurring sources of fresh water for *exploration and developmental use are scarce in the 1002 area,* this is true throughout the North Slope. Methods by which water has been successfully extracted include: (1) Excavating deep pools in river and stream beds; (2) Excavating deep pools in lakes; (3) Insulation of ponds to prevent freezing; (4) Desalination of sea water; (5) Erecting snow fences to trap snow which could be used with snow melters; (6) Converting gravel extraction pits to reservoirs.
99	2	4		Spring breakup and late summer/fall rains should provide sufficient recharge for any lake or river in the 1002 area. On page 21 of the EIS high water conditions are also discussed. Given the number of sources and techniques for getting water, and naturally occurring recharge of area water resources, it misleads the public to state that water use "could have a major adverse effect".
99	2	5	4	A minimum thickness for the NPRA ice airstrips was quoted at 12 inches. *Recent Hercules C-130 operations have found* that 6 inch thick tundra ice airstrips are acceptable, so this paragraph should be changed to read as follows: ....Ice airstrips on the NPRA were built with a minimum thickness of 12 inches for safety although recent Hercules C-130 operations have found 6 inch thick airstrips to be acceptable....

p.	c.	¶.	l.	
99	2	7	3	This paragraph should be rewritten to delete the mention of oil to "slicken" up the drill bit as it is not used for this purpose. The paragraph should read: ....the reserve pit will contain well cuttings, mud containing barite, bentonite and may contain some traces of hydrocarbons from cuttings obtained from reservoir rock, chemical residues, principally....
100	1	Item 2		The discussion of filling in the reserve pit with gravel should be rewritten as follows so that it is not misleading: ...Therefore, this method requires construction equipment to blade drilling pad material into the pit or haul in gravel to fill in the reserve pit area which over time would naturally revegetate.
100	1	1-2		The use of the FWS unpublished and unavailable data is not appropriate for this draft LEIS. It is particularly inappropriate in this case because the field work methodology, statistical analysis and draft reports by West and Snyder-Conn have been highly criticized by both industry and regulatory agencies. With regard to this issue, there are a number of published reports that are much more comprehensive and with *differing* results than West and Snyder-Conn on which impact predictions can be based. At a minimum, the recently published USGS Final Wellsite Cleanup on National Petroleum Reserve - Alaska should be reviewed and referenced. A meeting was held by USFWS on September 18, 1985, to review the West and Synder-Conn 1985 draft report entitled: "Effects of Prudhoe Bay Reserve Pit Fluids on the Water Quality and Macroinvertebrates of Tundra Ponds." This meeting was attended by representatives of Standard Oil Company, ARCO, ADEC, ADF&G, DNR, NSB, and M. Brewer of USGS. At this meeting attendees

p. c. ¶. l.

questioned the technical basis and validity of conclusions in the draft Snyder-Conn report. Additionally, ARCO submitted written comments to USFWS which questioned the credibility of the Synder-Conn study.

Reviewers have questioned the technical basis and validity of conclusions in the draft West and Snyder-Conn reports for a number of reasons. These reasons include:

1) The conclusions given in the draft reports are based on only 2 or 3 years of field data.

2) The experimental design has serious flaws: for example West and Snyder-Conn do not address other variables (natural or operation induced) which may cause variation in tundra ponds. Their elimination of controls with high salinity demonstrate a biased approach to control selection; and the statistical analysis of results was not meaningful.

3) The question to be addressed by the analysis was the statistical comparison of tundra ponds with reserve pits, in terms of water quality and aquatic life. The use by the author of the same ANOVA for both reserve pits and tundra ponds cannot not provide this answer, thus the conclusions provided are not valid.

4) The draft report identified specific criteria by which selection of reserve pits and ponds would be made for the study. However, the final sites selected to be sampled for the study did not meet those criteria. For example, a number of the ponds were actually impoundment areas that may not have been there prior to construction of the facility.

5) Credibility of this report is further compromised by impact predictions that cannot be technically justified. These areas

center around the speculated sources of high concentrations of various components of the reserve pit samples. The sampling methods used (grabs at the edges of pits and from under discharge lines instead of from hose discharge onto the tundra) could easily have provided skewed and unrealistic results.

6) Baseline conditions for the ponds and their ability to sustain healthy invertebrates was not substantiated. The use of a variety of species as indicators, instead of a few test species did not provide good study control. The ponds that were sampled freeze solid every winter, thus recolonization must occur every spring. The factors allowing the establishment of healthy invertebrate populations may only occur during certain periods of the open water season, based on the characteristics of the particular pond being studied.

This section should also mention that the State of Alaska has very specific discharge parameters allowing on-tundra discharges only when appropriate.

There are a number of published reports that are much more comprehensive and with results differing from those of West and Snyder-Conn on which impact predictions can be based. At a minimum, the recently published report Final Wellsite Cleanup on National Petroleum Reserve - Alaska volumes 1-3 (USGS, 1986) should be reviewed and referenced.

100 1 3-4 Abandoning reserve pits: Existing regulations which address this activity have been ignored. The State of Alaska Department of Environmental Conservation will promulgate regulations in 1987 which address pit construction and close-out requirements.

100 2 2 (#3)
101 1 3 (#6) These paragraphs concerning minor oil leaks and spills from operations gives the reader an exaggerated view of this

potential consequence. Minor spills are usually very local in nature, occurring on gravel pads and/or roads where they can easily be cleaned up and where their effects are only short term. Winter operations provide additional protection due to the layer of snow and ice protecting the tundra. Combined with the widespread use of impermeable liners under most facilities and work areas, the tundra in and around most operations remains untouched. The effect on the tundra of winter spills from operating equipment is minimal or none. When accidental spills occur (line 6), the contaminated snow and ice is scraped up and removed for disposal. There are only 3 months during which tundra or waterways are exposed to minor spills. Because of ADEC regulations requiring the reporting and cleanup of all spills, even minor discharges are addressed immediately, cleaned up, and the area restored if necessary.

CONSEQUENCES RESULTING FROM CONSTRUCTION OF ROADS, PIPELINES, AND MARINE AND PRODUCTION FACILITIES

VEGETATION, WETLANDS, AND TERRAIN TYPES

102 2 1-5
103 1 1-2

To imply that there are "hundreds" of small areas of vegetation effected by oil spills is a great exaggeration. The number of spills for the entire Western Operating Area (WOA) of the Prudhoe Bay Unit (PBU) averages around 100 spills per year or less. Most spills are cleaned up immediately, and in the majority of cases no vegetative impacts occur.

When referring to those cases where tundra spills do cause local damage to the vegetative mat, the report should discuss and cite current work on restoration. Work funded by the oil industry has demonstrated that with the use of proper oil recovery and cleanup techniques, followed by simple restoration techniques, vegetation in tundra areas inundated by oil can recover successfully in a short period of time (as short as one

summer growing season). The speed and success of tundra recovery has been found to be positively correlated with the increase in the moisture level of the areas affected. Most spills occurring on tundra tend to collect in areas of low relief. Conveniently, these areas are wetter. Standing water in areas of low relief provides a buffer zone between the plant roots and the oil; thus only the upper leafy portions of the tundra mat are killed as a result of most spills. Recovery success is also dependent upon the type of product spilled. Crude oil spills have been observed to cause less damage than refined product spills.

Numerous references concerning arctic vegetation recovery are available and should be cited. They include: McKendrick et al. (1978), Walker et al. (1978), Webber et al. (1978), Chapin et al. (1980), Johnson et al. (1980), Johnson (1981), Pope and Hillman (1982), Pope et al. (1982), and Brendel (1985).

Diesel fuel spilled on the tundra may be toxic, especially if a large quantity of diesel is spilled on dry tundra vegetation, allowing penetration to the roots and thereby causing death of the plant. Surface only impacts may not effect the roots, allowing recovery within one season or less. As mentioned above, if the area is moist or allows for recovery on the ponded surfaces, the effects may be temporary with recovery in the same season. Numerous revegetation references from the mid 1980s are available and should be cited.

102 2 4 1

Reserve pit fluids spilled on the tundra may cause some impacts, especially if a large quantity of contaminants covers dry tundra vegetation, however, it was noted in the recently published USGS report for wellsite cleanup on the National Petroleum Reserve-Alaska (USGS 1986),"drilling muds eventually become overgrown by plants; salinity diminishes; and impoundments and thermokarst depressions are colonized by

p.	c.	¶.	l.	
				water-tolerant vegetation, if water depths are not too deep." Also discussed was that Alaska flora and fauna demonstrate a certain plasticity which provides a capacity for adapting to several commonly occurring disturbances associated with hydrocarbons.
102	2	5		The use of larger quantities of fuel at exploratory drill sites may provide a larger potential risk; however, the design and construction of exploratory pads provide much better spill prevention facilities and equipment. This undoubtedly contributes substantially to the spill statistics which indicate that over 95% of the spills that occur are classified as minor spills, generally less than 1 barrel and frequently less than 10 gallons.
				Similarly, the reference to spills occurring during seismic surveys should be quantified, and if not quantified, deleted. Although there were some fuel leaks during the two winters of seismic exploration in ANWR, they were negligible (totaling less than 5 gallons, L. Brooks, GSI, pers. comm.).
103	1	1	2	There are cases where diesel fuel spilled on the tundra may be toxic, however, the references cited in the 1002 draft report address work done in the late 1970s. Substantial revegetation work has been done since. Current references that should be cited are listed above under p. 103, c. 1, ¶. 1-2.
103	2	2		It is not appropriate for the draft LEIS to quote the Meehan report which is still in draft form and out for review. Additionally it is incorrect to use Meehan's model, developed for assessing potential habitat concerns for birds, and extrapolate its reported results to all wildlife in the area. (Even with regards to birds, Meehan's work showed different responses in different species.) In the report, and thus in the draft LEIS, a number of arbitrary assumptions are made

p.	c.	¶.	l.	
				concerning the level of impact that dust and gravel have on tundra wetlands. The assumed 100 foot zone of secondary impact around all facilities, which is stated as 7,000 acres of vegetation that could be modified, has no scientific justification. The actual significance of this secondary impact zone in regards to wildlife use of the 1002 area is also not explained. It has been well observed and documented that birds do use areas of tundra adjacent to facilities where snow melt has occurred earlier than surrounding areas. Additionally, impoundment areas have also been classified as desirable habitats for some species of birds.
103	2	4	12	The largest spill cited in this sentence occurred at Chena River, just outside Fairbanks. The inference that it happened at Prudhoe Bay should be corrected. It is important to clarify that the spill reports by the ADEC, stated as 23,000 in number, encompass a much larger area than Prudhoe Bay. Standard's average number of spills per year is approximately 100 for the PBU. This paragraph provides a very misleading picture of the the spill potential for an oil development area.
104	1	1	9	In addition to stating that most spills that occur in the Prudhoe Bay area are small, (less than 10 gallons) it should be pointed out that these spills rarely occur off gravel pads and roads.
104	2	1		(See comment for p. 100, c. 1, ¶ 1-2, and p. 103, c. 2, ¶ 2) The draft LEIS repeatedly ignores established environmental protection field practices, promulgated by regulation and company policies, for petroleum developments elsewhere on the North Slope. (e.g., snow removal zones, 24 hr. field spill response teams, field security enforced traffic controls, and regulated tundra travel procedures)

p. c. ¶. l.

104 2 1 7 Add the words "design and" in front of the word "construction." Appropriate design and construction does play a major role in preventing spills of all substances.

104 2 3 2 Change the word "moderate" to "minor". Based on the information presented in this section and current references on revegetation and spill impacts the expected modifications would have a minor impact as defined in Table VI-1 on page 96.

COASTAL AND MARINE ENVIRONMENT

105 1 6 2 The word "severely" should be deleted as it implies an impact of extreme consequence could occur from any size of spill during any time in this environment. Based on the history of impacts from spills, research into the environmental effects of spills year-round (Owens et al 1984 and Owens et al 1985), as well as the mitigating measures of spill cleanup and restoration that are part of industry policy and government regulation, this is unrealistic. As stated in the last sentence of this paragraph, the level of impact would relate to the volume of oil spilled, location, effectiveness of cleanup, time of year, and fish and wildlife species present. Even if the catastrophic event were to occur, spill cleanup and natural recovery would take place; the impacts experienced and their magnitude would be totally dependent on the conditions occurring at the time. Past EIS evaluations for potential spill events in the Alaskan arctic have determined this level of potential impact as moderate.

105 2 2 3 Change the word "major" to "moderate". This is based on the historical record of measured impacts from catastrophic spills that have occurred world-wide and the recovery time of the effected environments. As stated on p. 120, c. 1, ¶ 2, l. 1, "Adverse effects on birds from further exploration are likely to be minor." Past EIS evaluations for potential spill events

in the Alaskan arctic have determined this level of potential impact as moderate.

TERRESTRIAL MAMMALS

CARIBOU

105 2 3 Some data do not appear to be consistent with some of the statements made about use of the area for insect-relief. In contrast to statements referring to caribou going to the coast for insect-relief: 1) caribou have sometimes remained inland in spite of the presence of abundant insects; 2) insects were not always present during several of the late June - early July "insect-relief periods"; and 3) caribou have rapidly left relatively insect-free zones and entered more heavily insect-infested zones. The two most important activities in the 1002 area appear to be calving, and post-calving activities culminating in the formation of large post-calving aggregations and the beginning of post-calving migrations, not "...calving and seeking relief from insects...". It is true that caribou make use of insect-relief habitats in the area when insects are present. During post-calving, caribou seek and make use of insect-relief habitats whenever necessary and wherever they occur locally (whether they be coastal, inland, or somewhere in between). But post-calving aggregations form with or without insect harassment. Insects, when present, act as a local and short-term modifier of these larger-scale happenings. Post-calving use of the 1002 area appears to be based largely on social needs, not just the presence of insects. Generally, discussions of insect harassment and insect-relief habitat appear to ignore this aspect -- if everything implied about insects were true, one might expect the caribou, once forced from the hills by insects, to remain on the coastal fringe until the snow fell, instead of migrating back inland where insects are sometimes present in much greater numbers, or migrating back inland before insects have emerged in any great

p.	c.	¶.	l.	
				number, as has often been the case (D.G. Roseneau, 1987, pers. comm.). This section should also clarify that mosquitoes are the relevant insects in the 1002 area, and that the oestrid flies do not emerge until after most of the caribou have left the 1002 area.
105	2	4		Some disturbance-related displacement of CAH animals might occur, but will it matter -- will it be of true biological significance to the population? The CAH is increasing in size and "pioneering" new range (at least new to the animals that are present today). Given the size of CAH vs. its current range, it is doubtful that some displacement from areas east of the Canning River would have more than minor potential for truly adverse impacts to the herd. In fact, it is doubtful that full exclusion from these areas would be of more than negligible impact.
105	2	5		The discussion here, and throughout the biological impacts section raises the question of habitat (available acres) versus habitat value. Here, the discussion is back to habitat, i.e. the direct and indirect loss of acres with no discussion of relevant values. The inference is clearly that modified habitat has lost value, and for the purpose of impact evaluation the land is totally lost and irretrievable.
				With respect to displacement, not only does the impact assessment assume total loss of an area from which caribou are only partially displaced, but it does not consider the possibility that neighboring acreage could increase in value since the PCH is not limited by habitat availability. What is not recognized in the displacement arguments is that the value of any given habitat unit is dependent to a great degree upon the value of the adjacent habitat unit. While some habitat may be disturbed and therefore lowered in value, adjacent habitat may increase significantly in value and compensate for the

p.	c.	¶.	l.	
				disturbance simply because it is there, and is available. This is especially true when the species of concern is a habitat generalist. In other words, habitat of low value to the species of concern (such as areas not used as frequently by calving caribou), when considered as parts of a whole, may have great value and be perfectly satisfactory in meeting the animal's needs.
106	1	2		If the Canning Delta is supporting more calving than the Kuparuk area, this is apparently relatively new, and probably a function of increasing herd size (such did not appear to be the case in the early and mid-1970s). The suggestion that calving caribou have been displaced by the Prudhoe bay oilfield is not supportable and should be removed (see below).
106	Table VI-4			The information given in Table VI-4 is dubious at best and is too meager to even permit qualitative comparisons. Footnote No. 1 suggests that about 3,000 animals previously calved in the Prudhoe Bay development area. The 3,000 figure referred to total herd size and not just to parturient females. This information is from Child (1973) and reported by Shideler (1986). The information is very general, and what proportion of these animals actually calved in what was then considered to be the "development area" (generally within a few miles of the coast between Beechey Point and Mikkelsen Bay) or the immediate area of the present day development is unknown. The Table implies 3,000. Indeed, Child (1973), cited by Shideler (1986), refers to the coastal area of Prudhoe Bay as being "...an important summer range for a small population of approximately 3,000 animals...". Child (1973) also states that "Lately the Prudhoe Bay range has become increasingly important as a calving ground for a <u>small</u> segment of the resident herd that over-winters in the area." (i.e., presumably a small part of the 3,000 animals). Child (1973) reports that the incidence of calving "...within the oilfield..." for 1971 and 1972 was

contained in other brief reports -- Child (1971 and 1972). [These reports were apparently not accessed by Shideler (1986) -- nor by Cameron and Whitten in various publications.] The incidence of calving never totaled 3,000 animals. For example, on a May 1971 survey Child (1971) found only 68 caribou scattered in coastal habitats between Beechey Point and Mikkelsen Bay -- only 10 cow/calf pairs were identified among them. [Note: presumably, most of the remainder were cows and calving was still likely occurring. Even so, this provides some measure of the magnitude of calving occurring in the coastal lowlands near and at Prudhoe Bay in 1971. For the sake of accuracy, the number of cows and calves in Table VI-4 should be reported as cow/calf pairs. For instance, the number "13" for the year 1972 actually represents 8 cows and 5 calves (see Shideler 1986). The number "42" for the year 1973 actually represents cows, calves and an unknown number (presumably) of yearlings (see Shideler 1986). Are all of the "51" animals listed for 1974 cows and calves? The 1981-1985 "data" reported provide an essentially meaningless comparison with previous years (i.e., three years reported, but data are not available for two of them). *In summary, Table VI-4 is useless and should* be omitted.]

106 1 4-5 The impact analysis must be revised recognizing that no area fitting the definition of "core" calving area exists and that there is no basis for the 2-mile displacement zone assumed.

106 2 2 Here it is correctly noted that oestrid flies are not a major feature of the PCH's environment in the 1002 area.

107 Table VI-5 Table VI-5 is confusing because the reader must continually refer to the text to see if the numbers in the table represent acres or percentages. More importantly, the figures given in the table assume total displacement from the assumed 2-mile sphere of influence around all facilities, roads and

structures, and are therefore incredibly misleading. As discussed in our general comments, the 2-mile sphere of influence applied repeatedly in the impact assessment of caribou is based on an incorrect interpretation of the work performed by Dau and Cameron (1985). The table gives less experienced readers the impression that large acreages will be totally and irretrievably lost, which is not the case.

Even though there is some validity to the concept of partial displacement (versus total) there are no data suggesting that displacement of parturient caribou has any effect at all on their calving success or on calf survival. Therefore, it should not be inferred (as it is in this Table) that it constitutes an adverse effect.

Also, the text incorrectly reads: "percent of total US and Canada area potentially influenced by development" when it should be reworded to read: "percent of total calving grounds". As stated, it gives the impression that areas of Canada will be affected by development.

The table also perpetuates the concept that caribou are dependant on a small, fixed "core" calving area (i.e., 311,000 acres -- an area only about 22 miles by 22 miles in size). This is not true (see our general comments). The area should be described for what it is, an area used repeatedly but not exclusively or even predictably on an annual basis by parturient caribou.

Further, the number, 50 caribou/square mile is arbitrary, and no density information is available to support it. Not only are there no data to support the reference to 50 caribou/sq. mi., it is not clear to the reader whether or not the 50 represents cows, cows and calves, or pairs. Most scientists would assume that it meant cows for several reasons including:

1) because calves depend little on the habitat for nutrition, and 2) because the numbers could be greatly skewed by including calves depending on what hour/day the survey took place and how many cows had calved at that time. However, we have been informed that the figure 50 actually refers to total animals, mainly cows and calves, (A. Rappaport, FWS, 1987, pers. comm.). Given this information, there could be as few as 25 cows/sq.mi. (one per 26 acres), which is not very concentrated. Even assuming total displacement within a "2-mile sphere of influence", significant numbers of cows would not be displaced (approximately 12,000 cows of approximately 65,000 cows in the population).

This table and references to it should be deleted in their entirety. If not, the table must be thoroughly revised to indicate that caribou will not be totally excluded from the "2-mile sphere of influence" and the definition of caribou concentrations must be clarified.

107 2 2 This paragraph makes superficial generalizations about the degree and effects of displacement that do not reflect a full analysis of available information on the subject. The numerous studies in the Prudhoe Bay and Kuparuk areas have resulted in a considerable amount of information contained in reports and papers not apparently consulted (e.g. Fancy 1983, Robus and Curatolo 1983, Murphy 1984).

There is no evidence that caribou ever used the area of the Prudhoe Bay oilfield for a calving ground, and therefore, the lack of calving activity there cannot be taken to mean that caribou have been displaced.

As discussed in the General Comments, interpretation of Dau and Cameron's (1985) study is confounded and cannot be used as the basis of a rational impact assessment. Impact analysis should

be ecologically based, i.e. emphasis should be placed on the factors governing caribou population dynamics, and impact evaluated in this context.

The entire discussion of caribou response to development is so focused on a few studies evaluating local, insignificant responses to disturbance that the authors have failed to appreciate that caribou elsewhere, even in Alaska, are coexisting with significant human developments.

108 1 2 See discussion under page 105, col. 2, para. 5.

It is doubtful that some measure of displacement into somewhat "less desirable" areas will have an effect on productivity. Davis et al. (1985), reporting on the considerable habitat and sensory disturbances that have occurred in the traditional calving grounds of the Delta herd, stated "Again we observed no adverse effects on productivity, indicating that caribou are more flexible in their selection of calving habitat than previously recognized."

108 1 3 This paragraph is a meaningless description of densities with no connection to the ecology of caribou.

108 1 4 Overcrowding of the CAH is unlikely to occur. The only records of overcrowding refer to populations transplanted to insular situations lacking predators e.g., reindeer on St. Matthew Island, muskoxen on Nunivak Island. However, such an occurrence has never been documented for populations of wild mainland caribou.

The term 'habitat stress' is undefined. What do the authors mean?

p.	c.	¶.	l.	
108	2	4		Dau and Cameron (1985) do not show displacement of 2 miles, but even if they did, how would that displacement be harmful? Only if displacement increased mortality would there be an effect. Displacement by itself is harmless. See the discussion of Dau and Cameron's (1985) work in our general comments.
108	2	5		The "core" calving area concept has to be reconsidered, as does its classification as Resource Category 1. (See comments on earlier sections.)
109	1	2	23	The authors cite Helle and Tarvainen (1984) and Davis and Valkenburg (1979) out of context. This paragraph discusses insect harassment and its observed effects on caribou during the post-calving period on the ANWR coastal plain. At that time and location, caribou are exposed to harassment by mosquitoes. However, the cited references and descriptions of extreme consequences to caribou survival all concern infestation by oestrid flies. Harassment of Porcupine caribou by oestrid flies occurs later in the season and predominately southeast of the 1002 area after the great majority of caribou have vacated the coastal plain. The issue of insect harassment relative to 1002 area development should be kept strictly in its proper context, i.e., relief from mosquitoes, not warble flies and nose bots (oestrid flies).
109	2	3		The last sentence implies that PCH animals may not habituate to oil field developments. Although it may take longer if contact is less frequent, it is logical to assume that PCH animals will habituate to a reasonable degree within a reasonable time to a variety of activities and facilities based on evidence from all other mainland herds. For example the Delta Herd in Alaska has habituated to rather extreme disturbance from military activity (Davis and Valkenberg 1985), and the Snohetta Herd in Norway has adapted to potential barriers including two fences, a major highway used by large trucks, a high board snow fence, and a railroad (Bergerud et al. 1984).

p.	c.	¶.	l.	
110	1	1		The 2-mile interaction area is without proper basis.
110	1	2		It might be noted that the possibility of calves being trampled would be highest when large aggregations are present. This is also the time when disturbance might cause more calves to be separated from cows. Lost calves tend to be very susceptible to predators. Discussion of the possible effects of aircraft disturbance (and other types of disturbance on the calving grounds) on caribou should mention Davis et al. (1985) and Valkenburg and Davis (1985). These investigators found the Delta Caribou Herd to be one of the fastest growing in the state in spite of considerable disturbance by aircraft. They conclude that either the animals have become habituated to it, or have never learned to fear aircraft; habituation seems the likely answer. Discussion of energy stress and major physiological response is vague and speculative. It also reflects an apparent belief that caribou are poorly adapted to their environment and that they are on the brink of disaster. Caribou, in fact, are well adapted.
110	1	2-3		The effects of disturbance will also be partially offset by the fact that not all areas will be developed concurrently. Many of the potentially disturbing activities will be relatively short-term events (e.g., high levels of activities may occur along some roads for a few years, but thereafter occur at much reduced levels). Again, it must be stated that the basic assumption that all development will occur concurrently represents a major flaw in the assessment process.
111	1	4	7-10	A November 1 to May 1 limited drilling window is proposed for ANWR. For a company to maximize its efforts in the refuge while minimizing its costs, it must be able to conduct

p.	c.	¶.	l.	
				year-round exploration drilling operations. Under reasonable circumstances, industry can drill wells less than 12,000' in one season and would therefore try to restrict their activities to winter. However, wells deeper than 12,000' require more time. If industry is forced to restrict exploration drilling activities to the November 1-May 1 window the costs of deeper wells will be exorbitant - in the range of $50 million each -for operational and logistical reasons. The real disadvantage is that high costs may limit the number of exploratory wells that are drilled to 10 or 12 as has been experienced elsewhere in Alaska, e.g. Gulf of Alaska. The complicated nature of the geology demands that at least 30 wells be drilled if the full potential of the area is to be realized. The best way to find hydrocarbons in ANWR is to lower the cost of drilling and drill more wells - and the only way to lower costs is to allow year-round drilling. This sentence should be reworded as follows:
				...Oil exploration, should be allowed to proceed on a year-round basis provided industry uses techniques which minimize disturbance of the environment.
110	1	4		Given that responses do not automatically translate into
111	2	7		negative, biologically significant effects, a flight level of 2,000 ft for caribou is extreme. It is also unrealistic, given the common occurrence of low ceilings and fog. A more reasonable approach might be to settle on 500 ft as the baseline (responses tend to be moderate at this level), and then establish flight corridors wherever possible, including instructing pilots flying at lower levels to avoid passing over large groups of caribou. [Note: during about 4,500 hrs of Arctic Gas sponsored caribou surveys, Calef's observations of "herding" large groups from altitudes of 2,000 ft were never seen, except in cases where the aircraft happened to be flying in the same direction as the caribou were already moving in (D.G. Roseneau, 1987, pers. comm.).]

p.	c.	¶.	l.	
111	2	10		Given the fact that PCH caribou spend little time near the coast, there is no reason why facilities should not be located in this three-mile zone. Locating facilities there would, in fact, significantly reduce the degree of interaction between caribou and petroleum development.
111	2	11		The current practice of placing facilities at least 500 ft from a water course has been adequate. There is no justification for 3/4 mile super-buffer zone.
112	1	2		The expanding trend of the PCH in the absence of evidence of overgrazing clearly demonstrates that the herd is not at the carrying capacity of the land.
				What is the point of this paragraph? It is too vague to be useful.
112	1	3		A major change in distribution is <u>one</u> possible result of displacement. Minor or moderate changes in distribution are two other possible results. Even if a major change in distribution occurs, it <u>may not necessarily be</u> "...an adverse result...". Indeed, given the history and data on the CAH, it is difficult to imagine that entirely excluding them from the 1002 area (i.e., "... a major change in distribution...") would result in a biologically significant adverse effect on the population. It is also difficult to imagine that displacement of the PCH will translate into more than minor changes in distribution, even under full leasing. As long as conscientious efforts are made to ensure relatively free movement of the herd (e.g., by elevating pipelines; separating pipelines and roads; providing ramps, if appropriate; controlling traffic, if necessary). There is no reason to expect any significant adverse impacts as a result of development.

p.	c.	¶	l.	
				This paragraph contains a very superficial impact analysis that is meaningless. The whole issue must be revisited making realistic assumptions and analysing ecological factors that affect caribou.
112	1	3		The percent loss of habitat and acreage figures discussed here are totally unrealistic and misleading. Not only are they based on worst case development scenarios and the highly simplistic "sphere of influence" concept, but total displacement from areas within the "sphere of influence" which is assumed. It has not been proven that a 2-mile displacement zone around all facilities is realistic. If the "sphere of influence" concept is used to do impact projections it should be properly defined and supporting evidence cited for each species to which it is applied. (See our general comments.)
112	1	4		There may be "...Lack of relevant experience in estimating impacts on this herd...", but information relevant to estimating impacts to caribou could have been used to a much greater extent. We agree that the estimate of "20-40 percent" is uncertain. Again, because there are no convincing data suggesting that the herd is limited by habitat both the estimate and the possibility of an actual decline in the population are not convincing. Also, in this paragraph and in others, it is implied that changes in distribution automatically cause adverse impacts and lead to population declines. This is not necessarily the case. Indeed, if one considers caribou, one might suspect that it is probably not the case, except under extreme conditions. Caribou are especially adaptable to changes in distribution, and they have demonstrated this capability repeatedly.
				There is absolutely no basis for predicting a 20-40 percent decline in population. Not even the exaggerated impact predictions have been logically connected to any mechanism that

p.	c.	¶	l.	
				could lead to a serious population decline. What is a 20-40 percent change in distribution?
112	1	5		We agree that the effects on the CAH will be moderate at most, but suggest they are more likely to be minor or negligible. The primary effect could be a slight change in distribution that is unlikely to translate into a truly biologically significant effect on the population. An actual decline in numbers is not likely to occur, even under, full leasing. Indeed, it is reasonable to predict, based on historical data from the CAH and the biology of caribou, that the CAH will continue to grow in spite of any and all development east of the Canning River.
				The analysis of the impact to the CAH must be reconsidered.
				MUSKOXEN
112	2	4		McLaren and Green (1985) reported the results of a study of experimental disturbance of 'naive' muskoxen. The distance at which the first animal reacted averaged 345 m. and the distance at which 50% of the herd was alerted averaged 267 m. Two herds that were approached repeatedly showed evidence of habituation. Muskoxen also have easily adapted to captivity. There is good reason to expect that the muskoxen within the 1002 area would habituate to oilfield activities that might take place nearby.
112	2	5 and		M.A. Fraker (pers. comm.) conducted surveys of muskoxen in the
113	1	1		Canadian High Arctic in 1974 and 1975 and observed evidence of habituation to aircraft. His studies were based at Rae Point which was the base camp of Panarctic Oils. There was considerable aircraft traffic, including helicopters, Twin-Otters, DC-3s, Electras, 727s, and 737s. There was also a

small herd of muskoxen off the end of the runway. These animals sometimes looked up at the aircraft as they passed by, and at other times seemed to ignore them completely.

The effects of disturbance will also be partially offset by the fact that not all areas will be developed concurrently. Additionally, many potentially disturbing activities will be relatively short-term events (e.g., high levels of activities may occur along some roads for a few years, but thereafter occur at much reduced levels). Again, it must be stated that the basic assumption that all development will occur concurrently represents a major flaw in the assessment process.

113 1 3 Difficulties have been encountered in measuring and even detecting the effects of habitat loss and disturbance (in particular) on muskoxen (and on other species, including caribou). Using Miller and Gunn's (1979) conclusion provides only one side of the story. Their conclusion is speculative, and to be fair, their statement needs to be paraphrased: the presence of visible responses does not necessarily mean that significant physiological changes or energy drain occur at levels sufficient to have major effects (or even moderate effects) on the population over time.

113 1 3 The muskox population in ANWR was recently introduced (1969-1970) and is still rapidly expanding. Their population, like that of many other Arctic species is far below threshold levels and will remain so as a result of factors other than habitat. It is extremely unlikely that the muskox population will decline as a result of loss of any habitat.

Displacement from calving areas is somehow assumed to translate automatically into negative effects on productivity. That may not be true at all. The animals have demonstrated an ability to expand into and utilize new areas for calving as the

population has increased. The exponentially growing population is now calving over relatively large areas. It is quite possible that even relatively large amounts of displacement (or exclusion) from areas currently used by the subpopulation for calving may have little effect on either individual or group production. It is agreed that displacement from calving areas might have some effect on the muskox, but it is doubtful that it would be of more than minor consequence to the population; long or short term.

113 2 1 The report of Reynolds and LaPlant does not support the assumed 2-mile sphere of influence. [Russell (1977) is unavailable to us.] Once again the EIS simplistically assumes that the quantity of real estate translates directly to population well-being.

We suggest that the impact analysis be ecologically based.

114 1 1 The data on this vigorous population, especially in light of the limited amount of surface area that will actually be affected by development, do not support any predictions of major negative effects on muskoxen. Data from this population and other transplanted populations in the state suggest that the present management objective of continued, naturally regulated growth can be met, regardless of some development on 1002 lands. The major management effort should be directed at regulating hunting of the animals. It is understood that some hunting of muskox is already allowed in the refuge. It is also interesting to note that part of the population is already expanding into a region containing development, the Sagavanirktok river drainage.

Just because the Niguanak-Okerokovik-Angun subpopulation is somewhat smaller than the other two primary subpopulations, or that it currently experiences less immigration, does not

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automatically mean that effects might be more pronounced on that subpopulation (assuming development and activities to be similar in each area). Also, given the expanding nature of the subpopulations, it is reasonable to expect that over the next few years, the likelihood of both immigration and emigration will increase.

114 1 2 The prediction of a 25-50 percent population decline is surprising given that there is no scientific justification for it.

It is true that distribution changes may occur under full leasing. However, development will most realistically proceed in stages, and not all changes in distribution are likely to occur at one time. Distributional changes alone may not seriously affect the population. Given the data on this population, it is not inconceivable that even fairly large shifts in distribution may ultimately be of little consequence to the total population. It is implied that up to 50% of the population may suffer some unspecified form and degree of decline. This statement is totally unsupported and very ambiguous. It is almost certain to be interpreted to mean a decline in current total numbers by most readers. Is this a decline to some level, or is it an on-going decline? Is it a decline in productivity, rate of population growth, or total numbers? A decline in productivity in 50 percent of the population may only mean a slower growth rate in the total population. It would not mean a decline in population numbers unless the decline occurring in half of the population is sufficient to offset productivity and recruitment of the other half. Acknowledging available data on muskox population dynamics from these and other transplanted groups, and the demonstrated ability of muskoxen to expand into and exploit new areas, a population decline is unlikely. In fact, given these data, it seems reasonable to predict that both the ANWR

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subpopulation and the total Arctic slope population will continue to increase for some time. It is possible to speculate that in spite of some distributional changes or occasional mortalities, at some point total numbers may plateau at slightly lower levels than if petroleum development had not occurred. Even in that event, however, more animals will probably be present both during and after development than there are today (unless natural events or hunting intercede).

114 2 2 Historically hunting has not been permitted within the North Slope development areas and workers are not allowed to have firearms. For production safety reasons, it is anticipated that this policy would be applied to development areas within the 1002 area. All refuge regulations would be followed by petroleum workers.

WOLVERINES

116 2 5 The logic behind this conclusion of "major effect" is lacking. Displacement, avoidance and reduced food arguments are not based on sound scientific information. Additionally, hunting has not been permitted in the North Slope development area and workers are not allowed to have firearms. It is anticipated that this policy would continue in the 1002 area for safety reasons. All refuge regulations would be followed by petroleum workers. If harvest is the major problem, then it should be controlled by the appropriate regulatory wildlife biologists and not by prohibiting development.

POLAR BEAR

117 2 8 Development in Block C will have only minor adverse effects, if any, on the continued suitability of the eastern 1002 area for polar bear denning. Developments can be sited away from specific denning habitat such as riverbanks, draws, and leeward

p.	c.	¶.	l.	
				sides of bluffs, where drifting snow accumulates. Generally it is unlikely that many facilities, roads, etc. will be sited in such locations.
118	1	3		Given adequate pipeline elevation, it is unlikely that, once in place, they will act as barriers to the movement of female polar bears.
118	1	3		True, some reduction in the availability of denning habitat might occur, if production facilities were poorly sited. However, the resulting reduction should not be termed "major". The assessment assumes total exclusion of denning over the long-term which is not likely. Availability of some habitat within coastal denning areas may be reduced in the short-term. However, it is not unreasonable to speculate that bears will reuse some areas after production facilities are in place and construction activities completed. This is just one example in the Section 1002 report where the impact assessment unrealistically assumes "concurrent development" throughout the 1002 area while failing to take into account the duration of some events -- e.g., all roads are apparently always assumed to have high levels of activity on them when in fact some roads will almost certainly have much reduced traffic on them after production systems are brought on line.
118	1	3		"...the 12-13 percent of females denning on land..." Does this represent the percentage of the total females in the "ANWR segment" of the Beaufort Sea population that den on land, or does it represent the percentage of dens found on land during 1983-1985 (see p. 33 -- 87% of dens found offshore)? Given that only some relatively small, localized areas on the ANWR coastal plain provide suitable denning habitat, the number of dens that have been found on land in any one year (1-2, even in recent years when considerably more effort has been made to find them), and allowing for the fact that a few other denning

p.	c.	¶.	l.	
				females undoubtedly escaped detection, the estimate of 12-13 percent suggests that the "ANWR segment" of the 2,000 bear Beaufort Sea population is very small. Given the same information, and assuming the "ANWR segment" contains some reasonable number of adult bears (let's say 300 of which 100 might be potential breeding females), the estimate of 12-13 percent seems unreasonably high.
118	1	3		Given what is known about the Alaskan and the Yukon coast, including information provided by local residents and available data on denning, denning habitat and terrain, it is very doubtful that an "...especially significant area..." for denning will ever be found on land (including south of Demarcation Bay). The vast majority of female polar bears will continue to den offshore, just as they probably always have. If the implications of this paragraph are correct -- i.e., that the mortality of female polar bears is close to the maximum the entire Beaufort Sea population can sustain, and at a level where the annual loss of cubs from one or two dens and a few adult females might cause the entire Beaufort population to begin decreasing along the ANWR coast -- then it follows that subsistence hunting of females must be carefully watched, and perhaps even controlled or stopped.
118	2	2		Caribou should be considered in addition to polar bear when siting/orienting pipelines and roads at right angles to the coast in some coastal areas (e.g., Camden Bay).
118	2	4		It is not reasonable to classify the exclusion of only one or two bears from consistently used denning areas as more than a minor impact. It is difficult to believe, that such minor exclusion will be of real biological significance to the ANWR segment of the Beaufort Sea polar bear population (and certainly not to the Beaufort Sea population as a whole). If

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the ANWR segment is thought important in terms of the Beaufort Sea population, and is so precariously balanced between mortality of females and recruitment as to sustain more than a minor impact from such a potentially small decline in reproduction rate (i.e., the output of one or two adult females annually), then there seems to be little question that any current harvest of females of any age should be stopped. Declines in reproductive rates, as measured in terms of output of a few individuals, do not always translate into declines in populations. Even with relatively small populations (as in this case), survivability of cubs might be a more important factor.

118 2 4 11-16 Again, the arguments here are not convincing that the exclusion of one or two females from denning areas (even assuming total fidelity of individuals to specific areas) could have more than minor impact on the population. If the population is indeed so precariously balanced, then past and current general lack of management of subsistence harvests may be the real cause. That "...similar...intensive developments...along the entire northern coast of Alaska and Canada..." will occur does not seem very likely. Other developments might occur somewhere in the vast area, but not all sections of the coast are of high petroleum potential. Even the development scenario used for impact analyses in this report is acknowledged by the authors to be a worst case scenario and very unlikely. Realistically, if other developments were to occur, the resulting pattern would probably resemble the wide spacing found between current and abandoned DEW Line facilities rather than continuous complexes of active facilities, pipelines and roads.

BIRDS

119 2 6 6-8 The meaning of this sentence is unclear. The response of fall-staging snow geese to aircraft overflights is not highly

p. c. ¶. l.

variable. Virtually all studies conducted so far have shown that snow geese flush away from approaching aircraft flying at altitudes up to 10,000 feet (Salter and Davis 1974, Davis and Wisely 1974).

120 1 2 6-7 If these estimates are accurate, the area influenced will be about 12.7 thousand acres, or about 1% of the total 1.5 million acres of coastal plain in the 1002 area. This seems like a very low percentage, considering the peripheral influences that no doubt will occur if the birds are affected by increased air traffic in the area.

SWANS, GEESE AND DUCKS

120 1 3 5-7 Other studies that are not documented (e.g., Johnson 1984b, Doughtery 1979) indicate that if proper mitigation programs are initiated, productivity of waterfowl (especially common eiders and probably black brant) actually may increase in areas of industrial development.

120 1 3 8-10 This could be the single most important and profound influence on birds of 1002 development. Snow geese do interrupt fall feeding and do flush at the approach of aircraft flying at altitudes as high as 10,000 feet (see p. 119, c.2, ¶ 6, l. 6-8).

It will be important to maintain strict aircraft corridors (preferably close to the coast, but not right along it) during the 30-45 day fall staging period for lesser snow geese (15 August to 15-30 September).

120 1 5 6-13 Wright and Fancy (1980) suggested that the increased mortality on waterfowl nests at Pt. Thomson may have been caused by foxes following human scent to bird nests in the two study areas, rather than as a result of poor housekeeping at the drilling camp.

p. c. ¶. l.

120 1 6 1 There is a possibility that a major spill could kill waterfowl. Based on the history of incident in PBU, however, this is not likely to be the case unless a large oil spill occurs very early in the season contaminating large areas of first-of-the-season open-water. Based on analysis in spill contingency plans for the area, it is unlikely that even if a catastrophic incident occurred and waterfowl were oiled and subsequently died, that effects to the bird population could be measured. This is stated in the ADEC analysis on the seasonal drilling restrictions made in June 1984 (Final Finding and Decision of the Commissioners Regarding the oil industry's Capability to Clean Up Spilled Oil during Broken Ice Periods in the Alaska Beaufort Sea), as well as many other references.

121 2 4 12-14 We suggest rewording the last sentence in this paragraph, as follows: "The judicious placement of transportation corridors south of coastal tundra swan nesting areas and away from snow goose staging areas would be particularly important."

122 2 1 There is no justification for the statement concluding that "..displacement of these geese from 45 percent of their preferred staging habitat, a reduction in the Banks Island population or change in distribution of an average of 5-10 percent could occur." First, there is no explanation of how the displacement translates directly to changes in distribution or population size. Second, we strongly disagree with the wording that equates a change in distribution to a change in population size, especially a change of "...5-10 percent...". Davis and Wisely (1974) showed that snow geese did accommodate to aircraft traffic on the North Slope of the Yukon Territory; there is no reason to assume that accommodation will not occur in the 1002 area of Alaska.

p. c. ¶. l.

SEABIRDS AND SHOREBIRDS

123 1 4 6-7 Regarding the mortality of birds due to strikes with towers, antennas, wires, and other structures, the only work done on this subject for the North Slope has been in the Lisburne Field. The Lisburne Field Monitoring report should be referenced as well as the small number of actual bird fatalities. A comparison of the lower 48 mortality rates would also be useful.

RAPTORS

123 2 3 1-3 There is experimental evidence contrary to these statements. Ellis (1981) conducted extensive experiments for the U.S. Fish and Wildlife Service and the U.S. Air Force concerning the effects of supersonic military jet flights (with sonic booms) near nesting peregrine and prairie falcons in Arizona. He found that negative responses by falcons were brief and never limited productivity. He concluded that "the birds were incredibly tolerant of stimulus loads which would likely be unacceptable to humans."

123 2 3 Raptors are not "...acutely sensitive to disturbance...". This grossly overstates the case. Indeed, the entire issue of disturbance to raptors has been blown out of proportion in recent years. Many "potential" effects have been imagined (often with little actual knowledge of the birds' behavior), but few have been realized, and few are supported by data. Over the years, the repetitive process of compiling environmental assessments has resulted in some of the potential effects taking on more than their fair share of reality. The mere fact that birds are "disturbed" and respond in some way, even repeatedly, should not be interpreted to mean that the birds will typically abandon nests or that there will be a biologically significant effect. Indeed, if this were true,

there would not be a large, robust, growing population of peregrine falcons nesting successfully along heavily commercially fished sections of the Yukon River. On the Yukon, many pairs nest successfully within a few hundred feet of fishwheels, set-nets and heavy boat traffic, and often within 1/4 mile of camps and villages, where they are typically disturbed several times a day. Again, if raptors were "...acutely sensitive to disturbance...", how would one explain that on the Seward Peninsula, gyrfalcons and rough-legged hawks commonly nest on cliffs along road corridors, and in in close proximity to active mining operations. It is quite true that repeated harassment can cause abandonment of nests, but these birds clearly exhibit a great deal of tolerance to a variety of situations, especially to those activities not specifically directed at them. Distances at which repeated disturbance may actually begin to take a toll tend to be relatively short. If the birds are nesting in high "superior" positions, or are naturally buffered by terrain features the distance between them and a nearby activity can be surprisingly short. Generally, for a disturbance to have real biological effects on pairs of raptors (and especially on populations), the activity must be at close range (usually within a few hundred yards), or be specifically directed at the birds. It is hardly surprising that gyrfalcons nested within one mile of an active airstrip in NPRA. One might trace perceptions that raptors, such as gyrfalcons and peregrines, are "acutely sensitive" to being disturbed to the fact that people either do not know, or have forgotten, that buffer zones originally recommended to protect nest sites were just that -- buffer zones. When the concept of a buffer zone was first created, peregrine falcon experts took into account the distances at which birds would usually become defensive and stay away from eggs and chicks. Then, to "err on the side of caution", they doubled, or even tripled that distance. For example, the original recommendation to restrict activities within 1/2 mile of active nests included

approximately 1/4 mile of actual "buffer". To be safe, the Alaskan Peregrine Falcon Recovery Team decided to increase that buffer further, and recommended a 1 mile buffer zone. Later, based on the tendency to believe that "more is better", a new 2 mile component was added to the 1 mile buffer zone for certain activities. In recent years, authors of various impact statements and operational stipulations have begun interpreting the current buffer zones as areas within which the nesting birds will automatically respond in some detrimental way to any activities barely crossing into those zones. This has apparently happened because of a lack of familiarity of the definition and logic supporting the original sizes of the buffer zones for raptors. In other words, there is no recognition of the considerable "buffer" distance that had previously been incorporated. If the recommended buffer zones are incorrectly interpreted to mean that the birds are disturbed when these lines are crossed, then it follows that people might incorrectly assume that these birds, raptors, must be very sensitive to "disturbance". In general, this is not true at all.

The Terror Lake rough-leg example is not especially convincing because numbers of nesting rough-legs can and do change abruptly from year-to-year. Given the number of years involved, it is also possible that fewer birds nested in the area because of natural events. Extreme caution must be used when interpreting observations like these. Is there any solid data backing up the supposition that the hiatus in nesting was actually caused by construction activities? If the pairs' nest sites were located very close to the activities then there may very well be a valid relationship. If the nest sites were located farther afield, especially beyond 1/2 mile, then possible relationships become questionable. [Comment provided by D.G. Roseneau, 1987, pers. comm.]

p.	c.	¶.	l.	
123	2	5		It is agreed that adverse effects to raptors would be minor.
123 124	2 1	6 and 1		Given the number of subadult golden eagles vs. the size of the calving element of the PCH (even assuming double or triple the current eagle population estimates), there would have to be a very major decline in PCH before one can realistically imagine more than a minor impact occurring to golden eagles. If changes occurred in the distribution of the PCH, the subadult eagles could (and almost certainly would) easily shift their distribution to match the PCH distribution, just as they almost certainly do when distribution of the PCH varies naturally. [D.G. Roseneau, 1987, pers. comm.]
124	1	Concl.		Changes in the distribution of subadult eagles resulting from changes in the distribution of the PCH are unlikely to be of biological consequence to the eagle population. Changes would have no greater significance than those observed under natural conditions in response to annual variations in PCH distribution (subadult eagles are highly mobile, see above comment). Given the number of subadult golden eagles that are usually present, it is not reasonable to expect any decline in their numbers unless there is a very large decline in the size of the caribou herd. The ratio of these highly mobile nonbreeding predators to the migrating prey base (i.e., caribou) is very large. It is also doubtful that there is a direct linear relationship between the size of the PCH and the number of subadult eagles preying on it. From all reports, and from general observations (mid-1970s to present), the large Western Arctic Herd (WAH) appears to have fewer subadult eagles associated with it even though there are large numbers of adult golden eagles nesting in portions of the Colville-Utukok-Kokolik-Kukpowruk uplands and western Brooks Range. If this difference in numbers of subadults between the two areas is as real as available information suggests, the difference between the number of subadults frequenting the WAH and PCH calving and post-calving

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				grounds may well reflect (at least in part) the difference in the locations of the herds' ranges relative to the spring migratory routes of the eagles. Most golden eagles migrating into interior and northern Alaska, and the central and northern Yukon Territory, pass through the Whitehorse area into the upper Tanana and Yukon river drainages. The timing is such that many arriving subadult eagles have good chances of contacting elements of the PCH during its spring migration northward out of central Yukon wintering grounds. In years when the PCH winters almost entirely in the Chandalar district of Alaska, many eagles might still tend to contact this herd before filtering westward throughout the Brooks Range. Subadult eagles are not headed for eyrie sites and may tend to wander, a reflection of their opportunistic tendencies. Subadult eagles arriving north of the St. Elias and Alaska ranges, may be attracted to and "short-stopped" by caribou inhabiting the central and northern Yukon (PCH), and east-central and northeastern Alaska (Fortymile Herd and PCH). Instead of passing over this large accessible potential prey base and continuing towards western Alaska, the subadult eagles may stop and closely follow the movements of the PCH and Fortymile Herd. Currently, fewer golden eagles appear to frequent the range of the Fortymile Herd than frequent the range of the PCH. If the Fortymile Herd were to increase again by several tens of thousands of animals, more eagles would probably attend it. However, if the herd were to continue increasing, doubling, tripling, or quadrupling in size, one might expect concurrent increases in eagles to become ever smaller, and for their numbers to eventually "stabilize", fluctuating in response to other factors, regardless of increasing herd size. [It is interesting to note that the current estimates of the number of subadult eagles frequenting the PCH calving grounds do not appear to be much different from rough estimates made in the mid-1970s, when the PCH was smaller.] [Comment provided by D.G. Roseneau, 1987, pers. comm.]

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FISH

125 1 3 The tone of the impact assessment is one of overstatement. Key fish issues are (1) winter water withdrawal, (2) adequacy of culverts for fish passage [this was the conclusion of the study of Alyeska Pipeline impacts to aquatic environments (Aquatic Environments Ltd. 1985)], and (3) disturbance of fish overwintering habitats.

125 2 1 Loss of fresh water fish habitat will be minor. Direct mortalities will be few, at most, and will not significantly affect the fish populations. Not considered here is that the creation of gravel pit water sources and other reservoirs may provide increased productive fish habitat.

125 2 2 4 Sticklebacks are one of the more successful freshwater fishes in the Arctic, both in terms of widespread distribution and abundance. We are not aware of any study which has found them to be an "important food source" for other fish. They are very poor swimmers compared to salmonids. It is not reasonable to require that culverts be designed for stickleback passage. Culverts should be designed for passage of key fish species identified because of their economic or subsistence value.

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EFFECTS ON SOCIOECONOMIC ENVIRONMENT

126 2 6 The economic benefits, given the North Slope Borough CIP Program and taxation, should be explained.

SUMMARY OF UNAVOIDABLE IMPACTS, ALTERNATIVE A

131-132 Rather than comment on this summary we refer you to comments already provided in the detailed sections.

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SUMMARY OF RECOMMENDED MITIGATION FOR THE 1002 AREA

Pages 145-147

Stipulation 1 We support the concept of consolidating facilities and designing all structures to minimize effects on the environment. We suggest modifying this stipulation to read: "...Locate nonessential facilities outside caribou calving areas where feasible and prudent."

Stipulation 2 This is a standard engineering practice; however, it should be recognized that other factors will be involved in the final design criteria for each structure. We suggest adding the words "feasible and prudent" to the end of the sentence.

Stipulation 3 Gravel sources are prevalent throughout the 1002 area. Gravel may provide, in many cases the most feasible option from an operational and economic standpoint. It is not reasonable to limit the use of gravel for exploration wells, especially those deeper than 12,000' that cannot be completed during the November 1-May 15 period. The "thin pad" concept can be utilized to minimize gravel quantities. We suggest the following wording: "The use of gravel for exploration operations should be minimized where feasible and prudent."

Stipulation 4 Rehabilition plans are included as a section of the Exploration Plan of Operations.

Stipulation 5 Change the word "prohibit" to "restrict." Maintenance and spill response require access. As in the PBU this access can be restricted to protect the active layer of the tundra during certain times of the year. In PBU all off-tundra travel involves specially designed and approved vehicles to minimize surface impacts; operations are then conducted by permit only.

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Stipulation 6

Under reasonable circumstances, wells less than 12,000' can be drilled in one season and industry would try to restrict their the operation to winter. Deeper wells will require more time, and there is no logistical or operational reason drilling should not be allowed to continue into summer.

Allowing operations on a year-round basis will considerably reduce costs. Exploration costs will figure prominently into the ultimate success of any exploratory effort in ANWR because it will dictate the number of exploratory wells that are ultimately drilled. The recent EIC well, for example, was 14,000', required two seasons to drill and cost approximately $50 million. If costs remain this high, it is fair to predict that less than a dozen wells will ever be drilled in ANWR unless an early discovery is made. The complicated nature of the geology demands that if the full potential of ANWR is to be realized, industry will have to drill 30 plus wells. Recent examples of exploratory efforts limited by costs and lack of ecouraging results include the Gulf of Alaska, Lower Cook Inlet, Navarin Basin and Offshore Beaufort Sea, where only 6-10 wells were drilled in each area.

We suggest that this stipulation be revised as follows: "Oil exploration should be allowed year-round except in those areas where summer activity would have a significant adverse impact on wildlife populations."

Stipulation 7

We suggest that gravel removal and water removal be addressed separately recognizing the different regulatory authorities covering each action. The habitat issues are different and should be mitigated on both a seasonal and case by case basis.

Stipulation 8

We fully support this stipulation.

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Stipulation 9

There are several problems with caribou ramps that must be understood. When ramps are used, pipelines are usually at an intermediate height, forcing many caribou to use the ramps rather than cross under the pipe. To allow the passage of large numbers of animals, ramps would have to be very wide, and the situation could still present some difficulty. The other problem is that the convergence of the ramp and pipe creates visual barrier that could cause a local avoidance response. The best option is to design a uniformly elevated pipeline wherever feasible and prudent; and where elevated pipelines are not possible, ramps should include wide "fans".

Stipulation 10

We support this in theory, but for operational and maintenance reasons it may not always be the best or safest option. Spill detection and surface access will play significantly in the design of oil transport structures. This stipulation should be modified to read: Bury pipelines where <u>feasible and prudent</u>.

Stipulation 11

Typos, <u>terrain</u>, <u>caribou</u>. This mitigative point is not consistent with NSB permitting policies concerning the need for pipeline maintenance roads to allow for periodic inspection and maintenance of lines for spills and spill response. In addition, this stipulation is inconsistent with the stipulation 1 and other sections of the report which requires consolidation of facilities by using roads as construction work pads for pipelines. The edge of the road should be no more than 30 ft. from the furthest pipe for side boom stringing.

Stipulation 12

This stipulation is surprising since the farther south oil field facilities are sited, the greater the potential exposure of calving caribou to those facilities, and the greater the contact with migrating herds.

We suggest any stipulation on the location of facilities be deleted. The issue will be evaluated during the EIS process

following a discovery when the location of the oil is also known. If a decision must be made at this juncture regarding the location of surface facilities, we suggest for biological reasons that they be clustered as close to the Beaufort Sea as feasible. [The concept of minimizing contact with caribou as much as possible by keeping structures as close as possible to the coast was the primary conclusion of a six-year mitigation study undertaken for the Arctic Gas Project. The basis for this conclusions was that nearly all contact with calving animals would be eliminated, and any contact that might occur would be limited to brief encounters.]

There are engineering problems inherent in siting facilities very close to the coast, so we suggest the following wording: "Oilfield support facilities should be clustered as close to the coast as feasible and prudent, consistent with environmental hazard considerations. Long uninterupted distances should be maintained between support clusters."

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Stipulation 13 — Monitoring programs must be kept highly focused if they are to provide useful information.

Stipulation 14 — This stipulation should be modified to require a 500 ft. setback from major rivers and a 100 ft. setback from all other fish bearing streams and lakes in accordance with current State standards that have proved effective.

Stipulation 15 — We recommend separate altitude restrictions for large and small aircraft. For small aircraft, a minimum altitude restriction of 1,000 ft. AGL is adequate. We also recommend establishing corridors for very low altitude flights during fog conditions.

Stipulation 16 — See the comment on raptors (page 123, col.2) provided by D. G. Roseneau. A 1-mile buffer should be adequate.

Stipulation 18 — This stipulation should be modified to read: "Survey suitable habitat in the area of operations annually to locate nesting peregrines and other raptors."

Stipulation 19 — This stipulation should be modified to read: "Monitor for female polar bear in the area of operations."

Stipulation 20 — Construction of development facilities will have to be allowed on a year-round basis. Construction of exploration locations will have to be authorized in October, even near the coast, if they are to be drilled during the November 1-May 15 winter drilling window. This stipulation should be deleted.

Stipulation 21 — Historically the possession of firearms has been prohibited in the vicinity of oilfield facilities.

Stipulation 23 — This species is not legally protected and there is no data suggesting that it has ever been threatened by development. (see comment, p. 23, col. 2, ¶ 4.) This stipulation should be deleted.

Stipulation 24 — It may be administratively efficient to establish a performance standard stating that there should be no changes in lagoon water chemistry as a result of development, however, in practice this is not a feasible or prudent standard. Basically, it is easy to characterize the coastal waters in terms of what is expected under certain river discharge flow conditions, and wind velocities, whether it is early season or late season. However, the occurrence of these conditions is extremely variable both temporally and spatially. This makes it difficult to describe specifically what the water quality characteristics will be in a given area at a given time. Therefore, with the inability to determine the "baseline" water quality to an exact salinity and temperature, it would be difficult at best to establish a causal linkage between a

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development activity and an observed water quality condition--the water quality might vary naturally within the range that is observed post-development.

The coastal waters of the Beaufort Sea are characterized as being estuarine because of the interaction and mixing of the marine ocean waters with the freshwater discharges of rivers and streams. The coastal waters of Simpson Lagoon were studied in the 1970s and the Prudhoe Bay/Gwydyr Bay waters in the mid-Beaufort area have been studied intensively since 1981. This habitat is best described as an "ecotone" between the marine and freshwater ecosystems. At certain times and locations the boundary between the marine and freshwater masses is distinct, fairly narrow (in terms of distance seaward from the shore) and may be evident from froth lines on the surface. At other times and locations, the boundary may be broad, such as in Simpson Lagoon, where mixing has occurred and the water mass is somewhat enclosed. This ecotone is extremely variable in time and space, perhaps more so than other habitats because of its strong three dimensional character. It is a boundary condition that expands and contracts seasonally, even daily or hourly, with snow and rainfall, wind speed and direction, river discharge, etc. The annual variability is similarly large, and has produced the descriptive phrase, "a typical atypical year in the arctic".

Stipulation 25 — Eliminate time and area closures/restrictions so exploration and development operations can be conducted on a year-round basis. Certain construction work such as placement and compaction of unfrozen gravel must be carried out during the July-mid-September period. Also, field production operations must continue on a year-round basis.

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Stipulation 26 — Rather than establish another set of flight altitudes and area closures, we suggest creating flight corridors and setting altitude minimums at 1,500' for large aircraft and 1,000' for small aircraft.

Stipulation 27 — This suggests that all camps and pump stations must be fenced. Fencing causes excessive snow drifting which can significantly obstruct surface facilities and access points, obscure spills from detection, cause excess spring ponding and require excess operation time and equipment for maintenance. Delete this stipulation.

Stipulation 30 — Control, use and disposal of fuel and hazardous wastes will be in accordance with state and federal regulations. We suggest the following wording: "Provide plans for control, use, and disposal of fuel and hazardous wastes in accordance with state and federal regulations."

Stipulation 31 — Numerous state and federal laws regulate the handling of hazardous wastes. This stipulation should be changed to read: "Provide treatment storage and disposal of hazardous wastes in accordance with federal and state laws and regulations."

CHAPTER VII OIL AND GAS -- NATIONAL NEED FOR DOMESTIC SOURCES AND THE 1002 AREA'S POTENTIAL CONTRIBUTION

The authors are to be commended for a lucid and concise summation of the 1002 area's potential contribution to the national need for oil and gas. The account is conservative in that it focuses on the impact of the mean conditional resource estimate of 3.2 billion barrels of recoverable oil for the full leasing alternative. It would also have been appropriate to show the impact of the 5% case and the high end economic scenario.

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New significant medium and long-term economic trends have been induced in the past 18 months by the oil price collapse. Because of this and the resultant depression in the U.S. domestic oil industry, the trends projected for domestic oil production and imports may be significantly worse than shown in Table VII-2. The figure for domestic oil production of 8.2 million barrels per day in the year 2000 is very optimistic. Oil imports may be as much as 70% of domestic oil needs by the year 2000, not 47% as projected in Table VII-2. Because of declining U.S. production (the U.S. is the world's largest oil consumer and importer) and similar declines in non-OPEC sources (e.g. North Sea) even modest increases in consumption growth rates will eventially put significant upward pressure on oil prices. Higher price scenarios (in real dollars) should not be discounted.

The Department of Energy is revising its petroleum forecasts which will be published in a report in February 1987. We recommend that Chapter VII be revised to incorporate those findings which should reflect the factors discussed above.

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STANDARD OIL COMPANY RECOMMENDATIONS

The draft 1002 draft report will establish a basis for the compilation of a credible final report to Congress supporting full leasing (Alternative A) of the ANWR Coastal Plain with the following recommended revisions:

1. A critical review of the applicability of the USFWS Mitigation policy as applied to the North Slope of Alaska and the major species of concern -- caribou, muskoxen, polar bear, snow geese, and arctic char;

2. Revision of the impact assessment methodology to evaluate the population limiting factors on caribou and other wildlife species of concern;

3. Re-evaluation (and additional literature research) of the baseline data and impact analyses relating to caribou, including the "core calving area" concept, the "sphere of influence" hypothesis, the interaction of wildlife with oil field facilities, and the importance of insect relief areas to caribou during their annual migration cycle;

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4. Review of the existing regulatory framework and standard industry practices in Arctic Alaska that accomplish environmental mitigation, and revision of the impact conclusions and mitigation recommendations to reflect the same;

5. Revision of the development scenarios reflecting a more sequential and staggered series of field developments rather than the assumed concurrent development of 3 major fields, and revision of the impact conclusions to reflect the same; and

6. Update of Chapter VII to reflect the impacts of 1986 price collapse on future U.S. energy situation and the contribution of ANWR's potential petroleum resources.

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APPENDIX

SAPC Testimony, January 5, 1987
SPC Testimony, January 9, 1987

TESTIMONY OF

STANDARD ALASKA PRODUCTION COMPANY

ON THE

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

FOR THE

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

January 5, 1987

PRESENTED BY:

ROGER C. HERRERA

MANAGER EXPLORATION AND LANDS

Mr. Chairman:

My name is Roger Herrera and I am representing the Standard Alaska Production Company with whom I am employed as Manager of Exploration and Lands.

The 1002(h) report has two great attributes which are not often seen in environmental impact statements - it is short and readable. The authors are to be complimented because these praiseworthy characteristics have probably resulted in the report having been read in its entirety by a large number of people. The nature of the decision to be made regarding the Coastal Plain of Arctic National Wildlife Refuge obviously demands a careful and dispassionate assessment of the knowledge gained from the six years of concentrated study in the area. It is our opinion that the 1002(h) report sets out that information in a meaningful and relatively balanced way. It is an adequate document to make judgments on the issue.

You have previously heard testimony from the Alaska Oil and Gas Association. Standard Alaska Production Company was involved in the preparation of that statement and endorses it in its entirety. We believe that the Coastal Plain of ANWR must be opened in full to responsible leasing, exploration, development, and oil production (Alternative A). Only in that way will our future state and national interests be adequately considered. We must plan to boost our domestic reserves and production, and at the same time indulge in responsible conservation if we are to preserve our lifestyle.

The Coastal Plain of ANWR figures prominently both as a possible source of major oil supplies and as a means to assuage man's yearnings for the aesthetics of solitude, scenery, and wildlife.

Without Coastal Plain oil it is perhaps pertinent to mention that the aesthetic experience of wilderness that is perceived to be the alternate goal to development will be available only to an elite few. It is also reasonable to mention that the tens of thousands of Americans and other visitors who have enjoyed a once-in-a-lifetime trip to the North Slope in the past decade have done so because of the development of Prudhoe Bay. Prudhoe Bay has not destroyed their arctic experience, it has made it possible, unique, and memorable. A small point, but one worth remembering.

One aspect of the report requires comment at this stage, namely the bias recognisable in the chapters dealing with caribou. This bias has lead to an emphasis on a proposed mitigation measure, the utilization of the Fish and Wildlife Service mitigation policy.

In discussing the inappropriateness of this policy in Alaska, reference must be made to the recently initialed U.S./Canadian Porcupine Caribou Agreement of December 3, 1986.

The Fish and Wildlife Service mitigation policy was deliberately excluded by the U.S. Government from that Agreement. If the use of the mitigation policy is unacceptable to the Government in its efforts to achieve conservation of the Porcupine Caribou herd in conjunction with the Government of Canada, what justification is there to impose it on industry in order to achieve exactly the same results on the Coastal Plain?

The Fish and Wildlife Service mitigation policy and some of the biological conclusions in the report result from an assumption that fish and wildlife populations using the ANWR Coastal Plain are indiscriminately limited by habitat availability. There is no evidence to support this assumption and, in fact, the report does not cite or discuss any evidence to justify that position.

Nesting birds on the North Slope are in general much more influenced by weather than they are by habitat, and there are no examples of mammal population size or productivity which has been limited by North Slope habitat availability. Caribou abundance is believed to approximate prehistoric levels in the North American Arctic, and it is generally accepted that caribou productivity is limited principally by wolf predation on the fall, winter, and spring ranges, augmented by human harvest. It is therefore not logical to suggest that animal species distribution or abundance would change in any biological, meaningful way as a result of the limited, low-density oilfield construction approach used in Arctic Alaska. Recent bird studies (Troy et al 1986) and fish studies (Craig 1986) support this conclusion, and the steadily increasing caribou populations during the period of oilfield development also indicate that habitat is not a confining factor.

The only biologically effective approach to assessing and mitigating any effects of development on wildlife is to determine how industry activities will alter population-limiting factors for each species of concern, and then to apply mitigative measures that avoid those limiting factors. That is quite different from and more practical than the Fish and Wildlife Service policy of preserving "habitat value". Such a policy usually translates into protecting land from change, or ensuring that all change is "natural". This ignores Arctic biology and makes policy dominant over biology. It imposes a particular point of view on the real world without determining whether the real world conforms with the imposed viewpoint.

In this case the policy is flawed and should be scrapped in Alaska. Likewise some of the proposed mitigating measures which result from the policy are unnecessary and often counter-productive. Many of the mitigating measures that have been proposed have been proven to be effective on the North Slope and are fully supported by Standard Alaska Production Company. Our aim with regard to environmental protection is the same as the Department of Interior's, but we feel strongly that the end result of oil production with minimum and acceptable environmental impact cannot be achieved using the Fish and Wildlife mitigation policy in the Arctic.

Two other points about the caribou sections of the report: First, the report would be greatly strengthened and balanced if reasonable use had been made of the information and analysis of the expert caribou Canadian biologists, Bergerud, Jakimchuk, and Bamfield. Their work has been largely ignored in the draft LEIS and the dismissal of the dissident views of Bergerud on Page 110 as "widely disputed" is a distortion unworthy of the authors. Second, the so-called core calving areas of the Porcupine herd and the "space constraints" which the caribou are supposedly subjected to at that time of the year, ignore the fact that many tens of thousands and in some years, hundreds of thousands of Porcupine Caribou calve in Canada. The maps in the report are misleading and less than scientific in not depicting the full calving range.

It is our intention, Mr. Chairman, to comment in detail on this and other issues in a separate written submission which we hope will be carefully considered.

TESTIMONY OF

THE STANDARD OIL COMPANY

ON THE

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

FOR THE

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

January 9, 1987

Washington, D.C.

PRESENTED BY:

ROGER C. HERRERA

MANAGER EXPLORATION AND LANDS

STANDARD ALASKA PRODUCTION COMPANY

Mr. Chairman:

My name is Roger Herrera and I am Manager of Exploration and Lands for the Standard Alaska Production Company. Today I am presenting testimony for The Standard Oil Company.

Standard is the largest producer of oil from the State of Alaska and has been present as an explorer and producer in Alaska since the late 1950's. The 1002(h) report has drawn on many scientific and technological studies carried out by or for Standard Oil as is recognized in the bibliography. Based on our long experience of operating in the Arctic, we believe the report is thorough, balanced, and fair in its description of the coastal plain ecosystem and assessment of scenarios of development. It needs some modification in the caribou section to make it more realistic, and it does not justify some of the proposed mitigation measures, especially the use of the Fish and Wildlife Service mitigation policy. That policy, which concentrates on preserving habitats rather than populations of animals, cannot benefit wildlife in Alaska. Alaska, in particular the North Slope and coastal plain, is unique in having more habitat than animal species can ever occupy. Consequently, administrative efforts to protect habitat above all does little or nothing to benefit populations such as caribou, polar bear, musk oxen, etc. The concept and practice of mitigation is akin to motherhood and totally accepted by my company, but I know from 25 years experience in the Arctic that the Fish and Wildlife Service mitigation policy is a poor protective mechanism and it should be changed.

The success of our mitigation efforts in the past is perhaps measured by the results of a recent public opinion poll in Alaska (Dittman November 1986). Eighty-six percent of the respondents thought that the oil industry has operated in an environmentally safe manner at Prudhoe Bay. Only five percent gave negative replies. That accolade was earned not because of protective environmental regulations and stipulations, although they obviously played a part, but principally because the operating oil companies pursued a philosophy of care for the environment and the animals. This was done for two reasons. First and foremost, because we are human beings too and have the same appreciation of wilderness and the aesthetics of scenery or seas of caribou as anyone else. Secondly, there is a clear logic and self-interest in not doing this wrong in the Arctic. A simple example is an oil spill on a gravel pad or the tundra. The spill itself cost the value of the oil - perhaps a few dollars, but the cost of clean up is usually measured in thousands, tens of thousands, or millions of dollars. The incentive not to spill oil quickly becomes very clear, as does the incentive to design better equipment to prevent oil spills.

It is perhaps worth mentioning, in passing, that the statistics on oil spills contained in the report are no doubt correct and represent the facts of life working outside at 40 or 50°F below zero in a harsh environment. What is not mentioned is the fact that the vast majority of those spills occur on gravel pads or roads and that all of them are totally cleaned up.

A recognition of this effort is seen in the figure of 83% of Alaskan respondents (November 1986 Dittman poll) who believe that the oil industry can operate safely in wildlife refuges in Alaska.

The success of future development of the coastal plain of ANWR will be achieved in two ways. One, by continuous and friendly consultation and coordination between industry, native residents and refuge managers and other Fish and Wildlife Service personnel, and secondly, by repeating and enhancing the philosophy and practice which has worked so well at Prudhoe, Kuparuk, Milne Point, and Endicott. Surely those two requirements are not beyond our capability?

Before closing let me mention some aspects of the report that require attention. The maps depicting caribou calving areas are less than truthful and if they have been used to arrive at the conclusions on caribou concentrations, etc., those conclusions must be wrong. Caribou calving areas have been mapped annually deep into Canadian territory, and not to depict the total calving area on the maps is unscientific and akin to joining the flat earth society. This should be rectified.

The three mile buffer zone precluding development facilities at the coast to protect caribou insect relief areas is unnecessary. Caribou use of that zone is sporadic and ephemeral and southern areas of the coastal plain are much more important to the herd than the northern fringe.

Standard Oil supports Alternative A. We appreciate the opportunity to testify and will submit detailed written comments in due course.

STATEMENT ON THE DRAFT REPORT

"ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA,
COASTAL PLAIN RESOURCE ASSESSMENT"
AND LEIS

BEFORE THE SECRETARY OF INTERIOR

SUBMITTED BY
TENNECO OIL COMPANY EXPLORATION & PRODUCTION
ON
JANUARY 9, 1987

MR. SECRETARY, I AM DR. MICHAEL ZAGATA, DIRECTOR OF THE ENVIRONMENTAL AND SAFETY DEPARTMENT FOR TENNECO OIL COMPANY. MY PURPOSE IN BEING HERE IS TO ADDRESS ONE OF THE ISSUES RAISED IN YOUR DRAFT REPORT, IE. THE POTENTIAL IMPACT OF OIL AND GAS EXPLORATION AND DEVELOPMENT ON THE PORCUPINE CARIBOU HERD. I WILL FOCUS ON THE CARIBOU ISSUE BECAUSE IT IS SYMBOLIC OF THE HEART OF THE PRESENT DEBATE CONCERNING THE NEED TO EXPLORE FOR AND CONSIDER THE DEVELOPMENT OF THE OIL AND GAS RESERVES BENEATH THE ARCTIC NATIONAL WILDLIFE REFUGE.

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ALTHOUGH THE UNITED STATES, INDEED THE WORLD, CURRENTLY ENJOYS AN ABUNDANT SUPPLY OF PETROLEUM, WE MUST LEARN FROM HISTORY THAT THAT SUPPLY IS CYCLIC. IT IS LIKELY THAT DURING THE NEXT DECADE THE U.S. WILL EXPERIENCE ANOTHER SHORTAGE. WHEN THAT HAPPENS, AMERICANS AS A NATION WILL, FOR A VARIETY OF REASONS, FIND WAYS TO EXPLOIT POTENTIALLY COMMERCIAL DEPOSITS OF PETROLEUM.

MR. SECRETARY, TENNECO CONCURS WITH YOUR FINDINGS THAT THE COASTAL PLAIN IN ANWR POTENTIALLY CONTAINS ENORMOUS DEPOSITS OF PETROLEUM.

THEREFORE TENNECO TAKES THE POSITION THAT THE CONTROVERSY PRESENTLY SURROUNDING ANWR IS NOT SO MUCH A QUESTION OF WHETHER THE MINERAL RESOURCES BENEATH THE REFUGE SHOULD BE EXPLORED FOR AND DEVELOPED, AS IT IS A QUESTION OF WHEN THOSE POTENTIAL PETROLEUM DEPOSITS WILL BE EXPLORED FOR AND DEVELOPED.

THE PRINCIPLE ARGUMENT AGAINST THE OPENING OF ANWR FOR PETROLEUM EXPLORATION AND DEVELOPMENT APPARENTLY IS THE PRELIMINARY FINDING IN YOUR DRAFT REPORT THAT THE PORCUPINE CARIBOU HERD WILL BE ADVERSELY IMPACTED BY DEVELOPMENT ACTIVITIES. INCIDENTAL TO THAT FINDING, CERTAIN HABITAT HAS BEEN PLACED IN RESOURCE CATEGORY I, AND BY SO DOING, THE POTENTIAL FOR MITIGATION IS NEGATED. AS A PROFESSIONAL WILDLIFE BIOLOGIST, I QUESTION THIS HABITAT CLASSIFICATION BECAUSE I AM RELUCTANT TO CONCLUDE, BASED ON AVAILABLE INFORMATION, THAT NO MITIGATION IS POSSIBLE. WITH MORE INFORMATION SPECIFIC TO THE PORCUPINE CARIBOU HERD, I BELIEVE EFFECTIVE MITIGATION MEASURES CAN BE FOUND. MOREOVER, THE LONG-TERM IMPACT OF PETROLEUM DEVELOPMENT ON THOSE CARIBOU WILL DEPEND ON THE "TOOLS" WHICH REFUGE PERSONNEL HAVE AT THEIR DISPOSAL FOR RESOURCE MANAGEMNT, AND/OR THEIR USE OF SUCH TOOLS.

TENNECO HAS A STRONG CORPORATE POLICY TO PROTECT THE ENVIRONMENT AND HAS A HISTORY OF CONDUCTING ITS BUSINESS IN A MANNER THAT MITIGATES ADVERSE IMPACTS ON THE ENVIRONMENT AND WHERE, OPPORTUNITIES EXIST, ENHANCING THE ENVIRONMENT. INDEED, TENNECO'S MANAGEMENT CONSISTS OF MANY PEOPLE, WHO IN THEIR PRIVATE, AS WELL AS PROFESSIONAL LIVES, ARE CONSERVATION MINDED. TENNECO THEREFORE TAKES THE POSITION THAT IT SHOULD BE EXPECTED TO CONTINUE CONDUCTING ITS BUSINESS IN AN ENVIRONMENTALLY RESPONSIBLE MANNER AND CAN BE EXPECTED TO SEEK WAYS TO MINIMIZE ADVERSE ENVIRONMENTAL IMPACTS.

TENNECO DOES NOT FEEL THAT THE ANWR ISSUE SHOULD PIT PRO VS ANTI-DEVELOPMENT INTERESTS AGAINST ONE ANOTHER. AS AMERICANS, IT IS IN ALL OF OUR BEST INTERESTS TO DETERMINE THE AVAILABILITY OF A POTENTIALLY ENORMOUS ENERGY SUPPLY. IT IS ALSO IN OUR BEST INTEREST THAT WE DO IT IN AN ENVIRONMENTALLY RESPONSIBLE MANNER.

WE ARE COMMITTED TO THAT END AND THAT IS WHY WE FEEL THAT NOW IS THE *MOST OPPORTUNE TIME TO DETERMINE IF THAT ENERGY RESOURCE REALLY* EXISTS. WE HAVE A SHORT TERM OVERSUPPLY OF ENERGY AT PRESENT. THIS GIVES US THE LUXURY OF SOME ADDITIONAL TIME - TIME TO CONDUCT THE RESEARCH NEEDED TO DETERMINE THE POTENTIAL FOR ADVERSE AND/OR POSITIVE IMPACTS ON THE CARIBOU HERD, TIME TO CONSIDER AND TEST MITIGATION MEASURES, AND TIME TO CONSIDER OPPORTUNITIES FOR ENHANCEMENT. THAT TIME WILL BE LOST IF A TWIST OF FATE ERODES THAT SURPLUS AND CREATES A CRISIS SITUATION BEFORE ANY ACTION IS TAKEN. WE HAVE THE TIME NOW TO SIT TOGETHER, NOT AS ENVIRONMENTALISTS, DEVELOPERS OR REGULATORS, BUT AS PEOPLE CONCERNED WITH OUR WILDLIFE HERITAGE AND OUR ENERGY FUTURE. IF AN ENERGY CRISIS DEVELOPS BEFORE WE RESOLVE SUCH QUESTIONS NOT ONLY WILL THE CHANCE BE LOST BUT THE DEVELOPMENT OF THE PETROLEUM RESOURCES MAY PROCEED AT A PACE THAT IS NOT IN THE BEST INTERESTS OF THE WILDLIFE RESOURCE.

THE ANWR ISSUE PRESENTS A "GOLDEN" OPPORTUNITY TO SHOW THAT OUR APPROACH TO ENVIRONMENTALLY SENSITIVE ISSUES HAS MATURED. TENNECO IS READY AND WILLING TO UNDERTAKE THE CONSTRUCTIVE STEPS NECESSARY TO BUILD THE CONFIDENCE NEEDED BY ALL THE PLAYERS IN THIS ISSUE IF WE'RE GOING TO WORK TOGETHER. INDEED WE INVITE THOSE PLAYERS TO BEGIN A POSITIVE DIALOG ON THIS ISSUE. THE SUBJECT OF SUCH A DIALOG MIGHT WELL INCLUDE THE CREATION OF A WILDLIFE TRUST FUND FOR ANWR PATTERNED AFTER THE EXISTING LAND AND WATER CONSERVATION FUND. A PERCENTAGE OF THE EXISTING ROYALTY COULD BE DEDICATED FOR ANWR IN THE SAME WAY A PERCENTAGE OF THE OFFSHORE ROYALTY IS DEDICATED FOR THE LAND AND WATER CONSERVATION FUND. THIS WOULD GIVE ALL OF THOSE WHO USE THIS ENERGY A CHANCE TO CONTRIBUTE TO THE SOUND STEWARDSHIP OF THE RENEWABLE RESOURCES ASSOCIATED WITH ANWR.

THANK YOU FOR THIS OPPORTUNITY TO PRESENT OUR VIEWS AND I LOOK FORWARD TO WORKING WITH THE DEPARTMENT AS THE ANWR ISSUE IS FURTHER EXPLORED. I WOULD BE HAPPY TO ANSWER ANY QUESTIONS YOU MAY HAVE REGARDING TENNECO'S POSITION.

cc: D. B. JOHNSON
C. S. KHOO
J. BARNES
D. S. TAYLOR
H. A. BRISCOE

J Donald Annett
Vice President

Texaco USA

1050 17th Street NW
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January 19, 1987

DRAFT ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN RESOURCE ASSESSMENT AND LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

Director
U.S. Fish and Wildlife Service
Division of Refuges
Main Interior Building, Room 2343
18th and C Streets, N.W.
Washington, DC 20240

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Gentlemen:

Texaco appreciates this opportunity to present its views on the captioned report. While we have some suggestions for change, we commend the U.S. Fish and Wildlife Service for its exhaustive efforts in developing a comprehensive, well balanced resource assessment. We strongly recommend Alternative A, the opening of the entire ANWR coastal plain for oil and gas leasing.

The report is timely when placed in the context of a potential national security and economic crisis resulting from the collapse of energy prices. One of the Administration's highest priorities must be to complete its energy national security study requested by the President and to establish policies which will increase domestic production, while at the same time decrease reliance on insecure sources of imported crude oil and petroleum products. As part of an overall national security strategy expeditious Administration and Congressional action should also be taken to open the Artic National Wildlife Refuge (ANWR) for leasing.

Selection of Alternative A will provide a clear signal that this nation is taking steps to provide for its energy security. As with the Strategic Petroleum Reserve, Alternative A is not an instantaneous solution. Once legislative authority has been given, we estimate that leasing in the remote, harsh climate of the ANWR coastal plain would not commence before the early 1990's and significant production would not start before the late 1990's. Nevertheless, its potentially large new reserves can

reduce the nation's energy security risk and expand efforts toward achieving national energy security. Accordingly, this resource assessment is timely and vitally important.

THE NATION'S NATIONAL AND ECONOMIC SECURITY IS AT RISK

Consideration of this matter is timely and critical under present circumstances. It is well known that decisions by foreign producing countries caused a decline of more than 40 percent in crude oil prices during 1986. This precipitous drop in revenue makes an increasing number of producing wells uneconomic. Consequently, U.S. production has fallen. While barely down in the first quarter of 1986 when compared to the first quarter of 1985, production fell 2.9 percent in the second quarter and 3.1 percent in the third quarter. By the end of the year U.S. production had fallen by 700,000 barrels per day. At the same time, U.S. consumption was up 1.2 percent in the first quarter, up 2.4 percent in the second quarter, and up 3.8 percent in the third quarter.

The net effect is that the growing difference between domestic consumption and production has been filled with increased oil imports which are up 23 percent over 1985. Significantly, petroleum imports have risen to 38 percent of U.S. oil consumption, a higher level of dependence than at the time of the 1973-74 embargo. Every knowledgeable forecast shows an increasing dependence upon imports.

The sharp drop in prices not only affects existing wells, but also impacts the drilling of new wells and thereby future production. Production declines normally over a period of time and drilling of new wells and the discovery of new reserves help to offset this decline. Lower prices, however, limit the number of wells drilled and the risk operators are willing to take to find new reserves. As a result, exploratory activities have been severely curtailed. The consequence is that future production from U.S. wells will be less than it would have been at higher crude price levels and, therefore, imports will be increased. As crude prices rise, as they inevitably will, exploration will accelerate. Given the long lead times involved in bringing Arctic production to market, however, it is important that affirmative action be initiated now to open the ANWR coastal plain for oil and gas exploration. Even if oil and gas leasing were authorized now, energy production from the coastal plain would not help offset increasing dependence on oil imports until the late 1990's at the earliest.

Worldwide lower prices, over a period of time, also reduce the productive capacity outside the U.S. due to the normal decline in production from older wells and to the reduction in cash flow to pay for new drilling and exploration. That fact means that, increasingly, world consuming nations, especially those requiring

larger imports, become more vulnerable not only to international cartels, but also to the political and economic decisions of the more radical producing states. Before an actual oil shortage occurs, artificial shortages may be created, as in the 1970's, by one or a few producing nations. The consequence, as before, would be rapidly, upwardly spiraling crude oil prices and major overall economic and political disruptions. Accordingly, the United States increasingly faces the real possibility of a return to serious energy problems. Future problems tend to be complacently deferred. Prudence dictates otherwise.

There is compelling evidence that a continuation of existing trends will result in an excessive and imprudent level of imported crude oil and petroleum products within the next 2-3 years. Our national security interests demand that the U.S. Government promptly adopt policies designed to insure that U.S. crude oil production not decline below a target minimum level. Such policies could include improved financial incentives to the domestic producing industry including consideration of an oil import fee or minimum "floor price." The appropriate remedy can be determined once the objective as to the desired future level of U.S. production is determined. (See Attachment entitled "Effect of Petroleum Imports on U.S. Crude Oil Production" which was a portion of Texaco's comments filed with the Department of Energy in connection with its energy security study for the President.)

THE ANWR REPORT IS IMPORTANT

The Department of the Interior's resource assessment clearly indicates that the coastal plain constitutes a tremendous opportunity for the discovery of new petroleum reserves. Consistently, the coastal plain is considered by many knowledgeable explorationists to be one of the most prospective areas, if not the most prospective, in the United States. Resource estimates reach easily into the billions of barrels. Production from the coastal plain may equal, or perhaps even exceed, the resource potential of Prudhoe Bay, which now accounts for nearly 20 percent of the oil production in the U.S. The true nature and extent of this resource can be determined only through the drilling of wells. Hopefully, this potential production will be available timely and mitigate the increasing dependence upon foreign oil supplies.

Those who oppose ANWR coastal plain development argue that the reserve potential of the coastal plain may be too small to justify leasing, as it may represent only a few months supply of oil for the nation at its current consumption rate. This argument lacks substance because this nation currently has less than a five-year supply of domestic reserves (existing domestic crude oil reserves divided by total domestic petroleum

consumption). Also, a few months supply is certainly significant when compared with the remaining estimated 10-month supply from Prudhoe Bay, the largest oilfield ever discovered in North America. The resource assessment supports the fact that the coastal plain is our best opportunity for finding another field as large as Prudhoe Bay.

Skepticism has also been expressed about the possibility of finding commercial-sized oil fields in the coastal plain. The Department of Interior has estimated that there is a 19 percent chance of success. That level of risk is very good in the oil business. Historically, the chance of an exploratory well encountering a commercial oil discovery is about five percent. Therefore, the opportunity for a commercial oil discovery within the coastal plain is nearly four times better than average.

Others wanting to delay the exploration of the ANWR coastal plain point out that there is presently a surplus of productive capacity in the world and that the domestic industry's current economic condition precludes heavy involvement in new frontier areas. Such statements ignore the long lead-time necessary before there will be production from the coastal plain. Even with favorable legislative action in the near future, actual production from the coastal plain probably will not occur until the late 1990's, under a best case scenario.

Timely exploration of the coastal plain, and the hoped for production from substantial new reserves, would act as a buffer, or mitigating influence, against forecasted crude oil shortages and rapidly escalating crude oil prices.

DEVELOPMENT OF ANWR COASTAL PLAIN PROVIDES SIGNIFICANT BENEFITS

Aside from its national security benefits the economic benefits associated with the exploration and development of the coastal plain are substantial. Oil production from the coastal plain would provide a significant, new source of tax and royalty revenue to federal, state and local governments. Moreover, development of the petroleum resources within the coastal plain would create jobs as a result of the new demand for goods and services not only in Alaska, but also in other states. Additionally, the negative U.S. balance of payments for international trade would be reduced.

Equally important, the opening of the ANWR coastal plain to oil and gas activities, provides necessary acknowledgment that this nation is taking steps to meet this future problem, which certainly has an impact upon the nation's military defense. While weapons are important, the availability of sufficient petroleum products has to be a concern. The nation also needs to know, as soon as possible, if hydrocarbons are not present in the

ANWR coastal plain. That information would allow energy policymakers to restructure their plans for future energy requirements.

ALTERNATE A IS THE PREFERRED OPTION

In view of the national benefits which could be derived from development in the coastal plain, Texaco believes that Alternative A should be adopted by Congress. Alternative B prohibits leasing on part of the area used by the Porcupine caribou herd for calving. However, the need for this exclusion is not well-documented in scientific literature. Alternative C would delay leasing and development indefinitely and calls for off-structure drilling which would provide additional information but would not establish the presence or absence of oil reserves. Alternatives D (no action) and E (wilderness) are unacceptable since each would preclude any development whatsoever. Given the decline in U.S. production, Texaco believes it would be imprudent to leave untested what the report terms, "clearly the most outstanding oil and gas frontier remaining in the United States..."

RECOMMENDATIONS ON THE REPORT

Acknowledge Additional Structures - The resource assessment identifies 26 major structures within the coastal plain based on an Ellesmerian play concept. We believe there may be insufficient information to assess properly other more complex plays which were not mapped. Accordingly, it would be desirable to have the statement, "No prospects were adequately resolved within the detached and highly deformed Mesozoic and Tertiary rocks," reflect that assessment of these areas had not been made. The report also states "...in these and several other plays (referring to all play concepts except the folded Ellesmerian/ Pre-Mississippian) the estimated accumulation sizes, though perhaps substantial, are often of such size as to be of little or no current economic interest if occurring singly, and are often mapped with great difficulty." Texaco believes this statement could be misleading by discounting the viability of these play concepts based on current price assumptions. That assessment should be based upon projected prices at the time of production.

Also in the report is the statement, "If most of the Ellesmerian rocks are missing in most of the 1002 area, the assessment number would be reduced considerably. Drilling one or two wells in critical areas would resolve this question." It implies that the Ellesmerian play trend must exist for development to occur and that one or two wells will prove the presence or absence of this play. Texaco strongly believes that there can be economic plays in the ANWR coastal plain without this particular geologic play being present and that such test wells may raise many new

questions and still not provide conclusive answers. Accordingly, further drilling could be warranted.

We agree with the statement, "Areas without mapped structures may prove to be of greater, lesser or equal potential. Without exploratory drilling as a confirmation and delineation tool, all (reserve) estimates must be considered uncertain." Therefore, it is necessary to have access to the entire coastal plain.

Date Reserve Estimates - In order to avoid misrepresentation of the resource assessment, we suggest that Table III-1 on page 50 be revised to include the dates that reserve figures for each basin were developed. In the event additional wells have been drilled in a particular basin which would impact reserve estimates, such estimates should be revised accordingly.

Exploration and Production of the Coastal Plain Can Proceed With Minimal Adverse Impacts - The resource assessment portion of the report was conducted under a statistically-based, "most-likely" case scenario. In contrast, virtually all of the environmental impact discussions are based on a "worst" case scenario. Also, it seems to have been overlooked that the consolidation of facilities and the imposition of reasonable operating stipulations can frequently fully mitigate an environmental concern.

The report states that "Long-term losses... would be the inevitable consequence" of development. Development "will result in long-term changes in wildlife habitats, wilderness environment, and native community activities" (emphasis added). The language is inconsistent with the facts and other quotes from the same section of the report, such as "The amount of reduction and its long-term significance for herd viability is highly speculative" (emphasis added).

ANIMAL AND PLANT LIFE WILL BE PROTECTED

Texaco agrees that caribou of the Porcupine herd are the most conspicuous biological community on the coastal plain, but we believe that designation of USF&WS Resource Category 1 for a portion of their widespread calving area in the Jago River area is not justified. The terms "traditional," "core calving area," "unique" and "irreplaceable" are inappropriate in this case. Concentrated calving has been observed in the Jago highlands during only five of the past 14 years which indicates that the calving habitat is not fixed at any one location along the calving habitat from Canning River to the Babbage River in Canada. Therefore, all of this area is an acceptable calving habitat and there is nothing traditional about the Jago highlands. It just happens that on the average, the interaction of migration, forage, predators and weather conditions have

combined to place some of the herd in that area when their calves were due to be born in five out of 14 years of observation.

Additionally, the discussions of possible adverse effects on the herd seems to ignore experience gained at Prudhoe Bay, Kuparuk River, Milne Point and Endicott despite the statement in the report that "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the coastal plain and generate similar minimal effects." Despite weak scientific evidence to support a distinction between the Central Arctic Herd and the Porcupine Caribou Herd, the report states "The lack of observable adverse effects from displacement exhibited by the Central Arctic Herd would be unlikely for the Porcupine Caribou Herd."

Texaco believes that industry has proven the ability to function in the Arctic without adversely affecting the caribou population. With similar protective measures during the coastal plain development, we see no reason why the Porcupine Caribou Herd should not continue to flourish in the same manner as the Central Arctic Herd.

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At several points in the report, the suggestion is offered that oil and gas exploration and development would "eliminate the wilderness character of the area." Texaco acknowledges that any activity within ANWR will affect its character. However, only about one-tenth of one percent of the surface acreage will be involved and the duration of use of the land is limited. Thereafter, the equipment would be removed and a natural regenerative process would begin to return the wilderness quality to the area.

It is useful to observe that the many predictions of adverse biological impacts, prior to construction of the trans-Alaska pipeline, have proven false. Animal and plant life have flourished and the state and nation have shared an era of great economic prosperity due to the pipeline and associated oil development. The extension of oil and gas activities to the ANWR coastal plain, therefore, would involve a known and proven process.

Texaco fully expects that oil and gas operations on the coastal plain would have only minor or negligible impacts on plant and animal life residing there. We fully support the conclusion, drawn by the Department of the Interior, on page 169 which states in part ". . . the production of oil from North America's largest oil field at Prudhoe Bay has taught us much about how to protect environmental values. Even though billions of barrels of oil reserves have been brought on line and the infrastructure

developed to bring that oil to U. S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy." We expect that same result to occur on the coastal plain.

ENVIRONMENTAL PROTECTION STIPULATIONS

Texaco believes the Department of the Interior can responsibly manage any oil and gas activities which may be authorized by Congress. In this regard, the proposed environmental protection stipulations, with a few exceptions, appear to be reasonable and consistent with current oil industry practice in the Arctic. Our comments on the exceptions follow:

First, there is a prohibition on all exploratory activity from May 1 to November 1. Texaco believes that activities likely to cause little interference with animal behavior should be permitted as part of a research program approved by the Fish and Wildlife Service to determine effects on wildlife. Activities in this category would be those confined to the drill pad and would include drilling and testing of wells. As currently stated, the stipulation could cause single exploratory wells to take two or more years to complete.

Second, there is, in the Arctic Slope Regional Corporation/U.S. agreement, a requirement that ice pads be used for wells being drilled up to 10,000 feet. We suggest that this stipulation be revised to allow the use of pad material in order to ensure a safe and successful completion of the operations plan. Bottomhole depth is often not the most important criteria in determining how long it takes to complete an operation. A stipulation, stating a preferred use of ice pads where a drilling program can be prudently accomplished with its use, would be acceptable.

Third, the restriction on surface occupancy in the 3-mile corridor along the coast to only marine facilities and infrastructure is an unnecessary prohibition of other temporary and essential facilities. Other mitigating measures already ensure caribou passage and minimize disturbance to wildlife. Texaco recommends the stipulation provide, at least, for temporary exploration and essential production facilities on a site-specific basis.

Fourth, we believe the stipulation which indicates a preference for buried pipelines should be reconsidered. Arctic experience has shown that burial of pipelines is unnecessary to accommodate movements of animals where elevation or ramping is used. Further, buried pipelines may not be environmentally preferable due to permafrost. Texaco

recommends that any proposed stipulation adopt the wording of the State of Alaska policy on pipeline design, siting and construction which states that adequate elevation, ramping or burial of pipelines will be required in areas identified as important caribou movement.

Fifth, the stipulation on the construction of docks and causeways is overly restrictive in calling for no change in water chemistry. Minor changes in water conditions should be acceptable as long as there is no measurable impact on marine species.

Sixth, the closure of a 3/4 mile zone along rivers is an excessive restriction to protect a riparian habitat. Maximum effort should be required to protect critical habitats. However, essential production facilities should be allowed on a site-specific basis.

SUMMARY

The nation is now facing a future energy security crisis which will result in product price increases and/or supply shortages. As in the 1970's, the timing will be determined by foreign political and economic decisions. Similar to military defense, national plans and actions should be prudently undertaken to mitigate or avoid the energy crisis.

The subject report provides a resource assessment and legislative environmental impact statement for the Arctic National Wildlife Refuge Coastal Plain. The report makes clear that this area has the potential to provide very significant volumes of oil. The report also makes clear that oil and gas activities can be accomplished in an environmentally safe manner.

Based upon the foregoing, there can be little doubt that the discovery of new reserves of petroleum would benefit the United States. Accordingly, to mitigate the prospective national energy security crisis, we strongly recommend Alternate A, the opening of the ANWR coastal plain, as the prudent, most viable option.

Sincerely,

J Dudley Arnett

JDA:caj

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ATTACHMENT

EFFECT OF PETROLEUM IMPORTS ON U.S. CRUDE OIL PRODUCTION

Absent a shift in U.S. energy policy, the continuation of current crude oil price levels ($14-$15 a barrel) will substantially increase U.S. oil import dependence by causing a decline in U.S. production and an increase in domestic consumption.

Projections completed by the Congressional Budget Office, American Petroleum Institute, the National Petroleum Council (NPC), Congressional Research Services, Data Resources Inc., and the Department of Energy indicate U.S. crude oil production, which was 8.9 million barrels a day in 1985, could fall by up to 3 MMB/D in 1990. The attached chart entitled "U.S. Net Oil Imports" shows a composite projection from four recently-available studies of U.S. production dropping to 6.3 MMB/D in 1990. And DOE has projected that by 1995, U.S. oil production will range between 5 and 7 MMB/D, assuming oil prices of $20 and $30 per barrel, respectively.

When combined with a 2 percent annual increase in U.S. oil consumption, amounting to as much as 2 MMB/D of incremental demand, the United States would be dependent on crude and product imports for more than 50 percent of its needs by 1990, a level higher than that experienced during the energy disruptions of the 1970's. This point is illustrated on the attached chart entitled "U.S. Oil Import Dependence." And according to the recent NPC survey's lower price scenario, imports would rise to 11.4 MMB/D in 1995 and account for 60 percent of total consumption. Such dependence raises a number of economic, energy and national security concerns which should be promptly considered by the U.S. Government.

1. Exploration cutbacks will reduce future U.S. oil production.

The downturn in U.S. exploration and development is evident by the decline in active rotary rigs from over 4,000 in 1981 to roughly 900 in mid-November 1986. This dramatic drop in rigs will have a marked downward impact on future levels of oil production.

Reductions by 40-50 percent in domestic exploration and production budgets relative to 1985 already are having a severe negative impact on the infrastructure of the U.S. oil industry, drilling contractors, oil field equipment suppliers, etc. The financial resources of many independent producers have been virtually depleted. The seismic crew count is down 80 percent from 1981; (i.e. 80) large and small companies have cut back sharply on R&D budgets; service companies are going bankrupt; equipment is being sold to foreign suppliers or scrapped; and, skilled professional and technical personnel are losing their jobs and transferring to other industries. This gap in infrastructure services will have a severe negative effect in the 1990's.

Announced and projected reductions in oil industry spending and oil field activity are linked closely with projections of declining U.S. production. Accordingly, it is noteworthy that a recent survey by the Independent Petroleum Association of America (IPAA) of its members found that at $13 per barrel their drilling activity would fall by 65 percent between 1985 and 1990. Similarly, a recent American Petroleum Institute survey found that total capital and operating expenditures for exploration and production (in 1985 dollars) would drop from $70 billion in 1985 to $21.1 billion in 1991 if the price of oil were at $15 per barrel during that period, and that total wells drilled would decline from about 75,000 in 1985 to about 31,000 in 1991.

2. Natural Gas Production will be similarly affected.

If crude prices remain in the $15/bbl. range until 1990, protracted cutbacks in exploration and development will also significantly reduce U.S. domestic natural gas production capability. During this period, demand is likely to be in the 17-18 TCF/year range. The combined effect of supply and demand should eliminate the domestic surplus gas deliverability in the U.S. by 1990, if not earlier.

As a result, DOE cannot expect that surplus domestic supplies of natural gas will be available in the 1990's to replace crude oil supplies for those industrial consumers capable of switching fuels. In 1985, industrial primary energy was supplied 43 percent by oil, 42 percent by natural gas and 15 percent by coal. Only one-third (1.2 MMB/D) of the oil is used for manufacturing heat and power, in which the potential for substitution of gas for oil is greatest. If it is assumed that half of the oil could be replaced by gas, this would be 600 MB/D of oil, equivalent to about 1.2 TCF/year. It is doubtful that as much as 1 TCF/year of surplus gas would be available after 1990 to substitute for disrupted oil supplies to industrial consumers with fuel switching capability.

3. Surplus production capacity will be unavailable in the 1990's outside OPEC.

The trend over the next several years toward declining domestic production as imports increase will characterize not only the U.S but many other non-OPEC countries as well. As a result, if today's levels of oil prices generally prevail through 1990, the world oil surplus that averaged 11 MMB/D in 1985 could largely disappear by 1990.

The sudden drop in crude and product prices is and will continue to have an effect on consumption. The demand for light-end products is increasing in the United States and abroad. The worldwide decline in residual fuel demand has been reversed as many utilities and industrial users with dual-fired capacity increase their use of fuel oil rather than natural gas or coal. Free World demand for petroleum is expected to increase by some 1 MMB/D in 1986, compared with a decline in 1985.

Free World oil demand could easily reach 50 MMB/D by the end of the decade, an increase of over 4 MMB/D from the 1985 level. But non-OPEC production will fall substantially as the combination of low prices and drastically reduced exploration will particularly affect production from the U.S., North Sea (U.K.), and Canada.

Although the downturn in exploration and development has been most dramatic in the U.S., drilling activity is also down sharply throughout the world. In Canada for example, 113 rigs were operating in mid-November, compared with 305 a year ago. Other areas, such as the North Sea, have been similarly affected. According to a recent Hughes Tool Survey, rigs operating outside North America were 305 less than in 1985 with lower activity in every section of the world, including the Middle East. A composite non-OPEC picture is available from a recently released study by Chase Econometrics which projects a decline in non-OPEC crude and NGL production by 4 MMB/D to 21 MMB/D in late 1988 within one of its two low-price scenarios.

The net effect of rising world demand and declining non-OPEC production will be a dramatic increase in OPEC's output and control over the market. By 1990,

OPEC's crude oil production could reach 24 MMB/D - up more than 50 percent from 1985. With current available OPEC capacity estimated at only about 27 MMB/D, OPEC's potential to control the market will be greatly enhanced. There is little doubt OPEC could establish an effective oil production sharing arrangement with only this small amount of surplus capacity.

National security expert Henry M. Schuler has written that over 95 and 85 percent, respectively, of the "installed but currently unutilized production capacity" is located in OPEC countries and the Middle East. When the output of currently unutilized production capacity is absorbed, non-communist nations will turn to proved but undeveloped reserves, over 76 percent which are located in OPEC and 69 percent in the Middle East.

API, in a study recently completed ("Two Energy Futures"), concludes that OPEC will obtain effective control over world oil prices when demand for OPEC oil exceeds approximately 80 percent of OPEC's current productive capacity. The forecast increase in world oil consumption of 4 MMB/D by 1990 combined with a 4 MMB/D decline in non-OPEC production would result in a demand for OPEC production in 1990 well above 80 percent of its current productive capacity of approximately 27 MMB/D.

4. The Strategic Petroleum Reserve (SPR) provides inadequate insurance.

The SPR was authorized by law in 1975 with the intent to store up to 1 billion barrels of oil. This level was subsequently lowered to a 750 million barrel SPR to be developed by 1991, deferring any decision on the remaining 250 million barrels. The current SPR of 505 million barrels provides a level of protection to the United States during a time of disruption. But it is unlikely that the SPR will be doubled between 1986 and 1990 to provide the same margin of protection against the growing U.S. oil import dependence which exists today.

The current SPR could replace net oil imports for about 82 days, if oil imports remain at August (1986) levels, but would fall to 50 days of protection if imports were to increase to 10 MMB/D by 1990. (10 MMB/D is a composite figure compiled from several forecasts.) To provide a 100 day supply would require a SPR of 970 million barrels (assuming imports of 9.7 MMB/D). To reach this level would require a fill rate of approximately 315,000 barrels per day for the next four years! This would cost $7 billion (for the oil alone at $15) and would severely impact government expenditures. The physical facilities for injecting and storing additional SPR oil would also have to be expanded at a substantial cost. In addition, a similar doubling of security stocks would be required in other IEA countries if the current margin of protection is to be maintained.

5. Alternative supplies of energy will not be available to the U.S. in 1990.

At present price levels, the synthetic/renewable energy contribution to meeting U.S. energy needs is and will continue to be minimal. Optimistic projections for shale oil, coal liquefaction, coal gasification, solar energy, methanol, et al have, for the most part, proved unattainable even at crude oil price levels prevailing before the current decline. The U.S. established the Synthetic Fuels Corporation in 1979 with a firm commitment to replacing oil with new sources of indigenous production. The goals set by the Administration for the Synfuels Program were 500,000 MB/D by 1987 and 2 MMB/D by 1992. With the suspension of further Synfuel Corporation funding, it appears the

Administration and Congress have little faith today in the potential synfuel contribution.

The recent nuclear accident at Chernobyl is expected to sharply limit the growth of the nuclear industry, particularly in the U.S. Almost no new orders for a nuclear powered utility in the U.S. have been made in the last decade. While coal and natural gas continue as alternatives to petroleum, there will be no significant alternative for transportation fuels and home heating oil in the medium term. If a crude oil import supply disruption should occur in the early 1990's, some coal or natural gas would probably be available to substitute for residual fuel for boilers. However, dual-fired capacity is limited. Also, there is a growing industry consensus that natural gas supply shortfalls are inevitable because reserve additions aren't keeping pace with consumption.

6. Conclusion

The U.S. oil industry is presently undergoing a massive restructuring. Budgets for oil and gas exploration and production, R&D, equipment purchases, etc. have been reduced by 40-50 percent. By 1990 U.S. reliance on imports will be at even higher levels than in 1973 and 1979. But when the U.S. reaches such dependence, industry will be unable to respond quickly to meet national economic and energy security concerns.

7. Policy Determination

There is compelling evidence that a continuation of existing trends will result in an excessive and imprudent level of imported crude oil and petroleum products within the next 2-3 years. Our national security interests demand that the U.S. Government promptly adopt policies designed to insure that U.S. crude oil production not decline below a target minimum level. Such policies could include improved financial incentives to the domestic producing industry including consideration of an oil import fee or minimum "floor price." The appropriate remedy can be determined once the objective as to the desired future level of U.S. production is determined.

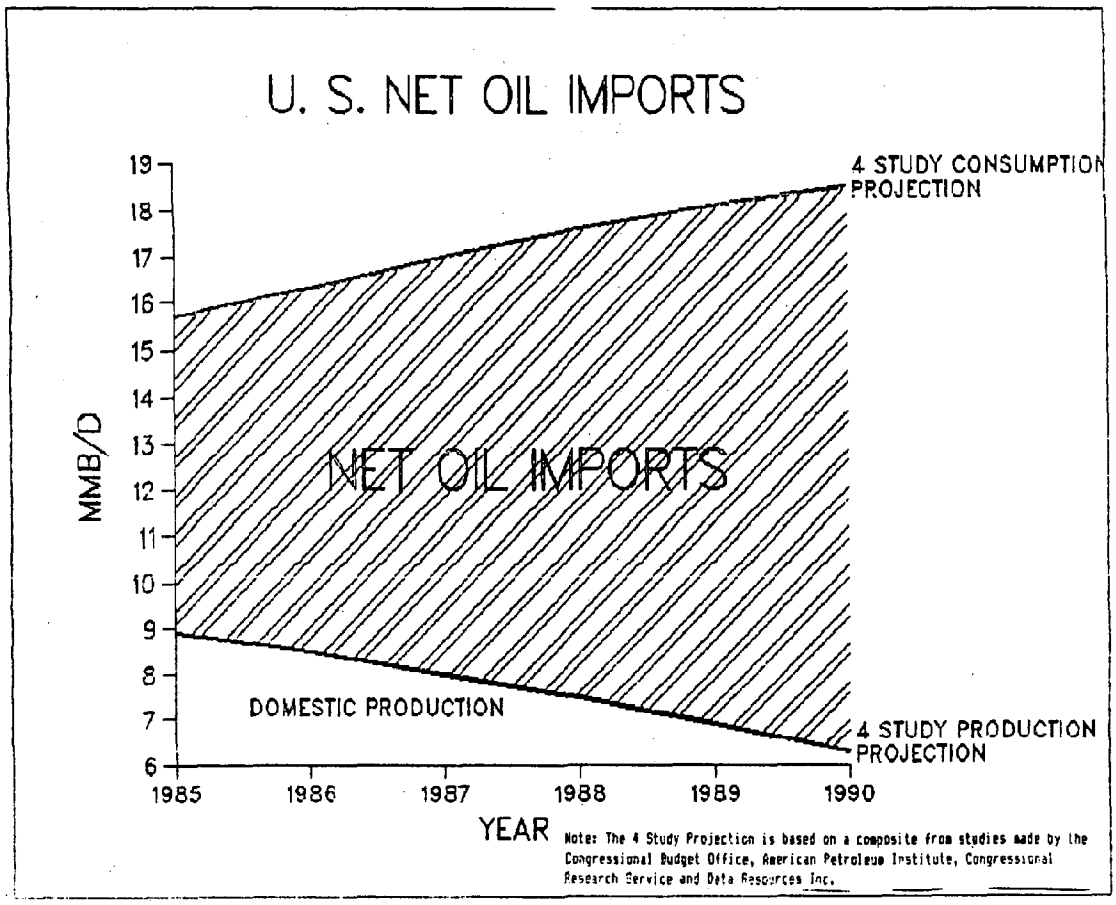
I-199

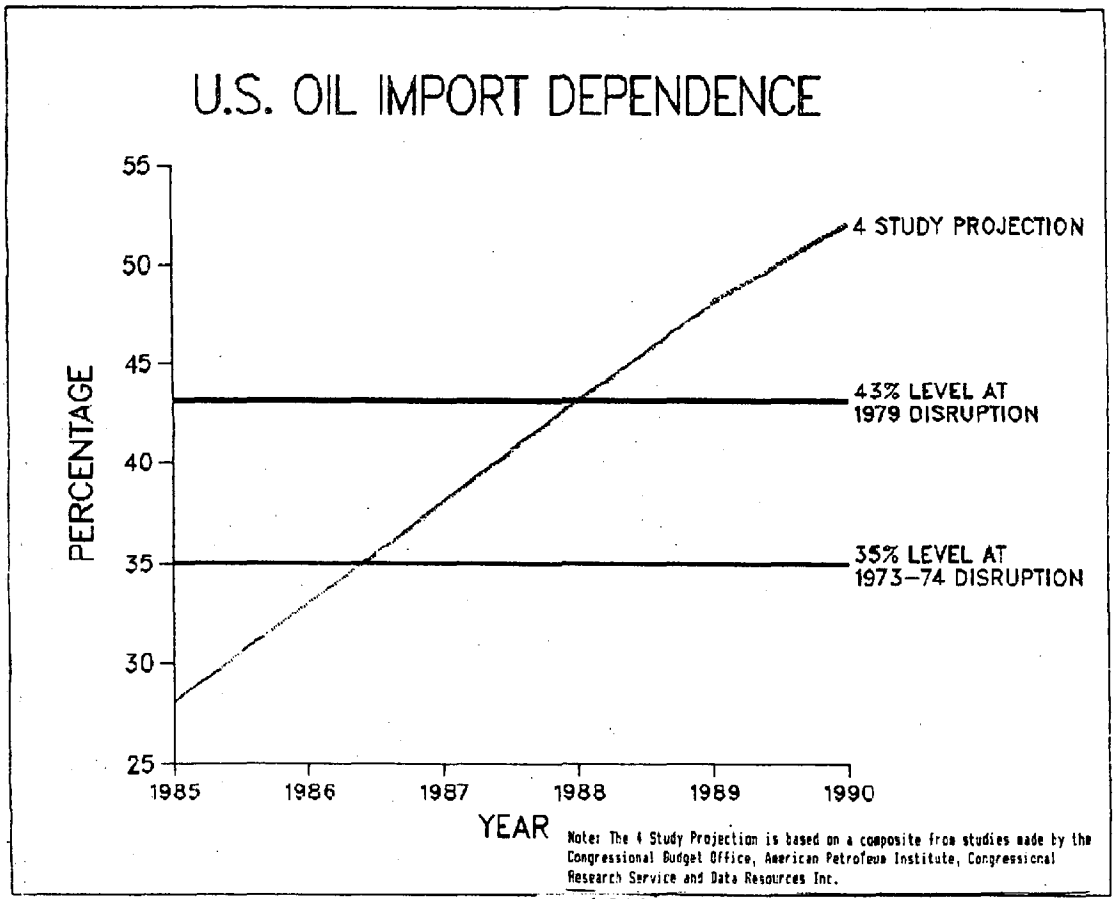
FREE-WORLD REFINING CAPACITY AND OIL DEMAND
(MMB/CD)

	1979		1981		1985	
	CAPACITY	DEMAND*	CAPACITY	DEMAND*	CAPACITY	DEMAND*
Western Europe	20.3	14.4	20.2	12.3	16.0	11.3
United States	17.2	18.5	18.5	16.1	15.4	15.7
Other Western Hemisphere	10.7	6.1	10.9	6.2	9.6	5.9
Asia/Pacific	10.3	9.3	10.6	8.7	10.4	8.4
Africa/Middle East	5.2	2.9	5.4	3.3	6.5	3.7
TOTAL	63.7	51.2	65.6	46.6	57.9	45.0

*Demands cannot be compared directly to refinery capacities because there are other components to supply such as natural gas liquids supply, processing gain, inventory change, yield differences, crude oil quality, etc.

SOURCE: Capacity: International Petroleum Encyclopedia. Demand: Western Europe - OECD; United States - DOE; Other - British Petroleum Statistical Review.


U. S. NET OIL IMPORTS
MMB/D
19
18
17
16
15
14
13
12
11
10
9
8
7
6
1985
1986
1987
1988
1989
1990
YEAR
4 STUDY CONSUMPTION PROJECTION
NET OIL IMPORTS
DOMESTIC PRODUCTION
4 STUDY PRODUCTION PROJECTION
Note: The 4 Study Projection is based on a composite from studies made by the Congressional Budget Office, American Petroleum Institute, Congressional Research Service and Data Resources Inc.


U.S. OIL IMPORT DEPENDENCE
PERCENTAGE
55
50
45
40
35
30
25
1985
1986
1987
1988
1989
1990
YEAR
4 STUDY PROJECTION
4.3% LEVEL AT 1979 DISRUPTION
3.5% LEVEL AT 1973–74 DISRUPTION
Note: The 4 Study Projection is based on a composite from studies made by the Congressional Budget Office, American Petroleum Institute, Congressional Research Service and Data Resources Inc.

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name DONALD C. HARTMAN

Mailing Address TEXACO INC. 550 W. 7TH AVE, SUITE 1320
ANCHORAGE AK 99501

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☐ I am speaking for TEXACO INC.
(please enter name of organization you represent)

I-201

TESTIMONY-DRAFT ARCTIC NATIONAL WILDLIFE REFUGE
COASTAL PLAIN (ANWR) RESOURCE ASSESSMENT AND
LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

My name is DONALD C. HARTMAN. I am ADVANCED EXPLORATION GEOLOGIST (title) for Texaco in ANCHORAGE, ALASKA (location).

ALTERNATIVES

Texaco strongly recommends that Alternative A (full leasing of the 1002 study area) be adopted by Congress as the alternative most compatible with national needs.

Specifically, domestic U.S. oil production, by some estimates, is expected to decline from approximately 8.6 million barrels per day at present to an estimated 4 to 5 million barrels per day by the year 2000. Assuming a modest increase in national demand, imports of oil, largely from politically volatile regions of the world, could climb to more than 12 million barrels per day by the year 2000. Specifics aside, a strong consensus has emerged on the falling U.S. production and dramatically-rising import dependence from projections recently completed by the Congressional Budget Office, the Congressional Research Service, the Department of Energy, the National Petroleum Council, the American Petroleum Institute, and Data Resources Inc.

Such great dependence upon imported oil raises a number of important economic, energy, and national security concerns. API President Charles DiBona warned of a severe energy crisis in the mid-1990's in releasing the API's report, entitled "Domestic Petroleum Production and National Security," on December 30, 1986. Similarly, the Interim Report of the NPC on the U.S. Oil and Gas Outlook noted in October 1986 that the "imminence and gravity of the national energy vulnerability" mandate that the NPC request the Secretary of Energy to convey the urgency of the situation to the Administration, the U.S. Congress, and the American people. And, President Reagan, himself, recognized the seriousness of growing import dependence in forming a fast-track, interagency study of U.S. energy security under DOE Deputy Secretary William Martin. Their report is expected in February or March, 1987.

Unquestionably, national security would be enhanced by the opening of ANWR and the anticipated discovery of substantial new reserves. Without doubt production of those reserves would decrease U.S. dependence on foreign oil and lower the future trade deficit. But, the timing of ANWR's opening is also critically important.

Although there is currently a worldwide surplus of oil, it is important to note that, due to the logistics of Arctic exploration and development, any oil discovered in ANWR in the

near-term would not be produced until about the year 2000. Accordingly, Texaco believes that Alternative A should be adopted and timely access to ANWR be granted so that this source of supply may be available when needed. This approach would also assure orderly, efficient development of resources in a non-crisis atmosphere.

The economic benefits associated with the exploration and development of ANWR are also substantial. Oil production from ANWR would provide a significant new source of tax and royalty revenue to federal, state and local governments. Moreover, development of the petroleum resources underlying ANWR would promote economic opportunity not only in Alaska but also in the Lower 48 states. Demand for goods and services in connection with such development would create jobs and positive impacts nationwide.

In view of the national benefits which could be derived from ANWR's development, Texaco believes the remaining alternatives are unacceptable. Alternative B prohibits leasing on part of the area used by the Porcupine caribou herd for calving, however, the need for this exclusion is not scientifically documented. Alternative C would delay leasing and development indefinitely and calls for off-structure drilling which would provide additional information but would cause unnecessary delays without establishing the presence or absence of oil reserves. Alternatives D (no action) and E (wilderness designation) are unacceptable since each would preclude any development whatsoever. Texaco believes it would be folly to leave untested what the report terms, "clearly the most outstanding oil and gas frontier remaining in the United States...". This is especially true given the declining state of our national oil reserves and the lead times necessary to establish production.

I-202

ENVIRONMENTAL IMPACTS

The resource assessment portion of the report was conducted under a statistically based, most likely case scenario. In contrast, virtually all of the environmental impact discussions are based on a worst case scenario. Texaco is concerned that such an unbalanced approach could be misleading. The major biological concern appears to focus on the Porcupine caribou herd and insufficient credit seems to have been given to consolidation of facilities and the imposition of reasonable operating stipulations which can frequently fully mitigate an environmental concern. Furthermore, the discussion of possible effects on the herd seems to ignore experience gained at Prudhoe Bay, Kuparuk River, Milne Point and Endicott. That, despite the statement in the report that "The evidence generated during the 18 years of

exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence, it is reasonable to assume that development can proceed on the coastal plain with similar minimal effects."

Texaco would also like to take this opportunity to point out that all of the predictions of biological disaster before construction of the trans-Alaska pipeline have proven false. Animal and plant life have flourished and the state and nation have shared an era of great economic prosperity due to the pipeline and associated oil development. The extension of such development to the ANWR coastal plain is therefore a known and proven process.

At several points in the report, the suggestion is offered that oil and gas exploration and development would "eliminate the wilderness character of the area." Texaco acknowledges that any activity within the Refuge will affect its wilderness character; however, what seems to be ignored is the fact that oil and gas development is of limited duration. Industry's use of the area in the event of a commercial discovery is expected to span 20-50 years. Thereafter, the equipment would be removed and a natural regenerative process would begin to return the wilderness quality to the area.

Texaco agrees that caribou of the Porcupine herd are the most conspicuous biological community on the 1002 coastal plain, but we believe that designation of USF&WS Resource Category I for a portion of their widespread calving area in the Jago River area is not justified. The terms "traditional", "core calving area", "unique" and "irreplaceable" are inappropriate in this case. Concentrated calving has been observed in the Jago highlands during only 5 of the past 14 years which indicates that the calving habitat is not fixed at any one location along the calving habitat from Canning River to the Babbage River in Canada. Therefore, all of this area is an acceptable calving habitat and there is nothing traditional about the Jago highlands. It just happens that on the average, the interaction of migration, forage, predators and weather conditions have combined to place some of the herd in that area when their calves were due to be born in 5 out of 14 years of observation.

Texaco supports the USF&WS conclusion that minor to negligible impacts may be expected to other mammalian species, to fish, to fowl and to threatened and endangered species.

STIPULATIONS

Texaco believes the Department of Interior can responsibly manage any oil and gas activities which may be authorized by Congress.

In this regard, with the exception of a few provisions, the proposed environmental protection stipulations appear to be reasonable and in accordance with current oil industry practice in the Arctic. Texaco will more fully address this issue in our written submission later this month.

CONCLUSION

Texaco fully supports the proposed leasing recommendation by the Secretary of the Interior on page 169 which states in part "... the production of oil from North America's largest oil field at Prudhoe Bay has taught us much about how to protect environmental values. Even though billions of barrels of oil reserves have been brought on line and the infrastructure developed to bring that oil to U.S. markets, the fish and wildlife resources of the Prudhoe Bay area remain extremely healthy." It is clear that the nation's best interests are served through the opening of ANWR to energy exploration and development. We trust that Congress will recognize that need and act to authorize leasing within ANWR as presented under Alternative A.

I-203

Thank you.

LRN:12/31/86
sjm:J6/C2

REC3/DW.402
DW.2

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Marie Adams
P.O. Box 313
Barrow, Alaska 99723

January 16, 1987

U.S. Fish & Wildlife Service
2343 Main Interior Bldg.
18th & C Streets, N.W.
Washington, D.C. 20240

ATTN: Division of Refuge Management

I am writing to let you know what my personal views are regarding the Arctic National Wildlife Refuge 1002(h) report. I work for the North Slope Borough and have followed this issue as public information officer under the office of Mayor George Ahmaogak. I attended the January 6, 1987 hearing on ANWR in Kaktovik.

After listening to everyone's comments I am in support of option B to permit limited leasing. I believe that any maternal grounds or calving grounds should be protected from disturbance. Also, one of the reasons I support option B is because of my background as a past Executive Director of the Alaska Eskimo Whaling Commission. Many of us involved with whaling have always said to explore and develop onshore oil and gas potential areas before going to offshore areas. I oppose the current Beaufort Sea Sale 97 which is along the migratory path of the bowhead whale currently listed as an endangered specie. Regarding ANWR, there is a lot of concern for 180,000 strong porcupine caribou herd. I would rather see exploration and development of oil and gas onshore before looking at offshore areas, where technology has been improved with the Prudhoe Bay experience. I do not believe technology for offshore arctic waters has been developed and the price for such activity is too great for our people who have to depend on subsistence resources.

P-1

One area which I strongly believe has been neglected in your 1002(h) report is coverage about what is going to happen to the local residents. The social impacts from Prudhoe Bay have been tremendous. We are now dealing with social problems never before experienced in the North because of the impact that the cash economy has on local people. We are facing alcohol and drug related diseases never before encountered by the Inupiat people in the Arctic Slope. We are a small population and studies should be done to enable our communities to at least obtain funding to deal with such impacts.

Thank you for this opportunity to comment.

Sincerely,

Marie Adams

Marie Adams

Jan 18, 1987
1724 Aspen
Ft. Collins, CO 80524

U.S. Fish and Wildlife Service
Attn.: Division of Refuge Management
2343 Main Interior Bldg.
18th and C Streets, NW
Washington DC 20240

Dear Sirs,

I am writing in regards to draft report 1002 for the Artic National Wildlife Refuge which was released on Nov. 24, 1986 by the U.S. Fish & Wildlife Service. I am very concerned about the Fish and Wildlife Service recommendation of full leasing of the entire costal plain and have the following comments:

1. Accidental oil spills are a known and inevitable risk of oil exploration. Since 1972 there have been 23,000 spills reported to the Alaska Department of Energy Conservation. More oil development just means more oil spills and we cannot afford any oil spills in Alaska's fragile environment.

2. The hazardous wastes produced in oil and gas production are another concern of mine. Where do you dispose/store such wastes in the North Slope? This needs to be addressed before more oil and gas drilling is done in that area.

P-2

3. What sorts of cumulative effects will oil and gas development in the Artic Refuge have on adjacent state and federal leases and offshore on the outer continental shelf?

4. Oil and gas exploration will have obvious negative effects on the more than 170,000 caribou that use that area as a calving ground and post-calving insect avoidance area. But what about the lesser known, irreversible effects such development will have on the soil, the insect life, the nutrient cycles, the plant life? The ecosystem needs to be considered as a whole when determining the consequences of oil and gas production. It has not been in this report.

5. Perhaps most importantly, I believe that the money and energy that would be poured into obtaining Artic Refuge oil and gas could be used 100% more effectively in energy conservation and education. Oil and gas supplies are a limited resource and will one day be economically outdated as a means of keeping our country running. It just doesn't make sense to me to keep despoiling America's premier wilderness areas - areas like the Artic Refuge - when known but untapped energy conservation methods are available for use right now.

In short, I believe that full scale oil and gas leasing in the Artic Refuge should not be considered as an option and urge you to consider less environmentally damaging and longer term solutions to our country's energy needs.

Sincerely,

Susan L. Anderson

Joan B. Beattie
4380 Reka Drive
Anchorage, Alaska 99508

February 3, 1987

U.S. Fish and Wildlife Service
2343 Main Interior Buildling
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Sir,

The 1002 area of the Arctic National Wildlife Refuge should remain wilderness. I support Alternative E, which recommends wilderness designation for the entire Arctic Refuge coastal plain.

I was disappointed that the 1002 report failed to address the cumulative effects of oil and gas development, not only within the 1002 area, but also between the 1002 area and adjacent state and federal lease areas on the north slope and outer continental shelf. The impacts of oil and gas development on a single site may be insignificant, but when viewed in concert with the host of other development sites, the impacts add up. P3

I am deeply concerned that the 1002 report also failed to adequately address how hazardous wastes will be dealt with and how sufficient water will be obtained and water quality standards not compromised.

I urge the Secretary to reconsider this unwise decision and to recommend the 1002 area for designation as wilderness in his final report.

Sincerely yours,

Joan B. Beattie

Joan B. Beattie

January 28, 1987.

UNIVERSITY OF VICTORIA
P.O. BOX 1700, VICTORIA, BRITISH COLUMBIA, CANADA V8W 2Y2
TELEPHONE (604) 721-7211, TELEX 049-7222

Department of Biology
721-7094

Director
Fish and Wildlife Service
Division of Refuges
U.S. Dept. of Interior
Room 2343
Main Interior Building
18th and C Street
Washington, D.C.
20240

Dear Sir,

As an interested caribou biologist, I wish to submit the enclosed brief relative to the impacts of full oil leasing of the 1002 lands in Alaska on the Porcupine Caribou Herd.

P4

Yours truly,

Dr. A. T. Bergerud
Biology Dept.
University of Victoria,
Victoria, B.C.
Canada V8W 2Y2

AN ASSESSMENT OF PETROLEUM DEVELOPMENT ON THE STATUS OF THE PORCUPINE HERD

by

DR. A. T. BERGERUD

Professor of Biology, University of Victoria, Victoria, B.C. Canada. V8W 2Y2

The U.S. Federal government has proposed that the 1002 lands of the Arctic Coastal Plain and in the Arctic National Wildlife Refuge, Alaska, be opened for exploration and full leasing for petroleum supplies. Included within the 1002 proposed lease area are 242,000 acres of 311,000 acres (78%) of the core calving area of the Porcupine Herd (core defined as areas used in $\geq$ 5 of 14 years) and 934,000 acres of 2,117,000 acres (45%) of concentrated calving area of the herd (areas with $\geq$ 50 animals/ mi^2). Also included in the 1002 area is the habitat where nearly the entire herd, now estimated at 18,000 animals, masses in early July to seek relief from mosquitoes. The herd leaves the 1002 area in mid to late July and does not return until the following May. I have been asked as a caribou biologist, by AOGA, to evaluate the impact of full leasing and development on the viability of the herd and specifically to critique the environmental impact statement prepared by the Fish and Wildlife Service on the proposed full leasing and development.

Background Theoretical Considerations

The environment of the caribou (Rangifer tarandus) can be segregated into: other animals, a place in which to live, food and weather (Fig. 1, Andrewartha and Birch 1954). The interactions of caribou with insects, open habitats, food and weather represent variable contingencies that result in facultative responses by caribou that can be modified relative to disturbance factors (Fig. 1). The interactions of caribou with other caribou and with wolves in open environments are consistent contingencies affecting reproductive fitness - these are obligatory responses that will respond to change very slowly, if at all, when habitats are modified.

P-5

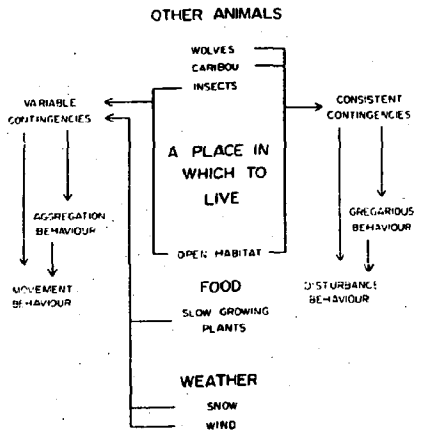

Figure 1. Diagram of the proposed manner in which the four components of the environment interact as variable and consistent contingencies in the development of movement, aggregation, gregarious and disturbance behaviour of caribou (Bergerud 1974b).

I feel that the major behavioral responses of caribou in the 1002 area are the insect x weather facultative responses and the predator x habitat obligatory responses. Unlike many biologists, I do not feel that food is a major factor in the calving and massing of caribou in June and July in the 1002 area.

Are Caribou Wilderness Animals?

Much of the concern for the well-being of caribou arises from the view that caribou are wilderness animals that cannot adapt to coinhabiting ranges with man. This concept has arisen, in part, because caribou are found on ranges far removed from major developments. Also, caribou herds have declined on the southern edge of their range as settlement proceeded (Cringan 1956). Thirdly, caribou are unwary and easily over-exploited. And lastly, caribou utilize slow-growing lichens that are many years in recovering following forest fires.

However, a closer examination of these facts suggests that they are not sufficient to define caribou as wilderness animals nor to imply that loss of wilderness per se will bring about the demise of herds. Obviously, mule deer (Odocoileus hemionus) and antelope (Antilocapra americana) were once far removed from European man in the 1700's, but they are not called wilderness animals today; they have adapted. The decline of caribou along their southern boundary was due to increased predation from man and natural predators, as well as from disease contracted from white-tailed deer (Odocoileus virginianus) (Bergerud 1974a) and not from outright habitat alteration. There is no evidence that herds abandonned their annual ranges because of an intrinsic aversion to man or man-made

structures. The nomadic life style of caribou and its propensity for shifting habitats makes it as adaptable to short term habitat alterations as it is to the slow succession of lichen following natural fires and regeneration cycles. The unwary nature of caribou means that they can coinhabit range with man if not overhunted. In fact, reindeer (Rangifer tarandus) are an important domestic animal in Eurasia. Several caribou researchers have noted that caribou are both highly adapted and adaptable (Skoog 1968, Bergerud 1974b, Roby 1978, Skogland, pers. comm.).

Resource-Limited by Food?

Another basic philosophy that influences how some caribou biologists view the impacts of development on caribou is the closely held belief that the carrying capacity of the habitat for caribou is determined by food resources, the slow growing lichens in winter, and green plants in the summer. It follows from this belief that if caribou are displaced by development and lose part of their range, then the potential carrying capacity is reduced. Another concern is that, if the animals are at a carrying capacity limited by food, then additional disturbance may stress the animals, thereby reducing reproductive rates and increasing mortality rates. A further refinement is that caribou select their calving grounds to maximize the quantity and quality of the diet - to optimally forage (Kuropat and Bryant 1980). Hence displacement from the calving areas should adversely affect the herd.

As an example of this type of thinking, Whitten and Cameron (Arctic (1984:293) said, speaking of developmental impacts, "For example, a series of mild winters might compensate for the negative effects of harassment or

habitat loss." Bergerud, Jakimchuk and Carruthers replied (Arctic 1984:295) "The supposition advanced by Whitten and Cameron...assumes:

(1) that winter conditions limit caribou numbers (this has never been substantiated in mainland North America);

(2) that harassment results in caribou mortality - never substantiated and the extreme case (Pot Hill data) given in our paper represents the best available contrary evidence pertaining to this assumption;

(3) that habitat loss (unspecified) has governed caribou numbers (greater evidence for the opposite case is available in the literature);

(4) that ranges are at carrying capacity - which is not the case for any of the herds we discussed;

(5) finally, that the supposition has some basis in fact. However, this supposition has never been researched."

Such a seemingly innocuous statement, as made by Whitten and Cameron, reveals a basic philosopy of food limitation, and is the cornerstone of many dire predictions of caribou demise with development.

But in fact, the carrying capacity of this herd is <u>not</u> limited by winter food supplies. The dynamics of the Porcupine Herd were modelled in a workshop at the University of British Columbia in 1978. The herd then numbered 110,000. The simulation model indicated that the herd was not limited by winter food supplies. Food would not be limiting until the herd reached about one million animals. The simulation even indicated that if no animals crossed the Dempster Highway and the entire range east of the road in the Ogilvie Mts was lost, the herd could still prosper if food resources were the only consideration. The same simulation, however,

indicated that the herd would be limited by wolf predation at densities far below those imposed by food resources (Walters et al. 1979).

Both reproductive and natural mortality rates of caribou are little affected by winter food supplies. Fecundity is relatively fixed at 1 calf/female/year for females $\geq$ 3 years-of-age regardless of densities (Bergerud 1971, Skogland 1986). Skogland provided an equation for recruitment for females $\geq$ 1 year in Norway, where there are few predators, where $R = 0.65 - 0.012\ Dw - 0.00013\ Dw^2$ where Dw = caribou/km^2. Even at a density of 10 caribou/km^2 of winter range, recruitment would equal 52 yearlings/100 females. At a density of 10 animals/km^2 the Porcupine Herd would number 1,800,000 animals; and even this density would not hold since this many caribou would have greatly expanded their range.

In North America, in herds coexisting with wolves, recruitment is commonly less than 25 yearlings/100 females and yet densities seldom exceed 2 caribou/km^2 (Bergerud 1980). This disparity in densities and recruitment between Norway and North America is due to predation in North America. Predation limits populations far below that provided by food supplies (Bergerud et al. 1983).

Carrying capacity has been defined as that point where recruitment = natural mortality (Caughley 1977). For caribou on mainland North America the carrying capacity is determined by the abundance of predators (Bergerud and Elliot 1986). Recruitment equalled natural mortality for 22 herds at 6.5 wolves/1000 km^2 (Bergerud and Elliot 1986) regardless of the density of caribou on the winter range.

Long Term vs. Short Term, Individual vs. Herd

Bergerud, Jakimchuk and Carruthers (1984) reviewed the demography of 8 herds relative to disturbance by human activities. They concluded that the major impacts were (1) the building of transportation corridors that permitted increased human harvests of caribou and (2) the improvement in calf survival when wolves were reduced. Caribou herds continued to cross roads, and herds such as those in Newfoundland, still prospered when habitats were altered by logging and flooding. The Central Arctic Herd in Alaska increased from about 5,000 to 13,000 (early 1970's to 1984) despite the Prudhoe Bay oil field.

The conclusions of Bergerud et al. (1984) were debated in letters to the editor by Whitten and Cameron (Arctic 1984:293), Klein and White (Arctic 1984:293-294) and Miller and Gunn (Arctic 1985:154-155). Rebuttals to all letters were provided by Bergerud and Jakimchuk (Arctic 1984:294-295, Arctic 1985:155-156). Klein and White agreed that the herds were increasing but thought that disturbance must be viewed on a long term basis. But this is a nonsequitur - if there are no effects of disturbance for a short term, how are they significant on a long term? The long term is the addition of short term intervals. Miller and Gunn agreed that the herds were increasing but stated that disturbance must be viewed on the basis of the individual, not the herd. Again, this is a nonsequitur - since individuals comprise herds, if the herds are prospering, then the individuals are also faring well.

Now, there are new arguments that the prosperity of the Central Arctic Herd in the face of development cannot be used to gauge the success of the Porcupine Herd when faced with similar development and the question

is, why not? The Central Arctic Herd spends its entire annual cycle quite close to the development zone - the Porcupine Herd spends only two months. All the animals now alive in the Central Arctic Herd have been born since development commenced; they have adapted. The basic reason that some biologists cannot accept that caribou can cope with development is their ingrained views that caribou are "wilderness animals" and that food supplies are limiting. The new research work planned for the Porcupine by the Alaska Fish and Game is proceeding on this basis. Now caribou will be radio-tracked by satellites and energy budgets calculated daily, perhaps hourly. It all flows from the unsupported belief that nutrients and energy will ultimately limit total numbers of caribou in this herd.

Biology of Calving and Aggregating Behavior

Before we can evaluate the potential impacts of development on the Porcupine Herd we must determine why the animals use the Coastal Plain in the 1002 area for calving and grouping after calving. Basically, what are the environmental factors that determine where caribou locate their calving grounds?

The calving grounds of the migratory herds in the Holarctic are usually located on the northern distribution of the herd's range in tundra habitats (Appendix I:Fig. 1). The cows leave the bulls and commence migration towards these areas generally in April before green plants appear. Some herds migrate northeast, others northwest, and two herds south of Hudson Bay even migrate east. The consistent factor in all these migrations is that cows cross the tree-line at right angles

(Appendix I:Fig. 1) Wolves in North America generally den near tree line (Appendix II). By migrating at right angles to the tree line the cows can maximize their distance from wolves, with the least effort. Caribou cows migrate and calve on the bleak inhospitable arctic tundra to reduce contact with wolves (Appendix II) and there are very few wolves on the calving grounds of the Porcupine Herd.

An alternative hypothesis is that caribou seek their northern tundra calving grounds to optimally forage, primarily on Eriophorum angustifolium (Kuropat and Bryant 1980). I was able to disprove this hypothesis in 1984 by comparing the nitrogen in fecal droppings and plants at the time of calving between cows on calving grounds and bulls still south of calving grounds. The bulls were feeding in more nutritious plant communities than the cows (Appendix I:Table 1). If the calving grounds were really unique in the quality of forage then the bulls should have been with the cows. If the cows were primarily "interested" in the quality of their forage, they should have stayed back with the bulls. The fact that cows commonly calve on Eriophorum tussock associations may be due to the particular microtopography of these habitats which results in little accumulation of snow and early snow melt (Benson 1969). That is not to say that caribou do not optimally forage within the constraints of selecting the best overall habitat to avoid predators. However, over all, the diet of the cows in late May and early June is not highly nutritious (Appendix I:Table 1) and this has resulted because of their own migratory behaviour.

The location of the calving grounds varies between years because of annual variations in snow cover. The caribou arrived on the calving

grounds of the Porcupine Herd on 5 May 1974 and 12 May 1975 when snow cover was light; they arrived 20 May 1976 and 24 May 1973 with medium snow cover and even later on 26 May and 30 May when winter snows had been heavy (Curatolo and Roseneau 1977). The calving ground of the Porcupine Herd is on the areas of reduced snow cover generally sandwiched between the foothills and the slightly colder coastal strip (Fig. 2). In an early spring, as in 1974, the animals will be farther west and north than in late years such as 1972 and 1973. In an early year, more caribou will calve in the 1002 area than in a late year. In 1982, the season was so retarded that the herd calved in the Yukon (ANWR Progress Rept FY 83-6). We can think of the annual variations as caused by snow induced limitations to the basic spacing antipredator tactic. But within this tactic, to maximize the distance from tree line, the animals also need to find brown substrates so that calves can be cryptic, especially to avoid predation from golden eagles (Aquila chrysaetos). Thus snow cover affects the distribution within the coastal plain but not the overall regional distribution.

We know less about the extrinsic and socialization factors in the massing of caribou in late June and July than we know about calving. In some years, such as 1976 and 1981, no large aggregations formed. But in all years, the animals concentrate on the 1002 lands. This occurred even in 1982 when the herd calved in the Yukon (ANWR Progress Rept. FY 83-6). We also know that the Porcupine Herd is unique that in some years the entire herd comes together for a few days in July. This represents the most spectacular aggregation of ungulates in North America and compares favorably with the aggregating of the wildebeeste (Connochaetes taurinus)

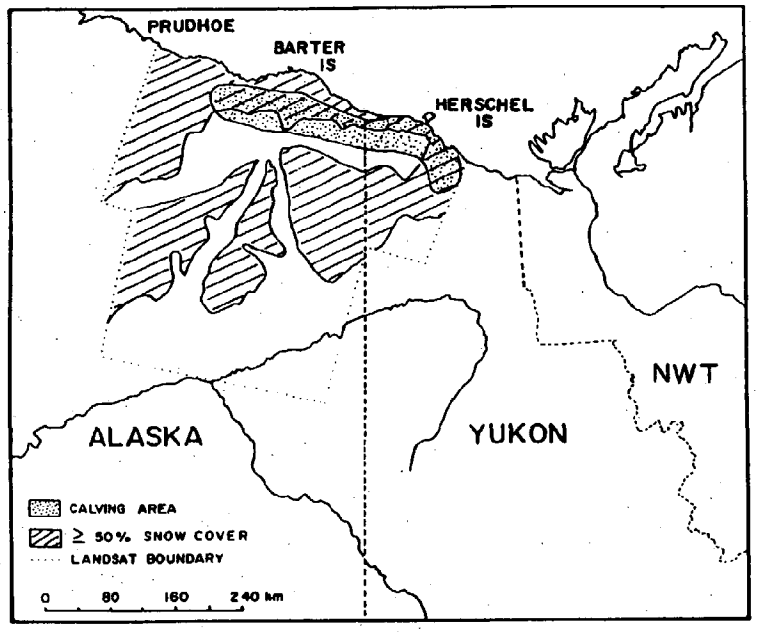

Figure 2. The snow profile of northeastern Alaska in late May 1978 (from Lent 1980).

on the Serengeti.

Initially, after calving, cows with their calves group together in the vicinity of where the calves were born (Lent 1966, Bergerud 1974b). This aggregating represents another antipredator tactic. A caribou calf will benefit if there is another animal between itself and a predator (the selfish herd concept) (Appendix II). Later, with the onset of the mosquitoes, the caribou in the Porcupine Herd move to the coast where cooler temperatures and fog provide some relief. The animals are usually concentrated in July south of Barter Island in the 1002 lands.

Why is this particular strip of coast selected? The animals may select the coast adjacent to Barter Island simply because the core calving area is near the Jago River, hence a direct route to the coast leads to Barter Island. In support of this view, in 1974, when the concentrated calving was along the Katakturuk River, the post calving grouping was at nearby Camden Bay. But to the contrary of this sequence, when the animals calved near Herschel Island in 1982, they still travelled up the coast after calving to the area adjacent to Barter Island (ANWR Progress Rept. FY 83-6). This fidelity to the coast opposite Barter Island could be due primarily to (1) tradition and socialization, or it might result because (2) the animals may, between the end of calving and the emergence of insects, follow the green phenology west, or, (3) the concentration at Barter Island may relate to some additional relief factor from mosquitoes. For example, a small herd of 2000 animals on the Hudson Bay Coast in Ontario aggregates in July on the tidal benches where there are large mud flats. In the absence of vegetation to hold insects, these caribou probably gain added relief from mosquitoes. This same situation

may hold for the tidal flats near Barter Island. Thus we don't know if the uniqueness of the gathering near Barter Island is because of its juxtaposition to calving locations or if the area, per se, has its own special attraction.

Critique of the Arctic National Wildlife Refuge-Alaska Coastal Plain Resource Assessment

My comments are limited here to the full leasing option and are restricted to caribou. This is the worst case scenario and many of my comments will reflect my view that caribou can adapt to full leasing and developing if the proper mitigating actions are taken. I will only discuss my major criticisms, which does not mean that I necessarily agree with sections not discussed.

2 mile limit: On several pages it is suggested that maternal cows will avoid a strip 2-miles out from major roads and development. This implies a 4-mile displacement when both sides of the road are considered. The reference for this avoidance strip is Dau and Cameron (1986). Based on this 2-mile rule, the report calculates the acreage lost to caribou from development. Firstly, the concern should not be the lost acreage as it relates to carrying capacity. The cows have not selected the coastal plain for it forage resources but to avoid predators. If wolves travel the haul road, as they did the TAPS highway (Roby 1978) it will be advantageous for caribou to avoid the habitat adjacent to the road. Secondly, Dau and Cameron (1986) did not show caribou avoidance of a 2-mile strip on both sides of travel routes. Dau and Cameron documented

a 50% avoidance of adjacent habitats at 2 kilometers from the road and no avoidance at 3 kilometers (p. 100:Fig. 4). Thus there should be 50% avoidance at 1.2 miles and no avoidance at 1.9 miles. Actually, Murphy and Curatolo (in press) show that caribou, including cows and calves, resume normal foraging and daily activities when 600 meters from active roads in the Prudhoe oil field. Therefore, a maximum statement is that maternal cows avoid about a 1½ mile strip on each side of the road; thus the displacement statements in the report should be reduced substantially.

If development proceeds in area 3 as shown on page 7 of the assessment statement, there would be 47 miles of road in the core calving area. We could expect maternal cows to be displaced from an area of 141 mi^2 or about 90,000 acres. However, the area between the two parallel roads in the hypothetical development would also probably be lost. Parallel roads to reach different objectives should be avoided. However, parallel roads to reach the same objective might be a way to re-direct traffic to minimize disturbance, depending upon which route has the most caribou nearby.

P. 28, Para. 1. "The lower levels of earlier estimates may reflect a truly smaller population, less accurate or less complete survey techniques,...". Because the Porcupine herd gathers in one or a few major aggregations, the census results of the herd by aerial photography is highly accurate. The herd has definitely been increasing. This increase has resulted from greater calf survival (Fig. 3). The increased calf survival occurred because wolves were reduced by rabies in the late 1970's and early 1980's. Jakimchuk and associates saw considerably more wolves in 1971 and 1972 than have been seen in recent years.

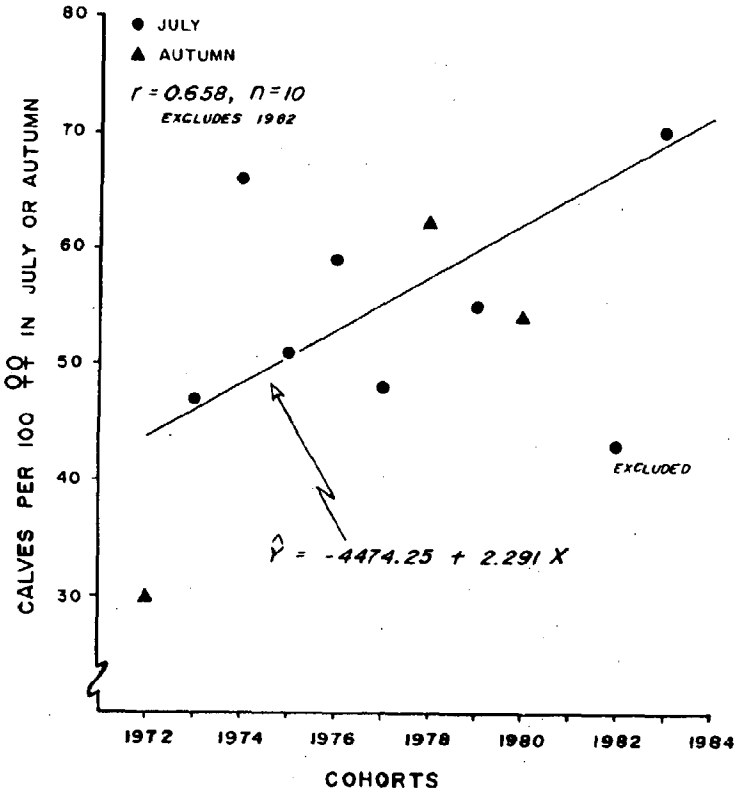

Figure 3. The regression of calf survival (calves/100 ♀♀) on year.

P. 29, Para. 4. "Access to insect-relief habitat and forage resources during this period may be critical to herd productivity." No one has documented that fecundity or calf survival have been affected by failure to reach mosquito relief habitat. There are no other large herds in North America that have access to a foggy coastal strip. Even if the animals could not use the coastal strip this would only put them on par with other herds. Note that there were an excellent 59 calves/100 cows in July 1976; in that year the animals did not mass on the shores of the coast. However, if caribou did seek the foothills for insect relief, reduced calf survival would be expected because of increased predation.

In this paragraph and throughout the report, the word "productivity" is used as a synonym for "recruitment". This is an unfortunate usage. To many ecologists, productivity brings to mind "to produce", the elements of reproduction, and for others it implies biomass as in the terms primary and secondary productivity. The use of the word "productivity" comes with the philosophy of a food carrying capacity. For many ungulates in the lower 48 states (where there are no wolves) the number of young born per 100 adult females does vary with nutritional conditions. In these southern ungulates, the final recruitment may indeed reflect the initial variations in pregnancy percentages. For caribou, we should use the terms "fecundity", "parous percentage", or "pregnancy rate" to describe the initial number of calves/100 cows at birth, prior to mortality. The emphasis thereafter should be on documenting the survival or mortality statistics; the final yearlings/100 females parameter at 12 months should be called "recruitment". "Productivity" is a catch-all and reveals a basic indoctrination that the resources of the land result

in cows being productive or not productive. Since fecundity is fixed in mature caribou the emphasis should always be on survival after the calves are born.

P. 29, Para. 10. "Riparian areas are used for travel corridors...". This does not sound feasible since wolves also use riparian areas for travel. Caribou in Spatsizi, B.C. avoid ambush cover in tall willows (Bergerud, Butler and Miller 1984). Also the streams are in flood in late May and early June and are not suitable for small calves. In Svalbard, T. Skogland (pers. comm.) indicated that bull caribou use the riparian communities and flood plains but cows avoid these dangerous areas. Curatolo (1985) also indicated that bulls used the riparian community but cows generally avoid them (see also Roby 1978).

P. 108, Para. 1. "Caribou select calving areas because of favorable... advanced new vegetation...proximity to insect relief habitat...". Caribou only select calving grounds to avoid predators (Appendix I,II). The report is too general in using the word "insect-relief". Generally, insect relief is meant to include both mosquitoes and oestrid flies, whereas the coastal habitats that the caribou seek are to escape only mosquitoes. Oestrids do not emerge until late in July, when the animals have left the 1002 lands.

P. 108, Para. 2. "Displacement of the PCH from a core calving area to a less desirable area would be expected to reduce productivity". Again, the word should not be productivity. If the development results in a

displacement of caribou farther south towards tree line it will result in increased predation (Fig. 4) and reduced survival. "Loss of important habitat has been shown to directly impact ungulate populations (Wolfe, 1978; Skovlin, 1982)". This is a general motherhood statement and these references are for ungulates living without wolves and are not appropriate for the Porcupine Herd. When caribou herds increase they expand their range and when they decline the range shrinks (Bergerud 1980). Calf survival drives numbers and hence range occupancy. "...Whitten and Cameron (1985) contend that the CAH has not experienced a reduction in productivity ... because (1) the CAH has been displaced from only a part of its calving grounds;...". The herd could be displaced from all of its calving area and still not decline if predator numbers were managed. The CAH herd increased 1972 to 1985 because of high calf survival since wolf numbers had declined with development. As their second point, Whitten and Cameron argued that the CAH did not decline with development because "...(2) suitable alternative high-quality habitat appears available...". The habitat at Prudhoe Bay is so poor that White et al. (1975) calculated some negative energy budgets and thought that the herd was energy-limited when it numbered a few thousand animals in the early 1970's. Again, the habitat was thought to be so poor from a forage standpoint that Skogland (1980) listed it as the area with the least plant biomass of 6 herds in the Holarctic. Yet today the CAH has grown to >15,000 animals. Point 2 of Whitten and Cameron (1985), referenced in the assessment statement, is an ad hoc hypothesis to explain away the herd's prosperity in the face of development. As their last point, Whitten and Cameron felt that the CAH

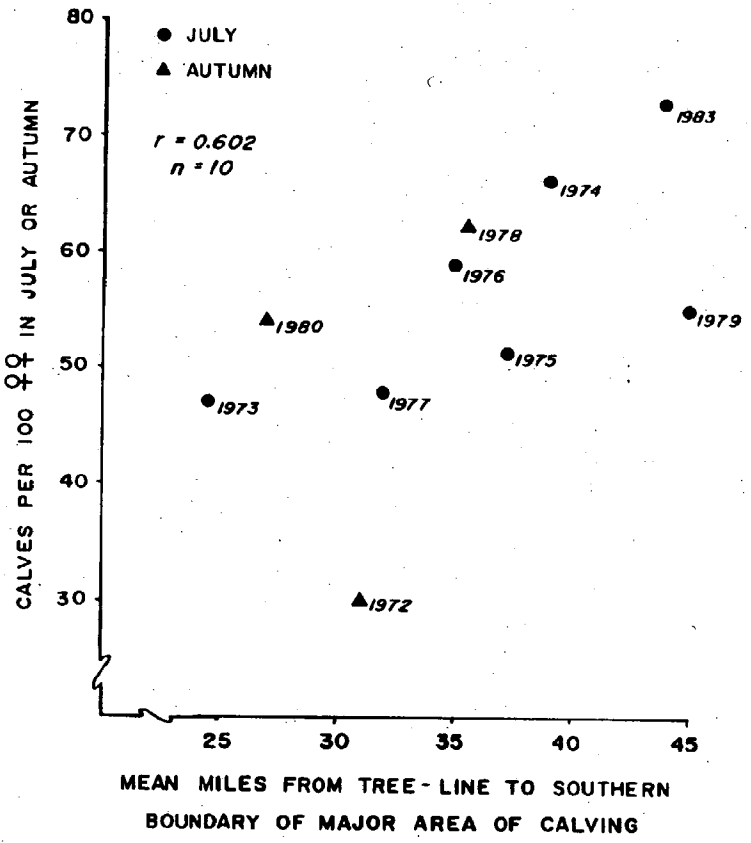

Figure 4. The regression of calf survival (calves/100 ♀♀) on distance of calving ground from tree line.

has not declined with development because the "...(3) overall density of CAH caribou on their calving grounds is much lower than that of arctic herds in Alaska". Again, this reflects Whitten and Cmeron's dogmatic opinion that forage determines numbers. The CAH calving ground is about 125 miles from tree line and the PCH, only 30-40 miles. Given the much larger "safe" space, the cows in the CAH are also able to disperse which is another antipredator tactic (Appendix II). The animals in the PCH herd, faced with less space, are more aggregated. Again this is expected, if the animals were dispersed, many would be nearer tree line and at greater predation risk. Since food supplies are not limiting for either herd, the greater densities for the PCH are not a problem. In fact the aggregating is a tactic to avoid predators; when animals face food problems such as in the high arctic or on Svalbard, the groups disperse and densities are low (T. Skogland and F. Miller, pers. comm.).

P. 108, Para. 3. "Both absolute..." This paragraph is irrelevant. One cannot use density figures (see above) to argue that the PCH will face greater consequences than the CAH from development. The CAH lives year round with development and has prospered; the PCH will only be near the development for 2-3 months. Densities are functions of aggregating behaviour and the lower densities for the CAH than the PCH mean greater forage as well as less space for the PCH, and in no way signify the density-dependent problems that Whitten and Cameron imply.

P. 108, Para. 4. "With the CAH calving density remaining low compared to other herds,... overcrowding and consequent habitat stress that might

result in reduced productivity have not yet occurred, ..." This statement is not correct; there is no habitat stress. The CAH cows have selected their calving range, with its low plant biomass, to avoid predators. Cows in other herds in North America are also prepared to sacrifice optimal foraging to avoid predators (Ferguson 1982, Bergerud et al. 1984).

P. 108, Para. 5. "The PCH is much more crowded..." They are not crowded - they aggregate to maintain maximum distance from tree line.

P. 109, Para. 2. This paragraph continues to discuss insect disturbance. But what is involved is primarily mosquitoes. Oestrid flies are not on the wing until the animals leave the 1002 lands. Helle in his publications was primarily concerned with oestrids and other flies and not mosquitoes. To quote their work in this context of causing mortality is stretching the argument.

P. 109, Para. 6. *"Failure to obtain relief from insect harassment from either factor* (barrier or displacement) could shorten foraging time, leading to poorer physical condition and subsequently to increased susceptibility to predation and reduced overwinter survival."
The 1976 and 1981 cohorts did not apparently use the coast line for insect relief and these cohorts did quite well. These animals are not on a fine edge in physical condition. No one has documented winter starvation in North America as a result of high insect years. When the insects abate in late August and September, the animals are able to recoop their losses

and fatten for winter. Remember that the Porcupine herd has a unique fog belt for insect relief that other herds do not have and even they (PCH) desert the mosquito relief habitat by mid-July. Murphy and Curatolo (in press) showed that caribou at Prudhoe Bay, away from the road, feed 53% of the day prior to mosquito emergence, 41% with mosquito harassment and 29% with oestrids on the wing. Oestrid flies harass caribou more than do mosquitoes and yet PCH animals contend with oestrid flies well inland in August.

P. 112, Para. 4. (and p. 132 as well) "These changes ... could result in a major population decline and change in distribution of 20-40 percent..." They have provided no data to show a 20-40% population decline. Neither was a concensus reached on the magnitude of any negative effects on the PCH population size or distribution by the 14 specialists at the Caribou Impact Analysis Workshop (ANWR) in November, 1985. I believe that the caribou will continue to use the 1002 lands with development, except near active roads. Even if there was some displacement, there is no need for the herd to decline if wolf populations are managed to provide positive recruitment or calf survival sufficient to balance natural and hunting mortality.

P. 112, Para. 5. "The population decline or distribution change would be 5 - 10 percent for the CAH throughout its range." There is no evidence to support such a decline. A change in distribution cannot cause a decline unless it changes the reproductive or mortality rates. Caribou, even in undisturbed populations, frequently exhibit range shifts,

including areas used for calving. Why can't the authors be objective? The empirical evidence is there for all to see; the CAH increased coincident with development because predator numbers were reduced. How can the field findings be twisted to fit preconceived ideas?

Impacts and Mitigation

The one guarenteed impact of the development of the 1002 lands will be that cows with young calves will avoid active roads for a distance of >1.2 miles. This is based both on theoretical considerations (Bergerud et al. 1984) and empirical observations (Dau and Cameron 1986). The loss of this habitat will not cause additional stress on the animals since they are not nutritionally limited. Nor will activity budgets be seriously altered by development activities (Murphy and Curatolo in press). It might be more serious if the animals remained near the road where predators may travel. We do not want these cows to habituate to traffic because this would suggest that they might become less wary to their natural predators.

An impact that might affect calf survival would be if the females in May failed to cross the east-west haul road because of the traffic and shifted their calving distribution closer to the foothills where there are greater numbers of wolves and bears. Such a barrier affect has not resulted from the TAPS corridor and haul road. The CAH animals have crossed the road and shifted their distributions between years, making use of habitats both east and west of the corridor. Presumably, these shifts relate to snow cover (Jakimchuk pers. comm.). The PCH herd, since it is both more migratory and larger than the CAH, should

cross a pipeline-road corridor more readily than the CAH. Also, the PCH caribou should cross rather than be funneled by the corridor because caribou should not be easily deflected when undertaking directional shifts to antipredator and mosquito-relief habitat.

Certainly, every effort must be made to allow the animals to continue to use all their potential space to avoid predators. Initially, until the impact of the corridor is understood, traffic will have to be prohibited in the period May 15-June 10 within several miles of cows moving west or north towards the road. Another effort to mitigate the effect of the corridor should be to reduce its visual impact as seen by animals entering the area (moving north and west). Once in the area, the animals will find their way out. If ramps are built they are more important on the south side of the road than on the north side. Murphy and Curatolo (in press) have shown that disturbance is greater when there is an active road combined with a pipeline. Theoretically, the vehicle appears as a predator - and the pipeline as the ambush cover. The pipeline and haul road should be separated by at least 1 km with the pipeline north of the road. Pipelines should be cryptic (painted green and brown), be motionless and scentless.

Another potential impact is that the road facilities will increase predator access to the herd. Wolves can be expected to move north down river valleys and then move laterally, using the road to cross rivers east and west. The cows, by calving between north-south river valleys, have in the past taken advantage of the rivers as potential barriers to east-west movements of predators, especially since the rivers are in flood in late May and early June. We do not want to increase the ease of

access to calving areas for predators by development (Bergerud 1985).

Even if the calving animals are displaced southwards by the corridor, the PCH can remain a viable herd if predator populations are managed. It is an incredible omission in this impact statement that predator management was not mentioned. The reduction of wolves is our major tool to improve calf survival. Wolves would not necessarily have to be reduced on the Coastal Plain. Control operations could take place on the winter range. The goal would be to have recruitment equal natural mortality + hunting mortality, which means, for the Porcupine herd, that about 12% of the herd should be yearlings in April-May (Bergerud and Elliot 1986). This oil development may provide advantages for predators. Once we disturb the status-quo, we must be prepared to manage the predators. This management is the fail-safe position.

I believe that the PCH will cross the haul road in seeking mosquito relief along the coast. The cow and calf that Curatolo (1986) radio-tracked in the CAH herd crossed the road 8 times in one mosquito season. Once a large herd starts across it will continue even if a vehicle approaches. Certainly large herds moving west and north will have to be monitored hourly as they approach the corridor and all traffic halted or rerouted. However, even if the animals did not cross and gain the coastal strip, I believe that the herd wuould be little affected in its vitality.

The one fact that we cannot escape is that the wilderness character of the coastal plain will be lost for decades. The post calving aggregation of the Porcupine Herd is the most spectacular large mammal display on the North American continent. We must do all that we can to

see that this massing does not become a memory as did the thundering buffalo herds of the plains. The animals should continue to mass in the undisturbed KIC lands, adjacent to the coast, in a wilderness setting.

Because I believe caribou can coexist in close proximity to an ethical man, I look forward to the day when I can go on a guided tour down the Haul road and view this massing of the mighty legions in July. The day will surely come when the old rigs will have been dismantled, the pipes disassembled, the scars left to heel, and the wind again sweeps unrestricted across the cotton grass plains. The caribou will still be there in uncounted numbers, coming as always down their ancestral tracks, and, we too will be there to see and marvel at the majestics of our fellow species.

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Please accept the following comments on the proposed leasing of the Arctic National Wildlife Refuge 1002 area.

First, the enabling legislation which set aside the Arctic NWR stated four general goals for management (ANILCA PL96487, sec. 303 (2)(B)(iv)), all of which would be negated if leasing is allowed. To destroy the reasons the refuge was set aside, for the sake of oil leasing would not be in the national interest. Amazingly Secretary Horn has recommended leasing of the NWR, even though his own Coastal Plain Resource Assessment admits that Major environmental damage will occur the Porcupine caribou herd, major damage to the muskoxen, moderate (questionable, probably catastrophic) effects on polar and grizzly bears, possible elimination of the wolverine. When the draft says that wildlife will be displaced, they fail to mention where the wildlife will be displaced to. The Coastal Plain 1002 area is the last hope for wildlife. The entire National Petroleum Reserve is open to leasing.

The report states there is only a 20% chance of finding oil, and to be economical to produce, oil must be several times higher than it is at present. Here in Texas, most people in the oil industry are laid off, indefinetly. Should we destroy the best habitat for caribou in the world, on the hope of finding oil, that at present cannot even be used?

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Mitigation is a joke, especially in the Arctic environment. Stipulations requiring prohibiting diaturbance, implementing time and area closures, and on site monitoring wont help a bit if the species is provoked, such as the muskoxen, into leaving an area where it was disturbed. I have worked in Arctic Alaska, and have observed muskox one day, went back the next day in a helicopter, only to find the herd several miles away. What will happen when hundreds of flights occur? The muskox will leave, if the roustabouts don't shoot them first.

How can you mitigate an oil spill? Since 1972, there have been 23,000 reported oil spills. I cannot understand anyone wanting to destroy the finest piece of real estate in North America. We cannot treat the coastal plain as a seperate entity. The integrity of the entire refuge will forever be destroyed if oil leasing is allowed.

One thing that the study does not cover in enough detail, in my opinion, is how to prevent a boom/bust cycle from occuring among the North Slope communities such as Kaktovik. Most employees will be out-of-state, but local communities will still be economically enhanced. But after the oil is gone, what then? A subsistence type of lifestyle will be lost forever. A few oil companies will profit, the State of Alaska will reap some taxes, but the natives will lose their way of life.

It is the contention of several groups, including myself, that the managing agency is biased towards development. Throughout the decision making process, Department of Interior and USFWS have done everything possible to minimize public involvement. USFWS has spent 300,000 dollars appraising land values in order to develop exchange agreements, which would remove subsurface mineral rights from federal ownership. If it weren't for Trustees of Alaska, no public review period would exist at all.

I am disturbed by one thing that I could not find mention of anywhere in the Coastal Plain Resource Assessment. During 1985, the leasing program for the NPRA was cancelled for lack of industry interest. I don't have information on 1986 NPRA leasing programs. I think this information should be included in the record--should we open up the last coastal area, when the developed fields don't draw any interest? Definetely not.

I wish to go on record as supporting Alternative B. Designating sec. 1002 of the Arctic NWR is the only alternative which adequately protects and enhances the four basic principles for which the refuge was created. Under federal wilderness protection, the coastal plain would protect the resources for all, not a few. And if in the future the oil resources are needed, they will still be there. But if we develop these resources now, every other value, such as wildlife, wilderness, recreation, and subsistence resources will be irretrievably lost.

Thank you,

Phillip H. Briggs
Rt. 2, Box 198
Beckville, TX 75631

PH.#214-678-3673

cc. Senator J. Bennet Johnson Chairman, Senate Energy and Natural
Honorable Steve Cowper, Governor State of Alaska
Senator Phil Gramm, TX
Senator Lloyd Bentsen, TX
Representative Jim Chapman, TX
Representative Morris Udall

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Anne Brown

Mailing Address 8731 Sultana Drive
Anchorage AK 99516

Check appropriate box below:

☒ I am here to offer my own views.

—or—

☐ I am speaking for _____
(please enter name of organization you represent)

DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

TESTIMONY OF [redacted]

8731 SULTANA DRIVE, ANCHORAGE ALASKA 99516

JANUARY 5, 1987

Mr. Chairman:

My name is Anne Brown. I am a fourteen year Alaskan resident and am representing myself at today's hearing.

It was a great surprise to receive the 1002(h) report and find it was a single volume, concise and well organized. I appreciate the careful, and judicious effort that obviously went into presenting and assessing more than six years of work done in the 1002 area. As a result, I have been able to read the report in its entirety.

The need for future domestic energy reserves and the economic benefits for all Alaskans and most U.S. citizens are the most compelling arguments in support of oil and gas leasing in the 1002 area. ~~However,~~ I could not support leasing if I were not confident, given the information in this document, and knowledge of the Prudhoe Bay experience, that industry can explore for and produce oil and gas with minimal changes to the environment that have not, and will not, affect the integrity of wildlife populations. I strongly support DOI's proposal to congress for full leasing of the Coastal Plain.

As a professional biologist, I read with particular interest the section on environmental consequences. The backbone of this section is the application of the habitat based impact assessment technique derived from the USFWS Mitigation Policy. This is not surprising since FWS has pushed for years to apply their national policy to Alaska. While it may be logical to apply the FWS Mitigation Policy to many regions in the lower forty-eight, there currently is no evidence which even suggests that habitat is a population limiting factor in the arctic. In fact, evidence shows that wildlife populations in the arctic are regulated primarily by non-human and human predation, weather, disease, parasites, and emigration. Although a habitat based system lends itself readily to precise quantitative analyses, and facilitates the bookkeeping of mitigative and compensatory requirements, it is meaningless from a biologic perspective in the arctic. At most, it satisfies political pressures.

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I support the FWS mitigation concepts of avoiding impacts where possible, minimizing impacts through project design when they cannot be avoided, and rehabilitating disturbed areas where surface impacts are extensive or have a significant adverse effect on wildlife populations. These principles, however, can be applied much more effectively outside the bounds of the FWS Mitigation Policy when population and mechanisms whereby development activities might limit populations are the basis for mitigation recommendations.

It is interesting to note that FWS sponsored a research project published in 1982 titled "An Assessment of a Wildlife Habitat Evaluation Methodology for Alaska". The study was based on the assumption that to mitigate effectively

the impacts from large scale natural resource development projects you have to mitigate the habitat losses accruing from such projects. It set out to examine experimentally habitat evaluation procedures for several species including caribou. With the exception of a few species, like beaver, that are habitat specialists and have very small home ranges, the conclusion was that the USFWS habitat evaluation type approach was simply not workable, especially for large herbivorous animals that are wide-ranging, or for any predatory species.

In spite of the inappropriate application of the FWS Habitat Evaluation Procedures, the authors of this report to congress are to be credited with presenting a tremendous amount of environmental material in a systematic manner. Biologic information, for the most part, was evaluated objectively. The only notable exception is the information on caribou.

The biases inherent in the caribou sections stem from the obvious disregard for much of the published work on caribou in the arctic, and from the less than scientific techniques developed to support the controversial notion of a caribou core calving area. Added to this, is the misuse of habitat evaluation procedures, whereby the authors assume complete displacement from any habitat with reduced value due to either direct or indirect affects of oil and gas operations. This has lead to the irresponsible and unreasonable prediction of major population declines in both the Porcupine and Central Arctic caribou herds if the entire 1002 area is leased for oil and gas development.

Species-by-species discussions in the draft report indicate that displacement or blockage is the primary mechanism by which wildlife populations could be adversely affected. The technology exists to design an oilfield that assures free passage of migratory birds and animals. We have the laws, and the commitment on the part of government and industry to insure the integrity of the arctic environment and wildlife populations. I am convinced that the caribou and other biological issues raised by opponents to full leasing of the Coastal Plain are red herrings. What conflicting views really boil down to are disagreements regarding aesthetics.

And, It's important to separate aesthetic feelings from biological issues and conclusions. Aesthetic arguments are frustrating because, by definition, they are based on very personal feelings. So many people involved in the discussion of the aesthetics of the 1002 area have never been to the North Slope or to Prudhoe Bay or ANWR in particular. They speak from a mental image that probably does the beauty and uniqueness of the region justice, but cannot possibly comprehend its vastness, its resilience and the insignificance of the presence of the largest oilfield in North American on the surface of the arctic. For most of those people who speak from experience, that experience was possible and memorable because of Prudhoe Bay, not diminished because of Prudhoe Bay.

I will never forget the first time I flew into Prudhoe Bay in 1978. The excitement of its remoteness and the awesome expanse of both the coastal plain spotted by polygonal lakes and the ice pack extending beyond the horizon are unforgettable. Most striking however was how small the industry facilities seemed amidst the expanse of the wilderness. Here was Alaska's economic life's blood and 20% of the nation's energy production and yet what

stood out was the environment, the incredibly beautiful surroundings, the wildflowers, the caribou and the waterbirds. I have spent a lot of time on the North Slope since then and feel lucky for every opportunity personally and professionally. Prudhoe Bay has provided a tremendous amount of opportunity and funding for biological research that otherwise would never have occurred. The leasing of the 1002 area will bring similar opportunities for individuals in my profession as well as engineers, drillers, accountants, lawyers, regulators, bankers and the general public; and it is necessary to meet the economic needs of this State and the energy needs of our nation.

Thank you.

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Peter D. Brown

Mailing Address 4731 Sultana Dr.
Anchorage, Ak. 99516

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☐ I am speaking for _____
(please enter name of organization you represent)

P-24

My name is Peter Brown and I am speaking as a private citizen.

I support Interior's ~~suggested~~ recommendation to fully explore and lease ANWAR. Direct experience in the Arctic has repeatedly shown that oil development can occur without ~~major~~ damage to the environment while providing major benefits to the United States and the State of Alaska.

I do feel that the 1002 report grossly ~~misrepresents~~ exaggerates the extent of environmental costs and that the public has been very ill-served by the Fish and Wildlife authors' ~~misinterpretation~~ of existing data with respect to caribou impact.

Implicit in their assessment but never openly stated are a number of subtle but critical assumptions which need to be explicitly stated and scrutinized. Examination of these unstated assumptions will reveal them to be ~~seriously~~ flawed. Furthermore, these assumptions are not supported by the very data F & W uses, namely the Alaska Fish and Game study of Caribou in the Milne point area.

Specifically, the critically flawed assumptions are:

1 the repeated misapplication of the "Sphere of Influence" concept ~~and~~

2. the idea that significant habitat area will be lost ~~and~~

3. that availible habitat is the major limiting factor in arctic wildlife populations.

1st of all
The F&G study does show that caribou avoid calving within ~~by~~ 2 miles of an active roadway ~~and~~ that the effect on non calving activity is minimal. From that F&W erroneously infers that all habitat within that "sphere of influence" is lost and that this loss of habitat will result in a loss of population. This is bad science at its worst and reduces wildlife study to the intellectual level of phrenology.

~~First of all,~~ The preponderance of evidence suggests that calving activity will simply be displaced beyond the 2 mile range, relocated but not disrupted entirely. Furthermore, the disruption which does result from road traffic ~~noise~~ can be limited by industry at the critical times to further reduce the effect to levels that may be insignificant even within the 2 mile range.

Secondly, the Sphere of influence concept as applied by F&W automatically assumes that all habitat value within the zone is eliminated when in fact the effect on non calving activity has been shown to be minimal.

Finally, a principal theme in F&W remarks and policy is that habitat loss is a predominant factor in arctic wildlife population change. Although biologically unsound, this emphasis on habitat does allow F&W to avoid a politically sensitive but biologically significant

issue, predation, especially controllable human predation by subsistance and sport hunters.

I am appalled by the quality of thought in F&W's method and conclusions. F&W should focus on the real issue, game populations, rather than the red herring of habitat loss and the misapplication of the sphere of influence concept. This seriously erodes the scientific integrity of public discussion of a complex and emotionally significant issue. This is particularly unfortunate when Fish and Wildlife's conclusions are not supported by data and create the appearance of a conflict between wildlife and development where none in fact exists.

Peter D. Brown
1/5/87

P-25

United States Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

1/25/87

To Whom It May Concern,

I am writing concerning the oil exploration and leasing proposed on the Arctic National Wildlife Refuge. I would like my opinion to go on record as opposing opening up this area for oil exploration and leasing.

As an Alaskan and a United States citizen, I realize there are some benefits of oil development in this area but I have come to the conclusion that the costs, in terms of the ecology, wildlife, wilderness and future subsistence values, are far too high for the oil potential present.

Impacts on the ANWR have been underestimated by the draft 1002 report. If Prudhoe Bay type facilities are required to explore and develop the oil resources, the web of pads, roads and pipelines would significantly alter the area. Table V-1 does not include major types of facilities that would be required such as exploratory pads, secondary roads, pipeline construction roads, base camps, construction camps, support facilities, minor stream crossings, reserve pits, pipeline maintenance centers, pump stations, airstrips, etc. Also, the impact of roads between Prudhoe Bay and ANWR are not discussed in the report. These roads and pipeline extensions will have impacts both on and off the refuge.

Since there were few baseline studies done before Prudhoe Bay was developed the idea that the oil companies have developed the area without impacts cannot be substantiated. Serious impacts that have occured at Prudhoe Bay are not addressed in the report, including water quality impacts described by Zemansky (1983).

The draft 1002 report should have been written on the higher reserve potential and not the mean since it is the higher potential that is being used to justify compromising the ecosystem this refuge was intended to protect. In any case, the reserve potential is not high enough to merit destroying this essential habitat for the caribou herd.

As managers of the United States fish and wildlife resources I urge you to support Alternative E in the draft 1002 report, which recommends wilderness designation for the entire Arctic Refuge coastal plain.

Thank you for your consideration,

Susanne Carter-Badilla

Susanne Carter-Badilla
Box 182
Douglas, Alaska 99824

Zemansky, G.M. 1983. Water Quality Regulation during Construction of Trans-Alaska Oil Pipeline System. PhD dissertation. University of Washington. 957 pp.

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13 Grafton Street
on Gallows Hill
Salem, Massachusetts 01970
19 January 1987

U.S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Building
18th and C Streets NW
Washington, D.C. 20240

re: leasing of the Alaskan 1002 area

P-27

To Whom It May Concern:

I have just finished reading the executive summary of the draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment, and the accompanying press release; and I must say I am APPALLED.

Appalled for several reasons, not the least of which is the blatant political and rhetorical manipulation exhibited in this project. Though I know there is no reason why I should be among the first to read this report, it is unconscionable for you to be sending it out so that I receive it on the 17th when written comment must be made by the 23rd. You are managing the debate in a shamelessly underhanded fashion to get what you want. Other examples of this are quoting a $33 and $40 price for oil, when the current price is less that $20 -- a price quote that is, forward or back, out of date. Then you turn around and use current drilling rates. This is called lying with statistics. Is this what we should expect? Perhaps you should ask to have your Services renamed in accordance with what they actually do: The Fish and Wildlife Habitat Destruction Service, partnered with the Bureau of Land Exploitation.

Shameful as this is, it is not the substantive issue that needs to be discussed. What we are looking at is a vital (in every sense of the word) habitat that the administration, in its arrogance and greed, wishes to turn into part of the oil patch. You, yourselves, admit that there is no way to avoid adverse effects on this part of the environment -- it may only be possible to mitigate these effects. In fact, if development were to occur, not only would there be immediate adverse effects on the caribou and other species that use this area, but eventually the entire area will become industrialized, to the permanent loss of this wilderness. Further, a statistically probable accident prior to full industrialization would also render portions of the 1002 area uninhabitable. Your solution to such damage appears to be that the offending party should pay a fine. Looked at another way, while the wilderness dies, little green pieces of paper move from one pocket to another. This is not a solution, but only the way men in cities, who see everything as coming down to money, think the situation would be alleviated. The wilderness would still be just as damaged, for we are not Godlike in our power to revivify what we destroy. On another, but related tack, you may look upon the changes in the lives of the indigenous people as positive. Objectively speaking, this is debatable. Lastly, you reccommend giving yourselves full oversight management. This strikes me as letting the fox guard the henhouse.

On the economic front, it seems ludicrous to be sinking new wells in unspoiled and neccessary (at least to the animal inhabitants) wilderness, when existing wells are lying dormant from the oil glut. Let us use what we have. The situation must, in my book, reach crisis proportions before we start to destroy our nation's heritage to salve it. And I'm talking about real crisis — not like those trumped to influence the uninformed with needless fright. Careful, minimal exploration might be in order to prepare for this.

inally, let not the arrogance of Mankind -- and the heightened form found
vernment officialdom -- lead us to think that our short term needs are the
important thing there is. That kind of logic is worthy only of a child.
ise, statesmanlike, forbearing and truly conservative -- conserve what
not be be replaced, lest our children suffer without.
Thanks for your time and attention, but thank you the more for taking this
heart.

Sincerely,

C. Alexander Cohen

C. Alexander Cohen

cc: members of the House and Senate

Jan 22, 1987

U.S. Fish & Wildlife Service
ATTN: Div. of Refuge Mgmt.
2343 Main Interior Bldg
18th & C Sts. N.W.
Washington, D.C. 20240

Dear Refuge Mgmt. Staff;

The management designation of 1002 Study lands in the Arctic National Wildlife Refuge is about to be decided by this office. Regardless of the feelings of the present administration and Secretary (& Asst. Secy) of Interior, the expertise of your field staff in Fairbanks should be followed as to their management preference for this fragile arctic environment. I strongly support the selection of alternative E instead of alternative A, Being the nomination to wilderness.

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My reasons are:

(1.) Prices quoted in the plan for crude oil are nearly twice the current world market price. (18^{00}/bl as of Jan 22, 87 instead of 33^{00}/bl) This overestimate of barrel prices presents an unrealistic economic scenario in this decision-making process.

(2.) The production values in the yr 2000 are not reflective of the reference sources quoted in the written statements. (8600 mds of b/d as compared to DOE (6.53 MBO/d) values for 1995 and Chevron (6.2 MBO/d values for 2000.) Again this error is only typical of false information that attempts to support a questionable use of public lands/resources

(3.) Present investigation data suggests only a 20% of finding a significant oil producing field. Such low odds are not practical in the comparison of destroyed, damaged, or disturbed environments in this fragile system.

cont.

(4.) The present knowledge as gained from oil & gas exploration, drilling & production as well as the construction of the pipeline (TAPS) is not conclusive in it's estimation of damage and destruction of fragile arctic environments by these past actions. Further the set of conditions by which future operations, as listed above (oil production), have not been listed that will insure the safe development of oilfields at little or no expense to these unique arctic environments.

(5.) The identification of methods, safety procedures, long term impacts, and storage areas for hazard wastes is not complete for past oil & gas development. To imagine that this proposed action will gain from these prior operations in safely and properly handling this material is unrealistic and suggests a false sense of production certainty.

(6.) The opportunity of other oil & gas fields being developed in Alaska or else where in America has not been explored or fully addressed. Further no mention of other energy sources is explored which would be a better long term answer for a complex earth environment. Why not consider other energy alternatives or does this plan evolve in a vaccum.

(7.) The limited & critical habitat of the Porcupine Caribou herd for calving (pre-calving) during spring/early summer appears to be for-

cont. page 2

restricted than the caribou herd habitat as has been studied along the pipeline (TAPS)

E) The loss of any opportunity to have a contiguous block of wilderness including the arctic plain/coastline and the only north american east-west mountain range, BROOKS, in one management unit would be unfortunate for the very slim possibility of a productive (giant or supergiant) oil field. We see the remains of a drilling camp that wasn't productive and the scars are very-long term.

These points are but a few of the major reasons that restrict my support of this proposed alternative and the Congressional approval for the 1002 lands of the Arctic National Wildlife Refuge. The selection of alternative E (wilderness designation for 1002) appears to be of a higher long term significance to the american public. Even the other alternatives might suggest additional study time of helicopter seismic crews and environmental studies over the selection of alternative A.

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Thank you for your time and concern (NEPA) on this draft plan which is important to Alaskans and all Americans.

Kind Regards,

Bruce A. Amery

Box 288
Copper Center AK
99573

14331 Osborne Street
Panorama City, California 91402

January 11, 1987

U.S. Fish and Wildlife Service
Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Re: Arctic Coastal Plain Draft 1002 Report

Dear Sirs:

We feel that the Interior Department's proposal to allow oil and gas leasing along the Coastal Plain of the Arctic National Wildlife Refuge is unwise and inconsistent with sound resource management. In our opinion it is vital to long-run interests of the United States that this area be designated wilderness.

To allow oil and gas leases in this area is unsound resource management because it jeopardizes one of the greatest and diverse wilderness areas left in North America, an area recognized worldwide as one of the last, biologically intact ecosystems. To adopt any plan which would permit oil and gas exploration along any portion of the Coastal Plain directly subverts the original reasons for the establishment of the refuge, i.e.:

(1) Conserve in their natural diversity, fish and wildlife populations.
(2) Meet international treaty obligations regarding fish, wildlife and their habitats.
(3) Protect the quality and quantity of water in the refuge.
(4) Provide for subsistence use by local residents.

Any decision that would allow any leasing for the purpose of energy development needs to be made in light of the consequences of both now and the future. Draft 1002 Report states, and we quote "...long-term losses in fish and wilderness resources, subsistence uses, and wilderness values would be the inevitable consequences of a long-term commitment to oil and gas development, production, and transportation."

We have compiled a list of the facts and the impacts associated with leasing any portion of the 1.5 million acre Coastal Plain.

The rationale provided in draft 1002 Report used to justify the full leasing is based on weak and questionable data because:

a. The report states that there is only a 19% chance that economically recoverable oil deposits exist beneath the Coastal Plain.

b. If the Department of Interior's estimated mean of 3.2 billion barrels with a 40% probability of success are considered valid it would only supply 4.17% of projected U.S demand by the year 2005 and 2.57% by the year 2010.

c. To be economically recoverable, any oil that may exist would require the same artificially high prices of oil $32-$40 per barrel that many shortsighted individuals and agencies have relied on in the past.

d. Not adequately considered in draft 1002 is the probability that alternative sources of every and future technology may substantially reduce our dependence on this resource.

e. Nowhere is any consideration given to the unsought geological consequences of continuously removing oil and the probability of magnifying geoglogical shifts in substrata.

Environmental damages associated with this proposed leasing of 1002 are many and cumulative, e.g.:

a. To quote 1002 "Accidental spills of crude oil and refined petroleum products are an inevitable consequence of oilfield development." Suffice it to say that since 1972, 23,000 spills were reported in Alaska magnifying the possibility of this type of accident.

b. There is no safe economically acceptable way to dispose of the toxic discharges (zinc, arsenic, and aluminum) which result from drilling into the earth. One needs only examine the negative impacts on water quality at Prudhoe Bay where drilling (reducing water quality and thus negatively impacting the food chain, just now becoming apparent), are the detrimental effects on bird and fish populations.

c. Any development of 1002 will be disastrous to the Porcupine Caribou herds as such development will interrupt or prevent critical calving and post-calving periods. To quote draft Report 1002 "...a population decline or distribution change for 20-40 percent of the Porcupine Caribou Herd." - "Increased noise and disturbance level displacing wildlife throughout the 1002 area..." - "Depending upon design, pipelines may create a barrier. Those adjacent to or close to active roadways would probably most impede free movement...this is of particular concern in the 1002 area because the probable pipeline haul road route would bisect the area,". In short, the development of 1002 would be mutually exclusive with the survival of the caribou who are noise sensitive and require the windy cool sea coast to avoid mosquitoes and store energy during the calving/post-calving period. Report 1002 states that, under full leasing, 72,000 acres of habitat would be lost to the caribou herds and other species.

d. Any development of 1002 will also result in habitat loss for wolves, arctic foxes, wolverines, brown bears and polar bears and over 100 species of birds which either nest, feed, molt and prepare for fall migration. It should be noted that over 300,000 snow geese, approximately 1/2 of the Pacific Flyway population, stage on the Coastal Plain in preparation for the long migration south.

e. Last, but not least, are the muskoxen and fish species in the rivers, streams and coastal waters offshore. Muskoxen, successfully

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reintroduced in the late 1960s after being nearly hunted to extinction, depend on the Coastal Plain. Draft 1002 states "...major negative effects upon the muskoxen population from oil and gas development could occur, considering the present management objectives for continued population growth of the herd under natural regulation and the displacement from habitat likely to occur."

f. The need for water, to quote draft 1002 "...as much as 15 million gallons of water may be needed to drill one exploratory well." presents a serious problem as sufficient water supplies are not available in 1002. This means that the proposed development jeopardizes fish, wildlife and subsistence users by competing for limited water supplies and by reducing the quality of those limited supplies by contaminating them with heavy metals such as zinc, arsenic and aluminum.

g. The need for large quantities of gravel to build roads and drill pads on the permafrost is not available. To quote draft 1002 "Each mile of road occupies about 5 acres and requires approximately 40,000 cubic yards of gravel." "Gravel might have to be mined from upland sites, river terraces, streambeds, lagoons or other potential sites." In the past, mining gravel and transporting it has always resulted in habitat destruction and negatively impacted streambeds and thus fish and wildlife populations. In all it is estimated that 40 to 50 million cubic yards of gravel will be required to construct and maintain the proposed development.

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Other disturbing facts regarding this proposed development revolve around the Department of the Interior and the U.S. Fish and Wildlife Service as follows:

a. Why has the Department of the Interior only allowed public review of draft 1002 as a result of a successful lawsuit by a coalition of local and national conservation groups?

b. Why has the Department of the Interior spent public funds to appraise lands in order to develop land exchange agreements with private native corporations that would remove subsurface mineral rights from the public domain in the 1002 area? Why were these negotiations (kept secret) known within the department as " Project M or Megatrade?"

c. Why did draft 1002 fail to consider the cumulative effects of oil and gas development? In essence the above actions smack of wrong doing, and subvert the original intent of the congress in establishing the Arctic Refuge.

d. This nation's lack of a national energy policy which considers conservation of resources and development of more efficient alternatives sources of energy is disturbing. Since the memories of the disastrous oil embargo have faded we have resorted to old habits and methods of depending mainly on oil as a source of energy and have never made any serious long-term commitment to other energy forms such as solar power.

e. Why, when there are already 23.6 million acres of Alaska's North Slope included in the National Petroleum Reserve (a figure which excludes the vast oilfields of Prudhoe Bay or state and federal Outer Continental Shelf oil leases), is the Department of the Interior seeking to increase even more the lands committed to oil exploration?

To destroy the ecological integrity of the Arctic National Wildlife Refuge by allowing oil and gas leasing of the vital Coastal Plain when only a one-in-five-chance of economically recoverable oil is possible and then only if artificially inflated oil prices of $35 to $40 per barrel can be maintained is unwise because:

a. Present projections show it will not significantly reduce our dependence on foreign oil by more than 4.17% by the year 2010 if prices are at $40 per barrel.
b. It ignores the disposal of hazardous wastes.
c. It fails to consider the cumulative effects.
d. Destroys habitat vital to fish, plant and animal species.
e. Ignores the need of subsistence users in Alaska and Canada by destroying vital Caribou habitat and thus the Caribou.
f. Worst of all it shows a reliance on conventional energy sources and a lack of commitment to more efficient nonpolluting energy sources, a quest which has all but been totally abandoned by the present administration who seem to rely on short-run solutions while ignoring the future needs of America to develop safe, more efficient nonpolluting energy supplies if we are to maintain a healthy environment in which to survive.
g. Appears to be consistent with the administration's willingness to sell off public resources in a desperate attempt to provide deficit financing, again a poor short run solution to a government which cannot control expenditures, but whose elected members have developed for themselves a foolproof method of providing automatic raises, i.e., contrary to the spirit of the Gramm-Rudman Act.

In conclusion we would like to recommend that the Department reverse its stand of leasing 1002 in favor of alternative "E" which recommends wilderness designation for the entire Arctic Refuge Coastal Plain.

Sincerely,

John P. Fredricks

Anne Halley

FEBRUARY 3,1987

DIRECTOR
U.S. FISH AND WILDLIFE SERVICE
DIVISION OF REFUGES
2343 MAIN INTERIOR BUILDING
18TH & C STREETS, N.W.
WASHINGTON,D.C. 20240

RE: COMMENTS 1002 REPORT

GENTLEMEN:

THE FOLLOWING COMMENTS ARE BEING SUBMITTED ON THE 1002 REPORT RECOMMENDATIONS COVERING THR ARCTIC NATIONAL WILDLIFE REFUGE (ANWR). I FULLY AGREE WITH THE RECOMMENDATION TO OPEN THE COASTAL PLAIN OF ANWR TO OIL AND GAS EXPLORATION, DEVELOPMENT AND PRODUCTION. I HAVE THE FOLLOWING CONCERNS THAT I FEEL HAVE NOT BEEN FULLY ADDRESSED IN THE 1002 REPORT.

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1. EXTREME CONCERN IS EXPRESSED ABOUT THE CARRIBOU IN THIS AREA AND WHAT HAS BEEN REFERRED TO AS A "CORE" CALVING AREA. THE MAPS APPEAR TO HAVE BEEN INTENTIONALLY CUT OFF AT THE CANADIAN BORDER AS THOUGH ALL OF THE CALVING WAS IN THE U.S. AND THERE WAS NO "CORE" CALVING AREA IN CANADA. AS A MATTER OF FACT A COMPLETE SET OF CARRIBOU MAPS MAY SHOW A DIFFERENT PATTERN FOR THE SO CALLED "CORE" CALVING AREAS WITH A VERY LARGE CALVING AREA EXTENDING INTO CANADA IN MANY OF THE YEARS. THIS SHOULD BE ADDRESSED. WHEN ONE LOOKS AT THE COMPLETE CALVING AREA, THE VALIDITY OF THE SO CALLED "CORE" AREA IS OPEN TO QUESTION.

2. THE AMOUNT OF PRESENT NORTH SLOPE PRODUCTION THAT IS COMMITTED IN EMERGENCIES BY INTERNATIONAL AGREEMENTS SHOULD BE ADDRESSED. IT IS UNDERSTOOD THAT THE JIMMY CARTER ADMINISTRATION COMMITTED A PORTION OF NORTH SLOPE PRODUCTION TO OUR ALLIES IN AN EMERGENCY AND THIS AMOUNT OF PRODUCTION WOULD BE LOST TO THE REST OF OUR COUNTRY. IF THIS IS THE CASE, IT IS EVEN MORE CRITICAL AND IMPERATIVE THAT THE COASTAL PLAIN BE DEVELOPED AS SOON AS POSSIBLE IN THE NATIONAL INTEREST. IF SUCH AN AGREEMENT EXISTS, THIS MATTER SHOULD BE ADDRESSED IN DETAIL.

3. MANY STUDIES ARE CITED TO ADD VALIDITY TO THE ANALYSES. BUT THERE IS NO EXPLANATION AS TO WHY MOST CONCLUSIONS ARE DRAWN ON A WORST CASE BASIS AND A VERY LARGE PART OF THE DATA FAVORABL TO DEVELOPMENT HAVE BEEN IGNORED. MANY OF THE STUDIES CITED SHOW CONCLUSIONS MUCH DIFFERENT TO THOSE IN THE REPORT AND NO REASON IS GIVEN AS TO WHY THE RESULTS WERE IGNORED. IF THE USFWS FEELS THAT THAT DATA ARE NO GOOD, THE REASONS FOR THAT CONCLUSION SHOULD BE GIVEN, AS WELL AS TO WHY THEY FEEL THE STUDIES WHICH IT RELIED ON WERE MORE RELIABLE AND INDICATIVE OF WHAT CAN "REASONABLY BE EXPECTED" AS REQUIRED BY THE STATUTE.

4. AFTER FIFTEEN OR MORE YEARS OF STUDY AND RESEARCH AND THE EXPENDITURE OF MANY MILLIONS OF DOLLARS BY BOTH PRIVATE AND GOVERNMENT BIOLOGISTS, THE SIMPLE TRUTH IS THAT NO ONE, INCLUDING ALL OF THESE BIOLOGISTS, KNOW WHY A CARRIBOU DOES WHAT IT DOES. FOR THIS REASON, WE SEE ALL KINDS OF PROPHESIES, BUT STILL NO ONE CAN PREDICT WHAT THE CARRIBOU WILL DO WITH ANY DEGREE OF ACCURACY. CERTAINLY THE BIOLOGISTS WONT PUT THAT IN THE REPORT BUT IT NEEDS TO BE SAID!

SINCERELY,

O.K. Gilbreth, Jr.

O.K. "EASY" GILBRETH, JR.
206 DAVIS STREET
ANCHORAGE, ALASKA 99508

February 1, 1987

1819 Muskox Trail
Fairbanks, AK 99709
(907) 479-2754

TO: U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Bldg.
18th and C Sts., N.W.
Washington, D.C. 20240

Attached to this letter of transmission are my comments on the 1002 Report prepared by personnel of the USF&WS, and the Executive Summary which was written by the Department of Interior. I want to be sure that this material will become a part ofthewritten record of public comments on the 1002.

Thank you for the opportunity to present these comments, because the fate of the arctic coastal plain of the Arctic National Wildlife Refuge is of vital concern to people throughout the United States - and not merely those U.S. citizens living in Alaska.

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Yours very truly,

Celia M. Hunter

Celia M. Hunter

I would like to present the following points as my comments on the "1002 Report" prepared by the USF&WS.

1. I wish to state my preference for either a "do nothing" option, or for wilderness for the entire coastal plain.

2 I have chosen these options because I feel that the 1002 report does not address the following points:

It fails to give a full and complete assessment of the nature and the values of the plain's current wilderness status.

It does not address cumulative impacts upon the coastal plain as off-shore oil development is added to on-shore efforts.

It does not acknowledge that the Prudhoe Bay oil development has had serious problems with accidental spills of crude oil and petroleum products: 23,000 spills have been reported to DEC ranging from a few gallons to more than 658,000 gallons.

Furthermore, it fails to note that DEC has extremely limited jurisdiction over the oil industry in the matter of disposal of drilling muds, hazardous waste, and cleanup of spills, because of special exemptions accorded the oil industry under RCRA.

There is a greater liklihood that oil development on the arctic coastal plain of the ANWR under Federal auspices will result in a build-up of communities for worker's families and the facilities to service them. The State of Alaska was able to influence the oil industry to operate Prudhoe Bay as a work camp, with the wives and families of workers living in other established Alaskan communities or in the lower 48. This policy has minimized some impacts on the North Slope environment, but it is doubtful if the Federal government were the landowner, if this policy would be followed, and doubly uncertain if the Native Regional Corp. became owners of the land, and were in charge of oil development.

It does not properly address the concerns of the Canadian people of Yukon Territory who share a dependency on the Porcupine caribou herd with villagers of northeastern Alaska. No treaty exists at present between the U.S. and Canada, and sample wording of such a treaty does not offer consistently strong habitat protection on both sides of the border, as well as foolproof stipulations guaranteeing maintenance of the herd at its present strength.

The Canadian Government has not been consulted by the USF&WS in any meaningful way as set forth by Congress when mandating the preparation of the 1002 report, so that Canadian concerns for the wellbeing of the Porcupine caribou herd have not been considered.

The report fails to acknowledge the actual

number of wells already plotted by the industry on the coastal plain, which would indicate a far more serious impact than originally thought in drawing conclusions from the 1002 report. This oversight appears to be a deliberate attempt to minimize the proliferation of roads, pipelines, drilling pads, and all the other infrastructure associated with an active oil field, and the extent of the impacts it would have on the surrounding landscape.

The Executive Summary which sets forth the policy on maximum oil exploration and full leasing of the coastal plain does not take into account the findings of the biologists of the USFWS and State ADF&G [illegible]ogists, in concert with biologists representing indu[illegible]y, which advocated absolutely no leasing or develop[illegible]t of any kind within the core calving area of the Porcupine caribou herd.

The economics of oil development on the coastal plain at this time is predicated on oil prices of $33 to $40 per barrel, totally unrealistic price assumptions according to the experts. These prices probably won't occur until we get into the 21st century. Therefore the demonstrations of economic feasibility for this speculative oil reservoir need to be re-worked using realistic data.

National Security and national oil independence are often given as reasons for pushing development of this field despite the high risk of irreversible environmental effects on wildlife, its habitat, and the wilderness character of the area. However, national security is not served by maximum development of any US oil reserves during this period of low priced oil. We are shutting down production in major producing oil fields of the continental U.S. in order to help raise prices by creating scarcity, as is OPEC. Wouldn't it be more sensible to declare the entire coastal plain off limits to oil exploration and development until much later, when that oil will be a precious reserve, rather than adding to an oil glut?

At the same time the State of Alaska is pushing for opening up the ANWR coastal plain, it is pressuring Congress to permit export of both oil and natural gas products from Alaskan soil. The effects of this strategy might bring down the present trade deficit by a minimal amount, but it isn't enough to warrant loss of all the other values of the coastal plain area.

In conclusion, I want to affirm my support for the continued existence of the wilderness nature of the coastal plain of the Arctic National Wildlife Refuge. I believe that the cumulative impacts of oil field development upon the present wilderness existing there has not been addressed anywhere in the 1002 report.

These impacts will be visual, noisiness, air and water pollution, plus the irreparable damage potential of trying to find

sufficient water and gravel in the coastal area for the proliferation of drill rigs, gravel pads, and roads. The negative effect upon all beholders, and particularly those visitors to the Arctic National Wildlife Refuge seeking the power of solitude, the spiritual re-charge possible from being in a huge expanse of natural landscape with no visible sign of the presence of other humans will be immeasurable.

Furthermore, when the Executive Summary glibly talks of 'mitigation' they are whistling in the dark. What will occur will be a direct loss of 20% to 40% of the vast Porcupine caribou herd (from a herd of 185,000, that would mean a loss of 74,000 animals) according to predictions contained in the biological research findings of the 1002 report. In addition, biologists predict large losses of all other wildlife and birdlife within the coastal plain area. These can't be 'mitigated' because to do so would require a refugiem area of similar carrying capacity to the arctic coastal plain, and this does not exist.

In addition, public access to the arctic coastal plain, and to all those other areas of the ANWR which depend upon transit across the coastal plain will be severely curtailed. The oil company restrictions on the movement of the public within the Prudhoe Bay complex virtually exclude all movements not work-related, even for individuals employed within the site. Even private citizens flying in and out of Deadhorse Airstrip are subjected to stringent regulations of their movements anywhere outside of the terminal buildings.

There could not be a more complete lock-up of that 1.5 million acres of the arctic coastal plain, or a more comprehensive lock-out of the public from that area, unless the area were to be turned over to the military.

Those who currently hunt in ANWR, those who float its rivers and backpack and hike the plains, river valleys and mountains, will be unable to carry on their traditional pursuits. This will mean a genuine hardship for a growing cadre of professional wilderness guiding operators, who have developed their businesses by providing guide service within the northern half of the Refuge.

This relatively small portion of the arctic north slope under the U.S. flag is the only part of that unique ecosystem we have been able to preserve. From the Canning River to the west as far as the Chukchi Sea, all of Alaska's northern coastal plain is open to oil and gas development, much of it within National Petroleum Reserve-Alaska.

Why sacrifice this small area of pristine wilderness on the gamble that the geologic structures (there is no single structure comparable to that underlying Prudhoe Bay, according to the geological section of the 1002 report) might produce a few million barrels of oil? At current and anticipated rates of oil use in the U.S., the maximum oil potential predicted would fill that demand for less than 2/3 of one year.

I would hope that Congress would note the sizable discrepancies evident between the incomplete data assembled in the USF&WS 1002 report, and the glowing optimism of the report's Executive Summary. The potential oil production is grossly over-estimated in that Summary, while the potential losses of public values is minimized.

Congress should demand congruency between the report and the Executive Summary as a minimum requirement before any serious discussion of this vital issue is attempted.

I request that the above material shall be entered into the public record of responses to the USF&WS 1002 Report to the Congress of the U.S.

Celia M. Hunter

Celia M. Hunter
1819 Muskox Trail
Fairbanks, AK 99709
(907) 479-2754

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2608 Lingonberry Lane
Fairbanks, Alaska 99709

January 22, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
3210 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Sir,

This letter is to air my opinions and comments on the draft copy of the Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment (1002 Report) issued by the U.S. Department of the Interior, in hopes that you will give the 1002 Report and my comments both thoughtful consideration. Based on the information gathered by researchers, professionals in their respective fields, the body of the 1002 Report is informative and substantial in most areas. But in other areas, particularly some very important aspects of this report are lacking. Hopefully you as well as all members of Congress will not just read the Executive Summary and call it good. It is very clear that, for some reason, the Executive Summary is quite different from the actual body of the report, which supposedly, the Executive Summary is from.

I oppose opening the 1002 area or any area of the Arctic National Wildlife Refuge to oil and gas leasing. My reasons are as follows:

1) Because on page 2 of the 1002 report (Executive Summary), Bill Horn states that "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources." And yet on page 29, U.S. Fish and Wildlife biologists state "Little or no calving has been observed in the TAPS - Prudhoe Bay oil field area since about 1973 (U.S. Fish and Wildlife Service, 1982; Whitten and Cameron, 1985)." This does not mean minimal impact to me. There are more discrepancies to follow.

2) Proponents of oil and gas leasing are using the increased population of the Central Arctic caribou herd as a point to support their statements that oil development and caribou are compatible. Yet they fail to include the fact that the increase is due to a) the Central Arctic herd (CAH) are moving out of their traditional calving grounds onto others. The same strategy would be great for the Porcupine caribou herd (PCH) except for the fact that they can not do the same - they can not because of the coastal plain's difference in topography. The close proximity of mountains which narrows the coastal plain area as you move eastward, reduces their choices for alternative and very important calving and post-calving insect-relief areas. b) their (PCH) numbers are also greater than the CAH and will therefore tend toward having less area per animal to avoid stressful situations. c) that a portion of the CAH coexists now with the PCH in the 1002 coastal plain area during the calving and post-calving seasons. d) unlike the CAH, the PCH travels a much farther distance each year, arriving at calving areas much more exhausted and therefore more susceptible to stresses. e) and finally, (page 28) "The post calving season is the low point of the annual physiological cycle when energy reserves of parturient cows are especially low. Access to insect-relief habitat and forage resources during this period may be critical to herd productivity." When one considers that 78% of the PCH core calving area is within the 1002 area than how can we think that there will be minimal impact?

3) On page 99, "On the 1002 area, obtaining water for drilling and ancillary needs such as ice roads and airstrip construction could be a serious problem and the greatest potential for effects on the physical environment." This issue is glossed over in the Executive Summary and is not sufficiently discussed in the body of the report. The mining and retrieval of these two resources could mean a considerable amount of impact when realizing the quantities necessary for drilling and considering the paucity of both immediately in the 1002 coastal plain area.

4) Because the hazardous waste problem of reserve pit fluid discharges has not been solved to anyone's satisfaction (except of course the oil company's). Even though preliminary results from U.S. Fish & Wildlife investigations have shown an increase in heavy metals and hydrocarbons and a considerable decrease in freshwater macro-invertebrate total numbers of species, diversity and abundance, North Slope oil companies continue to promote this method of waste disposal. How can this problem be mitigative in ANWR when it is already ignored as a serious problem in Prudhoe Bay oil fields?

5) Misconstrued benefits to the state of Alaska and North Slope Inupiats are constantly stated in the Executive Summary but are not supportable in the report's body of information.
a) local hire for construction and maintenance of the oil fields is an empty promise considering how hiring and employment has been orchestrated in Prudhoe Bay - little state benefit. b) revenues from taxes and leases are to be on a dif-

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ferent scale for ANWR as compared to Prudhoe - little benefit to the state. c) why do we need more oil fields established when there are oil fields in Louisiana that are being capped and closed down prematurely? Why do we [illegible] fields, established when leases are being returned by oil companies on the North Slope? d) the agency has failed to justify their recommendation of full leasing in today's flooded lease market, while the world is experiencing an oversupply of oil, and exploratory drilling indicates that prospects for discovering even one major economically recoverable oil field on the coastal plain is only 19%. I don't consider it beneficial to lose forever this last stretch of important coastal habitat to oil companies who have based their glossy picture on unrealistic predictions (50% chance of finding 3.2 billion barrels of oil at the inflated price of $33 per barrel = overly optimistic amount of revenues to the federal economy) and who have failed to conduct an economic analysis to prove how opening the 1002 coastal plain area to oil and gas leasing can provide maximum benefits to the Alaskan and national economies, and contribute to national strategic interests over the long term.

6) Despite our international agreements for protection of the Porcupine caribou herd, the Department of the Interior has proceeded with secretive land trade proposals, and plans to substantially decrease an international resource used by subsistence users of both the U.S. and Canada - the Porcupine caribou herd, and other migrating birds, mammals and fish - while failing to notify or even include the Canadian people in this period of public testimony and comment.

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7) I find the practice of secretive land swaps by our government underhanded. Proposed land trades with certain Alaska native corporations and the State of Alaska are practically sealed into agreement by the time the public - who own the resources being traded away - are made aware of such dealings.

8)Considering that not all in-place resources are recoverable, that statistically there is a much greater chance of not being able to recover enough oil to make oil development in ANWR economically feasible, that inflationary oil prices were used to generate cost benefit estimates, and that "Alaskan crude oil in excess of West Coast demand is transported to the Panama Canal for shipment to other markets." (page 165), I don't agree with the Interior Department's recommendation to open the Arctic National Wildlife Refuge to full oil and gas leasing.

So, in conclusion, I don't feel that the findings of the draft '1002 report' support the Interior Department's recommendation. I hope you will consider all aspects of this issue and make a well-informed decision when the time comes. Thank you for your time.

Sincerely

Laura Jacobs

P.O. Box 317
Yakutat, AK 99689
February 1, 1987

William P. Horn
Division of Refuge Management
U.S. Fish and Wildlife Service
2343 Main Interior Bldg.
18th and C Sts, N.W.
Washington, D.C. 20240

Dear Mr. Horn and Committee:

I am opposed to the recommendation by the Dept. of Interior for full oil and gas leasing for the 1002 area of Arctic National Wildlife refuge. I recommend the 1002 area be given federal wilderness designation.

The 1002 report fails to address some important issues concerning oil production on the North Slope. Oil developers like to point to the engineering success of the trans-Alaska pipeline (TAPS) as proof of our ability to extract oil on the Arctic coastal plain without environmental and/or other negative effects. I would, however, like to point out some of the negative effects which may have been overlooked.

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Historians tend to characterize Alaska as a place of boom and bust. Certain developments, such as TAPS, have helped to create and proliferate this type of cycle in Alaska. TAPS and ANILCA changed Alaska profoundly. The construction and production phases brought unprecedented amounts of money and human resources to the state. And while, monetarily, many Alaskans have reaped the benefits of that wealth, TAPS has also left behind scars. The once tight-knit Alaska Native family has been severed, as male family members marched off to work on the pipeline, leaving behind their traditional culture and value systems. Most of the highly technical jobs were awarded to out-of-state petroleum workers, so few Natives learned skills that were useful in the long run. Quick money brought drugs, and an increase in alcoholism and prostitution to Alaska, both which remain serious problems today. Disposal of toxic wastes is yet an unsolved problem at Prudhoe Bay. The current suggestion by ARCO to inject toxic wastes into deep wells in the arctic is unacceptable to my way of thinking. Accidental oil spills continue to plague oil development and production on TAPS. In the last 14 years, there have been 23,000 reported spills, the largest at 658,000 gallons. How many more spills have gone unreported? Regardless of the existence of more spills, the reported number shows a poor industry track record for production on fragile arctic tundra.

TAPS has created a false sense of security for Alaskans. Once again, the bust cycle is upon us and we are left holding the bag. Alaska has been like a spoiled child the last 11 years, on a rampage of construction and spending as if there were no tomorrow. With development on the coastal plain, we would have yet another schizophrenic cycle to look forward to.

Likewise, the United States appears intent upon viewing energy consumption as if there were no tomorrow. The issue with the coastal plain is not whether or not we should develop it, but rather, is that development going to provide anything for our long-term future as a nation?

I would urge you, Mr. Horn, and the Division of Refuge Management, as well as Interior Secretary Hodel and President Reagan, to reexamine our energy policies. By developing the 1002 area we are looking at a short-term solution to a global problem -- the depletion of a finite energy source. By concentrating our efforts on extracting all our oil reserves, we will ultimately find ourselves in a precarious situation regarding national security and foreign dependence on oil. We should concentrate our efforts on developing environmentally safe alternative sources of energy and on improving the efficiency of our present oil-dependent technology. Finally, our government should set an example by practicing conservation of our natural resources.

Intensive petroleum-related development on the Arctic Coastal Plain is not compatible with the habitat requirements of the Porcupine Caribou herd, nor is it compatible with traditional Native habitat requirements. A pipeline traversing the coastal plain will severely interrupt the migration patterns of the herd and will interrupt critical calving activity. The very nature of caribou migration activity precludes the establishment of exact calving areas. Therefore, it would be difficult to construct manmade facilities which would not adversely affect animal populations. The displacement of caribou by roads and pipelines has already been documented by activities of the Central Caribou herd near TAPS. Breeding bird populations, fish and other wildlife populations will also be severely impacted. A pipeline and road network across the coastal plain will alter a pristine wilderness forever. Certainly, one would not gouge a scratch across a Rembrandt painting, then say it's okay because it didn't spoil the entire painting. The point is, this type of development will spoil the entire wilderness. A fragile ecosystem, once disturbed, takes several lifetimes to recover. There is more to be gained by establishing wilderness than by developing the coastal plain.

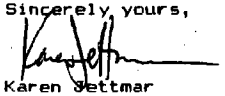
Canadian government in protecting the Porcupine Caribou herd.

ANWR was established in 1960 to protect its unique wilderness. While many would argue that we need the oil, I would argue that we need wilderness. I know, for I have felt what the Arctic does for me and I have seen the transformation in those people who have accompanied me into the Arctic. The experience of seeing tens of thousands of caribou, bounding across a peneplain free of human intervention is one which will remain in my memory forever.

In a world which becomes increasingly complex, technological, noisy and polluted, we need wilderness for our psychological and emotional benefit, as well as for the protection of unique fish and wildlife habitats. I recommend full protection and wilderness designation for the Arctic Coastal Plain and urge you to to do the same.

Thank you very much for the opportunity to comment on the draft ANWR Coastal Plain Resource Assessment.

Sincerely yours,



Karen Gettmar

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ASSISTANT SECRETARY
FISH AND WILDLIFE
AND PARKS

Bill Horn
Asst. Sect. for Fish and
Wildlife and Parks
Div. of Refuge Management
U.S. Fish and Wildlife Service
2343 Main Interior Bldg.
Washington, D.C. 20240

Jan. 31,1987

Dear Sir,

I would like to express my opposition to the Department of Interior's recommendations for oil and gas exploration and development and outline some of my concerns over deficiencies in your draft environmental impact statement.

The coastal plain of the Arctic Refuge has outstanding natural resorces that are of preeminent national significance. The 1002 area ought to be designated a wilderness as in alternative E to establish an international preserve following the Canadian initiative. It should provide a safe haven for important wildlife species such as caribou, muskox, polar bear, and snow geese and provide a spectrum of pristine Arctic ecosystems contained in the area.

The draft EIS does not present a sufficient national need for the oil resource to justify the detrimental consequences that development would entail. The Department of Interior should present alternative national actions that could achieve compensating reductions and therefore negate the need to impair this important national treasure. The EPA should not be relaxing fuel efficiency standards for automobiles while the DOI uses a national security rationale to promote development. Conservation should be the first priority - it has had remarkable success at reducing our national dependence on foreign supplies and contributed to the present oil glut on the international markets.

The Department of Interior must explain why it has abandoned conservation as a priority and instead promotes profligate development.

The EIS is also deficient in a number of aspects concerning the impacts to the land. The EIS seriously underestimates the amount of infrastructure that would likely be required for full development and therefore understates the amount of gravel required. The Kuparuk Oilfield alone has 37 drilling pads and another 10 are on the drawing boards. Then there are the flare pits, equipment storage pads, construction camps, and contractor facilities. There is also a large gravel requirement for the solid core causeways for ports that the EIS did not include. Then there is the possibility of future development such as offshore oilfields requiring gravel islands and causeways at millions of cubic yards per shot. This is not an unreasonable scenario - its happening at Prudhoe Bay and must be taken into consideration. In addition to the increased gravel requirements from the facilities overlooked, there is the potential problem resulting from the projected climatic warming trend that would alter the thermal balance of the gravel pads and require increased insulation. This would require thicker gravel cover if foam insulation is not required.

The EIS has avoided the delicate issue of where the gravel might come from as the sources are likely to be concentrated is areas with important habitat values. For example, consider the first development area around Marsh Creek. In this area, development would require a large dock with tremendous gravel requirements, then roads, drill pads, processing facilities, and possible offshore development requiring tens of millions of cubic yards of gravel. The gravel could come from the Sadlerochit River, which is of primary importance to muskox and is the most productive drainage on the coastal plain, or maybe the Kaktakturuk, which is also important habitat, or maybe the upland outcroppings of Tertiary gravels. The gravel requirement is huge and the supply is limited requiring concentrated devestation in important areas. Even mining in the lagoons would create temperature and salinity problems detrimental to fish populations. The consequences of the gravel demand appear much more drastic when the sources must be identified beyond bland generalizations that perhaps 500-750 acres might be affected.

Air pollution must be identified as a problem. It has recieved very little attention at Prudhoe Bay, only because it is in a remote area. Prudhoe Bay operators are permitted by the Alaska Dept. of Environmental Conservation to discharge 90,000 tons of NOx per year. Other sources of pollutants, including heavy metals and other toxic elements are the Borrough incinerators. The distribution, fate, and impacts of this air pollution need to be studied. Further development in ANWR would contribute to pollution of the Arctic basin, an international problem for which we must also be responsible . The arctic pollution may be of significance to solar energy absorption at the poles and consequently to global climate. Such enormous emissions are incompatible with a wildlife refuge.

The EIS needs more effort in identifying the occurrence and fate of liquid and solid wastes generated during oilfield development. There are many toxic compounds used in drilling and processing and these need to be accounted for. One of the largest concerns is the reserve pit fluids. Experience in NPRA has shown that with time the reserve pits are breached, usually from melting and subsidence underneath the containing berms, and their contents leached or eroded onto the adjacent trundra. The main toxic elements are salts but may also include some heavy metals. Allowing toxic wastes in the refuge is incompatible with wildlife protection.

Finally, the DOI must take steps to identify areas with critically high ice contents. During the seismic exploration program, drillers encountered massive ice beds, up to 60 to 80 feet thick with only a few feet of protective soil mantle, in some locations. These are extremely sensitive areas to disturbance and must be identified and avoided. Once thermal erosion starts in such massive ice beds, stability would be very difficult to achieve and in the worst case whole hillsides might erode before equilibrium is achieved. This is all the more

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critical given a projected climatic warming trend.
These concerns, along with the important wildlife consequences described by others, should be given further consideration by the Department of Interior.

Sincerely,

Tonne Jorgenson

2332 Cordes Way
Fairbanks, Alaska 99709

P-42

January 30, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Greetings:

I wish to comment on the proposed options regarding oil and gas exploration and development on the coastal plain of the Arctic National Wildlife Refuge (ANWR). My comments are made as a private citizen, however, I have worked professionally as a wildlife biologist in Alaska for the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service and the University of Alaska for a total of 34 years. Major focus of my professional work has been research on ungulate species, primarily caribou, muskoxen, deer and moose; and investigation of the effects of northern development on fish and wildlife and their habitats. This has included work in northern Canada, Greenland, Scandinavia and the Soviet Union.

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The primary purpose of National Wildlife Refuges is the protection and management of fish and wildlife habitats to assure the continued well-being of fish and wildlife populations and their sustained productivity. Additionally, the unique wilderness values of the Arctic National Wildlife Refuge were a major consideration in the original establishment of its precursor, the Arctic National Wildlife Range. Secondary, and very important purposes of the ANWR are to provide for the subsistence and recreational use of its fish and wildlife resources. Uses of the ANWR for other purposes, such as oil exploration and development, are clearly of lower priority than the primary fish and wildlife-related goals and uses. It is important that this ranking of priorities of ANWR be held in perspective when considering proposed oil and gas leasing.

Of major concern are the likely effects of oil and gas leasing and subsequent possible development on the fish and wildlife populations and their habitats in the 1002 area. The effects are dealt with in the draft 1002 report (Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment, November 1986). It is obvious that oil and/or gas development and production will detrimentally impact directly on fish and wildlife resource values of the area even with the constraints of strict environmental regulations.

Caribou, because of the importance of the calving grounds and use of, and access to, insect relief habitat, would be particularly vulnerable to detrimental effects of petroleum development. The very high density of caribou of the Porcupine Herd in the area and the important role that calving and insect relief habitat play in facilitating recruitment to the population and in allowing for optimization of growth and body condition of the caribou make it very unlikely that mitigation of the effects of oil development is possible. Extrapolation from experience gained with Prudhoe Bay and related oil field development and the Central Arctic Caribou Herd is of limited applicability to the 1002 area because of the lower density and resident nature of that herd in contrast to the Porcupine Herd. Nevertheless, Central Arctic Herd caribou have largely discontinued calving in the Prudhoe Bay oil field since its development, and access to coastal insect relief habitat is greatly hindered by pipelines, roads and other oil field facilities. Of pertinent interest here is experience from the very large Taimyr Peninsula Caribou Herd in the Soviet Union that, when confronted by a large diameter gas pipeline in the 1960's that had been built across it's migratory path, did considerable damage to range vegetation over a large area adjacent to the pipeline through trampling and overgrazing, while being delayed in crossing the pipeline.

An ethical question is raised with regard to the threat posed to the Porcupine Caribou Herd through petroleum development when this herd is an important subsistence base for Athabascan Indians in Arctic Village and several other villages in Alaska and to a lesser extent for the Inupiat people of Kaktovik. The value of the subsistence lifestyle to these people cannot readily be converted to monetary values for comparison to the short term dollar value of postulated petroleum reserves. Similarly, because the Porcupine Herd is an international resource that provides a subsistence base for the Athabaskan people of Old Crow in the Yukon Territory, as well as other native villages in the Northwest Territories on the lower MacKenzie River, the United States has a responsibility to maintain the productivity of this herd that transcends our own national borders. The United States has played a leadership role in encouraging other nations to respect the international nature of fish and wildlife populations that migrate across international borders, and to assure that the actions of one country do not jeopardize the resources upon which other countries may be dependent. This principle applies equally to migratory waterfowl, salmon migrating up the Yukon River through Alaska into Canada and to caribou of the Porcupine Herd.

Experience with the Forty-mile and Western Arctic Herds in Alaska, as well as with other herds in Alaska and other circumpolar areas, indicates that when herd size declines range use patterns change, with a reduction in total area used and discontinued use of some migration routes. Thus, a substantial reduction in the size of the Porcupine Herd resulting from the impacts of petroleum development on the coastal plain would be expected to bring about corresponding changes in range use patterns. The consequences of such changes would very likely be reduced availability of the caribou to subsistence hunters in both Alaska and Canada even though herd size might be adequate to sustain traditional subsistence harvest levels.

Predicting the consequences of development activities on caribou is much more difficult than for other ungulates, such as deer and moose, largely because of their migratory nature that extends their ecological relationships over several ecosystems. Additionally, their well developed sociality, vulnerability to insects and dependence on winter forage that must be excavated from beneath the snow cover are also unique to this species. Inspite of the generally well designed studies carried out on caribou in the 1002 area during the five years of biological baseline investigations, several aspects of the biology and ecology of caribou are not sufficiently understood to enable an in-depth assessment of the possible impacts of petroleum development. The calving grounds, although delineated, have not been adequately investigated in relationship to their use by caribou to provide answers to questions of their specific characteristics that have made them so attractive to cow caribou over

the centuries of their use. Quantitative data is also lacking on the energetic and nutritional costs of insect avoidance, as well as to how access to insect relief habitat may influence levels of parasitism in caribou. The complex interrelationships between caribou, weather, harassing insects, vegetation type and terrain, although known to exist, cannot, with our present level of knowledge, be integrated into a reliable predictive interactive model.

It is particularly frustrating to both the engineers who design development projects and the ecologists who attempt to minimize or mitigate the effects of these projects on wildlife, that the complexity of living systems is magnitudes greater than the seemingly complex development projects that may affect them.

It is quite evident that there is insufficient knowledge of the ecological relationships of caribou in the 1002 area at the present time to enable an adequate assessment of the consequences of the likely development scenarios. Biologists familiar with caribou have only been able to make "educated guesses" about the consequences of the proposed petroleum developments on caribou. In view of this, the only responsible recommendation with respect to leasing for oil and gas exploration and development in the 1002 area is to exclude those areas of known importance to caribou for calving, post-calving and insect avoidance use. At some future time, if the necessary research has been done, the knowledge may be available to plan for development in these critical habitat areas in such a way as to avoid or greatly minimize the impacts upon caribou.

Another ungulate species resident in the 1002 area that would be affected by oil and gas development is the muskox. The muskox was reestablished in the coastal plain of the ANWR through introductions made in the late 1960's. The muskox was extirpated from northern Alaska in the late 19th century and old skulls have been found on the tundra in the 1002 area from these previous populations, testifying to their earlier presence there. Their reestablishment in historical habitat in the ANWR through the joint efforts of the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game is an outstanding success story in the history of wildlife conservation.

Research we have completed on the patterns of habitat selection and use of these newly established and expanding muskox populations indicate that the riparian habitats along many of the major stream drainages of the coastal plain are preferred by the muskoxen during much of the year. The vegetated gravel bars and stream banks of these habitats have high plant diversity and productivity as a consequence of their annual flooding, which thaws and heats the soils and adds nutrients to them annually. The quality of plants in riparian habitats as forage is understandably high and the quantity is also high in contrast to the adjacent tundra.

The potential conflict between muskoxen and oil and gas development in the 1002 area focuses on the importance of stream or riparian areas to the muskoxen as a foraging habitat, while at the same time being of importance to the oil industry as sources of gravel and for transportation corridors. Because muskoxen are resident in the riparian areas or immediately adjacent to them for much of the year it may not be possible to plan disturbing human activities that might take place in these areas, such as gravel extraction or exploratory drilling, so as to occur when the muskoxen are not present. Additionally, gravel extraction in those stream drainages with high production of forage used by muskoxen will result in loss of high quality riparian habitat.

I have limited my comments to potential conflicts between petroleum development in the 1002 area and caribou and muskoxen because of my close familiarity with these two species in the area. There are obviously many other fish and wildlife species there that may be adversely affected by development activities and these conflicts I am sure will be addressed by others who have knowledge of them.

In conclusion, it seems obvious that the risks of damage to fish and wildlife habitats and of losses of fish and wildlife resource values that would be associated with petroleum exploration and development in the 1002 area are too great to justify opening the area to leasing at this time. With increased knowledge of the ecology of fish and wildlife in the area in the future, with reduced impacts of new technologies for petroleum extraction in the Arctic that will undoubtedly be developed over time and with the greatly increased value of petroleum products that will occur in the future, it is most prudent to delay leasing in the 1002 area until some time in the future when it can be fully justified.

Sincerely,

David R. Klein
2039 Weston Drive
Fairbanks, Alaska
99709

cc: Senator Bennett J. Johnson,
Senate Energy and Natural Resources Committee
Henry Cole, Science Advisor to the Governor of Alaska

Institute of Arctic Biology
University of Alaska
Fairbanks, Ak 99747
6 Feb, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18 and C Streets NW
Washington, D.C. 20240

To whom it may concern:

I would like to take this opportunity to comment on the draft Coastal Plain Resource Assessment Report to Congress (1002 report) concerning oil and gas leasing in the Arctic National Wildlife Refuge (ANWR). I have spent at least part of four summers in the Arctic Refuge, including two summers of research on bird populations at the Canning River delta and my report to USFWS is cited in the 1002 report. In addition, I have spent two summers involved in research at Prudhoe Bay concerning development impacts on the terrestrial environment. Thus, I have some familiarity with the area and the issues as well as a citizen's concern for the future of our public lands.

The report's recommendation to allow full leasing of the 1002 area is clearly not supported by the evidence presented in the body of the report. The petroleum potential of the area is stated to be highly uncertain. In reference to the Ellesmerian rock sequence, the report states (p. 54) "The presence or absence of these rocks in that area greatly affects the petroleum potential because very large structures occur in that area; these rocks include the main oil-producing reservoirs in the Prudhoe Bay area. If most of the Ellesmerian rocks are missing in most of the 1002 area, the assessment number would be reduced considerably. Drilling one or two wells in critical areas would resolve this question." Here is a clear statement that the data are inadequate to provide a prediction of petroleum potential of any precision.

One of the most glaring deficiencies of the 1002 report is its failure to review available data on ecological impacts of arctic oil development. With the possible exception of caribou research, apparently only a token effort was made to review the numerous impact studies conducted in Alaska over the last decade. In spite of this omission, the Secretary's Recommendation claims that "most adverse environmental effects would be minimized or eliminated through mitigation based on the vast amount of information and technology acquired during the development of the Prudhoe Bay area ...". This claim is completely unsubstantiated by data presented in the report and can only be interpreted as wishful thinking on the part of an administration favorably disposed toward development regardless of available information on impacts. In fact, there is a large body of pertinent impact-related research conducted at Prudhoe Bay and on the Arctic Refuge that is not even cited in the 1002 report. A partial list of relevant references ignored by the 1002 report is attached. The review of aquatic/fisheries studies was particularly disappointing, considering the effort and funds expended at Prudhoe Bay in this area. Impacts are not even considered for such important species of concern as arctic cisco. Many of the studies listed were conducted on ANWR, some by USFWS, and all are undoubtedly familiar to the field staff of USFWS in Alaska. It is difficult to understand why the report's authors proceeded with such disregard for pertinent information and apparently without the benefit of the expertise among USFWS staff most familiar with the area and issues.

The attached list of references represents only the tip of the iceberg -- there are undoubtedly many other studies with which I am not familiar, and there are studies currently in progress (related to the development of the Lisburne and Endicott fields at Prudhoe Bay) for which I have no references. There are also numerous proprietary studies conducted by industry, which are not generally available to the public. Industry might reasonably be expected to share the results of these studies if they would provide Congress with additional insights into ecological processes and environmental problems associated with arctic oil development.

Many of the studies that <u>are</u> cited in the report are inadequately summarized in the literature review. I have neither the time nor expertise to review this in detail but can provide examples of omissions which I suspect are rampant. For example, Troy (1984) is cited briefly on p. 132, but none of the analysis ofthe effects of drainage alterations and impoundments conducted by the Waterflood Monitoring Project is mentioned. On the same page, Murphy et al. (1986) are cited in reference to Glaucous Gull populations, but the main focus of their study (impact-related studies on waterfowl) is never mentioned.

The report is inadequate in its review of what we have learned from the Prudhoe Bay experience. It is equally important for a report of this nature to realistically assess what we <u>don't</u> know about the impacts of oil development on the Alaskan arctic. The report utterly fails to give any indication of the data gaps and the many uncertainties remaining in predicting impacts. Instead, the Secretary would have us believe that we are fully capable of predicting and mitigating the entire array of potential environmental problems. Furthermore, the report fails to review the efficacy of the various mitigation procedures that have been tested at Prudhoe Bay. Finally, no effort was made to realistically assess the enforcement problems and compliance with existing regulations at Prudhoe Bay. In summary, the report obscures the difficulties inherent in predicting environmental impacts, devising appropriate mitigation procedures, and the practical difficulties of insuring compliance with environmental regulations. Without a realistic assessment of these issues the discussion in Chapter VI cannot be considered seriously as a guide to decision-making. The cursory attention given to existing relevant information and expertise on development impacts is mystifying. Against these deficiencies, the Secretary's claims that "most adverse effects would be minimized or

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eliminated through mitigation..." and that "unnecessary adverse effects would not be allowed to occur" are inexcusably misleading.

In summary, the wildlife impacts of full leasing are to a great extent unpredictable. In contrast, the impacts to the wilderness qualities of the 1002 area are highly predictable and are aptly summarized on p.131, " The wilderness value of the coastal plain of the Arctic Refuge would be destroyed...". The issue of wilderness value is consistently underplayed in the report as a whole, and virtually ignored in the Secretary's Recommendation. This is particularly inappropriate given the stated purpose of the establishment of the refuge to preserve "unique wildlife, wilderness and recreational values".

Given the certain destruction of wilderness values and the unpredictable effects on wildlife populations, the uncertainties in the geologic data are a serious hindrance in making a rational decision on ANWR. The results contained in the report might justify limited and carefully controlled further exploration as a rational alternative (Alternative C) that would provide the Congress with the facts needed to make an informed decision on ANWR. There is certainly no justification for leasing contained or implied in the data presented. Had a wilderness review been conducted for the 1002 area, ample support for Alternative E (wilderness designation) would have been found. I believe this is the most appropriate designation for the 1002 area, given its unique and irreplaceable wilderness values. It is conceivable that in the face of overwhelming national need, high and relatively certain oil potential, and thorough and conscientious commitment to preserving biological resources, a decision for development would be jutified. None of these conditions are demonstrated by the 1002 report. The report is flawed in its preparation and its unsubstantiated conclusions betray a bias for development contrary to the intent of Congress in requesting the study.

Sincerely,

Philip Martin

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FEB 6, 1987

TO THE U.S. FISH & WILDLIFE.

DEAR SIRS-

ENCLOSED PLEASE FIND MY COMMENTS ON THE DRAFT REPORT, " ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, COASTAL PLAIN RESOURCE ASSESSMENT.

I WOULD LIKE TO STRONGLY SUPPORT ALTERNATIVE B IN THE REPORT. I BELIEVE DEVELOPMENT OF ANWR'S POTENTIAL OIL & GAS RESOURCES IS IN THE BEST INTEREST OF THE U.S. AND ALASKA. I BELIEVE THE ENVIRONMENTAL EFFECTS HAVE BEEN GROSSLY OVERSTATED & A MORE BALANCED VIEWPOINT IS REQUIRED.

AS A SENIOR ENVIRONMENTAL COORDINATOR WITH ARCO ALASKA INC. I BELIEVE I HAVE A KNOWLEDGABLE POSITION FROM WHICH TO OFFER SUGGESTIONS & CHANGES TO THE DRAFT REPORT. THESE COMMENTS ARE MY OWN & ARCO HAS SUBMITTED ITS OWN COMMENTS SEPARATELY.

MARK MCDERMOTT

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GENERAL COMMENTS ON ENVIRONMENTAL EFFECTS

CHAPTER VI
1002(h) Report

Comment #1 - The "core calving area" is assumed to be critical to Porcupine Caribou Herd (PCH) herd demographics and therefore any displacement from this area would necessarily impact productivity.

The "core calving area" for the PCH has been arbitrarily defined as an area where high density (50 caribou /km^2) calving has occured for at least 5 of the last 14 years. For much of this area high density calving has occurred in 9 of the 14 years, which still leads to the obvious conclusion that calving occurred outside the "core calving area" anywhere from 5 to 9 years. An important aspect of the "core calving area" is what percentage of all calving areas it represents. From Table VI-5, the total "core calving area" is 311,000 acres, while total concentrated calving occurs over 2,117,000 acres. Thus core calving represents 15% of all concentrated calving areas, and would represent an even lower percentage if peripheral calving areas were considered. The conclusion is that the PCH has successfully calved over a very large area in the past and while the core area is obviously important to the herd, it is not necessarily critical.

The assumption is made that areas outside the "core calving area" have reduced habitat valves or higher exposure to predators. If this were so then reduced productivity should be apparent from years that the herd used these alternate areas. This has never been demonstrated and it is known is that the herd has grown steadily since the early 70's.

In considering the effects of displacement from traditional calving grounds, examples can be drawn from the literature. Davis et al., (1983) report that "in 1982, the Delta Caribou Herd was apparently precluded from calving in its traditional core areas because of persistent snow cover and instead used an alternate calving area roughly within the area burned in 1979, even though snow conditions were as favorable in unburned areas northeast, northwest, and west of the 1979 burn, where some calving occurs in most years. Calving in 1982 was quite successful, which suggests that caribou may have considerable flexibility in their habitat requirements." The Central Arctic Herd and Taimyr Herd in Russia also provide examples where industrial activity has had no measurable effect on herd productivity. Miller and Gunn (1986) review other case histories of natural displacement in Alaskan caribou herds.

Skoog (1968) and Bergerud et al. (1984) believe that caribou are not habitat limited. Shank (1979) states that.

> **"Stating that animals have no adequate habitat into which they can disperse is tantamount to saying that the population is being density controlled. In fact, northern large mammals (excepting sheep) are most likely not often resource limited suggesting that at least some degree of distributional alteration could be accommodated without drastic demographic consequences."**

Comment #2 - Behavioral responses are consistently equated with demographic responses. That is, if a negative response is observed in an individual or group, then the species productivity has also been negatively impacted.

Shank (1979) discusses this confusion directly. He defines a behavioral disturbance "as any behavioral response to human-caused stimulus which results in actually or potentially reduced reproductive fitness. If human action results in an animal acting in a manner in which it would not otherwise have acted and if this alteration is thought to cause a reduction in that individual's capacity to produce a viable offspring, then behavioral disturbance has occurred. The issue is confused by the occasional unavoidable use of the term 'disturbance' to describe the human-caused stimulus itself."

"Another aspect of behavioral disturbance is that the response must cause the reduction in fitness rather than the stimulus itself."

"Behavioral disturbance becomes manifested in animals in three distinct analyzable modes: overt behavioral response, physiological response, and demographic responses."

There is a consistently blurred distinction in the report regarding what is a behavioral response and what is a demographic response. The discussion of effects on caribou and muskox are excellent examples of this confusion. In both cases observed behavioral responses (flight reactions or "displacement") are used to estimate areas of affected habitat. Although habitat is not a limiting factor for either species, these avoidance behaviors are then equated to demographic responses. As Shank (1979) states:

> "What is commonly forgotten or ignored...is that disruption of normal behavior is is not necessarily bad in itself. For behavioral disturbance to be of practical concern, it must be demonstrated that it does, or does not, have demographic consequences. Failure to provide this link is, without question, the major failing of current research."

Comment #3 - The definition of environmental effects on biological resources is inadequate.

Several problems exist with the definitions of environmental effects on biological resources in Table VI-1.

1. There is a fundamental difference between the definitions for "negligible" and "minor" and those for "moderate" and "major". For negligible and minor the effect measured is a change in population or distribution or habitat quality or habitat availability. For moderate and major the definition calls for changes in habitat availability or quality which lead to a change in abundance or distribution. Habitat is linked to abundance, which is not the case for many of the species discussed in the report. The 4 levels of effects should occupy a smooth continuum, not alter in the middle.

2. As mentioned previously, the definitions for moderate and major effects tie together habitat and population effects. The implicit assumption is that any alteration of habitat will result in a population effect. While this may be true for some species, it varies widely for those considered by the report. As an example, polar bears are thought to be maintaining a stable population and the removal of a few denning sites could adversely effect the population. Muskoxen are increasing their population at very high rates, such that major changes would have to be made in their habitat to produce a population effect. These two cases cannot be distinguished given the current definitions.

These definitions also lead to the questionable practice of combining population declines and redistributions. The effects on many species are summarized as "a moderate change in population or distribution". These two extremes need to be distinguished, not lumped together.

Another drawback to the current definitions is that there is no quantification of the population effects. In the cases where populations are high (arctic ground squirrels) or habitat is not limiting (muskoxen), a "moderate" change in habitat could yield no population effect yet the overall effect on the species is concluded to be "moderate". As an example, one ground squirrel colony could be covered by a gravel pad, yielding a local change, one that is long term, and one that results in a redistribution of squirrels. By definition this would be a "moderate" impact on ground squirrels in the 1002 area. Clearly something is wrong with a definition that leads one to a "moderate" impact on a common species such as squirrels by eliminating one colony.

3. Many of the above cited problems with the biological effects could be remedied by separating habitat effects from population effects and having a category for each. Thus under biological resources there would be 4 levels of effects for population in one subsection, and 4 levels of effects on habitat in a separate subsection. This would greatly increase the flexibility and accuracy of describing effects on the wide variety of species considered in the report.

Comment #4 - Declines in all major predators are assumed to occur due to the hypothesized decline in caribou population.

The discussions of wolves, brown bears, wolverines and golden eagles all predict a "moderate" impact, largely due to a hypothesized 20 - 40% decline in the PCH. This reasoning is flawed for several reasons:

1. No alternative prey species are considered.

2. The 6 - 8 weeks of PCH availability to predators on the coastal plain would have to be a critical period for all species where the predator relied almost entirely on caribou.

3. No consideration is given to the fact that the high numbers of the PCH relative to the low numbers of predators indicates that the predator - prey system is not in a stage of dynamic equilibrium where a small change in one population leads immediately to a change in the other.

As an example of the problems with the assumption that PCH numbers are now limiting the 4 predators discussed, wolves will be examined because wolf-caribou systems have been studied more extensively. The logic behind the argument applies to the other predators as well.

Population estimates for the PCH ranged from 100 - 106,000 for most of the 70's, which represents a decline slightly greater than the maximum 40% predicted by the 1002 report. Yet wolf numbers in the 1002 area are not estimated to have been significantly lower than the report's estimate of 5 - 10 wolves, and in fact may have been higher. "Wolf predation on caribou in the ANWR study area during calving and post-calving is probably low." (USFW 1982) It is fairly safe to assume that wolf populations on the 1002 area have been held artificially low through rabies and legal and illegal hunting and that PCH population size is not a dominant factor.

Keith (1981) shows a direct relation between wolf population density and ungulate population biomass. However, the theory behind this relation cannot be applied to the 1002 area because:

1. Wolf densities are quite low relative to the available biomass of the PCH, such that Keith's relation does not hold. This suggests other factors control wolf populations in the 1002 area.

2. The PCH are only seasonally available to resident wolves, and then at a time when wolves are tied to denning sites to the south of the 1002 area.

3. The availability of the PCH occurs in summer, not during the more critical winter period, when resources are more scarce and wolves have fewer prey alternatives.

For the reasons discussed above it is not reasonable to assume that declines of 20 -40% of the PCH population will have any effect on wolf numbers. Negligible to minor impact on other predator species would also be expected from the hypothetical worse case of a 20 - 40% decline.

Comment #5 - The standard for judging environmental effects is not discussed. Based on numerous examples documented in the specific comments section, the standard used in the 1002 report is "worst case". NEPA as now amended currently requires that effects be "reasonably foreseeable".

It appears that the standard frequently used in the report for judging environmental effects in the face of incomplete or unavailable information is worst case analysis. In many of these instances the use of worst case analysis is inappropriate, particularly without further justification and clear evaluation of other reasonable approaches and more probable outcomes.

In a recent rulemaking (51 CFR 15618 et seq. April 26, 1986), CEQ amended its regulations (40 CFR 41502) governing the preparation of environmental impact statements where information is incomplete or unavailable. In that rulemaking CEQ greatly restricted the use of worst case analysis to those situations where such analysis is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason. Moreover, where worst case analysis is used, all relevant credible scientific evidence must be evaluated using alternative theoretical approaches or methods generally accepted in the scientific community. (40 CFR 1502.22(b)(1)-(3). The report often ignored this reasoned approach to evaluating impacts.

While the NEPA regulations are not specifically made applicable to this legislatively mandate EIS, we believe that the approach set forth in CEQ regulations should be followed.

SPECIFIC COMMENTS ON ENVIRONMENTAL EFFECTS

CHAPTER VI
1002(h) Report

Pg. 95, para 8. "In Alternative A, three portions of the 1002 area.....are all predicted as being developed, and the assessment considers all three areas as developed concurrently... Therefore, the analysis and consequences may represent a higher level of development than may actually occur at any specific time if the area were opened to leasing."

We would agree that the analysis represents a worst case scenario and therefore most subsequent environmental effects outlined in Chapter VI are overstated from what is likely to occur.

Pg. 98, section on Effect on Physical Geography and Processes.
There are no mitigation sections in the subheadings:

"Consequences of Geological and Geophysical Exploration"
"Consequences of Exploratory Drilling"
"Consequences of Development Drilling"
"Consequences Resulting from Construction of Roads, Pipelines, and Marine and Production Facilities"

Mitigation sections are found in the remaining two main subheadings in this chapter: "Effects on Biological Environment" and "Effects on Socieconomic Environment", thus it would seem appropriate to include mitigation sections in the "Effects on Physical Geography and Processes." This is particularly true in light of the very large body of knowledge that has been developed over the past two decades on this subject. There are literally hundreds of proven mitigative techniques commonly applied on North Slope oilfields by virtue of the fact that arctic environmental engineering is in a mature stage of development.

One small example is contained in the comments regarding pg 100, paragraph 4.

Pg. 99, para. 3. "Effects of seismic exploration generally result from overland travel of seismic trains. The effect is to the tundra which, if broken or scarred, can cause thawing of the upper ice-rich permafrost during the succeeding summers. Such thawing in flat areas will cause ponding at the junction of the ice-wedge polygons, altering the appearance of the tundra landscape. However, if thawing occurs on sloping ground, erosion can occur. If that erosion and its products terminate at a stream, local silting may result."

Although in the previous paragraph it is stated that "effects of additional seismic exploration would be similar to the effects of the seismic surveys during the winters of 1983-84 and 1984-85", it is not stated what those effects were. Paragraph three then lists all the potential ill effects without the balance of stating what actually occurred during the previous two winters. A summary of the actual results, taken from Felix and Jorgenson, 1985 and Felix and others, 1986a and b, should be included in this section.

Pg. 99, last para. "...traces of oils used during drilling to 'slicken' up the drill bit;..." is not in keeping with current drilling technology utilized on the North Slope. Fresh water based mud systems are currently used to drill wells on the North Slope.

Pg. 100, para 1 & 2. "Preliminary results of those investigations show gradients of increase in pH, salinity, alkalinity, turbidity, and sediment loads from control ponds to ponds adjacent to reserve pits (R.L. West and E. Snyder-Conn, unpublished data). Trends of increase in the vicinity of reserve pits were also shown for heavy metals such as aluminum, barium, chromium, zinc and arsenic, as well as for certain hydrocarbons...."

We believe it is inappropriate for the USFW to cite an unpublished draft report that was the subject of widespread criticism based on its lack of technical merits Presumedly one of the reasons this report has never been finalized nearly two years after its draft release is that the deficiencies were recognized by USFW Management. the West and Snyder-Conn reports basic conclusions, cited in the draft 1002H report, that were derived from the misapplication of statistical analyses. Based on the ANOVA analysis performed in West and Snyder-Conn's draft report, they could not have concluded that ponds adjacent to reserve pits were significanly different that control ponds because they did not apply the statistics to answer that question. What they did conclude by their analyses, based on the comparison they carried out, was that reserve pits differed from control ponds. The USFW found 78% of their comparisons to be statistically significant (21 of 27 comparisons). In a re-analysis of the same data, ARCO Alaska Inc. found 16% of their comparisons to be significant (3 of 19 comparisons). The difference was that USFW compared reserve pits to control ponds, and ARCO compared ponds near reserve pits to control ponds. There is no question that reserve pit water quality differs from natural ponds. The appropriate question is how natural ponds near reserve pits differe from control ponds. USFW has not adequately analyzed the data to answer this question.

There are numerous other major deficiencies in West and Snyder-Conn's draft report that have never been corrected, . Because of these problems, we recommend deleting any references to West and Snyder-Conn's report or their conclusions.

Pg. 100, para. 3. "There are two approaches to abandoning an exploratory well reserve pit: 1. Leave it as is."....

Recent studies in the Canadian Arctic (French, 1985) and in the NPRA, Alaska (Nuera Reclamation, 1986) document the minor environmental effects of abandoning a drilling reserve pit without closure. However, it is current industry practice to "button up" the reserve pit adjacent to exploratory wells. All recent state and federal lease sale stipulations require complete closure and containment of reserve pits. Therefore, for the purposes of discussing future options for reserve pit closeout on the Coastal Plain, option #1 is not relevant and should be deleted.

Pg. 100, para. 4. ....."Therefore, this method requires remobilizing construction equipment, opening a gravel pit elsewhere, and hauling in material to fill in and "mound up" over the reserve pit area."....

Recent experience from ARCO's Brontosaurus well site (NPRA) and other recent exploration wells on the North Slope (Larry Dietrick, AK Department of Environmental Conservation (ADEC) personal communication) do not support this statement. The Brontosaurus well was drilled approximately 50 miles S-SW of Barrow during early 1985 from an ice pad. The reserve pit was excavated below the level of permafrost and the tundra mat was scraped off and stockpiled separately from the mineral soil. After operations concluded the reserve pit contents were melted, pumped dry and injected down the well. The mineral soil was replaced and then covered with the organic rich tundra mat. This resulted in a crown over the reserve pit of 2-3 feet above ground level. An August 1986 inspection by ARCO, ADEC and the North Slope Borough measured successful freezeback of the pit contents with virtually no slumping or ponding problems. Natural revegetation was already occurring 18 months after closeout. This technique is considered to be "state-of-the-art" by ADEC. Similar experiences from other recent wells would indicate that a) this method is a very effective mitigation technique, b) remobilizing equipment is not necessary, c) opening other gravel borrow pits is not necessary, and d) the material will revegetate naturally and rapidly.

Pg. 100, para 6. "1. Denuding of a 10-acre area of tundra for 10 years or more, and the long term (many tens of years) creation of a 2 to 3 acre rectangular appearing pond."

Recent experience from the Brontosaurus well and other North Slope exploration wells drilled from ice pads do not support the conclusion that this result is an "unavoidable consequence". The Brontosaurus site after 18 months has an affected area of only 1.5 acres, which represents the reserve pit cap. The four acre ice pad has had virtually no effect on the tundra vegetation and the areal extent of the pad is not recognizable from the air or ground. A pond is a result only if the reserve pit is not capped.

Pg. 100, para 8. "The almost unavoidable minor oil leaks and spill.....which would contaminate the tundra and, possibly, the aquatic environment...."

"Minor" needs to be quantified. The statement could be generally correct for spills less than 10 gallons. Some of these spills might go undetected and reach the tundra or aquatic environment during spring break-up. However, spills of oil are easily noticed on ice and snow and rarely escape detection, even in quantities of less than a gallon. Further, these spills are easily and routinely cleaned up and disposed of properly. All that is required is that the snow/oil mixture be scooped up by shovel or front end loader. Thus the actual amount of spilled oil that lasts until spring is exceedingly minor.

Pg. 100. para. 9. "Gaseous and particulate emissions which temporarily reduce air quality in the locale".

"Locale" needs to be quantified, since the affected area from a single drilling rig is minimal and the effects negligible.

Pg. 101, para. 1. "The most disruptive and the most visually displeasing (for thousands of years) places from which to obtain gravel are the upland areas."

Abandoned upland gravel borrow pits would either flood naturally, or could be purposely flooded, to create an artificial lake.

Pg. 101, para. 1 "Today, the untrained observer can scarcely find those (NPRA) borrow sites."

We would support the evidence that carefully engineered and environmentally sensitive gravel borrowing can minimize impacts and create only temporary (10 year) disturbance.

Pg. 101, para 2. "The large quantities of water required for development drilling on the 1002 area are not available."

Although the proposed solution of flooding streambed gravel borrow pits is a well reasoned and feasible alternative, it is by no means the only one. Water is potentially available from large underground aquifers (likely in a geological environment containing oil fields) or seawater could be pumped via pipeline from the coast, similar to the way waterflood operations are carried out at Kuparuk and Prudhoe Bay.

P. 101, para 3. "The infrastructure required to develop the economic prospects of the 1002 area is described in Chapter IV."

On page 75 of the Draft 1002 Report is is stated that "the exploration, development, and construction scenarios presented herein are general concepts and must not be considered to be final engineering solutions....", thus the word infrastructure on Pg. 101, para 3 should be modified by "proposed" or "hypothetical", such as "the hypothetical infrastructure required to develop...."

Pg. 101, para 3. "Construction of as many as four or five year-round five-foot thick gravel C-130 airstrips on the 1002 area".

The hypothetical development in Figure V-1, pg. 90 shows only two airstrips. The current airstrips in use for the five existing North Slope fields, a size similar to the proposed 1002 development, number three. Thus "four or five" appears to be an overstatement.

Pg. 101 #6. Same comment as for Pg. 100, para 8.

Pg 101, para 17. "Construction of a solid-core causeway....would require breaching to permit fish passage...."

The breaching of gravel causeways for fish passage is not a necessary requirement. Although fish do pass through large breaches (Endicott Environmental Studies 1985) they also go around causeways with and without large breaches (Endicott Studies 1985; Prudhoe Bay Waterflood Studies 1981, 1982, 1983 and 1984). The Waterflood studies demonstrated that the West Dock Causeway was not an impediment to the migration of large fish. The 1985 Endicott and Colville River Fish Studies showed that even the smallest migratory anadramous fish, young-of-the-year Arctic cisco, were able to get by both the West Dock and Endicott causeways to reach the Colville River.

Pg. 103, para. 4. "Also thermokarst, which commonly occurs on the edges of roads and pads..."

References are required for this conclusion.

Pg. 103, para. 4. Impoundment concerns can be mitigated by adding culverts periodically after construction, as found to be necessary.

Pg. 103, para 5. Reference to Meehan 1986 and calculation of 7000 acres of secondary effects.

We find it inappropirate to reference a preliminary draft report that has been widely criticized for its lack of technical credibility It would be more appropriate to reference Walker et al., 1984, Meehan's main source. Secondary effects based on measurements actually taken at Prudhoe Bay could be derived.

Walker et al. (1985), calculated the areal extent of secondary effects in a 20 km^2 area of the most heavily developed region of Prudhoe Bay. The authors themselves refer to their analysis as a worst case scenario for the oilfield and their analysis "must not be used to make interpretations for the field as a whole". The main data for this area, referred to as Map 22, is contained in Table 12.

Walker et al. measured 222.93 hectares of gravel pads and roads in this area as of 1983. Vehicle tracks, gravel and debris, and heavy dust or dust killed tundra comprised 48.78 hectares, or a factor of 0.22 for every unit area of road or pad. Thermokarst totaled 59.29 hectares, or a factor of 0.27. (Flooding data is ignored because the Prudhoe area is dominantly wet, flat lowlands and not comparable to the ANWR region. It is fairly safe to assume that dust and gravel spray are more independent of terrain and habitat type). Combining both thermokarst and gravel spray, dust and vehicle tracks yields a total secondary effect (excluding impoundments) of approximately 0.5 for every unit of gravel. For a development scenario of 5000 acres, then, actual data has measured that secondary impacts are on the order of 2500 acres. This is also noted to be a worst case scenario. In light of this data, the proposed 7000 acre estimate for secondary impacts is an overexaggeration and not defensible.

Choosing a 100' corridor for secondary effects led to an overestimate due to the fact that dust and gravel spray may reach the distance specified by the references locally. These effects are not continually present along roads out to 100'.

Pg. 103, para 7. "Since 1972 some 23,000, mostly small, spills have been reported to the Alaska Department of Environmental Conservation. The largest spill of 658,000 gallons was the result of sabotage in 1978. A spill of over 200,000 gallons near Atigun Pass in 1979...."

It should be pointed out that neither of these incidents occurred on the North Slope, although they are an indirect outgrowth of North Slope development.

Pg. 104, para 1. "To date, the cumulative effect of spills has not been significant".

We would concur with this assessment. However, the main reason for the lack of significant impact is completely absent from the discussion. Of the 82,216 gallons spilled in 1985, very little actually remained in the environment because it was properly cleaned up. The discussion leaves the reader to conclude that all 82,216 gallons went into the tundra or wetlands. Spill prevention and cleanup is

aggressively pursued on the North Slope and to date has been effective. Most spills occur on gravel production pads while snow is on the ground and are therefore easy to spot and cleanup. Those that do escape detection or occur in the summer off gravel pads are treated with sorbent pads and rehabilitation and revegetation procedures.

To gain the perspective of what percent of the 82,216 gallons reported in 1985 escaped cleanup and proper disposal, oil spill records for the Prudhoe Bay (Eastern half) and Lisburne oil fields were reviewed. In 1985 ARCO experienced 29 oil spills that were reported to ADEC for the two oilfields. These 29 spills represent approximately 18,000 gallons of crude, diesel and other fluids. Twenty five of the 29 were spilled on gravel production pads, largely in the winter, and were cleaned up nearly 100% by removing the contaminated gravel or gravel, snow and ice mixture. The 4 spills off of gravel pads represent approximately 1150 gallons of crude, diesel and natural gas liquids. Cleanup activities were not able to recover all the spilled liquids and it is estimated that 300 - 400 gallons were not recovered. This represents approximately 2% of the total volume of oil spills that escaped into the environment.

Pg. 104, para 4-6, Mitigation Section.

The preceding discussion of impacts to vegetation, wetlands, and terrain types covers in detail the possible impacts from:

1) seismic surveys
2) ice pads and roads
3) gravel pads and roads
4) reserve pits
5) oil and fuel spills
6) gravel mining
7) secondary effects of roads, such as dust, thermokarst, gravel spray and impoundments
8) seawater spills

The following Mitigation Section for these impacts discusses only a portion of these impacts and does so in the briefest possible manner. It is not for lack of subject matter or data, however, since 18 years of Arctic experience and millions of dollars have been spent on effective mitigation techniques. The following commonly employed mitigation techniques should be discussed to properly balance the discussion:

1) Snow depth, routing and USF&W oversight procedures followed during seismic surveys

2) Current accepted design parameters for ice pads and roads, (i.e. Brontosaurus well, NPRA, ARCO) that requires sufficient thickness, siting considerations.

3) Site selection criteria for roads and pads that avoid critical habitats.

4) The trend towards smaller gravel pads and reserve pits, decreasing the wellsite "footprint".

5) Aggressive fluid management of reserve pits to prevent overtopping and leaking.

6) Chemical screening of all reserve pit fluids prior to surface disposal to insure water quality standards are met.

7) Comprehensive oil spill contingency planning.

8) Spill clean up procedures, including proper disposal of snow/oil winter in and sorbent pads in summer.

9) Rehabilitation and revegetation of disturbed sites, including gravel spray removal, reseeding, replacing damaged vegetation mat.

10) Road watering to minimize dust generation.

11) Improved culvert design and placement to avoid impoundments.

The point is the mitigation section is inadequate. Only five sentences attempt to cover the large body of commonly used mitigative technology that applies to the preceding 16 paragraphs. Further, numerous sentences have nothing to do with mitigation and should be placed in the preceding consequences section: "An overall loss of approximately 5,650 acres (0.4 percent of the 1002 area) of existing vegetation could result, based on the estimated facility needs for developing the entire 1002 area. Habitat values would be lost when these habitats are covered by pads, airstrips, roads, and other support facilities. Additionally, at least 7000 acres could be modified by the secondary effects of gravel spray and dust deposition, altered snowmelt, and erosion patterns, thermokarst, impoundments, and pollution incidents. Habitat values would decrease."

Pg. 104, para 7. "The expected modification of approximately 12,650 acres (0.8 percent of the 1002 area) would be a moderate effect (Table VI-1) on area vegetation and wetlands."

The estimate of 5,650 acres for direct impacts of gravel appears to be reasonable based on the proposed scenario. Further, the classification of moderate impact for this area is appropriate. However, classifying 7000 acres of secondary impacts as moderate is either a) to large an area to be placed in the moderate category, as defined, or b) too severe a category for that broad an area.

The moderate category requires either a "local modification of considerable severity" or a "widespread modification of lesser severity". Since 12,650 acres is 0.8 percent of the Coastal Plain, it does not fit the category of "widespread". Therefore the 7000 acres of secondary effects are defined as local modification having "considerable severity". It is difficult to defend the hypothesis that 7000 acres of road dust, gravel spray and thermokarst would reach this degree of impact. Based on Walker et al. 1984, and the analysis contained in the comment for Pg. 103, para 5, we would recommend that this figure be changed to 2500 acres for secondary impacts, or 8150 acres total.

Pg. 106, para. 2. "Later studies (Cameron and Whitten, 1979, 1980; Cameron and others, 1981; Whitten and Cameron, 1985) indicate an absence of calving near

the Coast at Prudhoe Bay during 1976-85, possibly due to avoidance of the activity area by calving caribou".

This is a widely quoted, though erroneous, conclusion of the low numbers of cows with calves found in the Prudhoe Bay area. ADF&G reports for the period 1978-85 report average caribou densities of 0.06 caribou/km^2 while Gavin (1979) reports densities of 0.01-0.05/km^2 for the period 1970-79, or predevelopment. Thus the conclusion is that total caribou densities have always been low. In regards to calving, inspection of Table 1 shows the same consistent low historical numbers with little change through development.

At a recent caribou workshop at Alyeska (Demography and Behavior of the Central Arctic and Porcupine Caribou Herds in Relation to Oil Field Development, Oct 1986) all ADF&G and USFW participants reached the consensus that "the Central Arctic Herd (CAH) has never calved in the Prudhoe Bay area in large numbers."

TABLE 1 - TOTAL NUMBERS OF COWS AND CALVES WITHIN THE PRUDHOE BAY AREA (1165 km^2), 1970-1979.

From Gavin, 1980.

Year	Cows	Calves	Calves per 100 Cows	Yearlings	Bulls	Total	Density Caribou/km^2
1970	24	17	71	8		49	0.04
1971	16	7	44	7		30	0.03
1972	8	5	63	4		17	0.01
1973	24	9	38	9		42	0.04
1974	34	9	27	8		51	0.04
1975	27	13	48	4		44	0.04
1976	19	4	21	5		28	0.03
1977	14	11	79	3		28	0.03
1978	29	15	50	7	6	57	0.05
1979	13	7	50	8	4	32	0.03

Pg. 107, para 2. "These changes in vegetation, and thus food availability, could occur on approximately 7000 (2500) acres, of which nearly 1800 (650) acres is in Resource Category 1 (1 (0.3) percent). Total modification of caribou habitat attributable to direct and secondary changes would occur on about 12,650 (8150) acres, or 0.8 (0.5) percent of the 1002 area, and 1.3 (0.8) percent of the core calving area (Resource Category 1 habitat)".

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Based on the earlier discussion that 2500 acres of secondary impacts is a "worst case" based on actual data, then the above underlined changes should be made.

Pg. 107, para 5. "Whitten and Cameron (1985) found consistently low numbers of caribou and generally low percentages of calves in the Prudhoe Bay oilfield from their annual surveys of the CAH calving grounds, 1978-82, with caribou being displaced to adjacent areas already used for calving."

Based on Gavin (1980) which demonstrated consistently low numbers of caribou and low percentages of calves throughout the period 1970-1979, the conclusion is reached that numbers have always been low in the Prudhoe Bay Region. This was the conclusion of the Alyeska Caribou Workshop in October 1986 (see comments for Pg. 106, para 2). White et al. (1975) suggests that the high percentage of wet and moist areas near Prudhoe Bay makes this area less attractive to caribou.

Pg. 107, para. 5. "Dau and Cameron (1985), in what may be the most systematic study of caribou displacement by oil development, reported that maternal caribou groups showed measurable declines in habitat use within approximately two miles on either side of the Milne Point Road in the Central Alaskan Arctic."

The "two mile" reference is a typographical error. The actual distance is "two km".

Pg. 108, para. 2. "Displacement of the Porcupine Caribou Herd (PCH) from a core calving area to a less desirable area would be expected to reduce caribou productivity."

This statement is true, as it stands. However, in the ensuing discussion it is implied that any displacement of the PCH would necessarily be into a less desirable area. As the report points out, there is over two million acres of known concentrated calving area, not counting peripheral areas. Since the PCH has calved throughout this area successfully in the past, and there is no known effect of decreased productivity in the years that the herd used those areas exclusively, there is no reason to conclude that the areas outside the core calving area area less desirable. Therefore, the expectation that the herd's productivity will suffer is not supportable.

Pg. 108, para 2. "Although the CAH and PCH calving grounds are roughly equal in size..."

The total survey area covered by Whitten and Cameron (1985) of the CAH calving grounds is approximately 1.4 million acres. This figure is equal or higher than the CAH calving area by whatever definition. The concentrated calving area for the PCH is given as 2.1 million acres, and if peripheral areas are considered this figure would probably increase to three million acres or more. Thus, at a maximum, the CAH calving ground is 2/3 of the PCH, and probably closer to 1/2. (See Figure 1).

Pg. 108, para. 2. "Based on 1982 population estimates."

More recent population estimates, since they are available, should be used.

Pg. 108, para. 3. "As described by Whitten and Cameron (1985), absolute density for the PCH is nearly 14 times, and for the Western Arctic Herd (WAH) nearly 15 times greater than for the CAH. The difference in effective densities is even greater, particularly for the PCH, which are found at approximately 24 caribou per square kilometer as compared with approximately 5 caribou per square kilometer for the CAH. Effective density of the Western Arctic Herd is 15 caribou per square kilometer."

The difference in effective densities is not greater, it is less than absolute densities. For the PCH, absolute density is 14 times the CAH, while effective density is 24 caribou/km^2 vs. 5 caribou/km^2 or 5 times. For the Western Arctic Herd, absolute density is 15 times the CAH, while effective density is 15 caribou/km^2 vs. 5 caribou/km^2 or 3 times. Thus the difference in effective density is less than absolute density.

Pg. 108, para. 5. "The lack of observable adverse effects from displacement exhibited by the CAH would be unlikely for the PCH. The PCH is much more crowded in its calving habitats, and a substantially greater proportion of important calving habitats would be involved with development that included their core calving area."

The fact that the PCH has higher calving densities than the CAH is not sufficient to argue that displacement would be likely to cause adverse effects. Two other conditions would have to be met: 1) alternative high quality calving habitat is not available in sufficient quantities. The large area used by the PCH for calving, and their historical use and success in that habitat, would indicate that this is not the case. 2) The densities achieved by the PCH during calving are near some threshold limit above which range destruction or negative intraspecific interactions would occur. This has not been demonstrated.

Pg. 108, para. 7. "Based upon the work of Dau and Cameron (1985), caribou are displaced approximately two miles out from development."

Dau and Cameron (1985) show a partial displacement out to two kilometers, not two miles.

Pg. 108, para. 7. "Within this approximately two mile area of influence are about 357,000 acres (38 percent) of the total concentrated calving grounds in the 1002 area."

Given that Dau and Cameron (1985) shows a partial displacement out to 2km, or 1.2 miles, then the effected area would be reduced to 60%, or 214,200 acres (23 percent) of the total concentrated calving grounds.

Pg. 108, para. 8. "An approximately two mile displacement of caribou out from petroleum facilities would include loss of 32 percent of the most critical PCH core calving areas (Table VI-5)." "The projected displacement from preferred calving habitat would represent a complete loss of habitat values."

Given that Dau and Cameron (1985) show a partial displacement out to 2km, or 1.2 miles, then the 32 percent should be reduced to 19 percent.

The assumption that all caribou (100%) would be displaced up to 2km (or 2 miles) is totally unsupported by Dau and Cameron's data. Total caribou decrease from an average of 1 caribou/km^2 predevelopment to 0.4 caribou/km^2 post-development up to 1km from the road, a decrease of approximately 60%. From 1 to 2 km the decrease is 1.7 caribou/km^2 to 1.0 caribou/km^2, or a 40% decrease. Beyond 2km caribou were more numerous after development than before (presumedly the displaced caribou plus increased caribou due to a steadily increasing growth rate). For calves there was nearly a 90% decrease for the first km and approximately a 50% decrease from 1 to 2km. Beyond 2 km calves increased above pre-development densities.

This would indicate a weighted average of an approximate 70% decline in calves, or maternal cows, up to 2km with the displaced cows and calves moving to an area beyond 2km from roads. This is equivalent to a 100% displacement up to 0.7 X 2km = 1.4 km or .9 mi for the purposes of calculating affected habitat.

Thus a one mile displacement is consistent with Dau and Cameron (1985) and should be used rather than the current two mile limit. This would, or course, decrease all estimates of the affected area by 50%.

Pg. 108-109. In general, clarification is needed with regard to references by S. Murphy and/or J. Curatolo on ramp and crossing studies. As this information is presented, it is incorrect, misleading and confusing.

Pg. 109, para. 6. "If caribou refuse to cross through any development areas, then 294,000 acres would be unavailable as habitat. That area encompasses 52 percent of total insect-relief habitat and over 80 percent of Coastal insect-relief habitats. This would mean that all coastal insect-relief habitats within the 1002 area, except for a small area in the eastern portion, would become unavailable under full development."

The hypothesis that the PCH would be eliminated from virtually all it's coastal insect-relief is predicated by the supposition that the PCH would "refuse to cross through any development areas". There are no studies in the literature to support the hypothesis that a properly designed pipeline and road would present a total physical barrier to caribou movements. Yet there are abundant examples of herds throughout the world regularly crossing roads, roads with pipelines, hunter's firing lines, and even improperly designed pipelines such as the Norilsk gasline in Russia (Shideler, 1986). The supposition is unsupportable.

Pg. 109, para. 6. "The second factor is to assume the approximately 2-mile sphere of influence for oil development used previously. Under that assumption, caribou crossing through the development area would avoid using approximately 72,000 acres or 29 percent of identified coastal insect-relief habitat within the 1002 area...."

The 2-mile sphere of influence is based on the Dau and Cameron (1985) study that was conducted during the calving season, not mosquito harrasment season. Conclusions regarding movement of mosquito harrased groups seeking coastal areas cannot be drawn from studies of the distribution of caribou during calving. Dau and Cameron (1986) found that "during June, the relative number of caribou within 1km of the (Milne Point) road was positively corelated with distance from

the road; there was no relationship between number of caribou and distance from the road for either May or July/Aug." It is well recognized that measurable behaviors that can occur during calving, such as avoidance, are often absent at other times of the year, such as during insect harassment.

Pg. 110, para. 2. "Effects of disturbance might also include....energy stress, possible critical during times of low energy reserves such as winter...."

The vast majority of the PCH would not be in contact with the development scenario during the winter.

Pg. 111, para. 3. "Mitigation of the loss of caribou habitat in Resource Category 1 (242,000 acres of core calving area) is not possible."

This statement requires explanation.

Pg. 112, para 3 & 4. Based on the preceding comments, this entire summary of effects on the Porcupine Caribou Herd should be modified. Although a conclusion of moderate impact may still be possible, the affected areas, particularly the 80% of coastal insect-relief habitat, should be modified.

Pg. 112, para. 5. "For the CAH, a moderate change in distribution or decline in that portion of the CAH using the 1002 area could occur. The effect on the entire CAH population throughout its range may also be moderate. Those effects on the segment of the CAH within the 1002 area would be similar to those on the PCH that occur from disturbance, displacement and barriers to free movement. The population decline or distribution change would be 5-10 percent for the CAH throughout its range."

The basis for concluding that a moderate change in the CAH distribution or numbers has not been presented. In fact, all the data presented would lead one to the opposite conclusion. There is abundant discussion in the report regarding why the CAH is different and can be expected to respond differently to development than the PCH. The facts of lower overall densities, lower calving densities, more distributed rather than concentrated calving, incomplete range utilization, greater habituation and the overwhelming fact that the CAH has already demonstrated it's accommodation to development are all discussed in the report. All of these argue towards a minimal impact of the proposed scenario on the CAH. Further, the proposed development scenario borders the extreme eastern extension of the CAH's calving areas, while it overlaps substantially with the PCH. Given all these differences discussed in detail in the report, it appears to be inconsistent with the conclusion that the "effects....would be similar." The qualification of "on the segment of the CAH within the 1002 area" is specious because there is no distinct subpopulation of the CAH that uses the 1002 area. That a "population decline or distribution change would be 5-10 percent" is not supportable. Based on Table VI-1, the environmental effect on the CAH should be negligible.

Pg. 113, para. 3. "Displacement from calving areas would have a negative effect on muskoxen production."

Displacement from calving areas may have a negative effect on muskoxen production if they are near or at their upper limit of utilizing all high quality

calving habitat throughout their range. The high productivity reported for the ANWR muskox population has been attributed to the availability of preferred forage during summer (Robus 1981) and to the tendency for herds to remain in relatively restricted home ranges, thereby capitalizing on the abundant forage (Jingfors 1980). As the 1002 report points out, "carrying capacity has apparently not been reached." Thus due to the fact that the herd is still expanding its range, and that high productivity rates have been tied to abundant forage, it does not follow that displacement would have a negative effect on productivity.

Pg. 113, para. 4. "From the reports of Russel (1977) and Reynolds and La Plant (1985), a 2 mile sphere of influence was assumed in calculating the range which could be affected by full leasing."

The term "affected" is defined in the next sentence as "lost or greatly reduced." Thus the 2-mile area is being defined as an area where muskoxen are removed by 100% (lost) or decreased by an amount in the range of 60-90% (greatly reduced). The data of Reynolds and LaPlant (1985) show that a flight response occured in only 7 of 31 groups (23%) encountered in the Tamayariak area (Table 1) or the Okerokovik area (Table 3). This flight response occurred at distances from 200 m to 3.2 km, or an average of 1.5 km. Based on these data, one would have to significantly increase the stimulus, or shorten the 2-mile sphere of influence, or both, to reasonably expect a 60 to 100% displacement in muskoxen. Four of the 9 groups (44%) displayed no response at distances less than a km. It is not sound scientific judgment to pick the farthest distance reported for a flight reaction (3.2 km) and then conclude that most or all of the animals will behave in a similar manner, when the Reynolds and LaPlant data show that only 23% actually did. This is particularly true since habituation is known to occur in muskoxen, as the report states.

Thus the assumption that a 2-mile sphere of influence is appropriate for a complete displacement of muskoxen is not supportable by the data.

Pg. 113, para. 3. "The magnitude of that effect is difficult to accurately predict, particularly in view of the expanding nature of the population and refuge management objectives to allow continued population expansion."

Management objectives are irrelevant to the topic of discussion. Whether management objectives are to increase or decrease the herd has no bearing on whether displacement will have a large or small effect on muskox production.

Pg. 113, para. 4. "Table VI-6 shows that habitat values could be lost or greatly reduced throughout about one-third (256,000 acres) of the muskox range within the 1002 area."

These figures should be decreased by at least half based on the previous discussion.

Pg. 114, para. 1. "Major negative effects upon the muskoxen population from oil development could occur, considering the present management objectives for continued population growth of the herd under natural regulation and the displacement from habitat likely to occur."

It is inappropriate to attempt measure impacts against an open ended management policy when there is no discussion of the carrying capacity of the habitat and where limiting factors to growth may occur. This discussion confuses whether impacts are being measured against today's current population (implicit in the definitions in Table VI-1) or against some future potential. If the future potential is being used as a yardstick, then one must discuss some limits to future population. Clearly this management goal will have to be altered in the future as the herd reaches it's maximum utilization of whatever habitat is most critical.

If the negative effects are being measured against future potential, it should be clearly stated and the proper discussion of habitat limitations should be included. If the negative effects are being measured against today's current population, then references to the management objectives should be deleted as they confuse the issue.

P. 114, para. 2. "However, considering the larger extent (158,000 acres, 43 percent) of all high-use muskoxen habitat within the 1002 area, as well as more than 33 percent of the population's high use habitats throughout the Arctic Refuge which could be affected under full leasing, a change in distribution or decline affecting 25-50 percent of the population may occur."

1) Given that the 2-mile sphere of influence figure used to derive the affected area is based on a maximum distance to illicit a behavioral response which may have no demographic consequences (and did not in Reynolds and LaPlant's study) and 2) there is no data to indicate that the muskox are even approaching full utilization of their habitat, and 3) the herds are expanding their range driven by a high productivity, it is difficult to support a conclusion that a decline of up to 50 percent may occur.

Pg. 114, para. 9. "Effects on the regional moose population from habitat loss and mortality due to oil development in the 1002 area would be minor."

Due to the very low population of moose on the Coastal Plain, the extremely low loss of habitat expected, the ability of moose to habituate to disturbance and the ability of ADF&G to regulate moose harvest, it is reasonable to expect a negligible, rather than a minor, effect.

Pg. 115, para. 6. "A moderate decline of the wolf population using the 1002 and surrounding area could result from the cumulative effects of direct mortality and reduced production or survival of young, caused by reduced prey availability."

As pointed out in the state references, there is indeed a relationship between the abundance of wolves and the biomass of ungulate prey. However, even if one hypothesizes a 40% decline in the PCH from 180,000 to 100,000 animals, it is difficult to demonstrate that 5 to 10 wolves would be in any way limited by a herd of such magnitude. The cited references all deal with wolf/caribou densities that are orders of magnitude higher than 0.00002 to 0.0001. Further, no consideration is given to alternate prey species.

The environmental effect on wolves from the proposed development should be changed to negligible.

Pg. 120, para. 1 - Swans, Geese, and Ducks. One study that should be referenced in the Murphy, et al. (1986) "Lisburne Terrestrial Monitoring Program - 1985. The effects of the Lisburne Development project on Geese and Swans." The results of this study indicated that there was little effect on the nesting and area use of geese, swans and ducks in the Lisburne development area.

Pg. 120, para. 11. All references to the West and Snyder-Conn Report should be deleted for the reasons provided earlier in the comments on Pg. 100, para 1 and 2.

Pg. 121, para. 7. "Table VI-7 shows the amount of habitat that could be affected by development resulting from full leasing, assuming snow geese are displaced 1.5 and 3 miles as observed by Gollop and Davis (1974)."

The reactions of fall-staging snow geese to noise were studied by Gollop and Davis (1974) and Wisely (1974). In those studies, gas compressor noise simulators were placed in fall-staging areas and the reactions of flying and feeding flocks were observed with and without noise production. Some general conclusions, which cannot be evaluated quantitatively, include:

1) noise may decrease the number of flocks that land at a particular site;
2) noise may cause a temporary alteration in the flight path of goose flocks;
3) geese may avoid feeding sites where high noise levels are present;
4) feeding flocks may react to the sudden occurrence of gas-compressor type noise up to 3 mi away (Gollop and Davis 1974); and
5) feeding flocks may approach to within 300 m of continuously-operating gas-compressor noise simulators, but most flocks appear to avoid the area within 800 m in front of such noise simulators (Wisely 1974).

Gollop and Davis (1974) did observe some snow geese disturbance up to 3 miles, but, as with other studies cited in the 1002 report, this should not be given as an adequate indication that geese would be totally displaced out to 3 miles. In fact, Gollop and Gavis report in their Table 8 that the mean distance that snow geese flared under simulator tests was 365 yds, or 0.2 miles. Thus the 1.5 and 3 mile limits suggested by the report are gross overestimates and are not supported by the cited literature.

Pg. 121, para. 8. "Reduced time spent feeding and lost habitat in which to feed would result from petroleum development, adversely affecting accumulation of the energy reserves essential for migration. Davis and Wisely (1974) estimated that staging juvenile snow geese unable to adjust to aircraft disturbance accumulated 20.4 percent less energy reserves due to lost feeding time."

Davis and Wisely's discussion of the energetic effects of disturbance is questionable because the authors assumed that disturbance reaction time would subtract in equal proportions from all other activities. A more conservative approach would be to assume that the geese were capable of at least some compensatory increase in feeding rate. The estimates of 20.4% reduction and 9.5% reduction in energy reserves acquired by juvenile geese subjected to 2-h interval fixed-wing and helicopter overflights, respectively, are probably overestimates of the bioenergetic impact of these disturbances.

Pg. 121, last para. A decline in waterfowl populations has not been documented in the Lisburne operational area. This fact is counter to the supposition made that a decline in waterfowl could occur as a result of development.

Pg. 122, para. 2. "The average number of snow geese annually staging on the 1002 area could be reduced by almost 50 percent."

The affected habitat has been grossly overstated based on a misapplication of Gollop and Davis's results and the assumption that geese could not compensate for lost feeding time or habituate to disturbance. This has led to an equally gross overstatement of the potential effects on snow geese.

Pg. 123, para. 4. "Recent work near Prudhoe Bay has shown that reduced numbers of shore-birds occur near roads in the oil field (Troy and other, 1983; Troy, 1984)."

Troy's work also shows increased habitat use near roads for several species, including Northern Pintails, Red-Necked and Red Phalaropes in impoundments, and Semi-palmated Sandpipers in dust induced early melt zones.

Pg. 123, para. 11. "The major effects anticipated on the PCH from development could cause an effect on golden eagles because of decreased prey abundance or modified distribution."

There is no reason, a priori, to assume that a 20 - 40% reduction in the PCH would necessitate a moderate impact on golden eagles, given the high numbers and densities of the PCH.

Pg. 131, para. 6. "Moreover, the existence of oil facilities and activities would eliminate the opportunity for further scientific study of an undisturbed ecosystem."

While the opportunity for study of an undisturbed system might be eliminated, the reality is that millions of dollars worth of actual studies are guaranteed to take place if the coastal plain is developed. The amount learned will far outweigh the studies that might be carried out with little economic incentive.

Pg. 143, Table VI-8. The chart indicates under "Artifacts at Development Sites" that all would be lost in the full and partial leasing alternatives. When, in fact, under current law prior to surface use, an archaeological survey must be performed over the area that may be impacted. Important archaeological sites are avoided, studied or removed to prevent damage to this resource.

Pg. 145 - 148. Summary of recommended mitigation for the 1002 area. We recognize the need for meaningful mitigation measures, many of those listed are presently in force in the North Slope oil fields; however, during the last ten years we have found that some of the mitigation measures that were put in place at the onset were unnecessary. We recommend a more general/flexible case-by-case option to mitigate the concerns of the present, using the past history as guidelines for mitigation.

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DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Debbie Miller

Mailing Address [illegible]

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☐ I am speaking for _____
(please enter name of organization you represent)

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TESTIMONY REGARDING

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

BY

DEBBIE S. MILLER
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January 5, 1987

My name is Debbie Miller and I reside at 1446 Hans Way in Fairbanks, Alaska. I find it extremely inconvenient traveling to Anchorage with a six month old in order to testify at a public hearing. Numerous individuals and organizations, including Governor Cowper, requested that public hearings be held in Fairbanks and Arctic Village. Our requests have obviously fallen on deaf ears.

I am attending this hearing because I believe that the issue of opening the Arctic Refuge coastal plain to oil and gas development is the most important conservation issue in my lifetime. I cannot, in good conscience, sit at my desk and merely write a letter to the Secretary, criticizing his recommendation which would open the coastal plain to full scale oil and gas leasing. I must publicly denounce the Secretary's illogical recommendation which is not supported by the contents of the coastal plain resource assessment. I question whether the Secretary read the assessment prior to writing his recommendation.

Although I am testifying as an individual I represent many voices which will not be heard today. I speak on behalf of my daughter whose generation would like to see some of our Arctic landscape preserved as wilderness for their time. I speak for the elder in Arctic Village who detests the idea of opening the calving grounds of the Porcupine Caribou Herd to oil and gas development, but will not be given the opportunity to be heard in their own village. I remind you that Arctic Village residents speak English as a second language and few elders are capable of submitting written comments. My voice is also the voice of those whose efforts and dedication helped establish the Arctic National Wildlife Range for its unique wilderness, wildlife, and recreational values: individuals like Olaus Murie, Clarence Rhode, George Collins, and Lowell Sumner. Let's hope that their work was not in vain.

For the past 11 years I have been fortunate to spend a substantial amount of time living, working, and recreating within the Arctic National Wildlife Refuge. I taught school and was a resident in Arctic Village for three years. I have taken numerous backpacking, kayaking, and climbing trips in the refuge. I've been lucky enough to witness the aggregation of the 180,000 Porcupine caribou herd. In 1982 I assisted former refuge manager Ave Thayer on a wilderness assessment study of the coastal plain. In 1983 I assisted the Alaska Department of Fish and Game with an aerial census of the Porcupine caribou herd. Currently I am member of the consultation planning committee for developing the Arctic Refuge comprehensive management plan.

The most tragic dimension of the resource assessment is the Secretary's recommendation. I am extremely disappointed that the Secretary has apparently overlooked the significant wilderness, wildlife, and recreational values of the coastal plain, as well as economic and geologic data contained in the report.

The Secretary misleads the public in the opening paragraph of his recommendation where he states that the "coastal plain has been predicted to contain as much as 29 billion barrels of oil

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and 64 trillion cubic feet of gas, making it the most outstanding oil and gas frontier area in North America..." The Secretary further states that the mean recoverable value of 3.2 billion barrels could account for almost 4 percent of the daily U.S. oil demand in the year 2005. However, the Secretary fails to note that the mean recoverable value is based on the assumption that there is only a 19% chance of finding a major oil reserve within the 1002 area.

Even if there is 3.2 billion barrels of oil beneath the coastal plain it is hardly worth extracting such quanities for the equivalent of six months supply of oil for the nation. This is a drop in the bucket given our long term energy needs. By comparison, a 3.2 billion barrel field is merely one third the size of recoverable oil reserves at Prudhoe Bay. On the world scale such a field would offer little competition to the giant oil fields in the Middle East. Saudia Arabia and Kuwait boast of fields containing more than 60 billion barrels of oil. Let's face it, on the world scale, oil production in the U.S. rivals wheat production in the Soviet Union. Why not stockpile cheap foreign oil as a strategic defense policy for the United States?

It makes absoultely no sense to destroy the only virgin Arctic coastal plain on the North Slope for a few million or billion barrels of oil. Such action is completely contrary to the purpose for establishment of the refuge. In the late 1940's several individuals recognized the northeastern corner of Alaska as offering a unique diversity of Arctic and sub-Arctic species along with a wilderness quality that is unsurpassed. These wildlife and wilderness values still hold true today.

Furthermore, the Reagan administration has flooded the oil and gas leasing market. Over the years lease sales have been cancelled due to lack of interest by the oil industry. The average bid per acre has dropped by more than half. The department's leasing program amounts to a give away lease plan for the oil industry. Why not hold on to these tracts until the price of oil increases?

The Secretary's recommendation points out that the nation might benefit from a more favorable balance of trade by saving $8.1 billion in the year 2005 on the cost of imported oil. This may sound like a huge savings but what does this figure really mean in relative terms. If our trade deficit was $19 billion for the month of December what will $8.1 billion annual savings represent in the next century? I recently heard one economist note that our trade deficit could soar to $500-600 billion dollars annually in the 1990's. Balance of trade arguments do not justify opening up our only undisturbed Arctic region in the United States.

The report fails to adequately assess the environmental consequences of oil and gas leasing on the coastal plain. The report is based on the underlying premise that that the oil industry has a proven good track record with respect to 10 years of oil development in the Prudhoe Bay area. That's a bit like stating that U.S. companies have a clean track record south of the U.S. Mexican border. I'm not implying that the oil industry has created a New River scenario on the North Slope, however the industry has not been monitored on any regular basis by the State

of Alaska until 1982. The state is just now implementing hazardous waste and drilling mud regulations. This coming fall the Department of Environmental Conservation will open an air quality monitoring station at Prudhoe Bay for the first time.

In reality, there have been tens of thousands of oil spills reported in the Prudhoe Bay oil fields, there have been serious problems with disposed drilling mud effecting aquatic life on adjacent tundra ponds, and there has been no legitimate plan for hazardous waste disposal in recent years.

The Department of Environmental Conservation reports that the oil industry disposed of approximately 40,000 gallons of bona fide hazardous waste material to a local salvage operator on the North Slope who had no experience dealing with hazardous waste. The State of Alaska forced the oil industry to enter into a binding contract to dispose of the hazardous waste properly. Otherwise, the industry would have been faced with a Superfund clean-up.

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Potential air and water pollution problems associated with massive oil development were not adequately addressed in the 1002 report.

Several years ago I was fortunate enough to scale one of the highest glaciated peaks in the Brooks Range, Mt. Michelson. Mt. Michelson is located in the heart of the refuge between the Hulahula and Okpilak Rivers. From the top of this mountain I felt honored and so humbled to be a part of so vast a wilderness vista. To the south, west and east stretched an endless sea of snow covered ~~peaks~~ mountains. I was standing on one of the highest mountains of our most northerly mountain range in the United States.

I looked below me and watched one of our country's most northerly bands of Dall Sheep grazing along a velvet green ridge below the glaciers. And looking to the north was perhaps the most impressive view. For it was there that I could see the distant Beaufort Sea and the horizon of white ice stretching forever to the North Pole and beyond. And between the Beaufort Sea and the mountains lay the expansive, gently rolling coastal plain, sweeping towards the coastal lagoons. In one far reaching glance I was witnessing the most spectacular and remote wilderness setting in the United States. I realized at that moment in time that the Arctic refuge had given me, and our country, the ultimate gift of true wilderness.

The Department of Interior has failed to conduct an adequate wilderness review as mandated under 1004 and 1317 of ANILCA. How can the Secretary recommend oil and gas leasing of the coastal plain ~~and~~ while barely touching upon the wilderness values in the 1002 report? Furthermore, the Arctic Refuge consultation planning committee has been instructed to not consider addressing the 1002 area when developing the comprehensive management plan since it will be addressed by Congress. This is usually the forum where wilderness review mandates are met under Section 1317. If wilderness review is not included in the comprehensive management plan, and only touched upon in the 1002 report, it has simply fallen through the cracks.

I recommend that the Secretary conduct a complete wilderness

review of the 1002 area as mandated under Sections 1317 and 1004. The 1002 area is de facto wilderness and should be designated as wilderness to protect the area from man's industrial intrusion.

Finally I will say that I agree with pg. 46 of the report which states that:

"The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge. Caribou migrating to and from the 1002 area and the post-calving caribou aggregation offer an unparalleled spectacle."

If we open the 1002 area to oil and gas leasing we will be cutting off the most vital arm of the refuge. It is true that the greatest concentrations and diversity of Arctic wildlife occur on the coastal plain of the refuge. A pipeline bi-secting the calving, foraging, and insect relief grounds of the Porcupine Caribou Herd, along with a road complex and drilling pads, will adversely alter the habitat and create major negative impacts on the herd. The wilderness character of the refuge would be destroyed. These losses cannot be compensated. There is only one Arctic refuge in the United States.

I encourage the Secretary to read the resource assessment and to revise his recommendation in favor of wilderness preservation. Thomas Fuller once said that "A blind man will not thank you for a looking glass." Take a closer look at the 1002 area Mr. Secretary, and I hope you are not blind.

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Mitchell Management
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January 5, 1987

Hand Delivered at
Public Hearing
Anchorage, AK
January 5, 1987

U.S. Fish & Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Bldg.
18 & C Sts. N.W.
Washington, D.C., 20240

Reference: Public Comment on Draft ANWR Coastal Plain Resource Assessment and Recommendation to Congress

Gentlemen:

Please consider the following during your preparation of the Final ANWR Report and Recommendation to Congress:

1. I support the Secretary's recommendation that the Arctic National Wildlife Refuge be made available for oil and gas leasing. I believe that exploration and production can be carried out without significant environmental degradation.

2. There are numerous intersectional inconsistencies within the report as it now stands, perhaps reflecting the various opinions and bias of individual writers. These should be edited out. An example can be found in the discussions of the effect of development on archaeological resources. Table VI-8, page 143, indicates that all artifacts at development sites will be lost. The unnumbered summary table on pages 148 and 149, however, indicates negligible effects on these resources, perhaps based on pre-construction investigations which would be required in accord with proposed Stipulation 29.

3. Key items of documentation are missing. One example is documentation of why five out of fourteen years of concentrated use defines a core calving area compared to perhaps seven out of fourteen years or two out of fourteen years. Review of the data shows natural breaks at three and seven years, not five.

There is also a lack of documentation for many of the wildlife use areas presented on Plates 1 through 3 which were used in the overlay method to assess direct habitat loss or alteration. One example of this deficiency is Plate 1 E where approximately 150 square miles of land at the mouths of the Staines and Canning Rivers has been designated "Confirmed coastal denning area" based on one observed den since 1951. Approximately 250 square miles at the mouth of Marsh and Carter Creeks are similarly designated based on two dens in the last 15 years. Considering such large areas when making loss of habitat estimates seems to be unrealistic when it is proposed to limit activity within only one half mile of a confirmed den (Proposed Stipulation 19). Lacking

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proper documentation one might conclude that the wildlife use areas were artificially enlarged so as to increase the projected loss of habitat.

4. I believe that a major shortcoming of this draft report is the failure to provide a basis for equally comparing the projected conditions of the study area under each of the alternatives.

For example, Alternative E - Wilderness Designation, is not adequately addressed. The environmental consequences section consists of only some 400 words. Discussion is limited to a static situation responding only to the forces of nature. In order to make an informed decision among the alternatives, the condition in the study area under a wilderness designation must be projected into the future in the same way as should be used for the other alternatives. The effects of presumably full and undisturbed subsistence hunting pressure on the various wildlife populations must be addressed. As an example, one must address the likelihood of and effect of repeated subsistence takes of 25 polar bear per year as was the reported case in Kaktovik during the 1980-1981 harvest.

This section should address the changes that can be expected to occur in the cultural/socioeconomic environment over the foreseeable future. These would include a continuation of the trend towards a cash based society at Kaktovik, projected population trends and the effect of changes in population on the use of the area's subsistence resources, projected effects of changes in the efficiency by which the local residence will carry out subsistence activities and the like.

5. The statistical treatment in Chapter III is more confusing than it need be, as evidenced by the various claims and counterclaims about the areas potential and intentionally misleading the public. This goes deeper than a typographical error on pages 5 and 6 where "more than" was twice dropped from "...[more than] 0.6 billion barrels of recoverable ... [more than] 9.2 billion barrels ..."

The primary confusion arises out of the following sentence on pages 49-50 :

"It is estimated, if there is economically recoverable oil present (the chance of which is estimated to be about 20 percent), that there is a 95- percent chance of more than 0.6 BBO and a 5-percent chance of more than 9.2 BBO recoverable in the 1002 area as a whole."

Based on this sentence, it would seem like you could multiply the 20-percent "economically" by the 5-percent "more than 9.2 BBO

recoverable" and arrive at a 1-percent "more than 9.2 BBO economically recoverable". If this is the case, just say so.

Alternately, Table III-4, page 72, indicates that the "economically" factor is already contained in the 95-percent, ie:

> 95-percent probability of greater than 0.59 BBO Conditional, economically recoverable oil.

Regardless of whether it is one or the other, or somewhere in between, the language needs improvement for the sake of clarity.

6. At times the report slips facilely back and forth between addressing the entire Refuge and the limited 1002 study area. One such example is the Recreation section on page 45 where in the course of three paragraphs we change from discussing one to the other some eight times. This tends to be confusing to the reader and should be minimized. It is noted in passing that this section falls within the "undocumented" category discussed in the preceding item number 3.

7. Use of emotionally charged language should be avoided like the plague. The Wilderness and Esthetics section of the Existing Environment Chapter is a particularly bad offender. The sentence on page 46 which reads, "Caribou migrating to and from the 1002 area and the post calving caribou aggregation offer an unparalleled spectacle" is an example of one such sentence which has been publicized nationwide by an Audubon Action Alert.

I believe that it could be successfully argued that the migration and aggregation of Monarch butterflies is of parallel spectacle as is that of whales in the Baja California area.

8. I concur with the above cited Audubon Action Alert in that I believe that the status and projected results of all negotiations regarding land trades effecting the 1002 area must be discussed in this report. The economic benefits or losses which may be realized by various governmental organizations and private citizens based on exploration and/or production of this area will be significantly effected by such trades. I fail to see how inclusion of this information can be avoided in as much as it has been reported that such trades may be conditional upon Congressional action based, in part, on the subject report.

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Thank you for your consideration of these review comments. In closing, I would like to very briefly address what I believe to be two misstatements of fact which have often been made in the press and other public forums.

Firstly, the 1002 area is not the last chance to preserve a section of the arctic coast as wilderness. In excess of some 400,000 acres east of the Aichilik River have already been designated as wilderness.

Secondly, it has been said that, given only a 20-percent chance of finding economically recoverable quantities of oil in the area, it is not worth the chance of environmental disruption caused by construction of roads, pipelines, processing facilities, docks, and similar facilities. Should the area be opened for leasing however, and no economically recoverable reserves are found, the environmental consequences will be limited to those associated with Alternate C - Further Exploration, which are all, with one exception, identified as minor or negligible in the Summary of Effects table on pages 148-149. Should no economically recoverable reserves be located, development will be limited, for the most part, to the low impact winter construction and drilling of wildcat wells.

Sincerely,

Dennis W. Mitchell

Dennis W. Mitchell

Nina Mollett
1900 Gilmore Trail
Fairbanks, Alaska 99712

January 9, 1987

U.S. Fish and Wildlife Service
Div. of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

To Whom it May Concern:

This letter is intended as testimony on the draft Department of Interior Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment: Report and recommendation to the Congress of the United States and legislative environmental impact statement. I have read this report and, as a fifteen-year resident with a long-term active interest in the issues involving the future of this state, I differ sharply with its recommendation to pursue leasing of the entire coastal plain.

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The recommendation to lease does not follow in any kind of logical way from the contents of the assessment itself: on the contrary, such a recommendation can only be made by ignoring the compelling evidence contained within the report, and reflects instead the predictable ideological biases of an administration that, while giving lip service to "balance", has consistently favored development of non-renewable resources over conservation of renewable resources, and short-term political interests over long-term public values. The fact that Alternative A, leasing of the entire plain, is recommended, rather than Alternative B, which would exclude the critical Porcupine Caribou Herd calving areas, only serves to confirm the impression that the conclusion of the report was predetermined by ideology and was made independently of the objective assessment contained within the same document. The conclusion is also in conflict with that of the 1973 executive study, which recommended wilderness designation for the entire wildlife range, with certain exceptions, and the 1982 Thayer review of the 1002 area, which also recommended wilderness designation, except for the abandoned DEW line stations.

I favor wilderness designation for the coastal plain. The reasons for such designation are contained eloquently within the report itself, which on pages 45-46 states, "The Arctic Refuge is the only

conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosytems in North America...The coastal plain in its present state has outstanding wilderness values: scenic vistas, varied wildlife, excellent opportunities for solitude, recreational challenges, and scientific and historic values...The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge."

The executive summary, page 1, states that in addition to specific adverse environmental consequences of developing the 1002 area, the presence of infrastructure supporting oil and gas development would "eliminate" the wilderness character of the area.

The details of the enormous environmental problems with developing this area, problems which include a critical lack of fresh water and the necessity for scarring up the land while digging out enough gravel to build on permafrost, will I am sure be dealt with in other comments. What I wish to emphasize instead is the irrationality of the conclusion. Buried deep within this report is the information that there is only a 19 percent chance of an economically viable reserve being found in the coastal refuge. In reaching their conclusions the authors of the report ought to, but don't, attempt to balance this chance against the indisputable fact of a wilderness area unique in the world; there is no other coastal plain preserving such ecological variety in America, nor in Siberia, nor in Scandinavia. And beyond the unexamined assumption that unrecoverable wilderness is worth trading for a chance of recoverable oil, the conclusion of this report relies on a further unstated assumption: that we are the last generation; that extracting oil which will serve us for a few decades—30-90 years, according to the report—is worth laying waste to wilderness forever. The coastal plain is stated to be "the most outstanding oil and gas frontier remaining in the United States." But what will happen to our import-export balance, our economy, our national security, when the oil, assuming that it is found to be worthwhile extracting, runs out? Our government ought to operate under the assumption that there will be a future, which must be taken into account; if indeed this possibility of oil has such value that it is worth destroying our wilderness heritage over, there ought to be a discussion of whether it might not be wiser to preserve the opportunity for our descendants, who will likely be hurting for oil more than we are now (the world is, after all, currently experiencing an oil glut) and who may have greater need for it, and more compelling national security requirements. What gives our generation, like pigs at the sty, the right to lap up all available resources?

I don't expect that my letter will have any impact on the outcome of the final report of an Interior Department which held public

hearings on this matter not through any interest in the democratic process but because it was forced to by a lawsuit. However, fortunately this decision is in the hands of Congress and not the executive branch: it would have been politically smarter, I should think, for the department to mask its ideological extremism by recommending the somewhat less radical alternative of leasing the area with the EXCEPTION of its most sensitive areas. But if we wish to behave responsibly as, so to speak, executors of this estate, the entire coastal plain ought to be designated wilderness. And this is a moderate suggestion, since the rest of the North Slope has already been thrown onto the development side of an unbalanced scale.

Although I see no chance of the conclusion of this report being changed no matter how much carefully reasoned testimony is received, I would like to make the following more peripheral suggestions for the final report:

1) Page 72 contains the information that there is a 19 percent chance of economically recoverable oil, based on the "most likely case" assumption of $33 per gallon. There is also a 26 percent probability figure given, under the "optimistic case" assumption of a $40 per barrel price. No basis is given for adopting these optimistic assumptions, and there is NO figure for what we might call the "pessimistic, realistic case" under which the price would remain around $15-$20 per barrel. Since it is the existence or or absence of economically recoverable oil that must be the basis for a decision, the 19 percent figure, along with a more realistic calculation based on current oil prices, ought to be located candidly in the executive summary after the sentence, "This resulted in an estimated 95-percent chance of 0.6 billion barrels of oil recoverable, a 5-percent chance of 9.2 billion barrels of oil recoverable, and an average conditional economically recoverable resource estimate of 3.2 billion barrels of oil," which is otherwise misleading to anyone lacking an advanced degree in obfuscation.

2) Please explain what is meant by Bill Horn's suggestion that unavoidable habitat losses suffered during leasing be "fully compensated"—or else drop the concept, which since it apparently has no real meaning is misleading, lulling. Highway builders can compensate private owners for loss of their property, but who is to be compensated for the loss of caribou calving grounds? The caribou? How will the Kaktovik Eskimoes be compensated for the loss of subsistence opportunities and degradation of their quality of life? With money?? How will our descendants be compensated for the loss of the opportunity for solitude? In how many trillions of dollars? (Please excuse the sarcasm, but I am at a loss how otherwise to respond to the problem of official jargon; answering in the same style of jargon would imply acceptance of the terms of a debate which is in fact based on irrational assumptions. The

idea that compensation could be made—but to whom?—for loss of wilderness is of course an Interior Department fantasy, and the fact that it is couched in dry jargon makes it no less a fantasy.)

3) As mentioned earlier, the final report ought, in the sections delineating the potential benefits to be accrued from developing the oil reserves, to include a serious longer-term assessment. I believe that an objective examination of the current situation and the draft assessment would have concluded that leasing the 1002 area is not worth the price of wilderness destruction. But I can imagine a time of worldwide oil scarcity and energy needs so pressing that this conclusion would have to be reassessed. If the oil is in fact worth recovering economically, then the relative merits of extracting it immediately, or preserving it for a future time of perhaps greater need, should be carefully weighed. Such an assessment would be difficult; there are many factors which will not lend themselves easily to numerical manipulation; but to ignore the future entirely is to part with any claim to wisdom in your deliberations.

Sincerely yours,

Nina Mollett

cc: Senator Bennett Johnston
Governor Steve Cowper

P-70

Pamela S. Nelson
P.O. Box 1127
Kotzebue, Alaska 99752
January 6, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management-- ANWR 1002 Report
2343 Main Interior Building
18th and C Streets N.W.
Washington, D.C. 20240

Dear Sir/Madam:

I would like to comment against oil and gas development on the coastal plain of the Arctic National Wildlife Refuge. The draft report to Congress and the numerous 1002 Baseline Study Update reports document the tremendous wildlife values of the area. Specifically, I recommend the Wilderness (E) or the No Action (D) alternatives. I was a volunteer wildlife biological technician on the 1002 studies in 1983 and have since spent considerable time living in the arctic and working with migratory birds, caribou, and rural subsistence users.

A cautious and conservative approach, rather than the reckless and short-sighted Full Leasing Alternative currently proposed in the draft report, should be taken in the management of the ANWR Coastal Plain because of the following reasons:

1. This area is the historic and recent center of calving activity for the Porcupine Caribou Herd (PCH). Based on data presented in the Report to Congress, the 1002 Update Reports, combined with my field experience on the ANWR Coastal Plain, it is difficult to understand how an extensive oilfield can be placed in the midst of a caribou calving ground without major significant adverse impacts to the herd. The development scenarios show the greatest concentration of well pads and feeder pipelines in Resource Blocks C and D, and part of Block B, precisely in the most frequently used "core" caribou calving area.

When I was working in the "core" calving area on the Jago River near VABM-Bitty, even the mere presence of biologists on foot or small survey aircraft caused dispersal of caribou cow/calf groups. With the intensive ground activity of oilfield workers and equipment combined with frequent helicopter and cargo aircraft overflights, displacement of the cow/calf caribou groups will occur. The Report to Congress states that about a third of the concentrated calving area would be affected by the Full and Limited Leasing Alternatives (page 107). It is known that development in the Prudhoe Bay area has displaced cow/calf groups from the Central Arctic Herd (CAH), and that concurrent to such development, CAH use of the Canning River Delta calving ground within the 1002 area has increased (page 106). In effect, development at the Kuparuk and Prudhoe oilfields has displaced part of the herd's calving to the 1002 area. The 1002 report fails to address how such likely displacement of PCH caribou from its core area will be mitigated in view of the fact that calving displacement has already occurred, and that similar oilfiled development is occurring or planned to occur west of the refuge (Pt. Thompson) and east of the refuge (Yukon North Slope). There will be fewer and fewer places for calving grounds to be displaced to. The impacts of the actions on ANWR cannot be looked at in isolation, but must be weighed in terms of cumulative and chronic impacts on the range of the Porcupine Caribou Herd.

2. An economic analysis examining a decline in the caribou population and subsequent loss of its value to subsistence and loss of sport hunting and recreation revenues was not included in the report. There has been considerable publicity lately that one sockeye salmon in Bristol Bay was worth more than a barrel of oil last summer. Similarly, one caribou taken for subsistence is worth over $300 in meat value alone, not to mention the replacement costs to produce and transport an equivalent amount of beef to rural areas. Value added to the state's economy for each sport- harvested caribou could easily average $1000. Therefore, total value of about 2000-5000 caribou taken for subsistence, and another 500 taken for sport, exceeds $2,000,000 per year by the most conservative estimates. These figures over the next 20-30 years, the life of an oilfield, are significant, and should have been considered in the report.

3. The eastern portion of the 1002 area is critical to the long-term ecology of the Banks Island lesser snow goose population. The Report to Congress proposes a stipulation restricting aircraft altitude to at least 2000 ft (page 147) to minimize disturbance to the staging snow geese. The literature documents frequent cases of snow goose disturbance from ground personnel, vehicles, and low-flying and high-flying aircraft alike. In fact, habituation to these disturbances has not been documented for snow geese, even in the heavily developed wintering areas of California. Weather conditions on the coastal plain during the September staging period are usually too low to permit pilots to safely fly anything other than low (100-500 ft) altitudes. Since altitude restrictions are not effective, and undisturbed intense feeding prior to migration is energetically essential, the only way to avoid significant adverse impacts to the snow goose population using the ANWR staging area is to close it to all activities during the month and a half of staging. The proposed stipulations for surface and aerial closures of the same area during muskox and caribou calving combined with closures for snow geese dictate that the entire eastern third of the 1002 area would be closed much of the time between April 15 and September 30. The Report to Congress does not address whether such closures in a major oilfield are practical and enforceable over the long term. Similar efforts to maintain temporal and spatial closures in the Prudhoe Bay area have not been successful over the long term. The oil companies found such closures too restrictive and have gradually tried to have them relaxed, to the detriment of the wildlife. Regulatory agencies frequently have been unable to maintain such closures beyond the initial few years after agreement, due to political pressures from industry.

A recent poll conducted for the Alaska Oil and Gas Association concluded that about 70% of the Alaskans contacted were in favor of furture development of the ANWR coastal plain. Conversely, a write-in opinion forum published in two January 1987 issues of the Anchorage Daily News showed only 38% of the responses favored future oil development on ANWR. More than half of the responses in The News were in favor of the No-Action or Wilderness alternatives.

Because the high caribou, migratory bird, and regional- international subsistence values of the ANWR Coastal Plain cannot be adequately protected by Alternatives A,B, or C, the most prudent choices are No-Action (Alternative D) or Wilderness (Alternative E). The long-term value of these wildlife resources should not be sacrificed in favor of the short-term economic gains afforded by oil development.

Sincerely,

Pamela S. Nelson

cc: Senator J. Bennett Johnston
Senator Ted Stevens
Rep. Don Young
Rep. Moris Udall
Governor Steve Cowper

P-71

P.O. Box 270
Kotzebue, Alaska 99752

February 4, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

I would like to state my opposition to oil development on the Coastal Plain of the Arctic National Wildlife Refuge. I support Alternative E, Wilderness in the Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment.

The arguement used to justify the opening the Arctic National Wildlife Refuge to oil and gas development is weak at best. Oil and gas supplies are needed for our country's economy and defense but our Country's National Wildlife Refuges should not be sacrificed to produce oil. Oil is not a renewable resource, we will eventually need to adopt alternative energy sources. The question is, should we destroy our country's limited resources and endanger the wildlife populations before we come to terms with the fact oil supplies will eventually be depleted, or should we develop alternate energy sources now and preserve some areas of our country in their natural state for future generations?

I think the destruction of the resources on the Arctic National Wildlife Refuge would be too high a price to pay for a twenty percent possible chance of recoverable oil on the Coastal Plain.

Developing the coastal plain would have serious adverse impacts on wildlife. Major development is proposed to take place in the critical staging area for snow geese, the denning areas for polar bear and the year round habitat of muskoxen. Oil development could result in "Increased disturbance with possible avoidance by muskoxen of 71 percent of their high use, year-round with calving, habitats in the 1002 area resulting in a change in distribution, population decline, or no further expansion of the 1002 muskoxen population." (Draft Arctic National Wildlie Refuge, Alaska, Coastal Plain Resource Assessment. p.114).

Development could also lead to "Displacement of caribou from approximately one-third of the core, concentrated calving areas with in the 1002 area resulting in a large part of the projected populaton decline or distribution change for 20-40 percent of the Porcupine Caribou Herd" (Ibid. p.132). In addition the proposed pipeline bisects the calving ground of the Porcupine Caribou Herd and could well block their movements to critical insect relief habitat along the coast.

Much has been made of the successful proliferation of the Central Arctic Caribou Herd in the face of the Prudhoe Bay development. "Analogies comparing the effects of current oil development on the Porcupine Caribou Herd must be drawn with caution. Movements, density and traditions of the Porcupine Caribou Herd differ from those of the Central Arctic Herd." (Ibid. p.106). One very basic difference between the herds is that the Central Arctic Herd population is estimated at 10,000 animals versus a population of 180,000 animals in the Porcupine Caribou Herd. Is it wise to extrapolate the pattern of the Central Arctic Herd to a Herd that is 18 times the size?

Development would have a major impact on water supplies in the Refuge. "As much as 15 million gallons of water may be needed to drill an exploratory well. Taking this amount of water from the deficient 1002 area could have a major adverse effect."(Ibid. p.99). "The large quantities of water required for development drilling on the 1002 area are not available."(Ibid. p.101). Why pursue a course of development when studies show the limited supplies of water are inadequate to meet the oil development needs?

The case for allowing oil development on ANWR's Coastal Plain is being justified in part "on the ability of industry to minimize damage as learned from oil and gas activities elsewhere in the Alaskan Arctic."(Ibid. p.III.) I think the facts show the industry still has a lot to learn. The oil industry is still incurring significant damage on the resources. This assessment report anticipates moderate to major negative effects to Permafrost, Gravel Supplies and Ambient Noise Levels if Alternate A is selected. It projects "Increased noise and disturbance levels displacing wildlife throughout the 1002 area." (Ibid. p.131). Oil spills would also be a threat to the resource. "Any spill of oil or other hazardous materials along the coast could severely affect coastal and marine habitats and fish and wildlife." (Ibid. p.105). "Accidental spills of crude oil and refined petroleum products are an inevitable consequences of oil field development. Since 1972 (at Prudhoe Bay) some 23,000 mostly small spills have been reported to the Alaska Department of Environmental Conservation." (Ibid. p.103). Even the limited seismic exploration on the 1002 area during the 1984-85 resulted in leaks of crankcase oil, antifreeze, and hydraulic fluid from vehicles. (Ibid p.102).

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I do not believe the adverse effects and resulting destruction of ANWR's Coastal Plain resources is justified to remove limited amounts of oil. The Arctic National Wildlife Refuge represents the last large area of unaltered tundra ecosystem in the United States. I believe we owe it to future generations to save intact representative areas of the major ecosystems of the world. Millions of acres of similar habitat along the coast west of ANWR have already been sacrificed for oil development. The remaining coastal tundra habitat in ANWR is only a small percentage of what was one time available.

Sincerely,

Kathleen M. O'Reilly

cc:

Ted Stevens
U.S. Senate

Frank Murkowski
U.S. Senate

Don Young
U.S. House of Representatives

Morris Udall
U.S. House of Representatives

Bennett J. Johnston
U.S. Senate Energy and Natural Resources Committee

Steve Cowper
Governor, State of Alaska

January 22, 1987

P.O. Box 338
University of Alaska-Fairbanks
Fairbanks, AK 99775-1040

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, DC 20240

Gentlemen:

Attached is a copy of a letter I've written to Senator Bennett Johnston as Chairman of the Senate Energy and Natural Resources Committee, regarding the Arctic National Wildlife Refuge and the recently proposed "1002 Area" oil and gas development.

I strongly oppose this development. I also believe the Draft Report reflects significant weaknesses in the environmental impact assessment. I outline my reasons in some detail in the attached letter.

Please register my concern and my position. Thank you.

Sincerely,

Jon Pfeffer

Jon Pfeffer

P-74

January 22, 1987

P.O. Box 338
University of Alaska - Fairbanks
Fairbanks, AK 99775-1040

Senator Bennett J. Johnston
Senate Energy and Natural Resources Committee
Senate Office Building
Washington, DC 20510

Dear Senator Johnston:

I'm writing to express my strong disapproval of Secretary of the Interior Bill Horn's recommendation to allow full oil and gas development within The Arctic National Wildlife Refuge's 1002 area.

I feel the preferred alternative asserted by the Secretary in the Draft 1002 Report is a fundamental policy statement. It promotes perceived immediate economic benefit over a more incremental, less tangible, but permanent benefit - more complete than and certainly inclusive of economic value. This statement represents neither me nor, I suggest, the American public. Give us research and development in a sustainable energy future, specifically in renewable energy resources - and maybe we'll have something to show for ourselves as a nation even before the proposed development of ANWR would yield its alleged bounty.

Of the alternatives considered, Secretary Horn recommended full development notwithstanding the acknowledged unavoidable and very significant effect upon each of the concerns for which the entire Range (and subsequent Refuge) were originally established. The 19% chance of recoverable oil certainly does not merit full development. The prices of oil assumed in the report greatly exceed short-term projections; there is time for more study. . . . although one has to wonder if the problem lies more in evaluation of data than actual compilation. (Horn's introduction to the 1002 report represents what one local writer calls "a 'seam'. . . a government analysis in which you see a difference between what the staff wrote and what their bosses concluded." The 1002 report is full of seams.)

There should be no rush to avoid a circumspect public assessment and comment period. The 1002 Draft Report was initially published in insufficient quantity, and even with the recent extension for public comment, we (the public) find ourselves bombarded with information and analysis, much of it, of course, contradictory. My qualms regarding the 1002 Report and its proposed development include the following:

1. An unacceptably narrow perspective is being used to assess the environmental impact. The 1002 area is dissociated with adjacent oil fields currently operating and potential future leases, including off-shore leases. The impacts will be not merely distinct , or even additional, but synergistic. My concern is not merely for the caribou or any other single species as much as for the unparalleled

diversity indigenous to that area. That diversity is 100% guaranteed, and is dependent on the 1002 area in the way our bodies depend on our kidneys, for example. We do a disservice by discussing sizes of areas; we should instead assess function. Minimal management on the rest of the Refuge doesn't cut it. Adjacent wilderness and full development are not compatible.

Outside of the Refuge there are roughly 1100 miles of U.S.-owned Arctic coastline. Approximately 25 of those 1100 miles are presently protected from oil and gas development. We need more - and we're only asking for what already is.

2. The impact of natural gas development is not assessed. While this may be convenient and economic for the purposes of limiting the scope of research, it is misleading; it renders the environmental assessment incomplete.

3. Both The Alaska Department of Fish and Game and The Alaska Department of Environmental Conservation find the study lacking in essential information.

4. The impact of hazardous wastes generated by future development is not sufficiently addressed. Recognizing that the political clout of Big Oil has successfully prevented oil wastes from being categorized as "hazardous" by the E.P.A. (ludicrous as that is to members of the public as well as the scientific community), I still want to know how this quantity of waste would be handled. Current methods on the Slope are not effective.

5. Gravel and water are limiting factors. Removal of such quantities as are needed within the 1002 area will adversely affect the various watersheds - not merely the hydrology, but the entirety of the ecosystem based in them. Notable losers will be fish and the many predators of those fish.

6. The geology of most of the 1002 area is "complexly folded and faulted" according to the report, "vastly different from the relatively simple structure that underlies the coastal plain west of the Arctic Refuge, such as Prudhoe Bay." What is not contained within that area contains, according to a local journalist, the same oil-bearing structures as the shallow West Sak and Ugnu deposits of Prudhoe. These deposits are of such low quality that the fields are actually cased off from operating adjacent wells. Additionally, we're talking about 26,000 feet deep wells, more than one winter of drilling, for the elusive oil. This situation clearly promotes many exploratory wells - and much attendant impact.

7. Too many proponents of ANWR development cite the Prudhoe Bay pipeline as exemplary of wildlife management and ready adaptation. The Refuge is distinct topographically, and few correlations can be drawn between the respective ecologic communities. Additionally, the caribou "success" at Prudhoe is very moot; a distinguished University of Alaska-Fairbanks wildlife professor, who has spent years studying those caribou, states unequivocally that the impact on that population is decidedly negative.

8. "Project M" or "Megatrade", through which the U.S. Fish and Wildlife Service attempted to negotiate trades of land and subsurface rights with both Native corporations and the State of Alaska, was - and continues to be - irresponsible. Moreover, it undermines Congressional intent. The public's impression is that there are lots of cards under the table here, and the game is starting to stink.

To sum up, a notable portion of Alaskans oppose ANWR development, although we are not represented in Congress as such. We, like those in the rest of the country, prefer a viable energy future, a forward-looking plan, and an active research and development program in renewable energy. The 1002 area of The Arctic National Wildlife Refuge is not the answer to our needs.

Please accept the challenge to vote NO on 1002 development. Give us Wilderness, protect the values for which we established the Refuge, and get the issue out of the way. At the very least, give us more research - on both oil probabilities and environmental impacts.

Thank you.

Sincerely,

Jon Pfeffer

Jon Pfeffer

P-75

Comments re.: Department of Interior
November 1986 Draft Arctic N.W.R.
Coastal Plain Resource Assessment

From: Martha K. Raynolds
1099 Farmers Loop
Fairbanks, AK 99709

I appreciate the opportunity to comment on the Draft ANWR Coastal Plain Resource Assessment, and sincerely hope that the deficiencies pointed out in my comments and others' will be addressed in the final document. I thought most of the report was well prepared, but found several problems with Chapter VI Environmental Consequences, and found the Executive Summary to be a very poor representation of the contents of the report. I also disagree with the Interior Department's conclusion that Alternative A, full leasing of the coastal plain, should be the recommended alternative.

P-27-1

1. Water and Gravel Resources
The problems caused by lack of water and gravel resources on the coastal plain are not adequately addressed. Although their scarcity is mentioned, the alternative measures which would be required to extract the gravel and water required for development are not fully described. Consequently, the impacts which would be caused by gravel and water extraction are not covered in Chapter VI.

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P-27-2

2. Central Arctic Caribou Herd
The impacts of development on the Central Arctic Caribou Herd (CAH) are not adequately described. The discussion in Chapter VI does not include the impacts due to the pipeline and road which would be required to join the 1002 area to the Trans-Alaska Pipeline (TAPS). This east-west connecting corridor would be a prerequisite for development of the 1002 area. It would have a very significant impact on the CAH, by cutting across its summer habitat, used for calving and insect relief. The impacts of this pipeline and parallel road must be included in the discussion of the impacts of development of the 1002 area. The impacts to the Porcupine Caribou Herd are thoroughly addressed.

P-27-3

3. Petroleum Resource Potential
Chapter III states that there is a 19% chance of there being an economic size accumulation of oil and gas on the coastal plain. The Executive Summary does not even mention the 81% probability that NO economic oil or gas exists in the coastal plain. It only discusses the probable size of such an accumulation, should it occur. This is very misleading. The full probabilities of finding oil and gas should be presented very clearly in the summary.

P-27-4

4. Discussion of Impacts in Executive Summary
The Executive Summary glosses over the impacts of development as described in Chapter VI. The statement, "Most adverse effects would be minimized or eliminated through carefully applied mitigation....exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources. Hence it is reasonable to assume that development can proceed on the coastal plain and generate similar minimal effects.", is EXTREMELY misleading. First, the impacts to caribou, muskox, and snow geese, as described in Chapter VI are MAJOR impacts that cannot be mitigated. Secondly, development at Prudhoe Bay has had some very significant impacts on wildlife in the area. And thirdly, the Prudhoe Bay area is not directly comparable to the 1002 area. The ANWR coastal plain provides much more critical habitat for caribou, muskox and snow geese than Prudhoe Bay ever did. Most of the impacts of the recommended Alternative A are very clearly stated in Chapter VI, and should be included in the Executive Summary.

5. Recommended Alternative
Personally, I would recommend Alternative E. If and when oil and gas resources become so scarce and precious (as they are clearly NOT right now) that we should risk the wildlife and wilderness resources of the ANWR coastal plain, an act of Congress could allow drilling. Until such time, the coastal plain should be protected. If development interests are so strong that drilling cannot be prevented, why is Alternative C not adequate? The report states that even under Alternative A, considerable further exploration would have to be carried out before any companies would be interested in leasing. If preliminary exploration needs to be done, why not allow that and THEN review the data and assess the tradeoffs with more complete information to decide whether to open the 1002 area to leasing?

Signed Martha K. Raynolds
Martha K. Raynolds
Biologist

Date February 2, 1987

P-77

My name is Herman L. Rexford, age 72 years old I am an Inupiaq from the village of Kaktovik, located on Barter Island on the Beaufort seacoast.

I am a Board of Director member of our village Kaktovik Inupiat Corporation. and also a Board of Director member of Arctic Slope Regional Corporation for over ten years.

And also I am a Commission member of North Slope Borough Inupiat History, Language and Culture Commission representing of Kaktovik village.

And also Elder of Kaktovik Presbyterian Church here in Kaktovik.

Now I would like to present of comment and Concern about ~~the~~ my own feelings about oil and gas development in the Coastal plain and in the 1002 area.

I think and my feelings that if this 1002 area open for Oil and gas development in the Arctic Wildlife Refuge will be loss of our subsistence hunting opportunities throughout appexinately one half of the 1002 area myself I think it will hurts of our hunting area and I dont want to see that happen Change of hunting eskimo food for our families.

I hope our subsistence must be looked at in a manner that keeps areas open to hunting that are very important for our needs.

We eskimos in the Kaktovik would like to see this support comes with the understanding that certain stipulation be met toward the protection of wildlife, its habitat, subsistence lifestyles and the social economic future of Kaktovik.

I'm hoping that Interior State Secretary of Alaska and Governor Steve Cowper help us All of our concerns And Hoping that Secretary of State consider and think about it so he can help us.

That's all my concerns and we want your support on our subsistence way of life

Thank you.

Herman L Rexford

KAKTOVIK, AK 9974

DO YOU WANT TO MAKE PUBLIC COMMENTS?

If you would like to speak at the hearing today, please fill in the blanks below and turn it in to one of the Fish and Wildlife Staff members present. You need not complete this sheet to submit written comments. Thank you.

Please print

Name Malcolm B. Roberts

Mailing Address 2001 Churchill Drive

Anchorage, AK 99517

Check appropriate box below:

☐ I am here to offer my own views.

—or—

☐ I am speaking for _____
(please enter name of organization you represent)

P-78

please see last page

Thank you

TESTIMONY
ON DRAFT 1002H REPORT ON ANWR
By Malcolm B. Roberts
2001 Churchill Drive
Anchorage, AK 99517

Ladies and gentlemen. My name is Malcolm Roberts. I am a consultant in government and community relations here in Anchorage, and I am representing myself.

I have read the 1002H report and would like to commend you on its quality and thoroughness. Unfortunately, having worked in Washington, D.C. as a Special Assistant to the Secretary of the Interior, my hunch is that very few members of the U.S. Congress will take time to read it.

Instead they will rely mainly on the comments in the Washington Post, The New York Times, their local newspapers and on the personal briefings they receive from staff and from lobbyists on both sides of the issue.

In other words, they will be inclined to approach a scientific subject, which you have presented very well here, and react to it on the basis of media reports and emotional appeals.

In my view, America is ill-served by ~~faddist~~ advocacy journalism and bumper sticker wisdom.

One headline that reads "Oil developers trying to invade wildlife sanctuary" can be enough to sway an uninformed Congressman's vote.

For that reason, if sound public policy decisions are to be made by Congress, it is important that the substance of this report is presented in a manner that will counter some of that emotionalism.

I would like to suggest, not a correction of your report, but some additional information added to your graphics which illustrate effects on the biological environment. When discussing each specie of wildlife (as on page 149) I suggest that you add the population totals.

Secondly, I recommend that a graphic be included on the amount of public use.

P-79

In August of 1970, I accompanied the U.S. Secretary of the Interior as we flew over the Coastal Plain, doing what many of you have done, and I hope you will urge all members of key Congressional committees to do likewise. We spent the day in a helicopter. We were looking for wildlife.

After all, Congress in its wisdom dubbed this vast section of acreage a Wildlife Refuge.

We saw several dozen caribou from the Central Arctic herd. We saw one brown bear. It was dragging the freshly killed carcass of a moose. We saw a large number of snow geese. But for the expense and effort dedicated to the day's activities, the rsults hardly compared with a visit to Denali National Park.

If Ralph Nader, in the spirit of consumer protection, would spend $2,500 to fly coach from Washington, D.C. to Anchorage to Deadhorse and then charter to the Wildlife Refuge and back, I would suspect that he would return irate.

Mr. Nader, or any American citizen concerned about truth in packaging, would be disappointed to learn that other than caribou, most wildlife do not choose to migrate north towards this country with such little forage and no cover.

In fact, for ten months out of the year, there is virtually no wildlife in this Wildlife Refuge.

Your report details the evidence you have been able to gather about polar bears, brown bears, muskoxen, dall sheep, wolves, wolverines, arctic foxes, whales, seals, peregrine falcons, golden eagles and waterfowl.

That list is enough to make the average American's heart jump.

My point is...as this area of nearly 3,000 square miles or some 1.5 million acres, is being reviewed by Congress for its highest and best use, let's be more graphically specific.

Let's start with moose. I quote from your report:

"The number of moose using the 1002 area at any one time probably does not exceed 25." In other words, less than 1 per 100 square miles. The moose density in Anchorage is much far greater.

The Alaska Department of Fish and Game estimates that there are between 144,000 and 160,000 moose in the state.

Dall Sheep: I quote: "Dall sheep are very rare in the 1002 area." Even the unitiated realize that dall sheep, like most mountain sheep, live in mountainous areas. These animals do not wander north onto the flat or rolling lands of the coastal plain. By the way, there are some 60,000 to 80,000 Dall Sheep in Alaska.

Wolves: I quote: "no dens have been found" in the 1002 area, and "The number of wolves using the 1002 area on a seasonal basis is low and apparently does not exceed 5-10 animals annually."

P-80

Wolverines: Quote: "recent FWS studies have resulted in very few sightings." Your report places one guess at around 90.

Brown bears: "use is estimated at one bear per 30 square miles, or approximately 108 bears." Having spoken with those who flew a grid of the entire area for the gravity studies, I find this number hard to believe. But if it is indeed accurate, it is important for the American public to know that the Ak Dept of Fish and Game estimates that there are between 32,000 and 43,000 brown or grizzly bears in Alaska.

Polar bears: the report indicates there is a population of roughly 2,000 polar bears in the Beaufort Sea, 87% of whose dens are located on the ice pack offshore. Quote; "in the 1002 area, 1 to 2 dens were found in 4 of the 5 years" between 1981 and the present. "Another 5 dens have been located on ice near the 1002 area."

Muskoxen: Reintroduced by Governor Walter Hickel in 1969, the muskoxen herd in the entire 18 million acre Refuge has grown from 69 animals to 476. Domesiticated at the University of Alaska, Muskoxen have shown no adversion to man's presence, as long as man isn't hunting them.

Caribou: You estimaste that there are approximately 180,000 caribou in the Porcupine herd and another 2,000 - 3,000 Central Arctic caribou move from Prudhoe and Kaktovik into the 1002 area after the Porcupine Herd moves on. Over all, there are between 550,000 and 600,000 caribou in Alaska distributed in 25 distinct herds. State biologists say that nearly all of these herds are healthy and growing.

Geese: I quote: "The coastal plain is not a major nesting area." It is, however, a major staging area -- as many as 595,000 waterfowl gather on the entire staging area that stretches along the coast into the Yukon territory.

It should be noted that Prudhoe Bay, with its high level of oil industry presence, continues to serve as a nesting area for all major species of geese, for swans, ducks and other waterfowl.

So, in summary, my recomendation is that you include a chart on

with your wildlife population estimates. If my reading of the report is accurate, it would go something like this:

Dall Sheep	none
Wolves	5-10
Moose	25
Wolverines	90
Brown bear	108
Muskoxen	476
Polar bear dens	1-2
Caribou	183,000
Birds and waterfowl:	
Swans	400 - 500
Ducks	35,000
Geese	105,000
Golden eagles	25-75
Peregrine falcon eyries	2 (formerly occupied)

One element I did not find reported in the 1002 study, is the amount of human activity, other than subsistence use, in the 1002 area.

I would like to know, and I believe the American people deserve to know, how many people visit this area annually.

If there is very little wildlife there. Which is a fact. If nearly no one, other than government personnel visit there, which is a fact. And if Congress refuses to open it up to tap potential oil and gas reserves...someone needs to answer the question, what then is it for? Thank you.

2532 Roland Road
Fairbanks, AK 99709
January 20, 1987

U.S. Fish and Wildlife Service
Division of Refuge Management
2343 Main Interior Bldg.
18th and C Streets, N.W.
Washington, D. C. 20240

Gentlemen:

This letter responds to a request for comments to the draft Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment prepared by the Department of Interior.

From 1976 to 1984 I was employed by the U.S. Fish and Wildlife Service in Alaska where I served on the staff of the Arctic National Wildlife Refuge (ANWR) as an airplane pilot and Assistant Refuge Manager. I spent many hours in the air and on the ground within the coastal plain of ANWR.

Nowhere does this report make a purposeful statement that reflects the fact that the coastal plain of ANWR is one of the finest wilderness and wildlife areas in North America. With the exception of a small sliver of designated wilderness east of the Aichilik River it is virtually the only natural area on the north slope of Alaska and thus in the United States that is not dedicated to oil exploration and/or development. The original purpose of the Arctic National Wildlife Range established in 1960 was to preserve unique wildlife, wilderness, and recreation and scientific values. In a betrayal of those who worked so hard to have this area protected the ANILCA legislation does not even mention the word wilderness as one of the purposes of the expanded Arctic National Wildlife Refuge. Yet wilderness preservation is one of the key issues and it is what makes ANWR in its own unique way comparable to any of our finest national parks. Would the American public really approve of the degradation of a national treasure if this report unbiasedly assessed what was really at stake?

It is with considerable sadness, though not surprising, that I find the Department of Interior recommending full scale leasing of the ANWR coastal plain. Past actions of former Secretary of the Interior Watt telegraphed the intent of this administration regarding the future of ANWR. Watt traded away the subsurface rights to native lands around the village of Kaktovik and along the near coastal area south of Barter Island without the opportunity for broad public review. Heretofore the natives had title to only the surface estate of these lands precluding development of the subsurface estate. With public control of these lands within ANWR lost to private interests seismic exploration took place on these lands and Chevron drilled the first exploratory well within ANWR. All of this occurred prior to completion of this report and a decision by Congress, apparently, in an attempt to prejudice the outcome in advance.

P-82

I flew over the Chevron well site during the summer of 1986 and saw that stack upon stack of pink styrafoam left behind when the well was abandoned had been blown apart by the wind and was scattered across the tundra. Oil exploration and development is seldom the clean slick affair that this report would have one believe.

I understand the U.S. Fish and Widllife Service is working on a project known by some as the "mega trade". The Department of the Interior, apparently confident of the disposal of ANWR, intends to pursue giving up the subsurface rights to lands under the ANWR coastal plain in exchange for surface rights to native inholdings within other Alaska refuges. This decision would likely give the oil companies a freer hand to operate within ANWR should Congress open the area up. It should also be pointed out that it took a law suit to gain the right of the public to comment on this report yet hearings in Alaska were not held in Fairbanks and Arctic Village even though they were requested.

One could go on with the foregoing littany which demonstrates the prodevelopment bias of the Department of Interior. This is not necessarily bad except that any recommendation of the Department of Interior regarding the final disposition of ANWR lacks credibility because of internal bias towards one point of view. If one is truly interested in an objective assessment of the national interest with regard to the final disposition of the ANWR coastal plain one will not find it in this report.

If there is oil under the coastal plain and development is allowed to proceed the value of the coastal plain as wilderness will be destroyed. One cannot deface a "Mona Lisa" and still expect to have a masterpiece. While it may be speculative to say what may happen to the wildlife and especially the caribou of the coastal plain it is a well established fact that if you destroy wildlife habitat or deny use of same, wildlife species that cannot adapt to altered circumstances will not survive. There is more than just a slight possibility that more than one species of wildlife will not be able to cope with the various disturbances and destruction of habitat resulting from exploration and development of the ANWR coastal plain. Is the possible gain in the short term worth permanently degrading a natural area and placing at jeoprady the well being of wildlife using the ANWR coastal plain in the long term? The Department of Interior apparently believes that it is in the national interest to allow one of the nations premier wildlife and wilderness areas to be the next drilling target because it is alledgedly highly prospective for oil. Yet at the same time this nation has no national energy conservation policy, no alternative fuels program and this administration has relaxed auto fuel efficiency standards. This nation is like a child on a candy eating binge except our candy is oil. Now the public is being asked to risk a national treasure to continue this gluttonous diet. This should not be the next target for exploration, it should be the last if at all.

This nation will continue to be dependent on foreign oil imports far into the future irregardless of any possible contribution from ANWR because there is a defacto policy of energy consumption rather than conservation of a non-renewable resource. Any oil from ANWR will be

sucked out in 20 to 30 years leaving in its wake a degraded landscape and placing at risk far into the future nationally and internationally significant species of wildlife. Humpty Dumpty cannot be put back together again once the shove is given.

In the long run I believe the net benefit to this nation from retaining its premier wilderness areas in tact will far outweigh the short term benefits that may be gained from non-renewable resource extraction. One has only to look at our own national parks and refuges and those around the world to realize the benefits and wisdom of preserving our important natural areas for the enjoyment of future generations.

The argument that only the elite visit ANWR is "baloney". People from all walks of life make a deliberate choice to visit ANWR and save their money to do so just like anyone else who wishes to take a wilderness vacation. It is expensive but so is a vacation to Europe or some other distant point. It is good that there are still wild places that are not heavily visited. One of the primary reasons people visit ANWR is to enjoy the quiet and solitude of a wilderness setting. This opportunity is becomming increasingly rare as the worlds wild places dwindle to a few remnants. People need a place where they can come and find spiritual renewal which is not possible when hoards of people are present. Development of the coastal plain would devestate the quiet and solitude that people seek and are now able to find in ANWR.

Let us protect for now this natural masterpiece that is the ANWR coastal plain. Put this one in the bank and give it the protection of wilderness status. If there is oil it is not going anywhere. The price you are asking is too steep. Let's not make a premature withdrawal and risk throwing the bank into default until we are sure there is no other alternative.

P-83

Sincerely,

Donald E. Ross

der

P.S. Surprise me and recommend wilderness designation!

On page 75 if states that "new surveys might not differ much from the cumulative total of about 1300 miles already collected." Not mentioned here or elsewhere is the fact that in addition to the hundreds of miles of seismic lines impacts to the tundra also occur from the many additional miles of random trails created by supply trains that haul fuel and other supplies to and from seismic trains. "1300" miles of seismic line provides the reader with no clear picture of the actual miles of trails and back and forth travel that occurs along any one seismic line.

Page 76 Para. 1: What is reasonably near the coast? Use of rolligons to transport heavy equipment to a drill site might or might not be analogous to the use of "winter trails" by seismic crews. This would depend on the amount of snow cover, type of terrain and the number of passes over any one trail. How are rolligons used with "care"?

Page 99, Para. 2: It states that additional crews "could" increase the overall impact. It stands to reason that additional crews "would" increase the overall impact rather than could as this carefully worded sentence implies. Additional crews would mean more supply trains travelling across the tundra to supply seismic trains creating new trails and increasing the impact on the tundra.

Page 99, para 4: What is about 6 inches? Six inches of snow is a bare minimum standard. So stated it would allow operations in areas where there may be less than 6 inches of snow as long as there was about 6 inches in most places. This imprecise and minimal standard is not one that will insure the greatest protection of vegetation from seismic and other exploratory activities.

Page 102: Ice well pads and gravel-timber insulation pads are mentioned as ways to minimize the amount of gravel needed. In the following paragraph subsurface disposal of drilling muds is stated as a means of eliminating the need for large reserve pits. Yet when one reads about mitigation on page 104 the employment of any of these techniques to minimize effects on vegetation is not even mentioned or discussed.

The conclusion on page 105 that the effect of full leasing is anticipated to be minor on coastal and marine habitats is not accurate. Coastal and marine habitats would be significantly modified in places where port facilities are developed and causeways constructed to serve the same not to mention modification to coastal habitats from transporting equipment and supplies inland from these sites. Some dredging may also be required. It may be true that the effect on coastal and marine habitats from fuel spills is anticipated to be minor, at least until one occurs, but at least this conclusion would be more consistent with the foregoing discussion.

On page 106 it states that analogies comparing the effects of current oil development on the CAH and effects of potential 1002 development on the PCH must be drawn with caution. On page 108 the statement is made that displacement of the PCH from a core calving area to a less desirable area would be expected to reduce caribou productivity. Followed by a statement that no recognizable, long-term effect on the

the CAH as a result of displacement by oil development in the central Alaskan Arctic has been demonstrated to date. This does not strike me as a cautiously drawn analogy since the implication is because it did not happen to the CAH it would not happen to the PCH particularly when in a later paragraph it states that the lack of observable adverse effects from displacement exhibited by the CAH would be unlikely for the PCH.

The period for which data on the PCH is available from 1972 to 1985 is a relatively short one compared to the total unreported biological history of the herd. During the period from 1972 to 1985 the PCH also calved and moved in significant numbers west of the Hulahula River and can be expected to do so in the future. Just because the herd was observed to calve in significant numbers east of the Hulahula River in most of these years does not mean that this situation will necessarily continue in the future. A core calving area is a useful point of discussion for biologists since it reflects where caribou were conscentrated during the years of observation. It would however, be a mistake to conclude that because caribou used one area more than another during a particular period that the area used less frequently was also less important. From the standpoint of the well being of the herd denial of just part of the herd's historic calving grounds could have long term negative consequences if exploration and leasing schemes are based on the assumption that one part of the range is less important than another simply because the period of observation was too short and we had an incomplete picture of herd dynamics.

RICHARD V. SHAFER
2012 SARATOGA AVENUE
ANCHORAGE, ALASKA ~~99502~~ 99517
(907) 274 3149

PROFESSIONAL ENGINEER
ALASKA CE 3640

ARCTIC ENVIRONMENTAL ENGINEERING
ARCTIC MARINE SYSTEMS
PETROLEUM OPERATIONS PLANNING
SPILL CONTINGENCY PLANNING

01/21/1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Bldg.
18th and C Streets, N.W.
Washington, DC 20240

P-85

I would like to offer the following comments regarding the draft document, *Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment*, published by the U. S. Department of the Interior in November 1986.

I have been a resident of Alaska since 1972, and during this time I have been involved with a variety of operations in the arctic and subarctic tundra areas of the state. My employment during this period has been with the federal government as well as with private industry. Most of my experience in this state has been associated with environmental aspects of petroleum exploration and production. I have degrees in civil, petroleum and environmental engineering, and I'm a registered professional engineer in Alaska. I have a strong interest in promoting the environmentally responsible economic development of our resources.

I am presently employed by an industry-sponsored oil spill response association. However, I am writing this letter as an interested citizen, not as an industry spokesman.

I support the Secretary's decision to propose petroleum leasing on the coastal plain of the Arctic National Wildlife Refuge (ANWR) for the following reasons:

- o Western countries in general, and the United States in particular, need to reduce the present vulnerability to interruption of oil imports from the Middle East.
- o We in the United States have a desperate need to reverse the deterioration of our balance of trade.

Comments on ANWR resource assessment

- o Petroleum activity in the Wildlife Refuge will create sorely needed employment opportunities throughout Alaska's economy.
- o Leasing and development of additional petroleum reserves will strengthen federal, state and local tax bases.
- o Based on industry experience in the Prudhoe Bay area, I feel very confident that with prudent planning by industry and government, oil exploration and (with luck) development can proceed in the ANWR coastal plain area without significant or long term harm to wildlife resources.

Most of the proposed mitigative measures discussed on pages 145 through 147 of the assessment are consistent with present industry practice in the Prudhoe Bay area. In general, these proposed stipulations can be expected to ensure protection of wildlife and other environmental values. You may, however, wish to consider the suggestions listed below by stipulation number.

5. Proposed stipulation 5 prohibits off-road vehicle use except by local residents of by specific permit. This is a reasonable measure provided off-road permits are quickly available in the event of an emergency such as an oil spill.

6. This stipulation would prohibit exploratory activity during summer but allows exceptions. It is very important that the mechanism for exceptions be in working order in the event of a down-hole emergency. It should also be recognized that there are risks and costs associated with seasonal drilling, e.g. a new crew cannot be as proficient as a crew which has been working together for a period, and in an emergency situation a green crew cannot be expected to respond as quickly nor as appropriately as an experienced crew.

11. Where roads and pipelines are separate, some means must be designed for periodic inspection of the pipelines.

12. What is meant by "restricted surface occupancy"? Does that mean that well pads would be prohibited within the three-mile zone?

14. Prohibition of permanent facilities within 3/4 mile of specified water courses seems excessively conservative. Facilities may require special engineering treatment near water courses, but "near" might be 20 ft in one case or 5 miles in another, depending on terrain conditions. Also, it should be noted that it is usually best, environmentally as well as economically, to develop permanent water storage facilities near water courses. Decisions on development near water courses should be made on a case-by-case basis.

15, 26. Aircraft altitude restrictions should apply not only to petroleum operators but to government and scientific activities as well.

27. Fences can cause problems on the Arctic Coastal Plain. Tightly woven fences (e.g. Cyclone fences) can produce undesirable snow drifting. Open fences (e.g. cattle fences) allow snow to pass but can entangle caribou antlers. In any event, the fences must be placed at considerable distance from facilities in order to allow room for deposit of snow which has been cleared from the facility area. This deprives grazing animals of what is otherwise good habitat within the fenced area. Also, caribou often seek out production facilities as insect relief habitat, especially when they are being harassed by nose bot flies; fencing would deprive them of this habitat enhancement. Fences may be a requirement at some locations for protection of animals from specific hazards and for security reasons, but a blanket requirement for fencing seems unjustified.

I hope these thoughts and suggestions are helpful. I would welcome a phone call at 907-345-3142 during working hours if there are questions or comments on any of these points.

Sincerely,

Richard V. Shafer, P.E.

Jeffrey Sloss
740 5th St,
Juneau, AK 99801.

January 14, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Bldg.
18th and C Sts., N.W.
Washington, D.C. 20240

Re: Draft 1002 Resource Assessment Report on the Arctic National Wildlife Refuge coastal plain

To Whom it May Concern:

As an Alaskan resident I'm deeply concerned about the opening of the coastal plain of ANWR to oil and gas exploration. I strongly oppose the violation of Alaska's premier wilderness sanctuary and part of the only arctic coastal plain wilderness in the nation. ANWR is a national and worldly conservation treasure which should remain entirely undeveloped for the national interest.

I submit the following points about the Draft 1002 Resource Assessment Report :

Oil and gas leasing of the coastal plain could be devastating for the 180,000 (+) members of the Porcupine Caribou herd that depend on the area for calving and post-calving activities.

The report does not take into account the impacts of oil and gas development on the entire coastal plain ecosystem.

The issue of how enough water will be obtained for drilling activities (especially in winter) is a major problem apparently not dealt with in the report.

The cumulative effects of oil and gas development on adjacent state and federal leases, native lands and on the outer continental shelf are not adequately addressed.

I oppose any trading of any ANWR lands to Native Corporations or the State of Alaska.

Accidental spills of crude oil and other petroleum products are an inevitable consequence of oil and gas development and is an unacceptable threat to the fragile life of the arctic tundra.

P-87

The disposal of hazardous waste is a serious long term problem for the entire north slope which has not been solved in existing oil developments, much less this one.

It is clearly not in the national interest to promote development of the nation's only arctic coastal plain wilderness, also a world-class wildlife refuge.

Our nation's future energy requirements can and will be met by increasing conservation of energy resources and the development of viable alternative energy sources, not the squandering of perhaps the last energy reserves for a 19% chance at a few months of oil.

I urge that the U.S. Fish & Wildlife Service protect and manage the entire Arctic National Wildlife Refuge in a manner which is consistent with the conservation purposes for which it was established.

Thank you for the opportunity to comment.

Sincerely,

Jeffrey Sloss

cc. Governor Steve Cowper
Representative Don Young
Representative Morris Udall
U.S. Fish & Wildlife Service, AK

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

February 5, 1987

Dear Fish and Wildlife:

This letter contains my comments relative to the draft coastal plain resource assessment (1002 report) for the Arctic National Wildlife Refuge, released November 24, 1986. I will not thank you for this opportunity to comment, as I understand public involvement was only allowed as a result of litigation successfully brought against your agency by public interest groups. The Department of the Interior also failed to hold a public hearing in my home town of Fairbanks, even though a wide segment of the public requested one. I find it repugnant that my tax dollars were spent in an attempt to deny me an opportunity to comment on a public interest issue that directly involves me. Please address my comments in the final 1002 report to Congress.

I totally support Alternative E, wilderness designation, as the most responsible management strategy for the Arctic Refuge coastal plain. This area is a wildlife refuge, not a petroleum reserve. It has been protected as such since 1960, and I see no valid reason for altering this wise course of protection for internationally significant wildlife and wilderness resources.

P-88

I feel qualified to comment on this report for several reasons. First, I have read it in its entirety. I have also studied the Baseline Reports prepared pursuant to Section 1002(c) of ANILCA. Second, I have a Bachelor of Science degree in terrestrial wildlife biology from the University of Montana. Last but not least, I am a resident of the state of Alaska, the United States, and the world. To me, being a citizen means I should be involved in assisting the formulation of wise national policy. The destruction of the surface resources of the 1002 area in the pursuit of unknown quantities of non-renewable resources is irresponsible and as such does not represent wise policy.

One of the things that disturbs me the most is that the 1002 report says development of the refuge for oil and gas is necessary in the national interest. I find this impossible to believe, when there seems to be absolutely no leadership in this country for energy conservation. I don't see many programs being implemented to promote the development of alternative energy sources, either. Without programs implemented nationwide on these two crucial fronts, which could provide our country with massive amounts of energy via savings, there can be no valid national interest argument for the destruction of an important wildlife refuge. "Destruction" is not too strong a word, as it is exactly what would happen to the coastal plain's wilderness values, as well as to much of its surface area which now supports wildlife populations.

There are numerous problems with the 1002 report. Probably the most glaring is that the Secretary's Recommendations are not based on information contained in the report. The report doesn't answer crucial questions about some of the impacts that would result from oil and gas leasing and production, even though that was its purpose as stated in ANILCA. For example, sources for water and gravel are not adequately discussed, nor is the disposal of hazardous waste. We pride ourselves in this country on being intelligent enough to avoid repeating mistakes of the past. Yet in the 1002 area, we have a government agency recommending that we do just that. The Department of the Interior is doing the American public a grave disservice by swallowing oil company rhetoric hook, line, and sinker. To point to Prudhoe Bay as a shining example of the ability of environment and industry to coexist in harmony is misstating the truth. The impacts of oil development activities at Prudhoe Bay have been inadequately studied, just as the potential impacts on the coastal plain have been inadequately addressed by both the 1002(c) and the 1002(h) studies.

The Fish and Wildlife Service has been negotiating land exchanges in the 1002 area with private corporations for years now. Why are these exchanges, which are all set to go, not even mentioned in the 1002 report? Are these exchanges in the public interest? I don't see how they can be. The justification I've heard for these exchanges is that the Fish and Wildlife Service needs to obtain the surface rights to inholdings on refuges in other parts of the state, presumably to facilitate "management and protection" of those lands. How can you reassure the public of your ability to "protect" these areas for fish and wildlife when you can't protect it in the Arctic National Wildlife Refuge, one of the oldest conservation system units in the state? Not only are you not protecting the wildlife and wilderness resources of the coastal plain, as is your mission, but by your recommendations you are ensuring their diminishment. Don't expect the public to be so gullible as to want that to happen elsewhere, too.

I could go on and on about the report's inadequacies and biases. The statements made in both the Executive Summary and the Secretary's Recommendation, relative to the area's oil potential, are skewed to favor the highest potentials possible without mentioning their low probabilities of occurrence. The report pays some lip service to subsistence uses of coastal plain wildlife, but passes on rapidly, saying that losses would be "compensated", whatever that means. The harm that development could do to subsistence uses outside the 1002 area, which are extensive, is barely discussed at all. One of the report's more important omissions is that it does not consider the many cumulative impacts that oil development, both in and outside of the 1002 area, will undoubtedly have on wildlife and habitats. To attempt to look at the 1002 area in isolation is ludicrous. It resembles a doctor attempting to do a thorough physical of a person by only examining is head. It can't be done.

As a resident of the state of Alaska, I firmly believe that it is not in the best interests of this state, or of the nation, to explore the coastal plain for oil at this time. Nor do I believe that it will be at any future date. We must stick to our commitments, made years ago, to the protection of wild places. If we don't, they will be gone, along with a part of the American soul. That is why I urge the Secretary to alter his recommendations in favor of wilderness designation, the highest and best use for the Arctic Refuge coastal plain.

Sincerely,

Laurence R. Sutton

Laurence R. Sutton
P.O. Box 84663
Fairbanks, Alaska 99708

cc: Hon. J. Bennett Johnston
Hon. Morris Udall
Governor Steve Cowper

P-89

P. O. Box 80368
Fairbanks, Alaska 99708
February 2, 1987

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

RE: ARCTIC NATIONAL WILDLIFE REFUGE, COASTAL PLAIN RESOURCE ASSESSMENT DRAFT

GENERAL COMMENTS

This letter is in support of Wilderness Designation for the coastal plain (1002) area of the Arctic National Wildlife Refuge. I write as a long time Alaskan resident with extensive experience with Alaskan wildlife and wilderness. I hold degrees in biology and natural resources mangagement from the University of Alaska and have worked professionally for many years as an environmental planner and natural resource manager. My family has backpacked throughout Alaska including the Arctic National Wildlife Refuge. I know first hand the outstanding wilderness and wildlife values to be lost should the coastal plain be opened to oil and gas leasing and believe it is not in the long term national interest to forego this unique wilderness resource for the short term economic gain of oil development on the Refuge's coastal plain.

I have carefully reviewed the Draft Arctic National Wildlife Refuge Coastal Plain Resource Assessment and am impressed with the devastating impact oil and gas development would have upon the physical, biological, and social environment of the 1002 area. It is evident that there are no mitigating stipulations which can significantly reduce the inevitable loss of wilderness and wildlife values not only within the coastal area, but also throughout the entire Arctic National Wildlife Refuge as a consequence of oil development.

The Arctic National Wildlife Refuge is the nation's only extensive wildlife refuge along the Arctic coast. The Refuge was established by Congress to preserve the area's unique wildlife, wilderness and recreational values. The coastal plain of the Refuge provides essential seasonal habitat for most of the Refuge's species of mammals, fish, and migratory birds. It is an integral part of the entire ecosystem which is required by these species for survival. The inevitable and unavoidable consequence of oil and gas development on the Refuge coastal plain would be the reduction in the size and diversity of wildlife populations throughout the entire Arctic National Wildlife Refuge.

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Congress mandated that the entire Refuge be administered for specific purposes defined in the Alaska National Interest Lands Conservation Act:

1. To conserve fish and wildlife populations and habitats in their natural diversity.
2. To fulfill international treaty obligations of the United States with respect to fish and wildlife and their habitats.
3. To provide opportunities for continued subsistence use by local residents.
4. To ensure water quality and necessary water quantity within the Refuge to conserve the fish and wildlife populations and habitats in their national diversity.

The report's findings indicate that the Secretary's recommendation for full leasing for oil and gas development is directly opposed to the Refuge purposes mandated by Congress. The "Recommended Mitigation" measures (p.145) are grossly inadequate and misleading. As is apparent from reading the report, there are no mitigation measures sufficient to retain the unique arctic wildlife and wilderness resources of the Refuge in view of the scope of habitat damage directly and indirectly related to oil and gas development in this biologically rich and fragile coastal plain. If anything, the report understates the environmental impact of oil development because the cumulative regional impact of potential oil development on adjacent coastal and off shore areas has not been addressed. Nevertheless, even within the narrow focus of the study, and despite the "Recommended Mitigation", the report concludes:

-"Long-term losses in fish and wildlife resources, subsistence uses, and wilderness values would be the inevitable consequence of a long-term commitment to oil and gas development in the area." (p. 143)

-"Oil and gas development would result in widespread, long-term changes in the wilderness environment, wildlife habitats, and Native community activities currently existing in the 1002 area, resulting instead in an area governed by industrial activities. These changes include displacement and reduction in the size of the Porcupine caribou herd as a result of widespread and intensive activities throughout one-third of its core calving area, as well as throughout a large part of its postcalving and insect-relief areas." (P. 143)

-"But, even with effective mitigation, herd* displacement or reduction could be as great as 20-40 percent." (p. 144)

From general knowledge of the fragile nature of the arctic coastal ecosystem substantiated by the draft report findings, it is evident that oil and gas leasing and development of the 1002 coastal plain area would:

1.-Substantially reduce or eliminate fish and wildlife populations and destroy or make unaccessible to wildlife extensive areas of essential seasonal habitat.

2.-Violate international treaty obligations particularly in regard to migratory birds, caribou, and polar bear and other marine mammals; and, by example,

*Porcupine caribou herd

encourage the expoitation of circumpolar ecosystems and wildlife resources by other nations.

3.-Significantly reduce or eliminate opportunity for continued subsistence uses not only for residents of Kaktovik, but also for residents of the interior villages in Alaska and Canada dependent upon the Porcupine caribou herd for subsistence.

4.-Significantly degrade water quality and quantity within the coastal area required by fish, migratory birds, and other wildlife.

5.-Eliminate wilderness recreational opportunities in the 1002 area and significantly degrade the recreational experience on the adjacent Refuge wilderness areas.

The justification given by the Secretary for the full leasing recommendation is the national need for domestic sources of oil and gas and the need to provide for the national security. However, the Report fails to provide sufficient evidence that oil development of the 1002 area would provide oil to significantly alter the nation's dependence on foreign sources. With a predicted U.S. oil demand for the year 2005 of 16.5 million barrels per day, and assuming that there may be a mean recoverable value of 3.2 billion barrels from the 1002 areas highly speculative potential oil reserve, (p. 169), then the 1002 area would only supply the nation with the equivalent of 6½ months of oil. This is hardly a significant contribution to the nation's long-term oil needs nor to the national security.

Of the 1100 miles of arctic coastline in Alaska, it is only the 125 mile stretch within the Arctic National Wildlife Refuge which is currently closed to oil and gas development. With potential oil and gas reserve prospects along this entire coast, as well as off shore, it is irrational and untimely to open the Refuge area for leasing before all other potential oil prospects are explored and developed.

It is evident that the underlying rationale for the full leasing recommendation is not concern for the long-term national need for oil but, instead, for short-term economic gain. A sincere national commitment to maintain a supply of domestic oil for present and future generations would mandate the immediate enactment by Congress of a Comprehensive National Energy Conservation Policy. Implementation of such a policy today could, by the year 2000, save an amount of oil equivalent to the entire assumed recoverable oil potential of the 1002 area.

A decision to forego oil development on the Refuge coastal plain today would ensure a possible untapped oil reserve for the future. With "Wilderness Designation" of the 1002 area, future generations would receive a legacy of both an untapped oil reserve and the national treasure of a unique and intact arctic wilderness. Should it then become necessary to develop this potential oil reserve, future technological improvements may permit the extraction of oil and gas without the devastating impact to the environment which would occur today.

Moreover, the wilderness coastal area of the Refuge would provide a very valuable baseline study area from which environmental changes resulting from oil developments on other arctic areas could be measured. Mitigation measures could then be taken before there is irreparable damage to the arctic ecosystem.

SPECIFIC RECOMMENDATIONS

1. The final report needs to address the "land megatrade" issue. The Fish and Wildlife Service is actively negotiating the transfer of ownership of 1002 lands to Alaskan native corporations. After 1991, these lands would be available for private ownership including oil companies. Nevertheless, the physical, biological and socioeconomic assessment of the Draft Report is based upon the assumption that the 1002 lands would remain owned and managed by the Federal government (p. 98) These assessments in the Draft are invalid and should be redrafted if the 1002 refuge lands are not to be under Federal ownership and control. A full disclosure is required of the rationale and the extent of the land trades under negotiation.

2. It is incorrect to assume that the impact of oil development in the 1002 area would be similar to that of the Prudhoe Bay oil field. There are significant physical and biological differences between the two areas which will cause the adverse impact of oil development to be much greater in the 1002 area. Moreover, there have been serious problems in the Prudhoe Bay operation particularly with air, soil, and water pollution and hazardous waste disposal, which have not yet been resolved.

3. The report needs to expand upon plans to secure the great quantity of water required for oil development before a meaningful assessment of the impact on wildlife can be made. There is not sufficient water supply to support wildlife as well as the oil development in the 1002 area. One of the specific purposes defined in ANILCA for the Arctic National Wildlife Refuge is to ensure water quality and necessary water quantity to conserve fish and wildlife populations and habitats in their natural diversity. Therefore, since wildlife must be given priority in the allocation of the limited water resource of the 1002 area, where is the source of water required for oil development?

4. The final report needs to expand upon plans for securing the large quantity of gravel required for oil development. The major sources of the limited gravel resource within the 1002 area are river and riparian areas. Removal of gravel from these special habitats would adverely impact fish, migratory birds, and musk ox and other mammals. Information of the location of potential gravel sources for oil development is needed in order to assess the extent of the adverse impact of gravel extraction upon wildlife.

5. The potential soil, water, and air pollution from oil development activities has not been adequately addressed. The cumulative impact of small discharges of pollutants introduced into the environment over the life of the oil field must be considered as well as the short-term accidental releases. Proposed stipulations for disposal of fuel, hazardous wastes, drilling muds, and other wastes are grossly inadequate to safely remove these pollutants from the Refuge environment (p. 147) There is no approved hazardous waste disposal site in Alaska. Reinjection of wastes into permafrost is not a safe option. Little is known how such wastes might alter the thermal balance of the permafrost, nor how such wastes may migrate through the permafrost.

6. The final report needs to address the cumulative effects upon the 1002 area of potential oil development along and off-shore of the entire arctic coast, particularly from Prudhoe Bay east to the Refuge boundary. Should the 1002 area be opened for leasing and development with construction of an oil pipeline link to Prudhoe Bay, oil development could be greatly accelerated off-shore and on adjacent state owned coastal lands west of the 1002 area. The Draft Report understates the extent of habitat destruction within the 1002 area since the required infrastructure would serve not only the 1002 oil fields, but would also provide support for oil development off-shore. It is wrong to assume that wildlife, such as caribou, muskox,polar bear, and migratory birds displaced by habitat destruction in the 1002 area,could find suitable habitat elsewhere in view of this potential development along the entire arctic coastal plain. There would be no "refuge" for displaced wildlife. An overview map and plans for potential oil development along the arctic coast should be included in the final report.

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CONCLUSION

The 1002 area is an integral part of the Alaska National Wildlife Refuge established by Congress to protect unique arctic wildlife, wilderness and recreational values not duplicated in any other national park, refuge, or wilderness area. It is evident that the 1002 area cannot be opened to oil and gas leasing without permanent loss of these values to nation. The impact of oil development defies all the purposes for the Refuge defined by Congress in ANILCA. The findings of the Draft Report support the conclusion that on this particular coastal area, oil leasing and development and wildlife refuge are not compatible land uses. The choiceis clearly wildlife refuge or oil development; not both.

The Secretary's stated concern for national oil needs and his assurances of controlled development to minimize environmental impacts is outrageous considering that the Fish and Wildlife Service is actively engaged in negotiations to transfer the 1002 refuge lands out of Federal ownership. The recommendation to open the 1002 area to oil and gas leasing may achieve short-term economic and political ends. But the potential 6½ months supply of oil from the 1002 area would not significantly contribute to the oil needs of the nation.

Opening the Arctic National Wildlife Refuge to oil and gas leasing makes as much sense as would a proposal to melt down the Statue of Liberty for national security and for satisfying the national domestic need for a supply of copper.

There are alternative and more effective means of securing a long-term domestic supply of oil through a national commitment to oil and energy conservation.

"Wilderness Designation"for the 1002 area would in no way deplete the domestic oil reserves which may underlie the Refuge. This potential reserve would remain a source of oil for future generations when technological advances may allow oil and gas extraction without the inevitable and devastating impact on wildlife and the arctic ecosystem that would occur today.

"Wilderness Designation" for the 1002 Refuge area would leave the legacy to future Americans of both an untapped oil reserve and an unsurpassed unique arctic wilderness.

I urge the Secretary to reconsider his recommendation. In the long-term national interest in assuring domestic oil reserves for future Americans, and consistent with the purposes defined by Congress for the Arctic National Wildlife Range, I urge the Secretary to recommend that the 1002 coastal plain of the Refuge be designated "Wilderness".

Dorothy H. Thompson

Dorothy H. Thompson

Testimony given at Kaktovik 1-6-87

First of all I would like to mention that from what I have read in the report. Arctic Village was not taken into consideration. The studies cover the immediate area of the coastal plain. It does not cover the full range of the Caribou migration route. Which, would all be affected if the herd are disturbed in at least one area.

The Caribous survival depends on their basic instinct of fear. Since the Arctic National Wildlife Refuge has always been a wilderness area. Any activities by man would have an enormous impact on their behavior. I think the studies are disturbing enough.

The people in my area especially the elders,primary diet is Caribou meat, also as far as obtaining the food, Caribou is more reliable than groceries. Simply because we understand the Caribou a lot better than your local supermarket. We can judge the quality and quantity of Caribou we need for any length of time. We can't do the same with groceries, since we are in remote area and the reliabilit of transportation is always questionable, also most groceries shipped into the village is at best one to two weeks old. Subsistence hunting and fishing is our only means of obtaining fresh food.

My people has a practice that has been handed down from generations that is the area of the killing must be cleaned after the animal has been butched and removed. This lessens the chance of the are being contaminated and diseases being spread by scavengers that comes into the killing area. This insures the continued existence of a healthy herd. There is no way that explorations and development will insure this.

Lastly, most studies refer to positive changes from subsistence to cash base economy. Usually, increase education, employment and health services. But there is never any mention of the negative changes like now, like icrease in drugs, alcohol, crimes and suicide rates.

I believe that if there is to be any kind of exploration or development considerations. There should also be alternatives, planned for all negative aspects of such activities. Since this is basically the last of our wilderness area nothing should be left to chance.

-next page-

Last but not least, I do not think it makes good business sense to develope any more of our oil potential, while the oil market is unstabled, OPEC has already wasted enough of our oil dollars.

Thank-You

Lincoln Tritt
P.O. Box 22003
Arctic Village, Alaska
99722

3 February 1987

U.S. Fish & Wildlife Service
Div. of Refuge Management Resources
2343 Main Interior Building
Washington, D.C. 20240

RE: Comments on Interior's Draft 1002 (ANWR) Report

Having lived in Alaska for the past twenty years--before, during, and after construction of the North Slope Haul Road and Trans-Alaska Pipeline--I have some serious concerns regarding oil and gas drilling activities on the ANWR coastal plain. Three aspects of the Draft 1002 Report particularly disturb me:

(1) The Economic/Geologic Analysis

Interior's recommendation that full leasing be permitted is not consistent with only a one-in-five probability that oil is present in economically recoverable amounts. Furthermore, considering that that estimate is based on an inflated oil price ($33 per barrel), we can assume that calculations using a more realistic price range ($14-$19 per barrel) would yield an even lower probability.

The estimates that the field most likely has only 600 million barrels total, but may have some six times as much, further argue against opening it to development. Even the larger quantity would not contribute significantly to the U.S. oil requirements at our present rate of consumption; the smaller is truly insignificant.

Both the geologic and economic analyses (a 95% probability of only 600 million barrels of oil; only a one-in-five chance of finding economically-recoverable oil at all) argue in favor of the NO ACTION or WILDERNESS DESIGNATION alternatives at this time.

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(2) Assumptions of Industry's Environmental Responsibility

Coastal plain development would cause, in my opinion, a level of environmental damage greater than that acknowledged in the Report.

The Report refers to the inevitability of oil spills. This prediction is consistent with my own observations on the North Slope. Even with best intent, these spills are never adequately cleaned up and the "ability of the industry to minimize damage" must be viewed skeptically.

Illegal hunting, feeding, and harrassment of animals (especially bears and wolves) within reach of roads and camps is a certainty which regulations to the contrary will not prevent. This is not adequately considered.

The oil industry, pleading it cannot afford to conform to toxic-waste regulations, is exempted from them. Drilling activity on the coastal plain will inevitably lead to water and soil contamination by toxic drilling muds, among other pollution sources. A serious problem anywhere, the risk is unacceptably high in the Arctic (because of slow decomposition rates), particularly when the health of the Porcupine Caribou Herd is at stake.

(3) Aesthetic Values

The Report's perspective is here utterly backwards. Both Alaska and the oil companies want to develop fields on the Arctic coast, recognizing that these fields may have some potential. But they have done so, and they can continue to do so, on fields west of ANWR. The 1002 lands, on the other hand, represent the only portion of the high Arctic coast in Alaska or Canada which we can preserve free from disturbance. I believe this opportunity is so important that it, alone, should have precluded recommendation of the full-leasing alternative.

alternative, to be the only responsible management options for the Arctic coastal plain at this time. These alternatives, while protecting an absolutely unique and valuable ecosystem, would leave ample coastal and off-shore lands open to development. Wilderness designation would also be consistent with the intent of Congress expressed in ANILCA and in subsequent votes in the U.S. House to designate the coastal plain as wilderness.

Sincerely,

June Weinstock
1339 6th Avenue
Fairbanks, AK 99701

P-95

Jerry C. Wickstrom
1009 E. 26th Ave.
Anchorage, AK 99508

January 15, 1987

U. S. Fish & Wildlife Service
2343 Main Interior Bldg.
18th & C. Street N. W.
Washington D. C. 20240

ATTN: Division of Refuge Management

Ladies and Gentlemen:

Enclosed are my comments and recommendations with regard to resolving the issues of opening the Arctic National Wildlife Refuge to petroleum leasing and development. These comments are based on my review of the document and my professional experience as wildlife and fisheries biologist, land and resource planner and past program manager for BLM interagency leasing and environmental studies for the National Petroleum Reserve in Alaska (NPRA).

The best approach that Alaska can take to getting the refuge opened is to take a steady thoughtful approach, tone down divisive rhetoric, look at the long term and nationwide interests, manage the land carefully and plan for ultimate restoration of the area to as close to natural as feasible.

There is no doubt pure wilderness will be destroyed. We should admit that up front and offer to trade this area for inclusion of wilderness elsewhere. For example, part of NPRA - e.g. Teshekpuk, Utukok Upland, and Icy Cape have had little petroleum development interest and may be trade off potentials.

With regard to the caribou calving controversy, I suggest that a commitment to phase in of leasing, studies and inventory in advance and better communication of industry efforts and success in the Kuparuk are essential. There should however be immediate leasing in all of the area except area D since the issue of oil potential can only be resolved by drilling.

The Secretary of Interior's recommendation is sound. Legislation should include additional long term mitigation and management commitments from the beginning. The long term view needs to be expressed.

Sincerely,

Jerry C. Wickstrom

JCW/acr

cc: RDC
State of Alaska
USFW - Anchorage
BLM - Anchorage
Anchorage Board of Realtors

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REVIEW COMMENTS AND POLICY RECOMMENDATIONS

ARCTIC NATIONAL WILDLIFE REFUGE - DRAFT EIS

01/15/87

GENERAL COMMENTS

The report is an excellent example of EIS writing, editing, and illustration.

ISSUES

a. Congressional designation of a wildlife refuge put wildlife in the highest priority position, however, the decision to not place the coastal plain in wilderness must have been made due to oil and gas potential.

b. The issues are nearly identical to NPRA issues. The NPRA court suit over subsistence was decided by the 9th Circuit Court ruling that there had been compliance due to deletion of core calving areas and Teshekpuk Lake waterfowl area, and the subsistance and other stipulations.

c. Complex geology of the area requires drilling to define subsurface values. Fear and opposition to leasing on NPRA proved to be unfounded due to little or no exploration drilling and no development after leasing. Also, there was no interest in the 3rd lease sale.

d. The Kuparuk experience is the best technically documented experience regarding caribou calving. Prudhoe Bay area had no inventory in advance - Kuparuk is a good example of cooperative design development.

e. Alyeska Pipeline experience demonstrates that elevation of the pipeline works for pipeline passage of wildlife. Gravel crossings have not been used and thus are costly and unnecessary.

f. Habitat should be looked at in broad perspective, e.g. gravel pads, etc., do convert a minor percentage of one type of habitat - e.g. moist tundra, but may diversify habitat from a comprehensive standpoint by varying the habitat. Gravel, roads and pads - if not being used by humans probably attract a variety of species including caribou which may find insect relief or a dry resting area. They may however on an ecosystem standpoint introduce use pattern changes, e.g. predators having easier travel routes.

g. The worst case scenario would be for industry, after finding and developing a field, to find it uneconomic, e.g. Milne Point. In this case the wilderness would be destroyed or severely impacted and no benefits accrued. The best scenerio would be for a massive discovery which makes it all worthwhile.

CONCLUSION & RECOMMENDATION

The Secretary's recommendation of phased in leasing is the best approach. This could be improved and implemented by:

a. Institution of off season government or industry COST well exploratory drilling to define values in the trade off decisions regarding development of area D. The NPRA experience of government exploration was helpful.

b. Support for and passage of energy conservation legislation. In the best of discovery circumstances the nation's energy supply and balance of payments will not be corrected.

c. An oil import tax with proceeds to go directly to payment on the national debt. This would also provide government and industry a long term stable basis to make minimum bid, royalty rate and economic development decisions.

d. Lease stipulations including a requirement that roads, pads, airstrip and other physical activities which mar the wilderness, be designed at the beginning to facilitate rehabilitation at the end of field life, to small "w" wilderness or backcountry status. For example pads, excavation and pits should be rounded or lenticular in shape or easily reshaped to such rather than square cornered contemporary engineering designs.

e. Initial legislation stating the goal of restoration of the area to as close to natural as possible. This would include removal of all structures, obliteration, removal and cosmetic treatment of all physically disturbed areas including pits, berms, roads and pads. The road to the Dalton Highway should not become a permanent transportation link within the refuge, but could provide access to the western boundary. The gravel road, while largely rehabilitated, would form a hiking trail across the coastal plain. Pictures of the restoration and cleanup record on NPRA should be used to educate the national public.

f. Legislation establishing a jointly funded sinking or reserve fund to accomplish restoration. The Federal Government, State of Alaska and the oil companies should contribute a minor percentage of proceeds from sales, bonuses and net profits to an investment fund. If 100 years is the hypothetical end of operations, $1,000,000 set aside at 6% compounded annually for this period amounts to almost $340,000,000.

g. Halting land trades with the Native Corporations. These trades, although well intended, may prove to be a complex, particularly litigous impediment to expedited leasing. Rather than a land trade, I recommend a percentage of State of Federal income from the sale be committed to buy out critical inholdings in conservation areas, or fund other conservation needs.

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SPECIFIC COMMENTS

PAGE 72, TABLE III-4

How was the price of oil determined? What will be the likelihood of bids if the price of oil stays down? What will be the price per barrel to establish minimum bids? Are there any alternative approaches to leasing that should be considered - e.g. low minimum bid and sliding scale royalty?

While these factors are not usually a preliminary consideration they do become part of the decision process and thus should be explained.

Jerry C. Wickstrom
1009 E. 26th Ave.
Anchorage, AK 99508
(907) 274-9480 Home
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RESUME

1956-59	South Dakota School of Mines - Geological Engineering
1959-62	South Dakota State University - BS - Wildlife Management
1962	Karluk Lake Kodiak Island - Bureau of Commercial Fisheries, Red Salmon Research
1962-65	Land Examiner Realty Specialist - BLM, Fairbanks
1965-68	Wildlife Biologist, Watershed & Range Specialist, District Safety Officer, Fire Control Duties - BLM, Fairbanks. * First Fisheries Inventory - Brooks Range, First BLM District Wildlife Biologist, First Fire Control - Soil Erosion Studies & Management Recommendations.
1968-73	Wildlife Biologist, Fisheries Biologist, Recreation and Land Planner Specialist, BLM - Winnemacca District, Nevada. * First Wildlife Biologist, First Fisheries Studies, First District Wide Land Plan, First Interagency Land Plan - BLM/USFWL, District Safety Officer & Defensive Driving Instructor.
1973-1977	Environmental Coordinator Alaska State Office - BLM * First Environmental Coordinator, Developed Statewide d-2 Alternative, d-2 EIS Writing & Review, Washington, D.C.
1977-1983	Asst. Chief and Chief NPRA - Alaska State Office, BLM, 105-C Interagency Report - Leadership of 6 Agencies & State & Borough. * First on Shore Competitive Leasing Regulations, EIS & Program.
1983 -	Real Estate - Foreign Trade - Import/Export - Business Profession & Ownership. * Corporate President & Owner, Board of Realtors - Planning & Zoning Chairman, 1986, Vice Chairman, Anchorage Foreign Trade Zone Group - A Nonprofit Corporation.

FILED
SEP 10 1984
PHILLIP B. WINBERRY
CLERK, U.S. COURT OF APPEALS

UNITED STATES COURT OF APPEALS

FOR THE NINTH CIRCUIT

SARAH KUNAKNANA, etc., et al., Plaintiffs-Appellants/ Cross-Appellees, vs. WILLIAM CLARK, etc., et al., Defendants-Appellees, and AMOCO PRODUCTION COMPANY, et al., Intervenor-Defendants/ Appellees/Cross-Appellants.	Nos. 83-4325 84-3623 Alaska (Anchorage) ORDER

Before: ANDERSON, SKOPIL and POOLE, Circuit Judges.

The panel unanimously affirms the decision of the district court. An opinion will be filed and available within the next several days.

FILED

SEP 12 1984

PHILLIP B. WINBERRY
CLERK, U.S. COURT OF APPEALS

UNITED STATES COURT OF APPEALS

FOR THE NINTH CIRCUIT

SARAH KUNAKNANA and JEAN NUMNIK, Plaintiffs/Appellants, vs. WILLIAM CLARK, Secretary of the Interior, and THE UNITED STATES DEPARTMENT OF THE INTERIOR, Defendants/Appellees, and AMOCO PRODUCTION COMPANY; ARCO ALASKA, INC.; GETTY OIL COMPANY; SHELL OIL COMPANY; and TEXACO, INC., Intervenor-Defendants/Appellants.	No. 83-4325 D.C. No. A83-337 Civil OPINION

Appeal from the United States District Court
for the District of Alaska
The Honorable James M. Fitzgerald, District Judge, Presiding
Argued and submitted May 16, 1984
Decided 9/10/84

Before: ANDERSON, SKOPIL, and POOLE, Circuit Judges.

J. BLAINE ANDERSON, Circuit Judge:

Sarah Kunaknana and Jean Numnik, two Inupiat Eskimos, appeal a district court judgment denying their challenge to certain oil and gas lease sales by the Bureau of Land Management within the Alaska National Petroleum Reserve. We affirm.

I. OVERVIEW

This appeal concerns oil and gas leasing on the National Petroleum Reserve-Alaska (NPR-A), a national petroleum reserve located on the North Slope in Alaska and encompassing 23 million acres. With certain exceptions, oil and gas production was prohibited within this reserve according to the terms of the Naval Petroleum Reserves Production Act of 1976 (NPRPA). 42 U.S.C. §§ 6501-6507. In 1980, Congress amended the NPRPA to provide for "an expeditious program of competitive leasing" in the NPR-A. Id. at § 6508.

Pursuant to this directive, an expedited leasing program was developed. The program involved five annual sales of approximately two million acres each. The Bureau of Land Management (BLM) published a Final Environmental Impact Statement (FEIS) concerning oil and gas leasing in the NPR-A and subsequently issued its Record of Decision. Lease Sale 831, challenged here, was the first offering under this scheme.

Appellants Numnik and Kunaknana and the City of Barrow, amicus here, sought a preliminary injunction blocking the lease sale. They noted that one of the primary objectives of the Alaska National Interest Lands Conservation Act (ANILCA), enacted just weeks before the NPRPA was amended, was "to provide the opportunity for rural residents

engaged in a subsistence way of life [the opportunity] to do so." 16 U.S.C. § 3101(c). They contended that the BLM had failed to make certain determinations required by the ANILCA after concluding the lease sale would result in a significant restriction of subsistence use by the native Alaskans. 16 U.S.C. § 3120.

A preliminary injunction issued on July 19, 1983, after the district court concluded that the BLM had failed to make the required findings. The court permitted opening and accepting of bids by the BLM but enjoined execution of leases pending an expedited trial on the merits. Such a trial was required by the NPRPA, 42 U.S.C. § 6508. Of the 81 tracts offered for lease in Sale 831, bids on 17 were accepted.

Trial on the merits commenced December 12, 1983, and the full administrative record was submitted to the court without objection. Counsel for the government announced that its position had changed since the preliminary injunction hearing. He asserted that a mistake had induced the government's initial position due to an assumption that the BLM had made a determination of significant restriction in subsistence use. Admittedly, such a conclusion would require further findings under 16 U.S.C. § 3120(a). At trial, counsel asserted that the BLM had, in fact, concluded just the opposite and offered a "Modified Record of Decision" to explain this determination.

The district court entered its decision, finding in favor of the government on the merits. The court enjoined execution of the leases, allowing appellants to file in this court for injunction pending appeal. An injunction pending appeal was entered on January 13, 1984, permitting lease issuance but enjoining any exploratory drilling or any other lease activity that would substantially and adversely affect subsistence use. This expedited appeal followed.

II. DISCUSSION

Appellants Kunaknana and Numnik contest the validity of the district court's review. They argue that the court considered impermissible materials, improperly limited discovery and erred in determining that the BLM's rule-making procedure complied with section 810 of the ANILCA. Intervenors Amoco Production Company, et al., cross-appeal, contending that Kunaknana and Numnik lack standing due to a failure to participate meaningfully in the administrative process preceding Lease Sale 831.

A. Standing

Traditionally, a party has standing to seek judicial review of agency action where the challenged action has caused "injury in fact" to an interest "arguably within the zone of interests to be protected or regulated by the statute" allegedly violated. State of California v. Block, 690 F.2d 753, 776 (9th Cir. 1982) (quoting Association of

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Data Processing Service Organizations, Inc. v. Camp, 397 U.S. 150, 152 (1970)). Under this requirement, plaintiffs must show not only a "distinct and palpable" injury but also a "fairly traceable" causal connection between the claimed injury and the challenged conduct. Warth v. Seldin, 422 U.S. 490, 501 (1975).

We find that the traditional standing requirements have been met by appellants. The purpose of the ANILCA was to protect those North Slope natives who, like appellants, lead a subsistence lifestyle. 16 U.S.C. §§ 3111-3112. Oil and gas development within the area would directly affect the availability of the subsistence resources and limit those areas in which subsistence activities could be conducted.

We disagree with intervenor's claim that appellants should be deprived of standing due to a failure to participate meaningfully in the administrative process. See Vermont Yankee Power Corporation v. National Resources Defense Council, 435 U.S. 519 (1978). See also City and County of San Francisco v. United States, 615 F.2d 498 (9th Cir. 1980) and Seacoast Anti-Pollution League v. Nuclear Regulatory Commission, 598 F.2d 1221 (1st Cir. 1979). The rationale of Vermont Yankee has been applied in those instances in which an interested party suggests that certain factors be included in the agency analysis but later refuses the agency's request for assistance in exploring that party's

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contentions. Id. at 553-554. Such a party will not be permitted to challenge the agency decision on the ground that it failed to consider the necessary alternatives. Id. The district court declined to establish a broad rule which would require participation in agency proceedings as a condition precedent to seeking judicial review of an agency decision, and we affirm.

B. The Modified Record of Decision

Appellants take issue with the district court's inclusion of the Modified Record of Decision (MROD) as a part of the administrative record on review. Characterizing the MROD as an impermissible post hoc rationalization of an agency decision, made in response to litigation, appellants contend that consideration of the MROD was improper. See Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 420 (1971); accord Camp v. Pitts, 411 U.S. 138, 142 (1973) (per curiam). We disagree.

Agency actions are reviewed by examining the administrative record at the time the agency made its decision. Overton Park, 401 U.S. at 419-420. Agency documents prepared during and in response to litigation are generally excluded from this review. Id.; accord ASARCO, Inc. v. U.S. Environmental Protection Agency, 616 F.2d 1153, 1158-61 (9th Cir. 1980).

The general rule prohibiting post hoc rationalizations is not without exceptions. In Overton Park, the

Supreme Court expressly authorized the trial court to allow the Secretary of Transportation to "prepare formal findings" in order to "provide an adequate explanation for his action" which the court could then review. 401 U.S. at 420. The Ninth Circuit has also addressed the scope of the district court's review of an agency decision, adopting the more "enlightened" approach which permits "explanation" of agency decision-making. ASARCO, 616 F.2d at 1159. In ASARCO, we held that "[a] satisfactory explanation of agency action is essential for adequate judicial review, because the focus of judicial review is . . . on whether the process employed by the agency to reach its decision took into consideration all the relevant factors." Id.; accord Overton Park, 401 U.S. at 402; Bunker Hill Co. v. Environmental Protection Agency, 572 F.2d 1286, 1289 (9th Cir. 1977). The court limited the purposes for which information outside the administrative record may be considered to use as "background information" and for "ascertaining whether the agency considered all the relevant factors or fully explicated its course of conduct or grounds of decision." ASARCO, 616 F.2d at 1160. Finally, the court observed that additional information should be explanatory in nature, rather than a new rationalization of the agency's decision, and must be sustained by the record. Id. at 1159-60.

In the instant matter, the district court noted that "without the [MROD], the record before this court will

'not disclose the factors that the Director considered or [his] construction of the evidence.'" CR 111 (citing Overton Park, id. at 419-20). It appears that without benefit of the explanation of agency action set forth in the MROD, the trial court would be prevented from determining whether the agency action was within the scope of its authority. We find, therefore, that the inclusion of the MROD in the district court's review was both permissible and necessary.

C. Section 810 Compliance

The appellants argue that the Department of Interior failed to comply with Section 810 of the Alaska National Interest Lands Act of 1980 in holding Lease Sale 831. 16 U.S.C. § 3120. They contend that the department failed to accurately identify the section's requirements and consequently failed to fulfill those requirements. We disagree.

The Naval Petroleum Reserves Production Act of 1980 requires the Secretary of the Interior to implement "an expeditious program of competitive leasing of oil and gas in the National Petroleum Reserve in Alaska." 42 U.S.C. § 6508. The statute did not give the Secretary the discretion not to lease; instead, the Secretary was given the discretion to provide rules and regulations under which leasing would be conducted and was to develop restrictions

necessary to mitigate adverse impact on the NPR-A. Id. Expedited judicial review was an additional concern of this legislation. Id.

Shortly before the NPRPA legislation, Congress enacted the Alaska National Interest Lands Conservation Act. Its purpose was to preserve scenic Alaskan lands, to maintain wildlife species and undisturbed ecosystems and, as previously noted, to protect the interests of individuals engaged in subsistence lifestyles. 16 U.S.C. § 3101. In order to assure the continuation of subsistence lifestyles, Congress indicated that residents so engaged should play a part in the administrative structure. 16 U.S.C. § 3111. Section 810 of the ANILCA, 16 U.S.C. § 3120, provides the procedural mechanism which insures this local input into the administrative decision-making process.

Section 810, Public Law 96-487, 16 U.S.C. § 3120, provides in relevant part as follows:

> (a) In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the Federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency--

> (1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to Section 805;
>
> (2) gives notice of, and holds, a hearing in the vicinity of the area involved; and
>
> (3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

Agency interpretations of a statute are entitled to great deference and should be upheld so long as they are reasonable. Western Pioneer, Inc. v. United States, 709 F.2d 1331, 1335 (9th Cir. 1983); United States v. Boyden, 696 F.2d 685, 688 (9th Cir. 1983). "This traditional acquiescence in administrative expertise is particularly apt" when an agency "has played a pivotal role in 'setting [the statutory] machinery in motion.'" Ford Motor Credit Co. v. Milhollin, 444 U.S. 555, 566 (1980)(quoting Norwegian Nitrogen Products Co. v. United States, 288 U.S. 294, 315 (1933)). As we noted in Western Pioneer, 709 F.2d at 1335:

> Our task then, is not to interpret the statutes as we think best, but rather to inquire whether the [agency's] construction was "sufficiently reasonable" to be

> accepted. "To satisfy the standard it is not necessary for a court to find that the agency's construction was the only reasonable one or even the reading the court would have reached if the question initially had arisen in a judicial proceeding." [citations omitted.]

The plain terms of Section 810(a) require the director or his designee, here the BLM (agency), to "evaluate" three factors concerning the decision to issue oil and gas leases involved in the programmatic leasing sale. These factors include: (1) the effect of leases on subsistence uses and needs; (2) the availability of other lands for oil and gas leasing; and (3) other alternatives which would reduce or eliminate the amount of land taken away from subsistence uses. 16 U.S.C. § 3120(a). This provision must be read in light of section 6508 of the NPRPA which requires the agency to grant some oil and gas leases in the NRP-A. 42 U.S.C. § 6508. The only "other lands" and "other alternatives" that the agency could have considered without violating section 6508 would be other tracts within the NPR-A which could be leased for oil and gas.

As the district court observed, when the first sentence of section 810(a) is read in light of 42 U.S.C. § 6508, it requires the agency to evaluate the effects upon subsistence needs of leasing the particular tracts tentatively selected and to compare the relative desirability of leasing other tracts within the NPR-A. This leaves to the

agency's discretion the particular details concerning when, where, and how leasing within the NPR-A shall occur.

A second provision of Section 810(a) requires the agency to hold public hearings and make specific findings concerning significant restrictions upon subsistence uses caused by federal decisions involving Alaskan public lands. 16 U.S.C. § 3120(a). The second sentence of this provision suggests that these procedures are necessary only if the agency first concludes that the contemplated action may significantly restrict subsistence uses. Id. To read the sentence otherwise would require that the agency follow these procedures any time it contemplated federal action concerning any public lands in Alaska and would completely ignore the phrase "which would significantly restrict subsistence uses." The inference to be drawn from this language is that Congress intended a two-step process: first, the agency determines whether the contemplated action may significantly restrict subsistence use; if it may, the agency must comply with the notice and hearing procedures. This construction of the statute is a reasonable one, relying on the plain meaning of the words of the statute.

Pursuant to this procedural scheme, the agency first defined "significant restriction" and then conducted an extended analysis of the "significance" of subsistence restrictions, as to both subsistence resources and user

access. MROD at 1, 5-25. This analysis allowed a finding of no significance only if there were "no" reductions or only "slight" reductions or disruption of resources or user access to those resources. MROD at 5-6. As a result of its analysis, the agency determined that neither the programmatic leasing program nor Lease Sale 831 would significantly restrict subsistence uses. Appellants argue that this decision was capricious and should be overruled. 5 U.S.C. § 706(2)(A).

> To make this finding the court must consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment. Although this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgment for that of the agency.

Citizens to Preserve Overton Park v. Volpe, 401 U.S. at 146; Southeast Alaska Conservation Council v. Watson, 697 F.2d 1305, 1312 (9th Cir. 1983). Additionally, we must consider whether the agency articulated a rational connection between the facts found and the choice made. State of California v. Watt, 683 F.2d 1253 (9th Cir. 1982).

We find that the agency examined the relevant factors and did not error in its judgment. The district court's decision includes findings of fact which evidence an articulated rational connection between the facts found [by the agency] and the choice made. Id. See CR 111 (Decision of Record). The agency's decision-making process

included the cumulative impacts of both the entire expedited leasing program and Lease Sale 831. This is evidenced by the fact that the agency remcved certain lands, such as Caribou calving areas and Black Brant molting areas, from potential leasing and included stipulations regarding subsistence use in the leases. The agency imposed these protective lease conditions and stipulations in order to preclude future restrictions on subsistence uses that might be caused by activity permitted by the NPR-A leasing program.

Appellants argue that the agency adopted an overly restrictive definition of the term "significant restriction upon subsistence uses." This term is not defined by Section 810(a); consequently, the agency has defined it as (1) a reduction in the availability of harvestable resources caused by decline in the population of subsistence resources; (2) a reduction in the availability of resources, caused by an alteration in their distribution or location throughout the NPR-A; and (3) the limitation of access for subsistence harvesters. Arguing that the term is analogous to the finding of "significant effect on the quality of the human environment" of the NEPA provisions, appellants urge adoption of a broader definition. They argue that a "restriction" is a much higher threshold than that required to trigger a NEPA procedural process and so should be prohibited.

We agree with the district court's finding that the agency definition of "significant restriction" is within the range of reasonable meanings which the words of the statute permit. Loma Linda University v. Schweiker, 705 F.2d 1123, 1126 (9th Cir. 1983). The term "restrict" may well be a higher threshold than that required by NEPA; however, we need not determine in this case whether the agency's general definition survives the arbitrary and capricious standard in all cases or whether it is not at a high enough threshold. We hold only on the record before us that the application of that definition to the proceedings here and the actual analysis that led to the decision reached was not arbitrary and capricious and that the proceedings undertaken sufficiently complied with the requirements of section 810. We note also that the BLM explicitly retained the right to impose additional restrictions, including mitigation requirements during the permitting process to protect subsistence resources. The definition is within the range of meanings which could be given and is consistent with the purposes of the legislation and we affirm. Id.

D. Restriction of Appellants' Case

Kunaknana and Numnik contend that the district court erred by unreasonably restricting the presentation of their case. Specifically, error is alleged in the district court's refusal to consider the affidavits of two of

appellants' expert witnesses; limitation of discovery; and improper resolution of the MROD issue on summary judgment.

As noted earlier, trial court review of agency decision-making is generally limited to the existing administrative record. Overton Park, id. This record may be supplemented with testimony from the officials who participated in the decision explaining their action or by formal findings prepared by the agency explaining its decision. ASARCO, 616 F.2d at 1159-60. Outside information is admissible only for limited purposes. Id. at 1160-61. See Bunker Hill, 572 F.2d at 1292 (outside evidence admitted to furnish background information); see also Association of Pacific Fisheries v. Environmental Protection Agency, 615 F.2d 794, 811 (9th Cir. 1980) (outside evidence used to ascertain whether all relevant factors were considered). "[T]echnical testimony . . . elicited for the purpose of determining the scientific merit of the [agency's] decison," is not generally admissible. ASARCP, id. at 1161.

Our review leads us to conclude that the expert witness affidavits offered by appellants, CR 68, are the type of "technical testimony" prepared "for the purpose of contesting "the scientific merit" of the agency's analysis which we rejected in ASARCO. The district court's decision to exclude these documents on review is affirmed.

Appellants' contention that curtailment of discovery forced presentation of their case on an incomplete

record lacks merit. The order staying discovery permitted deposition of BLM officials Jerry Wickstrom and James Gilliam and did not limit the areas of inquiry. CR 67. In view of the statutory mandate to expedite, 42 U.S.C. § 6508, we do not find that the district court abused its discretion in foreclosing discovery and setting an abbreviated briefing schedule. O'Brien v. Sky Chefs, Inc., 670 F.2d 864, 869 (9th Cir. 1982).

Finally, Kunaknana and Numnik claim that the district court improperly resolved this matter on motion for summary judgment. We disagree. Our review reveals a trial by the court on December 12, 1983, followed by a resolution of the contested fact issues in a Decision of Record entered December 20, 1983. We find that the district court conducted the proper inquiry in the acceptable format.

III. CONCLUSION

For the foregoing reasons, we

AFFIRM.

January 18, 1987

Dr. William D. Witherspoon
2897 Country Squire Lane
Decatur, Georgia 30033

Director, U.S. Fish and Wildlife Service
Division of Refuges
Room 2343 Main Interior Building
18th and C Sts., NW
Washington, DC 20240

Re: Draft Coastal Plain Resource Assessment, Arctic National Wildlife Refuge, Alaska

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Dear Sirs:

I would like to take this opportunity to comment on the draft Arctic National Wildlife Refuge (ANWR), Alaska, Coastal Plain Resource Assessment. I understand the deadline for such comments is January 23, 1987.

I feel qualified to comment on geologic aspects of the report because of my previous work in this area. From December 1980 through March 1984, I worked as Research Geologist for one of the oil companies active in the area. My major responsibility was to provide regional geologic support for exploration in the ANWR and adjacent offshore. I met with some of the authors of the report in Menlo Park and I visited the Coastal Plain of ANWR in 1983 as part of a surface geology study team.

I respect both the geologists of U.S.G.S. and my former colleagues in the industry. However, I would be quite surprised if any of them would expect a decision-maker in industry to lease a tract or drill a well based on the depth and quality of the analysis presented in the report.

Yet, on such information, Congress is expected to end the area's status as the last protected Arctic coastline in the U.S.

As others have indicated, the executive summary seems to bias the report's results in favor of development. It quotes the prediction of "a 95-percent chance of the 1002 area containing more than 4.8 billion barrels of oil..." yet omits that this is supposed to be contingent on there being at least one commercial discovery, the chances of which are assessed as 19 percent. The summary also exaggerates the report's optimism by quoting estimates of oil in-place rather than economically recoverable oil.

But the summary is not the only problem. In my opinion, the precise-sounding figures themselves are <u>at best</u> seat-of-the pants estimates, and at worst an overly optimistic interpretation. Here are some key points in the report that trouble me:

1. For most of the area, only one seismic horizon has been mapped -- the "basement top" reflector (p.58). By not mapping the objective reservoir intervals, the authors avoid using the only data they have to determine whether reservoir intervals terminate on unconformities, disappear due to facies changes, or thin laterally. All of these factors are real possibilities in the area.

2. Likewise, by mapping only the top of basement, the authors tacitly assume that closure on their propects remains the same at the (higher) stratigraphic levels of the objective intervals. This is rarely the case in a fold and thrust belt: typically structures at higher levels are smaller due both to tighter fold geometries and interruption by steeper thrust faults. This increases my skepticism about the two exceptionally large structures in the northeast part of the 1002 area, 18 and 19 (Figure III-1), which undoubtedly contribute significantly to the optimistic sacle of the reserve estimates.

3. At the root of the first two problems is evidently lack of access by the authors to the sophisticated seismic processing available in the industry. The seismic data as shown in plate 5 is of poor quality. Combined with the only moderate grid spacing, this contributes to an overall lack of confidence in the map on which the reserve estimates depend so heavily.

4. According to the report, 50% of the estimated oil is contained in the "Folded Ellesmerian/Pre Missisippian" play (p. 68). Yet the report itself raises many doubts about the

continuity of these units into the study area. For example, Figure III-5 presents the interpretation that the most attractive reservoirs in this sequence (including the Prudhoe reservoir equivalents) are missing in the 1002 area due to erosion!

On the same page, the report states, "However, their northward extent [into the 1002 area from exposures in the mountains] depends on several factors, such as the rate of truncation on the unconformity, the amount of northward transport by thrust faulting, and the possible existence of downdropped fault blocks north of the truncation edge, about which we have little direct information....If most of the Ellesmerian rocks are missing in most of the 1002 area, the assessment number would be reduced considerably." (p. 66).

One could add that these strata if present could lack porosity due to their history of greater deformation and overburden than at Prudhoe Bay.

5. The report states that potential source rocks for the Ellesmerian play include fine-grained Ellesmerian rocks (believed to be gas-prone) and "possibly the Hue shale" (p.66). The doubt about the Hue is presumably because other rocks may intervene between it and any Ellesmerian reservoirs and because in any case "charge from above" is not generally considered a strong scenario. Since the Hue is the only potential source rock the report confirms to be oil-prone (p. 62), there is doubt that the Ellesmerian play could be oil-bearing.

My opinion is that the report does not contain enough depth for a geologist to responsibly conclude that "The area is clearly the most outstanding oil and gas frontier remaining in the United States" (Executive Summary, page 1). The report adds considerably to our earlier understanding of the area, but the overall impact on the attractiveness of the area is <u>negative</u> in my view, for at least two reasons.

First, the data confirms that the fold and thrust architecture as seen in the Brooks Range indeed characterizes the whole area. Notwithstanding encouraging results in areas such Idaho and Montana, thrust belts are among the most challenging of frontier areas. They present formidable obstacles to seismic processing and interpretation. They can be characterized by rapid and unexpected facies changes, often poor porosity, thermal regimes that tend to make them gas provinces, and small size and complex evolution of trapping structures.

Second, one of the properties of a successful province like Prudhoe Bay that one hopes will carry over into adjacent areas is the source rock. But the report appears to put hopes to rest that the pebble shale and older possible source rocks for Prudhoe could have generated oil in the 1002 area (page 62).

I understand and to some extent sympathize with the desire of my former colleagues in industry to meet the challenges of the ANWR and particularly to provide additional geologic control to assist current exploration efforts in the adjacent offshore.

However, I think it does the American people a disservice to represent the area as a sure-fire success and solution to future energy problems. The area is already in service to the public: let it remain as the last pristine Arctic coastline and a preserve for future generations.

Sincerely,

Bill Witherspoon

cc:

Hon. Pat Swindall
Hon. Lindsay Thomas
Hon. Sam Nunn
Hon. Wyche Fowler

February 3, 1987

TO: U.S. Fish and Wildlife Service
Attention: Division of Refuge Management Resources
2343 Main Interior Bldg.
18th and C Sts., N.W.
Washington, D.C. 20240

FROM: Virginia H. Wood
1819 Muskox Trail
Fairbanks, AK 99709

RE: Comments on Arctic National Wildlife Refuge Coastal Plain Resource Assessment

I wish to have the following comments inserted in the record.

First, let me state my bias openly and straightforwardly. I admit to having a strong emotional attachment for the Arctic National Wildlife Refuge; and I am strongly opposed to any legislation by Congress which would open up the coastal plain (the 1002 area) of this sanctuary to the oil industry for oil and gas leasing and development. This violates the very reason for which the Refuge was created by Congress in 1960--"to preserve the area's unique wildlife, wilderness and recreational values".

The Alaska National Interest Lands Conservation Act (ANILCA) added other purposes for the Refuge:

1. To conserve fish and wildlife populations and habitats in their natural diversity.
2. To fulfill international treaty obligations of the U.S. with respect to fish and wildlife and their habitats.
3. To provide opportunities for continued subsistence uses by local inhabitants.
4. To insure water quality and necessary quantity within the refuge.

My first statement is influenced by having personally known the late Olaus Murie, the highly regarded pioneer of arctic biological research in Alaska, who first conceived of a preserve that would set aside a representative area of arctic Alaska large enough to preserve wildlife and habitat for posterity. He envisioned a preserve large enough to encompass a range of landscapes from the polar sea and tundra plains to the arctic alpine and the boreal forests.

I took part in the preliminary hearing held in Fairbanks, Alaska which eventually led to the establishment of the Arctic National Wildlife Range in 1960. For the past 11 years I have guided commercial backpacking and river rafting trips in various parts of the present Arctic National Wildlife Refuge. (I would like to interject here

that over half of my clients have been over 50 years old and a few have been over 70, most all of moderate means.)

Thus my comments are not just based on academic or doctrinaire opinion, but come from a close personal involvement in this land and its wildlife that are unique in the USA. I expected the Department of Interior to hold this Refuge in trust for me and future generations. I feel that this trust has been betrayed by the Secretary's recommendations.

I also challenge the Secretary's recommendations as stated in Chap. VIII of the Draft Assessment on the 1002 area because I believe that his assumptions equating Prudhoe Bay developments with those that would take place in the 1002 area are false; that they do not address the important potential impact of ancillary infrastructures that opening the entire area to oil drilling and production would require--including airfields, roads, more pipelines, waste disposal and construction and maintenance camps; that it does not deal with the fact that, contrary to the Prudhoe Bay site, the 1002 area is extremely lacking in the water and gravel resources necessary for construction and operation; and that the recommendations contradict the conclusions of the Department's own biologists in the report.

On Page 6 it is stated:

"Long term losses in fish and wildlife resources, subsistence uses, and wilderness values would be the inevitable consequence of a long term committment to oil and gas development, production and transportation...Oil and gas discovery will lead to industrial development. There will be pressure to use this area as a base to serve exploration and development on the continental shelf, or to intertie with projected oil and gas developments on the outer continental shelf.

Oil and gas development will result in widespread, long term changes in wildlife habitats, wilderness environments, and Native activities. Changes could include displacement and reduction in the size of the Porcupine caribou herd (presently estimated at 180,000 animals)...Geography apparently limits the availability of suitable alternate calving or insect relief habitats for the herd".

The Secretary's recommendation states that wildlife habitat impacts would be "mitigated", but there are no details on just how this could be done. (My suspicion is that mitigation would be waived if this put an economic burden on the oil companies.)

The assumption that the Prudhoe bay experience proves that oil drilling can take place on sensitive arctic habitat with little or no impact on wildlife or the environment is challenged by such highly-regarded biologists as Dr. David Klein of the University of Alaska, who has done extensive research on caribou in Alaska and Canada, as well as on the wild reindeer of Scandinavia. He has said,

"It's still an open question, but the Prudhoe Bay oil field is such a mass of pipelines, roads, and facilities,

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without any good planning for caribou that the area appears largely lost to their use."

A news article in the Fairbanks Daily News Miner, dated Feb. 1, 1987, stated:

"The state Department of Environmental Conservation says oil and gas exploration and production produces hazardous wastes, but the industry has been exempted from federal and state laws governing its management and control."

The article goes on to cite specific instances of hazardous waste in the North Slope oil fields and the difficulties involved in dealing with it. Industry retaliated by saying that complying with regulations would be "economically devastating".

The alleged justification for opening the whole 1002 area for unlimited oil drilling and production in direct contradiction of the stated purposes for which the Refuge was established is that new oil fields are needed for "energy independence" and "national security".

The environmental risks this portends hardly seem worth the approximately 196 days worth of recoverable oil possible at optimistic estimates based on the report's own figures of the amount of daily use of oil predicted by the year 2005 divided into the amount of oil that might be recoverable.

Especially when oil lease auctions on Alaska state lands are attracting few bidders nowadays; when Arco and other oil companies are abandoning their present leases because oil glut prices do not justify paying the rent on them; and when oil companies in Alaska are closing down viable wells because oil revenues are too low. Also by administrative decree for some reason the oil reserves stored for emergency use are now kept at a low percentage of their capacity.

Projected monetary returns from projected 1002 area wells, should they become a reality, are based on a price of oil at $33 per barrel, a price not predicted by economists during the next decade.

Keeping the 55 mph speed limit, implementing the compulsory energy efficient ratings on appliances, and mandating higher mileage per gallon ratings for new cars--all of them recommended for elimination by this administration--would save as much oil as the 1002 area may produce at the given odds.

Nor does "national security" seem a convincing reason to sacrifice the wilderness integrity of the coastal plain of the Arctic National Wildlife Refuge when there is also a strong push to sell Alaska oil to Japan; or when our major threat to national security appears to be a "mistake" that might start a nuclear war, and the terrorist bombings and taking of hostages--none of which can be deterred by Alaskan oil. I also recall that in our last "war" we were defeated by peasants on foot and bicycles while we had all the oil we could possibly use for our military machines.

It is rather an irony that opening up the 1002 area to full oil drilling and production would preclude me and my

clients from going anywhere near an oil field or using the infrastructure facilities, yet under the present status of the Refuge, or under wilderness status, we could rove at will.

There is tight secrecy and security at Prudhoe Bay. One is not allowed out of the terminal at Deadhorse Airport without a security clearance. This is not a national defense restriction. It is imposed by the oil companies. They also refuse to disclose drilling data that would help determine if the disposing of hazardous waste in dry wells in the arctic is feasible and safe.

The 125 mile coast of the Arctic National Wildlife Refuge is the only shoreline closed to oil drilling in the arctic. There are still vast areas open to oil exploration and development in other parts of the North Slope of Alaska, and elsewhere in the state. The oil that might be in the 1002 area of the Refuge will still be there when we have squandered the crude in other places and so will the caribou and wilderness. Let us then decide our priorities. Although I would prefer Alternative D - "no action", realizing that refuge status did not protect the 1002 area from a Secretary of Interior who chose to recommend that it be opened up for full leasing and oil development, I feel I must opt for Alternative E--wilderness designation--to give it adequate protection.

Signed Virginia H. Wood

Virginia H. Wood
1819 Muskox Trail
Fairbanks, AK 99709

P-111

JAN 17, 1987

MS CYNTHIA WRIGHT
521 E. 6th St. #7
NYC, NY 10009

Noreen Clough
Division of Refuge Management
Room 2343
U.S. Department of the Interior
18th and C Streets N.W.
Washington DC 20240

Dear Ms Clough,

Please send me a copy of the report referred to in the Dept. of the Interiors news release of NOV 24 1986 concerning the "Interior Dep Seeking) Public Comments on DRAFT Report Regarding Oil and Gas Potential on ARTIC National WILDLife Refuge."

I have a copy of DRAFT
ARTIC NATIONAL WILD
REFUGE, ALASKA
COASTAL PLAIN RESO
ASSESSMENT

I read it and had issue with the following—

I.) In looking to the future, should
not anticipate the possibility/proba
that our oil and gas consumption
might cease to grow or even
shrink as our technology improves
ways of recycling spent fuels and
petroleum products and using more
available oil and gas alternatives?

II.) The "traditional oil producing areas of
the western United States, Texas, the
Gulf Coast and Mid-continent" where
the report mentions "significant decl
in reserves will occur," are currentl
working at a fraction of their
capacity. It is impossible to antic-pat
therefore when these reserves will
be "depleted," if ever.

III.) The report states "most adverse environm
effects would be minimized or eliminated th
mitigation based on ... information acquired
during the development of Prudehoe Bay...
and the Pipeline."

Exactly what are those lessons and ho
can they be carried out? We have
all seen pictures of the
tundra (an extremely fragile fau

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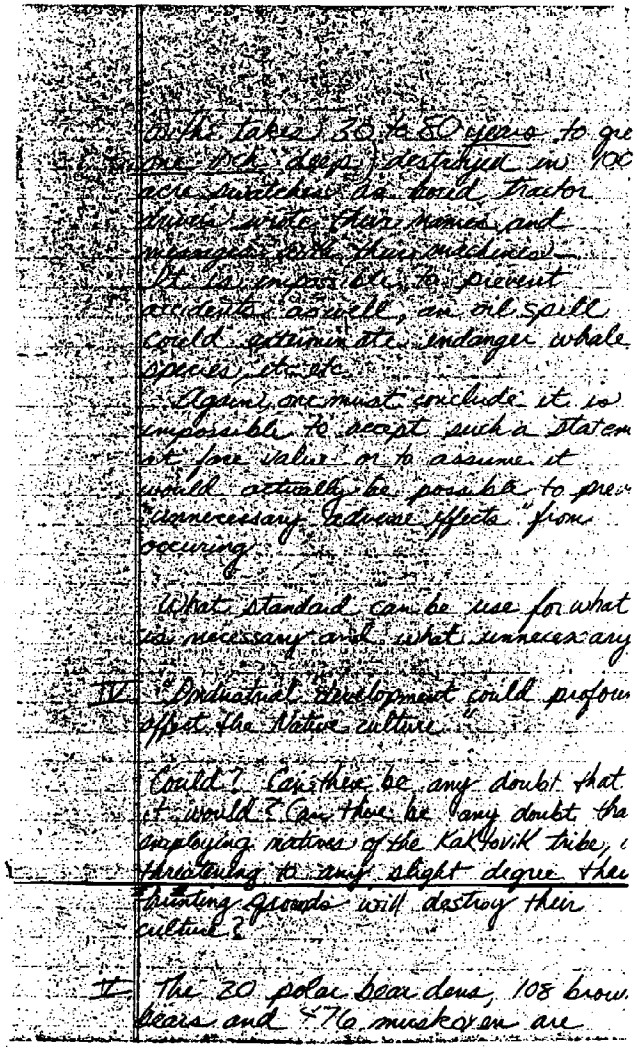


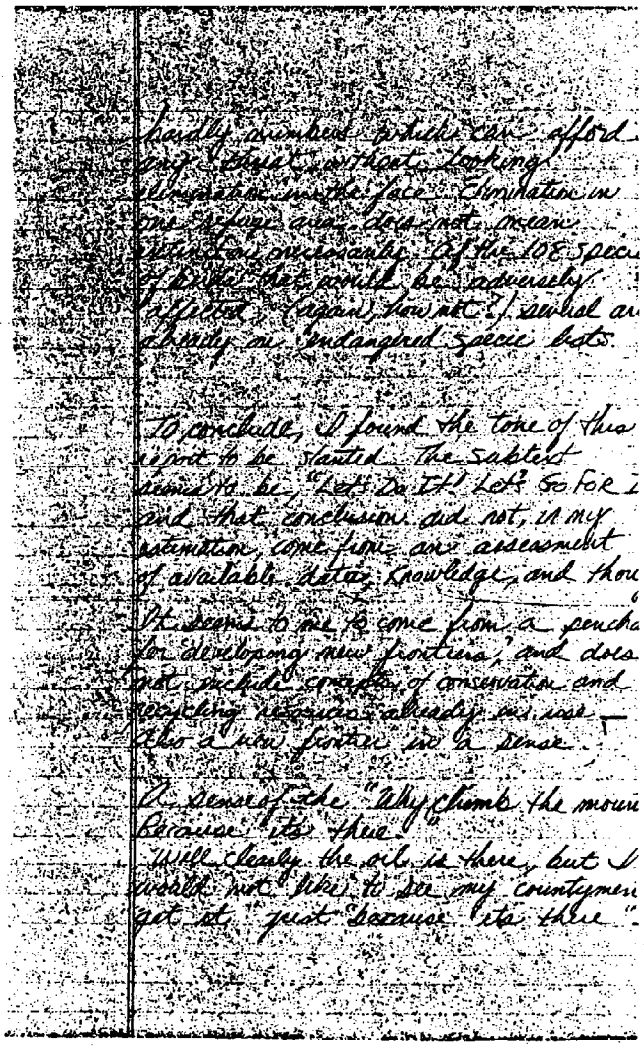
might take 30 to 50 years to gro
one inch deep destroyed in 100
acre swath by a diesel tractor
driver write their names and
emerge with their medals —
It is impossible to prevent
accidents as well, an oil spill
could exterminate endanger whale
species etc etc.
I agree, one must conclude it is
impossible to accept such a statem
at face value or to assume it
would actually be possible to pre
"unnecessary adverse effects" from
occuring.

What standard can be use for what
is necessary and what unnecessary

IV "Industrial development could profou
affect the Native culture."

Could? Can there be any doubt that
it would? Can there be any doubt tha
employing natives of the Kaktovik tribe,
threatening to any slight degree their
hunting grounds will destroy their
culture?

It The 20 polar bear dens, 108 brow
bears and 476 muskoxen are



hardly numbers which can afford
any chance without looking
disaster in the face. Elimination in
one of four areas does not mean
elimination necessarily of the 108 specie
of bears that would be adversely
affected. Polar bears now not? / denied a
already as endangered species lists.

To conclude, I found the tone of this
report to be slanted. The subtext
seems to be, "Let's Do It! Let's Go for i
and that conclusion did not, in my
estimation, come from an assessment
of available data, knowledge, and thou

It seems to me to come from a penchan
for developing new frontiers, and does
not include concepts of conservation and
recycling resources already in use —
this a new frontier in a sense.

In sense of the "Why climb the moun
Because it's there."
Well clearly the oil is there, but I
wouldn't not like to see my countrymen
get at it just because it's there."

1031 S. Scoville Ave.
Oak Park, IL 60304
14 Jan.'87

U.S. Fish and Wildlife Service (USFWS)
Attn: Division of Refuge Management
U.S. Department of the Interior (USDI)
2343 Main Interior Bldg.
18th and C Sts., NW
Washington, DC 20240

Dear Persons:

Subj: Comments on Draft Coastal Plain Resource Assessment
Arctic National Wildlife Refuge, Alaska (ANWR).

This letter constitutes my comments on your draft coastal plain resource assessment for the ANWR dated November 1986 and prepared under your program in response to §1002 of the Alaska National Interest Lands Conservation Act (ANILCA). I cannot emphasize too strongly my believe that the public interest in this matter can only be well-served by designation of the entire ANWR (including, most emphatically, the critical coastal habitat of the §1002 area) as wilderness (i.e., selection of your "Alternative E" as identified on pages 141-142 of the draft assessment).

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Regrettably, I must take issue with the contention in the draft assessment that the USDI's proposal to lease the entire §1002 area for oil and gas exploration and development rests on any analysis of the facts of the matter [p. 1]. The word analysis implies reasoned examination. To the contrary, it has been evident from the beginning that the USDI had a strong precommitment to oil exploration and development anywhere, at anytime, and at any cost to the public. Unfortunately, such precommitment is consistent with the historical way in which the USDI has operated as well as the policy of President Reagan's Administration. It preceeded any research or information gathering activities actually conducted in carrying out §1002 of the ANILCA. Indeed, it colored how the USDI has gone about conducting its research and managing the ANWR during the past six years.

I was present in Kaktovik and the ANWR during part of the time the USDI was carrying out its §1002 program in the first four years after passage of the ANILCA. From interactions with USDI officials, it was quite clear what was taking place and that the decision to condone full leasing for any oil exploration and development desired by the oil industry had already been made. This was obvious at the first scoping meetings in Kaktovik when USDI officials refused to provide interested citizens with requested information or answers to highly pertinent questions and it has been equally obvious to the present time when it has taken legal action to make this comment period possible. It was also obvious when the USDI facilitated the "land swap" that allowed Chevron to drill on the coastal plain and approved the use of tracked vehicles for surface seismic work when less damaging technology that could obtain the same information was readily available. Both of these actions can be interpreted as frustrating the expressed will of Congress.

A careful reading of the draft assessment makes it clear that the facts as presented in it support selection of "Alternative E". I do not believe that any other conclusion can be drawn from an analysis of the information presented in it as a whole if the public interest is uppermost in your mind. The physical [pp. 15-23] and biological [pp. 15-38] environment of the ANWR is without parallel in the United States and the traditional values of the Inuit eskimo people living in the area are dependent on its maintenance (other Native peoples in Alaska and Canada are also dependent on migrating animals that utilize the §1002 habitat). These are clearly threatened by any oil exploration and development activities. Such activites are simply incompatible. Furthermore, there is no guarantee that any commercially recoverable oil even exists in the ANWR. USDI is willing to jeopardize the ANWR and the animals and people who depend on it for a 19.0% "marginal probability" of finding any "economically recoverable oil somewhere in the 1002 area" [p. 72]. Even if oil was found, it would literally be a drop in the bucket that would only marginally extend a failed policy. The real answer is to shift to sustainable and environmentally compatible alternative energy programs rather than attempting to delay the inevitable and degrading the environment in the process.

At least at some times in the past the USFWS took its professional and legal responsibilities more seriously than it apparently does now. Recognizing the potential for adverse effects that proposed energy development activities in the same area of the ANWR posed at that time (i.e., the arctic gas pipeline), the USFWS issued a position paper in which it was pointed out that such development was fundamentally "incompatible with the basic values of the Range" in 1977 and that the USFWS should oppose it because it had a "legal responsibility to preserve the (ANWR's) integrity". As stated in that position paper (copies of this two page position paper and L.A. Greenwalt's one page cover memo of 21 Jun.'77 are attached to these comments):

> "The U.S. Fish and Wildlife Service is opposed to the proposed gas pipeline routing across the Arctic National Wildlife Range or, alternatively, along its northern or western borders. We do not believe that the long-term National interest would be served by committing this unique area to development for short-term benefit when its outstanding values for wildlife and wilderness would be forever lost. To protect our public trust and to exemplify our good conscience as concerned ecologists, we must object strongly to any development which would threaten the integrity of the Arctic National Wildlife Range (emphasis added)."

As noted in the draft assessment [pp. 45-46]:

> "The Arctic Refuge is the only conservation system unit that protects in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America (emphasis added)."

> "Most of the major wildlife species occurring on the refuge (caribou, moose, brown bears, wolverines, wolves, muskoxen, polar bears, and numerous species of birds) use 1002 area habitats for all or part of their life cycles (calving, nesting, breeding, staging). The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge. Caribou migrating to and from the 1002 area and the postcalving caribou aggregation offer an unparalleled spectacle."

Some of the admissions regarding expected adverse impacts on species which depend on coastal habitat in the §1002 area of the ANWR that appear in the draft assessment are summarized below for emphasis:

1. There would be a major change in distribution of both that portion of the central arctic caribou heard using the §1002 area and the Porcupine caribou herd. The sum of loss of calving habitat, barriers to free movement, disturbance, stress, and "other factors" would "cumulatively" reduce both available habitat and habitat values on remaining aras and "could result in a major population decline and change in distribution of 20-40 percent" [p. 112]. The §1002 area provides critical habitat for the Porcupine caribou herd, estimated to consist of as many as 180,000 animals [p. 105]. This risk alone should be enough to swing the decision against any further oil exploration and development activities in the ANWR. It is unacceptable.

2. It is predicted that "Major negative effects upon the muskoxen population" could also occur from oil development, on the order of "a change in distribution or decline affecting 25-50 percent of the population" [p. 114].

3. Although "only a few polar bears" might be excluded from their traditional denning areas, it is acknowledged that this "would be a moderate impact" because biologists "believe that the Beaufort Sea population can sustain litte, if any, increase in mortality" without a significant population decline [p. 118].

4. Although the cumulative effects of direct and indirect habitat loss, disturbance, and direct mortality might only result in "a reduction in the Banks Island population (of snow geese) or change in distribution of an average of 5-10 percent" a reduction in snow geese annual staging in the §1002 area "by almost 50 percent" could occur [p. 122].

5. According to the draft assessment, a number of other adverse impacts are likely on various mammal, bird, and fish populations in the §1002 area but, with the exception of possible "moderate" declines in the golden eagle population it is hoped that the adverse impacts will either be "minor" or can be reduced to "minor" levels through mitigating measures [pp. 105-126]. In this regard, it should be remembered that reliance upon mitigating measures is not always found to be justified and that the cumulative impact of a series of "minor" impacts may be highly significant.

The people living in Kaktovik value the natural resources of the ANWR very highly and their traditional lifestyle is dependent on them. What does the USDI propose for them? As acknowledged in the draft assessment, they are likely to suffer cumulative adverse effects through "reduced availability of subsistence resources", "disruption of traditional subsistence use sites, and likely psychological effects" which, as a whole, are classified as "a major adverse effect" [pp. 126-129]. The people of the north slope (including Kaktovik) have already suffered substantial disruption as a result of other oil exploration and development activities. This disruption has been accompanied by increases in alcohol and drug abuse. We cannot in good conscience allow more such disruption. If we do, what this says about our values is self-damning.

I have lived and worked part-time in Kaktovik and the ANWR for eight years. I am an engineer whose profession is environmental protection. It is my firm believe that we cannot afford to risk the ANWR. If you give the "green light" to oil exploration and development in the §1002 area damage will occur. The only question

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would then become precisely how much damage. For example, is the Porcupine caribou herd to be reduced by 20 or 40 percent (or somewhere in between)? Human systems (both engineered and regulatory ones) are imperfect. Even under the best of circumstances with well-intentioned people, you can expect equipment to fail and regulatory systems not to accomplish their assigned tasks. Such problems tend to occur more frequently in the arctic than in more temperate climates. The widespread environmental noncompliance that took place during construction of the trans-Alaska oil pipeline system is a classic example. We know of a number of significant, adverse environmental impacts that occurred during that project (e.g., fish kills from large oil spills and sedimentation) and the full impact of it is as of yet unknown. The ANWR is too precious to allow it to be damaged for any reason let alone one that may be a "pipe dream" pushed by people who place personal greed about the public interest. It should be remembered that once upon a time there was an infrastructure pushing for exploration and development of the "tremendous" oil reserves believed to exist in what was then called National Petroleum Reserve No. 4 (NPR-4), on Alaska's north slope (e.g., Senator Jackson of Washington, who no doubt received his information from the oil industry and Alaska commercial interests, once opined that there were 100 billion barrels of oil waiting to be tapped in NPR-4). After spending something on the order of one-billion dollars of public money to drill deep, dry holes we seem to have laid that fantasy to rest.

I strongly urge that the USDI change its position and recommend wilderness designation for the §1002 area. The entire ANWR should be protected to the highest level possible and such incompatible uses as oil exploration and development should not be allowed there. Your consideration of these comments would be appreciated, but it would be even more appreicated if the USDI would take them to heart and act accordingly. I also request that you provide me with copies of the final assessment, the required response to comments, and the final decision in this matter.

Sincerely,

G.M. Zemansky, Ph.D.

Attachment

cc: Selected Members of Illinois Congressional Delegation

OPTIONAL FORM NO. 10
JULY 1973 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Service Directorate DATE: JUN 21 1977

FROM : Director

SUBJECT: U. S. Fish and Wildlife Service Position on Proposed Arctic Gas Pipeline Across the Arctic National Wildlife Range, Alaska

As you may know, the President is to make a determination of the need for, and possible routing of, a natural gas pipeline system from the Prudhoe Bay area of Alaska to the contiguous United States. This decision is to be made by September 1, 1977, unless the President utilizes the option provided by the Congress, which would permit a delay in issuance of the decision for up to 90 days after September 1.

This decision will be a difficult one, with many sensitive factors to be considered. One of the more controversial routes proposes to cross the Arctic National Wildlife Range with a 48 inch pipeline that would transport the gas, via the Mackenzie-Delta and Valley, through Canada, to the Midwestern States for ultimate delivery both east and west of the Rocky Mountains.

The Service has developed a clear position on this pipeline route, as indicated in the attached statement.

You or your staffs may be asked about the view the Service takes, and the general interest in this subject may generate press inquiries of your offices. The position taken, that of opposing the crossing of the Arctic Range by a gas pipeline, is based upon the fact that such a crossing is clearly not compatible with the basic purpose of the Arctic Range and, therefore, must be opposed by the Service.

This position statement will be used to portray the Fish and Wildlife Service's position on this subject, and should be your source document for dealing with inquiries and in making your own responses to questions about the issue. For additional information, if needed, you may contact Burkett Neely, Division of Refuges, Washington, D. C. (Telephone No. 202-343-4047). Mr. Neely is the FWS's coordinator for this project.

Lynn A. Greenwalt

Attachment

P-117

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

STATEMENT OF POSITION OF THE U. S. FISH AND WILDLIFE SERVICE ON THE MATTER OF A GAS PIPELINE ROUTE FROM PRUDHOE BAY, ALASKA

To date, no cooperative land-use plan among State, Federal, and Native land owners has been established for the Arctic slope of Alaska. In its absence, the history of development in this region has been one of commitment to National defense and the petroleum industry. As a result much of this area has been degraded to varying degrees, most prominently by thousands of miles of seismic trails laid out in checkerboard patterns across the tundra, and by airstrips, drilling pads, access roads, oilwells, and discarded equipment scattered across the coastal plain. More degradation will ensue with increasing exploration activities on the National Petroleum Reserve.

Between the Canadian border and east of the Canning River lies the Arctic National Wildlife Range, managed by the U.S. Fish and Wildlife Service with the paramount objective of perpetuating the wildlife and preserving the delicate Arctic wilderness habitat. The natural conditions within the Arctic National Wildlife Range, with but few exceptions, have been preserved as the single remnant of the vast Arctic slope of Alaska free of exploration and development. The Arctic National Wildlife Range is the last unspoiled area of its kind in the entire Northern Hemisphere. It is a biologically continuum of essentially unaltered arctic and subarctic habitats, from the arctic lowlands and foothills, across the Brooks Range, and onto the forested northern plateau.

Establishment of the Range resulted from wide-ranging support from noted conservationists, scientists, and many others, who more than two decades ago recognized its intrinsic value for wildlife and wilderness. The establishing order declares the purpose of the Arctic National Wildlife Range to be the preservation of unique wildlife, wilderness, and recreational values. A gas pipeline through or immediately skirting the Range and the probable ensuing development are clearly contrary to the mandated purpose of this order. Such activity would destroy wilderness values and irretrievably disrupt many wildlife populations and their habitats.

All the Range's fish and wildlife, including the polar bear, muskox, Dall sheep, barrenground grizzly bear, and peregrine falcon, is vital to the natural interplay of ecological forces. Of particular concern is the welfare of the Porcupine caribou herd, a major international resource which is vulnerable over a vast area because of its migratory behavior. Experience with the Arctic, Forty-mile, and Nelchina caribou herds, and with herds in Siberia, show human disturbances and/or developments on the traditional

range of caribou to be a principal factor disrupting the population dynamics of this species. The ultimate consequence has been a decline in herd size. A gas pipeline through the Arctic National Wildlife Range would cross the herd's traditional calving grounds in Alaska as well as the Yukon Territory.

The Dempster Highway, scheduled for completion in 1977, crosses the herd's crucial wintering grounds. The combined impacts from these developments and the logical extension of activities from them would undoubtedly cause a major reduction in the size of the Porcupine caribou herd.

The U. S. Fish and Wildlife Service is opposed to the proposed gas pipeline routing across the Arctic National Wildlife Range or, alternatively, along its northern or western borders. We do not believe that the long-term National interest would be served by committing this unique area to development for short-term benefit when its outstanding values for wildlife and wilderness would be forever lost. To protect our public trust and to exemplify our good conscience as concerned ecologists, we must object strongly to any development which would threaten the integrity of the Arctic National Wildlife Range.

Since there are alternative routes available to transport Prudhoe Bay gas to market, the U.S. Fish and Wildlife Service opposes the Arctic Gas Pipeline route in that it is incompatible with the basic values of the Range. It is our legal responsibility to preserve the integrity of the Arctic National Wildlife Range.

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Attention: Division of Refuge Management

I urge you to recommend that the coastal plain of the Arctic National Wildlife Refuge in Alaska be opened to petroleum exploration and development. The production of oil on the arctic coastal plain would help limit America's growing dependence on imported oil. And, the petroleum industry has demonstrated that petroleum operations are compatible with preserving the arctic environment.

Name: Viola K Verpeuran

Street: 5613 Hayter Ave

City: Lakewood, Calif State: 90712 Zip Code

R-1

I am against ANWR leasing.

Attention: Division of Refuge Management

I urge you to recommend that the coastal plain of the Arctic National Wildlife Refuge in Alaska be opened to petroleum exploration and development. The production of oil on the arctic coastal plain would help limit America's growing dependence on imported oil. And, the petroleum industry has demonstrated that petroleum operations are compatible with preserving the arctic environment.

Name: Billie Sebastian

Street: Rt 1 Box 247

City: Loving State: Tex Zip Code: 76062

If someone could figure out a meter for the sun, the oil and electric companies would get busy.

Action Alert: Give A New Year Gift to Wildlife?
Sign and Mail These Coupons Today!!

Deadline: January 30th:

The Secretary Donald Hodel
Rm. 6151
Department of the Interior
Washington, D.C. 20240

Dear Secretary Hodel,

I object to the proposal to allow oil drilling in the Arctic National Wildlife Refuge. This fragile arctic wilderness is the home of the last great herd of North American caribou. Oil drilling and associated activities would deter the caribou from their calving areas, disrupt the rich diversity of arctic wildlife that exists there, and damage the fragile arctic flora of the tundra. The amount of oil projected would not significantly affect our national security, nor would it in any way compensate for the environmental damage inflicted. I want this pristine part of our natural heritage preserved for generations to come. I strongly urge you to not allow any development to occur in this area. Please include my letter in the public record. Thank you.

Sincerely,

Signed: Sharon Silberstein Date: 1/12/87

Name & Address: 15 Hevers Lane, Mill Valley CA 94941
Sharon Silberstein

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20510 1/15/87

To Whom it May Concern:

I am writing you as an Alaska resident opposed to oil and gas exploration in the Arctic National Wildlife Refuge. I strongly feel it would be in the national interest to designate ANWR a wilderness area, for many reasons, so many I hardly know where to begin...

The amount of oil and gas the government says might come out of ANWR's coast plain is so small it doesn't justify the cost to wildlife and the overall beautiful wilderness of that place. And it bases its economic arguments as to the value of the oil on future oil prices that seem to me to be much too high. And where will the water to drill exploratory wells come from up there--the lakes are frozen during the winter and pumping it in from the sea would be really damaging, I think.

It angers me that the government has done so much lately to stop national energy conservation programs and other programs that would develop alternative, less damaging sources of energy while pushing ahead with oil development in areas like ANWR which are so valuable for so many other reasons. This seems so short-sighted and politically motivated--and threatening to our national security in the future, when there will be even less oil and we'll have to conserve and use other sources of energy.

What about the 20-40 percent decrease in the Porcupine caribou herd, the 25-50% decline in the muskoxen population, the 50% decline in the area's snow geese, and the significant declines in other wildlife populations predicted by the INterior report? I just don't understand how that kind of destruction can be justified for the relatively small amount of oil that may come out of the 1002 area. I keep thinking of the buffalo, the grizzly bears, the whales, and so on. When will it end?

I understand from a friend who is a computer consultant working at Prudhoe and who was at the recent hearings on the ANWR report in Kaktovik, that the natives there are seriously divided on the issue of whether or not to allow exploration in ANWR, contrary to what is reported (at least in the local paper here in Juneau, which is a cautious, knee-jerk rag at best, owned by someone in Florida) in the media. Natives with strong commitments to and good positions in the corporations up there are for it; natives with less power and money (my friend referred to them as "fringe types") are against it. I suspect these "fringe types" are the people living the traditional way, the "subsistence-users" who depend on caribou for meat. Another friend who has lived in Kaktovik and Arctic Village off and on for years told me that the mayor of Kaktovik is publicly in support of exploration, but privately has grave misgivings about it. He said the mayor said he's afraid to come out with his true opinion because he's afraid of causing trouble in the community. And I understand the people of Arctic Village are largely opposed to exploration in ANWR because of what it will do to the caribou. All this just to suggest that you look carefully at which interest groups within the native community are saying what. And consider what the social costs will be when the oil money (a small sum, probably, relative to the short-term profits of the oil companies) starts pumping in and ripping their communities apart, the way other Big Money has done in other parts of Alaska.

Finally (and this is the most difficult point to express): is it really in the national interest to eliminate most of the last stretch of wild arctic coastline in Alaska for a relatively few day's supply of oil? All the rest of that coast is open to oil development. I think the time has come--I hear it in the national media and from my friends and family in the lower 48--when a critical number of Americans are realizing that the "mental health" of the nation (if that's the right way to say it) depends on keeping the last few wild places on the North American continent as wilderness. Over and over again people below have said to me: "Oh, you live in Alaska. I don't think I'll ever get up there, but I love to think that there's all that space up there." I get the feeling when they tell me that that they're thinking of their own sanity, and of keeping the opportunity open for their children and their childrens' children to see wild places, really natural places so they can get a perspective on human society and maybe just get away from it for a while. I don't think of myself as an "environmentalist" opposed to all development; as an Alaskan I am now benefiting personally from oil development at Prudhoe Bay. But I see development in ANWR as a bad deal for Alaska as well as the nation, an unnecessary, foolish, short-sighted sacrifice of a national treasure. I just hope Congress gets the message in time that a considerable number of Alaskans feel the way I do.

Sincerely,

John R. Howe
6087 Thane Rd.
Juneau, AK. 99801

R-2

JOHN C. STOUT, JR.
2800 PEACHTREE CENTER HARRIS TOWER
235 PEACHTREE STREET, N.E. • ATLANTA, GEORGIA 30043-0801

January 12, 1987

U. S. Fish & Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th & "C" Streets, N. W.
Washington, D. C. 20240

Re: Arctic National Wildlife Refuge

Dear Sir or Madam:

Please be advised that I am strongly opposed to opening up the Arctic National Wildlife Refuge for oil and gas exploration. This refuge was set aside for the protection of wildlife, including the principal calving grounds of one of the largest caribou herds in the world. It is also a critically important habitat for a number of other rare and endangered species, such as golden eagles and polar bears. Endangered whales also dwell in the adjacent Beaufort Sea.

At a time when our oil and gas industry is practically shut down in the lower 48 states, particularly Louisiana, Texas and Oklahoma, it makes absolutely no sense to open up such a critically important wildlife refuge to oil and gas exploration. Moreover, I understand that there is only a 20% chance of finding economically recoverable oil beneath the coastal plain in the refuge. If it is not economically feasible to develop oil in the lower 48 states, then one must question the wisdom of the substantial destruction opening up the Arctic National Wildlife Refuge will cause in light of the dubious benefit to be obtained.

As one of those who worked long and hard for the preservation of critical Alaskan lands, and one who has also visited these Alaskan lands, we

would do great injustice to ourselves and to future generations to substantially damage such a unique resource for short-term gain. There is no critical oil shortage now. In fact, we are wallowing in oil and doing everything but conserving it. One day we will pay a price for that, too, just as we will pay for leasing the Arctic National Wildlife Refuge for oil exploration.

The coastal plain of this refuge should be designated as a wilderness area. It should not be opened up for oil and gas exploration.

I am sending a copy of this letter to my elected representatives in Congress. I am asking each of them to co-sponsor legislation to include the Arctic National Wildlife Refuge and its coastal plain in the national wilderness preservation system.

Thank you for your kind attention to my comments.

Very truly yours,

John C. Stout, Jr.

JCS:ls

cc Senator Sam Nunn
Senator Wyche Fowler
Hon. John Lewis

R-3

LEGISLATIVE OFFICE
P.O. Box 2793
904 Divide Avenue
Bismarck, North Dakota 58501

Farm Bureau & Affiliated Companies

North Dakota Farm Bureau

January 27, 1987

U.S. Fish and Wildlife Service
Division of Refuge Management
2243 Main Interior Building
18th and C Street NW
Washington, D.C. 20240

Dear Sirs:

The North Dakota Farm Bureau is a general farm organization of some 23,000 member families belonging to 50 county Farm Bureaus. We are concerned about obtaining an adequate amount of fuel at a reasonable price to carry out our farming operations.

R-4

We believe that it is most important that our nation develop all sources of energy. Furthermore, adequate and consistent supplies of energy are critical if agriculture is to continue to meet our nation's demands for fuel and fiber.

Farmers in North Dakota are most dependent on portable liquid fuels for production and transportation of agricultural commodities and farm supplies. At the present time there are no alternative sources of energy available to run equipment on the modern day farm. And, according to what we have heard, your Service is concerned about offshore exploration near Alaska. We believe this area is one of the most promising areas for exploration and development of petroleum and natural gas resources. It is our belief that there should be no delay in the exploration of this area for energy.

The environmental impact of the offshore oil industry is one which has an excellent record. Records show that only one spill in U.S. waters has resulted in significant amounts of oil reaching shore. More than 31,000 wells have been drilled in U.S. waters without a major incident. We do not believe that these small environmental risks justify a moratorium or any type of delay in exploration off Alaska. Delay of such exploration could have a major impact on agriculture and our nation as a whole.

Please consider allowing this exploration off Alaska with no delay.

Thank you.

Sincerely,

John McGauvran
Director, Public Affairs
North Dakota Farm Bureau

JM/ms

ARCTIC VILLAGE
ALASKA 99722
P.O. BOX 51
JAN 26, 1987

TO: WHOM IT MAY CONCERNS

SUBJECT: ARCTIC NATIONAL WILDLIFE REFUGE (ANWR)

DEAR SIR:

NOTHING MUCH I CAN DO OR SAY MIGHT NOT CHANGE YOUR MIND ABOUT KEEPING ANWR CLOSE TO OIL DEVELOPMENT, EVEN IF YOU DECIDE ALREADY TO KEEP IT CLOSE OR NOT. I STILL WANT YOU TO READ ON, ON WHAT I HAVE TO SAY

I'll TELL YOU LITTLE ABOUT MYSELF I GREW UP AS AN SUBSISTENCE USER, MY PARENTS ARE BOTH UNEDUCATED BUT MY FATHER UNDERSTOOD SOME ENGLISH. I GREW UP IN THE COUNTRY, NATIVE WAY OF LIFE

FOR HIGH SCHOOL I WAS SENT OUT TO OUTSIDE (OREGON), GRADUATED AFTER 6 YEARS, THAN ON TO RELOCATION PROGRAM THOROUGH BIA FINISHED 6 MONTHS OF CLERK TYIST, @ AT HEALDS BUSINESS COLLEGE. LIVED IN SANFRANCISCO, CALIF. WORKED AS GEN CLERK FOR BLUE, SHIELD HEALTH PLAN. I CAME BACK TO MY HOME 1970. SINCE THEN I INVOLVE WITH COMMUNITY TRYING TO BETER LIVING AND EDUCATION FOR MY PEOPLE

MY VILLAGE IS JUST A SMALL VILLAGE OUTSIDE OF ANWR, BUT IT HAVE A LONG HISTORY TO IT WHICH ARE VERY IMPORTANT TO US. I'll LIST MY CONCERNS BY NUMBER EACH ONE IS IMPORTANT TO US. BY THIS CONCERNS HOPEFULLY YOU MAKE YOUR DISCISION.

① CARIBOU AN IMAGRITING ANIMAL WHICH IS VERY LIKE ONE TO BUFFALO, WE DON'T WANT IT TO BE DISTURB IN ANYWAY POSSIBLE. STORIES I HEAR FROM THE TIME OF OUR ANCESTOR. ITS ONE TYPE OF ANIMAL KNOWN TO BE WELL ORGANIZED. THAT ANY DISTURBANCE TO THIER CALVING AREA, CAN really harm them IN TIMES, IT MIGHT NOT SHOW UP WITHIN A YEAR, My ANCESTOR NEVER HUNT WITHIN the CALVING OR DISTURB THEM IN ANYWAY, EVEN WHEN THEY ARE STARVING DOWN THOROUGH THE HISTORY CARIBOU HAVE THIER YOUNG ONES THOROUGHOUT IN VARIES AREA WITHIN THE ARCTIC COASTAL PLAIN. THEY DONT CONCENTRATE to ONE AREAS. THE ANWR IS A VAST LAND BUT A HERD THAT SIZE NEEDS TO MOAN OPENLY. SO WE NEED TO KEEP IT OPEN FOR THIER NEEDS. ONE OF THE REASON THEY CALVE THERE, ITS THAT TIME OF YEAR WHEN WEATHER is COOL AND NO, MISQUITO, BREEZING THERE ALL THE TIME, ALSO ITS A BIG OPEN FLAT PLACE, SEE DISTANCE WHICH HELP THEM to PROTECT THIER YOUNG ONES, SUCH AS KEEP INTRUDER OUT LIKE WOLVE AND SO FORTH. GOOD GROUND FOR YOUNG ONES TO PRACTIC THIER FIRST WALK AND ETC. SO THAT AREA SHOULD STAY OPEN FOR THE CARIBOU NOT FOR OIL

2. As an Alaskan I can tell you about the experience we have had with oil development I feel like we didnt gain anything from what they already pumped out. Here in the village I paid $25.00 for 5 gallon of gas and quart oil, and $30.00 a load of wood that last me for 2 days during cold weather, this price been around for quite while like back in '70's. Until resently when price went down $16.00 for gas+oil. Some amount for a load of $30.00 which is size of 6 feet long, largest of 10 inches diameter of 10 pieces. This calculation don't tell me its benefiting us Alaskan

P6

3. You are going to get mix feeling from different Alaskan about keeping ANWR open or close. People that benefit financially will want more development. I seem some people get rich out of oil, some don't get nothing. So far I know quite a large number of people want ANWR close for development which includ Indians and non Indians. They said 75% of Alaska want development. I just don't believe that figure. I'll tell you now the people that are in the lead, wants it open and they made thier own percentages, to conveniece other or just to get what they want.

4. I have great feeling for native and respect where we came from. From the time of the first Indian we believes we generated from the area of ANWR, only reason we are within that area, because of the great change that came to us. First it was christainity than trading, trapping, disease schools that force us to settle where we are now. Not only Arctic village it included all the Yukon Flat, Yukon Territory all the way up to the Arctic coastal plain. Within this vast land people are acustom to caribou meat as thier diet. So please decide this as international issue.

5. The ANWR is not abundance with wild animals as our ancestor have ~~bbb~~ describe, the only reason caribou increase in numbers because it happen after it was established as ANWR, when they stop or limit use of the land. There are some animals that are not back in numbers yet even after 17 years of ANWR. All the time my family lived as subsistence living between 1950-64 theres hardly any living things so alot of time we have to do without. We lost alot of living things from

BIRDS TO FISH, WHEN ONE OF THE GREAT CHANGE CAME TO US, DURING FUR MONEY WAS UP. THEY POISON ALOT OF SMALL AND LARGE ANIMALS, WHEN THEY USED POISON FOR BAIT, THAT WAS WAY BEFORE 1950. SO ITS FINALLY REGAIN ITS LIVING THINGS. LETS JUST GAVE THIS LAND A TIME TO REgain ITS LIVING THINGS BEFORE ANOTHER GREAT CHANGE, LIKE MAY BE NEVER DO IT AGAIN. SO IF YOU JUDGE A LAND BY THE ABUNDANCE OF LIVINGS AS THE GOOD HEALTH OF A LAND. THAT 90% OF ALASKA IS WILDERNESS IS NOT TRUE.

IF YOU COULD PUT THIS INTO CONSIDERATION IN YOUR DECISION MAKING, THAT PERTAINING TO ANWR,.

I AM VERY MUCH INTEREST OF ANY ISSUE THAT PERTAINING to the GOOD HEALTH OF MY PEOPLE, STATE AND NATION

THANK YOU FOR READ MY CONCERNS.

SINCERELY,

Sarah James

1. RESIDENT OF ARCTIC VILLAGE
2. ARCTIC VILLAGE HEALTH - OCCUPATION
3. ARCTIC VILLAGE AIDE COUNCIL MEMBER
4. VENETIE + ARCTIC VILLAGE TRIBAL GOVERNMENT COUNCIL MEMBER
5. ARCTIC VILLAGE representative TO PORCUPINE CARIBOU HERD INTERNATIONAL TREATY

JOURNEYS NORTH

Ambler, Alaska 99786

3020 Northwest 60th Street
Seattle, Washington 98107

January 20, 1987

U.S. Fish and Wildlife Service
Attn: Div. of Refuge Management Resources
2343 Main Interior Building
18th and "C" Streets, Northwest
Washington, D.C. 20240

RE: COMMENTS ON DRAFT 1002 REPORT

My first trip to the Arctic Wildlife Refuge was in 1968, when I spent six weeks in the Schrader and Peters Lake areas. On a hike over to the Hulahula River, I caught my first glimpse of the sprawling coastal plain from the frontal slopes of Kikiktat Mountain -- an intriguing landscape with a shimmering strand of white sea ice defining the distant horizon. I vowed to return, and did so the following year.

R-8

In the Arctic springtime of June, I explored the plain and foothills of the Brooks Range south of Camden Bay. I wanted to photograph Arctic wildlife, and it was during this four week period I witnessed the most unforgetable and exciting wildlife scene in the nearly twenty seasons I have spent in the Arctic. It was a peak lemming year, and I had timed perfectly the calving of the Porcupine caribou herd which filed past my camp day after day, the number of newborn calves steadily increasing. Snowy owls were numerous, I found several nests; as were foxes, both red and Arctic. I saw several grizzly bears and many golden eagles. Nesting birds were everywhere. I look back on that special time as one of the most memorable of my life.

I have since returned to the refuge numerous times: hiking from the upper Okpilak River to Barter Island; floating the Canning, Hulahula, Kongakut and Sheenjek rivers; exploring many other drainages, named and unnamed. On some of these trips I was a guide and outfitter, sharing my experiences in the ANWR with others. I guided my first group to the refuge in 1975. Income from this seasonal activity is an important component of my livelihood.

I have always felt the hallmark of the Arctic National Wildlife Refuge is the continuum of wilderness from the Arctic Sea, over the Brooks Range to the forested lowlands of the interior. The Coastal Plain is essential to this continuum, as well as being essential habitat to the wildlife for which the refuge was established.

One of the most awesome wildlife spectacles in North America occurs there with the calving of the Porcupine caribou herd in June. This is followed by the post calving concentration, when the animals move northward to the coast to escape the emerging hordes of insects. Often by early July, the caribou are found in dense herds numbering as many as 80,000 animals. I saw one such mass concentration in 1974 from the ground. It is somethings one can never forget.

To open the Coastal Plain to intensive oil exploration and development would destroy all of this. The wilderness integrity of the Arctic National Wildlife Refuge would be gone. The sweeping views across the the plains from the frontal peaks of the Brooks Range would be broken by roads, buildings, airfields and drilling towers. The Porcupine caribou herd as we know it, numbering over 150,000 would become a mere remnant of what it now is. Gone would be the opportunity to witness the wildlife spectacles which I saw in 1968 and 1974. We would sacrifice this for what, in even the most optimistic estimates, would satisfy our oil needs for only a few months.

To fully lease the Coastal Plain of the ANWR for oil development as proposed by the Department of the Interior would be tragic. It would rob future generations of a complete Arctic National Wildlife Refuge. It would degrade beyond measure the premiere unit of the national wildlife system. It makes a mockery of the efforts by so many people over so long a time to preserve a wildlife and wilderness legacy of global significance.

The only alternative for the Coastal Plain is wilderness -- complete, lasting protection under our wilderness system, so that those who inhabit this country long after we are gone do not look back on us as shortsighted, greedy and foolish.

Sincerely yours,

Wilbur Mills

Wilbur M. Mills

4058 Kingston Park Drive
Knoxville, Tennessee 37919

December 23, 1986

U. S. Fish and Wildlife Service
Attention: Division of Refuge Management
2343 Main Interior Building
18th and C Street, N.W.
Washington, D.C. 20240

Gentlemen:

I understand that the Department of Interior has tentatively recommended allowing oil and gas development of the coastal plain portion of the Arctic National Wildlife Refuge to proceed. I would strongly urge you to reconsider this tentative recommendation and, instead, that you recommend that the entire Refuge be designated as wilderness.

It is my understanding that your report reflects that there is only a twenty percent (20%) chance of finding economically recoverable oil and that such estimate is predicated upon an oil price that would be more than double what it is now. At the same time, your report acknowledges that there would be significant adverse consequences on the outstanding fish and wildlife resources in the coastal plain area. Such conclusions should be sufficient by themselves to reverse your recommendation.

I have visited the Brooks Range on three occasions and plan to backpack in the Arctic National Wildlife Refuge in the next several years. The outstanding scenic beauty of the area and the wildlife resource, including particularly the 180,000 head porcupine caribou herd, should be protected against a questionable oil and gas resource.

Thank you.

Sincerely,

William H. Skelton

WHS:jcm

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Maine Farm Bureau Association
"The Voice Of Organized Agriculture"

December 23, 1986

Director
U.S. Fish and Wildlife Service
Division of Refuges
Main Interior Building - Room 2343
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Director:

This is to encourage your further support of oil and gas development on the Artic Coastal Plain, an area we believe holds enormous potential for secure supplies of domestic energy.

It goes without saying that the Maine agricultural community is dependent on petroleum for its well-being of the Americans we serve. The ever growing reliance on supplies of foreign oil is a cause of increasing concern and begs a continuation of supply cutbacks and escalation of prices.

Experience has shown that oil activity in Alaska can be conducted in an environmentally safe manner as it buys us time for development of alternative energy sources.

We heartily endorse the recommendations contained in the Interior Department's draft study calling for oil development on the coastal plain of the Arctic National Wildlife Refuge.

Sincerely,

Dan LaPointe
President

DL/lb

478 Western Avenue P.O. Box 430 Augusta, Maine 04330 207-622-4111

Genesee Valley Regional Market Authority

900 JEFFERSON ROAD ROCHESTER, NEW YORK 14623 716-424-4600

William J. Mulligan, Administrator

January 15, 1987

Mr. Frank Dunkle, Director
U.S. Fish and Wild Life Service
Division of Refuges
Room 2343 Main Interior Bldg.
18th and C Streets N.W.
Washington DC. 20240

Dear Mr. Dunkle:

If you could see the Market on any given morning you would see a flurry of activity, trucks coming in and heading out carrying food products to various markets throughout the Northeast. This hub of activity requires massive amounts of energy.

I'm sure you realize that the food business has changed in the past few years and is no longer the labor intensive industry it once was. New machinery and new methods have improved efficiency and serviced the comsumer in a far better fashion, giving them more fresh products at very competitive prices.

Where then would the food industry, yes the Market Authority, be without competitive fuel prices and a stable availability of product? That concern has raised new alarms, because we see that the OPEC countries are getting their act together, and prices are rising. We see a growing dependence on foreign suppliers, as the balance of payments deficit soars and domestic production declines.

We have 125 member companies who depend on competitive fuel prices and market availability to keep their doors open. They believe, as do I, we need new sources of domestic oil and gas and we need it soon.

The Northern Territory of Alaska -ANWR- appears to have the greatest potential reserves of oil and gas. The section called 1002, less than 10%of this vast park network, could and should be developed with great concern for all the natural beauties in the Refuge.

The proven methods of oil and gas development in that region of the world, show it can be done safely and efficiently. We urge you to get on with the job.

Sincerely,

William J. Mulligan

William J. Mulligan
Administrator

R-10

National Association
of Manufacturers

Resources and Technology
Energy
Environmental Affairs
Natural Resources
Innovation, Technology & Science Policy

January 9, 1987

Mr. Frank Dunkle
Director, U.S. Fish and
Wildlife Service
Division of Refuges
Room 2343 Main Interior Building,
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Dunkle:

The National Association of Manufactures (NAM) appreciates the opportunity to comment on one of the most significant energy policy and national security issues of recent years, the Arctic National Wildlife Refuge (ANWR), Alaska, Coastal Plain Resource Assessment report. NAM supports and commends the United States Department of the Interior (DOI) for recommending that the Arctic National Wildlife Refuge's Coastal Plain be opened for oil and gas leasing, and urges the Congress to accept the recommendations contained in the draft report, released in November 1986.

R-11

NAM is a voluntary business association of over 13,500 companies, large and small, located in every state. Our members range in size from the very large to over 9,000 small manufacturing firms that each have less than 500 employees. NAM member companies employ 85 percent of all workers in manufacturing and produce over 80 percent of the nation's manufactured goods. NAM is affiliated with an additional 158,000 businesses through its Associations Council and the National Industrial Council.

NAM's interest in the ANWR report stems from the fact that our association's membership constitutes major users of energy as well as most of the domestic producers. Despite the diversity of NAM membership interests, however, it is safe to say that they're all concerned with international competitiveness, its effect on the manufacturing trade deficit, the federal deficit, national security, and, of course, the health of the entire domestic economy.

FOREIGN OIL IS DISPLACING U.S. OIL IN A U.S. MARKET

Today, America's energy producers are rapidly losing ground to imports in the oil marketplace. National energy forecasters now predict that oil imports may increase from 35 percent of the U.S. market to 50 percent by the 1990s. Furthermore, U.S. imports from the volatile Persian Gulf area have increased 300 percent in

1331 Pennsylvania Ave., NW
Suite 1500 - North Lobby
Washington, DC 20004-1703
(202)637-3000

1986 and accounted for more than half of the total increase in imports last year. What this means to America's energy consumers in the near future remains to be seen. But it certainly is evident that the nation is once again, experiencing the phenomenon known as "oilzheimer's disease", defined as the capacity to use more and more oil without remembering past negative experiences. If we do indeed look back to the experiences of 1973 and 1978, we begin to realize how close to the edge we remain in 1987 by increasingly relying on unstable foreign sources for major supplies of oil. Gasoline lines and upward price spirals could be just around the corner.

But, even with immediate access to high potential areas such as ANWR, this picture will not improve short-term. Exploration and development of Arctic oil and gas usually takes more than ten years from the initial discovery to first production. Consequently, any production from this area is not likely to occur much before the end of this century. At that time, oil production from current U.S. reserves is expected to have declined considerably from the present level of over 8 million barrels per day (bpd) to less than 3 million bpd, and Prudhoe Bay production which in 1986 is averaging 1.5 million bpd will have declined (according to the State of Alaska, Department of Revenue) to 280,000 bpd in the year 2000. To compensate for this loss of production new discoveries of domestic oil must be developed or imports must be increased. There are few alternatives.

But despite its relative inaccessibility, at least geographically, ANWR is actually a valuable potential source of domestic oil, in part due to the in-place infrastructure from Prudhoe-Bay development.

TRANS-ALASKA PIPELINE ENHANCES COMPETITIVENESS OF THE ANWR RESOURCES

It should be remembered when considering development of ANWR that the Trans-Alaska Pipeline System (TAPS), which was completed in 1977, and cost approximately 10 billion dollars is already in place. The close proximity of TAPS to the ANWR region only enhances the resource potential for this area and other economic reasons make ANWR attractive.

The approximate $10 billion cost to place TAPS in operation represents a sunk cost; if capacity is fully used, the marginal cost of utilizing TAPS is independent of the sunk cost and is quite low.

Since the cost of producing petroleum resources at any site includes development and transportation, the availability of TAPS capacity to transport potential North Slope production at ANWR and elsewhere represents a significant cost advantage vis-a-vis a site where a more expensive transportation option is required.

This cost advantage resulting from the availability of relatively inexpensive TAPS capacity means that fewer resources need to be expended to produce the petroleum resources in ANWR than at a comparable site lacking in-place transportation facilities.

Consequently, the availabilty of throughput capacity at TAPS for potential ANWR production is not only valuable in that it will help keep out foreign imports, but it will also be economically competitive.

ENVIRONMENTAL CONCERNS

"Economically competitive" however does not exclude "environmentally compatible" development. Opposition to petroleum operations on the ANWR plain arises from the concern that wildlife species and habitat will be significantly harmed. Although any sizeable petroleum operation will have some impact upon the environment, previous experience leads us to believe that ANWR resources can be used in a safe and responsible manner.

One need only look "next door" to the Prudhoe Bay operation. It has been proven that industry and environment can coexist in a multiple use capacity.

In fact, several major problems have been resolved as a result of the Prudhoe Bay operation. Aside from the hostile climate and difficult logistics of operating in an extremely remote location, the most challenging technical problems encountered and solved in the onshore Arctic were related to permafrost.

From the years of operating experience there has been developed an environmental protection technology to minimize, and in some cases eliminate long term changes to the tundra. For example, low-pressure tired vehicles have been developed which can cross the tundra without crushing the vegetative mat or scouring the soils as tracked vehicles might.

The issue of the caribou is of course a concern. Again, Prudhoe Bay serves as an example. When the Prudhoe Bay oil field was developed in the mid-1970s, regulatory agencies acted cautiously and studies were conducted to determine the effects on the Central Arctic caribou herd. In fact, the results of the studies and the tools implemented to prevent damage to the Central Arctic herd were quite positive, in that the herd has increased at a rate of 12-18 percent per year over the past decade. At more than 13,000, it numbers at least four times what it did in 1975 before most of the Prudhoe Bay development activity began. The positive results from Prudhoe Bay and other similar experiences from northern Europe and the Soviet Union, prove that herds can exist in the presence of industrial development, including oil

fields and railroads. Wildlife habitats, environmental values, and the petroleum industry can and do coexist.

CONCLUSION

As important as ANWR is, it's only one piece of the major energy puzzle. ANWR is what could rescue this nation from foreign imports and provide for some energy needs well into the 21st century. We must be able to plan for future needs, and ANWR can play a role in meeting these needs, in the context of comprehensive energy planning.

In light of our overall domestic energy concerns, NAM's Energy and Natural Resources Committees passed a resolution which takes into perspective a much broader approach to the current energy dilemma. A full text of this October 30, 1986 resolution is attached.

But as part of this approach, NAM supports the draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment being considered today, and we respectfully submit that the Congress of the United States also accept and act upon the recommendation in the draft report.

NAM's long-standing policy has been that public land should not be closed to or restricted from resource development and nonwilderness multiple uses in the absence of compelling national interests that override the need for adequate domestic oil, natural gas and other valuable resources. Before areas are set aside for exclusive uses, every effort should be made to determine the availability of materials and other resources on the proposed set asides, and access should be assured to explore and develop the area's resources.

United States' energy policy should be oriented towards significantly reducing our nation's dependence on imported energy resources. The development of domestic energy resources, such as those contained in ANWR, are the best hope to reduce America's energy vulnerability, and enhance the ability of manufacturers to be more competitive in world markets, or at least amid those economic influences brought on by unstable energy markets that don't allow for proper planning of manufacturers energy needs and the producers' opportunity to explore. Thank you for the opportunity to express our views.

Sincerely,

Kevin D. Ott
Director,
Natural Resources

KDO:lek

NAM

RESOLUTION SUPPORTING NEED FOR A STUDY TO ASSESS THE ECONOMIC AND NATIONAL SECURITY IMPACT OF INCREASED IMPORTS OF CRUDE OIL AND REFINED PRODUCTS.

The NAM has had long-standing policy supporting (1) an adequate and secure supply of energy at competitive prices, which is necessary for the nation's economic growth and (2) an energy policy oriented toward significantly reducing our nation's vulnerability on imported energy resources.

The NAM has observed the following:

o There does not appear to be free trade in the international market for crude oil and petroleum products because of the collusive power being exercised by all or some of the member countries in OPEC;

o The continuation of current crude oil and natural gas price levels will result in a dramatic decline in U.S. production, an increase in consumption and a substantial increase in U.S. oil import dependence over the next several years;

o Increased U.S. oil imports exacerbate the record trade deficit;

o Similar trends will take place in other non-OPEC countries over the next several years and the net effect of rising world demand and declining non-OPEC production will be a dramatic increase in OPEC's output and control over the market;

o It appears very likely the United States will have to rely on the Middle East for an increasing share of its oil imports;

o The infrastructure of the U.S. oil industry is declining rapidly because of decreasing investment and will take years to rebuild if major increases of oil and natural gas are required in the U.S. at a later date;

o The synthetic/renewable energy contribution to meeting U.S. energy requirements will continue to be minimal and significant supplies of alternate energy cannot be expected to be available to supplement petroleum if there is an energy shortage in the 1990's;

o The capability of the Strategic Petroleum Reserve to provide protection against the impact of an oil disruption could dramatically diminish if current trends in imports continue;

o The President and the Congress have called for prompt studies of the economic and national security implication of low crude oil prices and the dramatic increase in imports of crude oil and refined petroleum products.

Therefore, the National Association of Manufacturers supports the urgent need for an Administration study to assess the economic and national security implications of increased imports of crude oil and petroleum products. Recognizing that oil imports are only one of several critical imports that could impact upon our national security, such study should assess, among other things, the following relevant factors:

- The impact on our trade deficit if projected increased oil imports continue;
- Whether there will be a significant worldwide crude oil supply surplus in the 1990's to prevent OPEC, or others, from being able to significantly influence availability and/or price of U.S. imports;
- Which producing countries will have excess capacity in the 1990's to replace imported oil that may be disrupted? To what extent would incremental supplies be dependent upon Middle East reserves with their long-haul and other exposures;
- The extent to which the downturn in exploration occurring in the U.S., combined with the increase in demand at lower energy prices, is occurring in the rest of the free world. What implications does this have on the future worldwide supply-demand balance as the U.S. moves toward increasingly higher levels of import dependence?
- An analysis of the political environment in Middle East by 1990. What are the prospects for a supply disruption resulting from developments such as the Arab-Israeli War or Iranian Revolution during the period 1986-1990?
- The constraints which will be placed on our foreign policies with increased reliance on imports;
- The effect which growing dependence on imported crude oil and refined petroleum products will have on U.S. military planning and costs;
- The refined petroleum product needs of the military, defense-related industries and vital federal, state and

local services under all foreseeable national emergency scenarios including an oil embargo, terrorist attack, protracted regional and/or global war and the ability of the refining industry to meet the need for such refined products;

- o The impact of the oil price collapse on the oil service/ oilfield supply industry. What will be the lead times involved in rebuilding this industry from the current depressed levels (and which are projected to worsen)?
- o The ability of the United States to activate shut-in crude oil and natural gas wells and idled or shut down refining capacity in the event of an interruption in the supply of imported crude oil and refined petroleum products;
- o The adequacy of alternative sources (including synthetic fuels) of energy in the event of an interruption in supply of imported crude oil and refined petroleum products;
- o The projected free world supply-demand balance in the 1990's compared with the supply-demand balance in 1979;
- o The size the SPR should be in order to provide the same margin of protection which exists today in the event of an import supply disruption;
- o The current level of private stocks and inventories (compared with 1979) as a margin of protection against a supply disruption;
- o The interaction and obligations of the United States within the International Energy Agency program.
- o The likelihood that OPEC will engage in another round of export refinery construction to capture value-added benefits at such time as it regains market power. What implications would such a development have on the ability of the U.S. to maintain adequate domestic refining capacity to process withdrawals from an SPR approximately double the current size?

The NAM urges the President, after completion of the subject study, to promptly determine (1) the levels and sources of imports of crude oil and refined petroleum products at which a threat to our economic and national security exists and (2) the legislative and/or administration options available to reduce this threat.

Approved by the NAM Energy
and Natural Resources Committees
October 16, 1986

NATIONAL OCEAN INDUSTRIES ASSOCIATION

1050 Seventeenth Street, N.W., Suite 700 Washington, D.C. 20036

January 20, 1987

Director
U.S. Fish and Wildlife Service
Division of Refuges
U.S. Department of the Interior
Room 2343
18th & C Streets, N.W
Washington, D.C. 20240

Re: Request for Comments on the Draft Legislative Environmental Impact Statement and Resource Assessment Regarding the Coastal Plain of the Artic National Wildlife Refuge. (51 FR 42307, November 24, 1986).

Dear Sir:

On January 9, 1987, the National Ocean Industries Association (NOIA) participated in the public hearing held in Washington, D.C. relative to the coastal plain of the Artic National Wildlife Refuge (ANWR). As we testified, NOIA strongly supports the U.S. Department of the Interior's proposed recommendation that oil and natural gas leasing be permitted in the ANWR coastal plain. Our comments are reiterated here for your information.

NOIA is a trade association based in Washington, D.C. and is composed of over 325 member companies. Each of these companies is engaged in one aspect or another of discovering and recovering our nation's offshore energy resources; from geophysical data collection, drilling exploratory wells, and finally, developing the oil and gas if it is found. Additionally, NOIA represents all the companies who provide various services and supplies to each phase of offshore development. Examples of these companies include, but are not limited to, those that manufacture and supply drill bits, blowout preventers, drill pipe, casing, wellheads, logging equipment, and companies involved in diving, catering, banking, marine and air transportation, marine engineering, and construction. NOIA member companies are headquartered in 34 states and in the District of Columbia and have plant locations in all 50 states.

NOIA supports the U.S. Department of the Interior's (DOI) proposed recommendation that oil and natural gas leasing be permitted in the Arctic National Wildlife Refuge (ANWR) coastal plain. We believe oil and gas exploration and development operations on the coastal plain are vital to America's energy and economic future and national security. The nation's best hopes for major new oil and gas discoveries are in the ANWR coastal plain and in the nation's offshore area, particularly off the coast of California. Industry activity to date indicates that significant petroleum reserves may lie under the coastal plain and extend out under the Beaufort Sea. If the United states is to free itself of its dangerous overdependence on oil imports we must move ahead with the task of finding and developing the potentially vast oil and gas resources off our coasts and beneath the ANWR coastal plain.

Such resource potential cannot be ignored. Leasing, exploration, and hopefully, production of our nation's domestic energy resources must proceed because of our nation's increasingly precarious and uncertain energy position. We presently have a surplus of low-priced petroleum created in large measure by temporary overproduction by the oil producers of the OPEC cartel. Low oil prices have, unfortunately, caused public misunderstanding and complacency concerning our nation's future energy needs. The dark side of the temporarily low prices and the world supply surplus includes:

- significant economic disincentives to invest in domestic petroleum exploration and development;
- reversal of our unprecedented energy conservation measures implemented over the past ten years
- decreases in alternative energy technology development and application;
- increasing near-term demand and further dependency on oil imports; and most importantly,
- a serious and potentially fatal weakening of the American energy community, including the support, service and supply industries.

Based on current consumption rates and domestic oil production decline, our dependency on foreign oil could rise from the current level of 38 percent of U.S. consumption (as of November 1986) to 50 percent or more by the early 1990s. Such dangerously high reliance on oil imports weakens the U.S. economy, undermines national security, worsens the balance of trade deficit and costs American jobs. It means OPEC could once

again control world prices and supplies, with U.S. consumers again facing soaring prices and a return to the energy supply disruptions of the early 1970s.

Therefore, it is more important than ever that our nation pursue an aggressive and effective leasing program which will enable us to develop our best prospects for major new oil and gas discoveries. With world oil prices remaining at such low levels, oil companies, as a result of depressed earnings, have significantly reduced their capital and exploration expenditures. With less money for exploration, we must focus on the most promising oil and gas prospects, both onshore and offshore. First and foremost among these prospects is the ANWR coastal plain.

We have carefully reviewed DOI's draft report to the Congress which does a highly effective job of calling attention to the potentially vast oil and gas resources which may lie beneath the coastal plain. As DOI points out, there could be billions of barrels of oil under the coastal plain and similarly huge amounts of natural gas. In fact, the area's oil fields could be the largest domestic fields discovered since Prudhoe Bay and the Kuparuk River fields. Except for these fields, no U.S. field with reserves exceeding 1 billion barrels of oil has been discovered since 1948. As DOI's draft report explains, a leasing program in the coastal plain area could contribute billions of barrels of additional oil reserves toward the national need for domestic sources. Not only might discovery of a giant or supergiant field contribute to domestic reserves and production, it could do so at a relatively low average cost per barrel because of economies of scale.

Crude oil from the North Slope's three producing fields -- Prudhoe Bay, Kuparuk, Lisbrune and Milne Point (which may be soon joined by the Endicott field) -- are already contributing about 20 percent of U.S. oil production. America's dependence on foreign oil could increase markedly in the years ahead, as the older fields in the lower-48 states reach peak production and start to decline -- as many already have. Yet it is to Alaska's undiscovered oil and gas that the nation must turn, if our future energy security is to be more secure.

We have no doubt, that based on the more than 20 years of petroleum industry experience on Alaska's North Slope, oil and gas operations can be conducted on the ANWR coastal plain without harm to the caribou or other wildlife of the area and in a manner that is totally compatible with the sensitive arctic environment. We are not talking theory or concept here. We can cite a record

of effective environmental protection and time-tested safeguards. We can cite the stringent standards and regulations imposed by the federal government and the State of Alaska to make certain that arctic wildlife and its habitat are fully protected. We see no environmental justification for delaying or prohibiting oil and gas operations on the ANWR coastal plain.

This vitally needed oil and gas development will not only help meet America's energy needs in the 1990s and beyond, it will also bring important economic benefits in terms of jobs and business for virtually every state in the union -- and it will mean increased leasing revenues, royalties and other funds for the federal government. These are significant benefits which frequently are overlooked in our discussion of the need for Alaska oil and gas development.

For example, between 1980 and 1986, major oil companies operating on the North Slope spent more than $10.5 billion in the United States on the development of those oil fields. Every state in the union took part in supplying goods or services and the share of the business ranged from $3.4 billion in Texas, $1.8 billion in California and $1.3 billion in Alaska to $300,000 in New Hampshire, and $200,000 in West Virginia.

If the coastal plain were leased and a major oil field discovered, sizeable royalty payments would be generated. The distribution of the potential revenues among the federal, state and local governments depends on the details of how the area is leased. But the resulting revenues would be significant -- in 1984 alone, Alaska received some $1.4 billion in oil royalties, rent and bonuses from leases on its own lands.

The American Petroleum Institute has estimated that, based on ANWR coastal plain peak production of between 350,000 and 2.7 million barrels of oil daily, projected employment gain would range between 138,000 to more than 1 million jobs, and the gross national product would increase from 0.14 percent to 1.01 percent above the levels that would otherwise be the case.

Significant oil discoveries within the coastal plain could also help reduce the nation's huge balance of trade deficit by cutting back U.S. dependence on foreign oil. Development of the coastal plain would also have the important economic benefit of providing a continuing flow for the Trans-Alaska Pipeline as oil fields elsewhere on the North Slope are depleted. Continued use of the pipeline at capacity permits low-cost transportation of oil from the North Slope. The availability of the pipeline to transport ANWR coastal plain oil provides a significant cost

advantage over other Alaskan sites and may make it economical to develop higher-cost reserves.

In summary, NOIA believes that the Department of the Interior is correct in proposing the opening of the ANWR coastal plain to oil and gas leasing. We firmly believe that this is a critically important step that must be taken if our nation is to have the energy it needs for the decades to come and if we are to free ourselves from the threat of future energy supply disruptions. At a time of continuing political chaos and terrorism in the Middle East, we have no choice but to find and develop the oil and gas resources within our own borders. The ANWR coastal plain is the place to start.

Thank you for this opportunity to express our views. If NOIA or I can be of assistance to you, please do not hesitate to contact us.

Sincerely,

William P. DuBose, IV
Government Affairs Representative

WPD/tlm

International Union of Operating Engineers

LOCALS 832, 832B, 832A, 832C

AFFILIATED WITH THE AFL-CIO AND BUILDING TRADES DEPARTMENT

1210 JEFFERSON ROAD ROCHESTER, NY 14623 PHONE 716 [illegible]

NEIL BURNSIDE

EARL ZAHN
JAMES WALSH
RAYMOND DOUGLAS

January 17, 1987

Mr. Frank Dunkle, Director
U.S. Fish and Wild Life Service
Division of Refuges
Room 2343 Main Interior Bldg.
18th and C Streets N.W.
Washington, D.C. 20240

Dear Mr. Dunkle:

Right now the Operating Engineers are vitally concerned with getting a new highway bill passed by the 100th Congress. But, looming over the horizon is the long range threat of an energy crisis, especially a domestic energy crisis.

As one who is responsible for the lives of 1500 members, an energy crisis would raise havoc in the construction industry, and especially with our members whose big machines gulp large amounts of motor fuels.

R-17

It is our understanding that Prudhoe Bay production will begin to show a decline in the next year or two. And, from looking at the facts available to us, we think the Artic Region, designated as 1002, holds the greatest promise for new resources of these vital products.

Many of our members hunt, fish and travel extensively in their leisure time. They are concerned with the environment, and in carrying out their daily tasks are very cognizant how the level of awareness has increased for its protection. No longer do bulldozers run roughshod over the terrain without environmental planning. The past years of oil and gas development in that region show clearly that development can be done with minimal damage to wildlife or natures other beauties.

Failure to develop new Domestic sources of oil and gas could create misery in the human environment. We urge exploration and development of the ANWR's selected site known as 1002.

Sincerely,

Neil Burnside,
Business Manager

NB:66

BETHEL NATIVE CORP.
BOX 719
BETHEL, ALASKA 99559

January 15, 1987

U.S. FISH & WILDLIFE SERVICE
Division of Refuge Management
2343 Main Interior Building
18th & C Streets, N.W.
Washington, D.C. 20240

RE: Developing the Arctic National Wildlife Refuge

Gentlemen:

The Bethel Native Corporation would like to take this opportunity to express its position regarding the potential development of the Arctic National Wildlife Refuge. We would also like to acknowledge the outstanding record of the oil companies in protecting the fish and wildlife resources and their habitat as evidenced by the oil and gas development in the Arctic. Those agencies arguing to preserve the fragile environment fail to acknowledge the accomplishments of the oil companies in mitigating the adverse impacts to the Arctic environment.

We feel that developing ANWR will significantly improve the economy, improve the job market and employment, reduce the trade deficit, provide for many by products used in the home, business and recreational areas. In addition, the decision to develop ANWR should acknowledge the oil companies impeccable record in protecting the fish and wildlife resources and their habitat.

We would like to compliment the North Slope Borough and the Department of the Interior for submitting well documented reports supporting the development of ANWR. We concur with their recommendations and want to provide the following observation. The oil companies in Alaska, and the continental United States, have experienced one of the most serious set-backs in any economy. The Alaskan economy needs another boost and the development of ANWR will significantly improve the economy. The oil companies will be provided an incentive to remain in Alaska and all other support facilities closely associated with oil companies will be directly affected by Congress's decision to develop ANWR. The decision to open ANWR for development will have a ripple effect on all other businesses closely related to oil and gas development. Not only would the economy improve due to the ANWR development but the decision would significantly improve the job market and employment opportunities.

Once Congress makes its decision to open ANWR for development, all businesses associated with oil companies will be advertising for workers and that will reduce unemployment and provide a variety of jobs. The recent slump has drastically reduced the job market and contributed to Alaska's unemployment. The

(907) 543-2124

decision to open ANWR would improve the economy and the employment opportunities in any business that supports the oil and gas development.

According to the report submitted by the Department of Interior, this country's dependence on imported oil has increased based on the demand for petroleum products. Recognizing OPEC's control of the price if oil in the world market, we remember the 1973 trade embargo that emphasized the theory of supply and demand. We do not believe this country is prepared to experience what happened in 1973 but its trade deficit is increasing at an alarming rate. The demand for petroleum products will continue on into the twenty-first century and we anticipate that this country's trade deficit will continue to rise. The decision to open ANWR for oil and gas development would prepare the country to meet any anticipated demand without a greater degree of dependence on foreign oil. We would like to emphasize that this country should not be at the mercy of OPEC when it can develop its oil and gas reserves. Less dependence on foreign oil would significantly reduce the trade deficit and this will only be accomplished by developing new oil and gas deposits, like inside ANWR. Not only would the trade deficit be reduced but many by-products from an oil and gas activity would be provided to the general public.

The production of oil and gas activity has introduced many by-products that are being utilized in the home, business and for recreation. Those opposed to the development of ANWR should begin to realize that they utilize many by-products of an oil and gas development. In addition, we believe that these same people have children and their future will depend on the availability of the by-products that are utilized in the home or business. The decision to open ANWR for development should be predicated on the future of our children and their children. We have to begin thinking that anything we accomplish today is for the future generations that will follow with possibly a greater dependence on oil and gas and their by-products. As responsible stewards, we should not deny them the availability of a resource that can be developed cheaper today then in the future where it may be far too expensive to develop or produce.

The decision to open ANWR should take into consideration the existing oil and gas activity in Prudhoe Bay that has proven the compatibility of an activity with a harsh and fragile environment. We concur with the reports submitted by the North Slope Borough and the Department of Interior which emphasized that no significant impact has resulted to the fish and wildlife resources and their habitat. Contrary to concerns expressed by the opposition, the wildlife within Prodhoe Bay have flourished and have adapted to the oil and gas activity with no significant problems. We are optimistic that opening ANWR would be the most responsible action our government can undertake.

With oil and gas development in ANWR we are optimistic that the economy will improve, employment will be better and more jobs available, and the foreign trade deficit will be reduced. Most importantly, we believe that ANWR can be developed consistent with the compatibility requirements of the conservation system units as established by the Alaska National Interest Lands Conservation Act (ANILCA) of December 2, 1980. We therefore support the development of ANWR by acknowledging and agreeing with the reports submitted by the North Slope Borough and the Department of Interior.

Sincerely yours,

Felix Hess
Land Manager

ARMCO INC.
GENERAL OFFICES · MIDDLETOWN, OHIO 45043

ARMCO

January 16, 1987

Director
U.S. Fish and Wildlife Service
Division of Refuges
Room 2343
Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Director:

In my role as Director of Environmental and Energy Engineering for Armco Inc., my responsibilities and concerns are very similar to yours, i.e., that there be a proper balancing of environmental and economic (energy) issues.

I believe the record speaks for itself as to Armco's concern for the environment. Through 1985 we invested $426,300,000 for environmental control facilities. In 1986 dollars, this amounts to over one billion dollars. Our annual operating expense (including depreciation) for these environmental control facilities is approximately $75,000,000 per year.

A reliable, assured source of energy, at a reasonable cost, is essential - absolutely critical - to a viable American steel industry. Ours is an energy intensive business, requiring on the average over 22 million BTU per ton of steel. While oil is not a direct source of the energy used for production of steel, the availability of oil has a significant impact on the price of natural gas, electricity, and coal because of the interchangeability of fossil fuels for many uses. Furthermore, oil is essential to the transportation of our raw materials and finished products. From 1975 to 1982 our average energy cost has more than doubled.

I have read your excellent draft report of November 1986, entitled "Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment."

In the interest of America's economic self-sufficiency and national defense, I firmly believe that the entire 1002 area should be opened for exploration and development of the oil and gas resources that are believed to be there. I also firmly believe that the important lessons learned at Prudhoe Bay and in the construction of the Trans-Alaska Pipeline System should be utilized to the maximum extent feasible to mitigate environmental harm.

R-20

If we can be of any assistance to you in these important deliberations, please call.

Very truly yours,

John E. Barker
Director
Environmental and Energy Engineering
Armco Inc.

JEB/bn
JEB5/45
cc: L. W. Hicks

Ohio Chamber of Commerce

35 E. Gay St., 2nd Floor • Columbus, OH 43215-3181 • 614/228-4201

January 19, 1987

Mr. Frank Dunkle, Director
U.S. Fish and Wildlife Service
Division of Refuges
Main Interior Building, Room 2343
18th and C Streets, N.W.
Washington, D.C. 20240

Re: Comments on draft report of the United States Department of the Interior "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment"

Dear Mr. Dunkle:

The Ohio Chamber of Commerce, a statewide business trade association, supports the recommendation of the U.S. Department of the Interior that oil and gas leasing be permitted on the Arctic National Wildlike Refuge (ANWR) costal plain.

The economic health of Ohio and of this nation depends on a secure energy future free from dependence on imported oil. Oil consumption in the U.S. has exceeded domestic production for more than twenty years. Concurrently, no U.S. oil field with reserves exceeding 1 billion barrels of oil has been discovered since 1948. If we are to reduce imports, we must find and develop oil and gas here at home. According to the Interior Department's draft report on ANWR, "the area is clearly the most outstanding oil and gas frontier remaining in the United States and could contribute substantially to our domestic energy supplies," capable of producing as much as 9.2 billion barrels of oil.

The U.S. petroleum industry has nearly twenty years of experience in finding and producing oil on Alaska's North Slope and is committed to striking a balance between development and environmental protection in this area as has been their record in the past. As the Interior Department's proposed recommendation states, "Development of (the ANWR's) potential oil and gas resources could make a significant contribution to the economy and security of this Nation, and could be done in an environmentally responsible manner based on lessons learned at Prudhoe Bay and elsewhere."

The Ohio Chamber of Commerce believes that the ANWR coastal plain development is a critically important step for our nation's energy future. We urge you and the Secretary of the Interior to recommend development of this vital area in your final report to Congress.

Sincerely,

William T. Blair

President

Chairman
RICHARD H. HOLL
President
The Logan Clay Products Company
Logan

First Vice Chairman
WILLIAM H. ELLIS
Mid-Atlantic Regional Manager
North American Gov. Affairs
Ford Motor Company
Columbus

Treasurer
ARTHUR D. HERRMANN
Chairman
BancOhio National Bank
Columbus

President
WILLIAM T. BLAIR
Ohio Chamber of Commerce
Columbus

R-21

JUNEAU AUDUBON SOCIETY
P.O. Box 1725 • Juneau, Alaska 99802

January 14, 1987

U.S Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Sts, NW
Washington, DC 20240

The following comments by the Juneau Audubon Society concern the Draft 1002 Report on oil and gas development on the Arctic National Wildlife Refuge (ANWR). Juneau Audubon objects to the Secretary's recommendation for full oil leasing for the following reasons:

Due to the importance of ANWR for its unique wildlife, we would like oil and gas leasing postponed until there is a documented need for such development. The fragile and unique ecosystems in the arctic are being rapidly developed the world over leaving very few areas for the wildlife that has played such a critical role in native subsistence and the ecology of the arctic.

ANWR is not just a typical example of the Alaskan arctic coast. Unlike the Prudhoe Bay area, the caribou at ANWR are part of one of the largest and most far-ranging herds in the Alaskan arctic. The Alaska pipeline has restricted the movement of caribou at Prudhoe Bay, but the caribou have survived since they can still access most of their traditional range. At ANWR however, oil development will likely make the traditional caribou migration to boreal forests in Canada difficult at best. The loss of this herd and the wildlife associated with it would have a major environmental impact on the Alaskan arctic and on the native people of Canada and Alaska.

Even on strictly economic terms, we feel the national interest would be better served by developing alternative energy sources and giving energy conservation a more important role in the nation's long-term energy plans. This oil will be available in future years when there may be a greater need for it than there is now. A world-wide oil glut has greatly depressed oil prices. Why should we squander Alaska's non-renewable resources in this way right now? The natural values of ANWR, especially its unique fish, wildlife, and wilderness are much more important and irreplaceable than any amount of oil that can be recovered. And the value of such unique areas will only increase with time as all of the unprotected areas of the arctic are developed. The risk of jeopardizing our fish and wildlife resources, subsistence uses, and this rare wilderness, is too great a price to pay for oil that would only supply at most 4% of the total U.S. demand.

R-22

JUNEAU AUDUBON SOCIETY
P.O. Box 1725 • Juneau, Alaska 99802

We think the decision to open up ANWR to development should not be done capriciously. Estimates of oil reserves are speculative at best. The long-term impact of oil development on the wildlife of ANWR is still a basic unanswered question. We will all have to live with the consequences of destroying this irreplaceable area if that decision is made now; but if we could defer a decision and make it more out of national need and on a solid factual basis rather than for temporary political gain, we believe our country would be far better served.

Sincerely,

Judy Hall Alaback

Judy Hall Alaback
Conservation Chair
Juneau Audubon Society
Box 1725
Juneau, AK 99802

cc: Governer Steve Cowper
Representative Don Young

Burnell R. Roberts
Chairman and
Chief Executive Officer

World Headquarters
Courthouse Plaza Northeast
Dayton, Ohio 45463

Telephone: 513-222-6323

January 20, 1987

Director
U.S. Fish and Wildlife Services
Division of Refuges
Room 2343, Main Interior Building
18th and "C" Streets, N.W.
Washington, D. C. 20240

Gentlemen:

In my capacity as Chairman of The Natural Resources Committee of the United States Chamber of Commerce, I wish to express my support of the Department of the Interior's Fish and Wildlife Services recommendation that Congress enact legislation making the entire coastal plain portion of the Arctic National Wildlife Refuge (ANWR) in Northeastern Alaska available for oil and gas leasing, with necessary environmental safeguards.

It is important to the long range supply prospects of the United States that we identify the location of the most promising oil and gas prospects that exist on our Federal lands. I believe the most promising on-shore frontier is the 1.5 million acre coastal plain in the ANWR.

As Chairman and CEO of The Mead Corporation, which is a major owner and user of forest resources within the United States, I am aware of the need for the extreme care that must be taken to protect the valuable natural resources of this area. I am also confident that with proper regulations we can ensure environmental integrity in all oil and gas operations that may eventually result in the area.

In summary, it is vitally necessary that our nation continue its orderly oil and gas development to insure our energy and economic

future. To accomplish this objective, we must undertake discovery and then development of the coastal plain's potential petroleum resources. I support your efforts and recommendations regarding making the Artic Natural Wildlife Refuge (ANWR) available for such exploration.

Sincerely,

Burnell Roberts

BRR:lb

cc: Susan Connolly, US Chamber

American Farm Bureau Federation

WASHINGTON OFFICE
600 MARYLAND AVE., S.W.
SUITE 600
WASHINGTON, D.C. 20024
AREA CODE 202 • 484-2222

January 20, 1987

Mr. Frank Dunkle, Director
U.S. Fish and Wildlife Service
Division of Refuges
Main Interior Building, Room 2343
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Dunkle:

R-24

The American Farm Bureau Federation, our nation's largest organization of farmers and ranchers, endorses the U.S. Department of the Interior's recommendation that Congress enact legislation to permit oil and gas exploration on the Arctic National Wildlife Refuge (ANWR) coastal plain.

While meeting in Anaheim on January 15, 1987, delegates to our national convention adopted a resolution supporting the development of energy in Alaska's coastal plain. This resolution originated with the Alaska Farmers and Stockgrowers Association (Alaska Farm Bureau) which adopted the position at its annual meeting in November 1986. It states:

> "We urge Congress to open the Alaska Arctic National Wildlife Refuge Coastal Plain to environmentally responsible oil and gas exploration, development and production."

The Farm Bureau believes that it is imperative that our nation develop all its sources of energy. Adequate and consistent supplies of energy are critical if agriculture is to continue to meet our nation's demands for fuel and fiber.

Nearly 80 percent of the energy used in agricultural production is derived from petroleum. Petroleum fuels have been an important contributor to the dramatic gains in agricultural productivity during this century.

Current economic conditions in both U.S. agriculture and energy industries make it all the more important that domestic oil and natural gas production be encouraged and the dependence on oil imports be minimized. United States agricultural and energy needs require that areas of potentially vast oil and gas resources, such as the Alaska coastal plain, not be closed off to energy exploration and development.

The American Farm Bureau Federation, for our more than 3 million families nationwide, urges Congress to open the ANWR coastal plain for oil and gas exploration and development.

Sincerely,

John C. Datt
Executive Director
Washington Office

JCD/laf

NUNAMIUT
CORPORATION

Anaktuvuk Pass, Alaska 99721 • Village phone (907)661-3227

William P. Horn
Assistant Secretary for Fish
and Wildlife Parks
U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th & C St., N.W.
Washington, D.C. 20240

January 19, 1987

Dear Mr. Secretary:

I am writing to present the comments of the Anaktuvuk people on the draft report concerning resource assessments and recommendations for the Arctic National Wildlife Refuge Coastal Plain. We believe thatwe have a special prespective on one of the alternatives contained in the Secretary's draft report, that is, Alternative E that would designate the ANWR Coastal Plain as "wilderness".

R-25

My people live in the Brooks Mountain Range about 250 miles southwest of Kaktovik. For many, many years we have used the lands in the central Brooks Range and the foothills to the north to maintain our culture and traditional lifestyle, and for subsistence hunting, fishing and trapping.

In 1971 Congress passed the Alaska Native Settlement Act in which our aboriginal rights were extinguished in exchange for cash payments and, most importantly, the right to receive title to about 92,000 acres of land. It is important to point out that the land we received under ANCSA was far less than the area we have traditionally used for subsistence purposes and continue to use even today.

In the first few years after the passage of ANSCA, we saw very few outsiders in our village and even fewer in the surroundings lands that we continued to use for subsistence purposes. It was not until Congress began to consider the Alaska lands legislation in the late 1970s that hikers and others began to come to the village with greater frequency to gain access to the surrounding mountain area.

In 1980, Congress passed the Alaska National Interest Lands Conservation Act -- ANILCA as it has come to be known--and as part of that legislation created Gates of the Arctic National Park. About 69,000 acres of our ANCSA lands lie within this 8 million acre national park. Within the new national park, Congress also designated almost all of the lands surrounding our ANCSA lands, as well as those selected by ASRC in the same area, as "wilderness".

At the time ANILCA became law, we did not realize that "wilderness" designation would mean severe restrictions on the type of activities that could be conducted on such lands. For instance, there can be no mechanized vehicular activities on "wilderness" lands unless "snowmobiles, motorboats, and other means of surface transportation traditionally employed" for subsistence purposes are used.

Although we continue to use snowmobiles in the winter months for access to subsistence resources, in recent years the Anaktuvuk people have come to use lightweight, all-terrain vehicles during the summer months to travel to areas away from the village for subsistence hunting, fishing and trapping. We feel that use of ATVs has been part of a slow, evolutionary adaptation of modern means of transporation to engage in our traditional pursuit of subsistence resources.

The National Park Service, however, in administering Gates of the Arctic National Park, has interpreted the law to prohibit the use of ATVs in the "wilderness" area where many of our subsistence resources--such as caribou--are found. The Park Service argues that ATVs are not"means of surface transporation traditionally employed" for subsistence purposes. This legal interpretation has resulted in severe hardships on the Anaktuvuk people in their efforts to obtain access to vitally needed subsistence resources during the summer months. It is difficult for us to distinguish between snowmobiles, which are permitted, and ATVs, which are not. Each is a relatively modern form of transporation that allows us access to subsistence resources in the winter and summer seasons respectively.

To resolve this problem, we have had to engage in costly and time--consuming negotiations with the National Park Service. It now appears that the only possible solution to the problem may be some kind of a new land exchange as well as new federal legislation that would possibly de-authorize the "wilderness" areas that we continue to use for subsistnece purposes.

My purpose in providing these comments is a limited one. It is to bring to your attention the problems we have encountered in attempting to carry out our traditional subsistence lifestyle in a "wilderness" area. Therefore, we recommend that the Secretary not adopt Alternative E, which would place the ANWR Coastal Plain in "wilderness" designation

Very Truly Yours,

Nunamiut Corporation

Harry K. Hugo, Vice-Pres.
for Jacob Ahgook

Jacob Ahgook
President

SCOTT W. REED, Attorney at Law/P. O. Box A/Coeur d'Alene, Idaho 83814/(208) 664-2161

January 21, 1987

Division of Refuge Management
U.S. Fish and Wildlife Service
2343 Main Interior Building
18 & C Street, N.W.
Washington, D.C. 20240

Re: Draft Arctic NWR, Alaska,
Coastal Plain Resource Association

Dear Sirs:

As a member of the board of directors of National Audubon Society, I received a copy of the testimony of President Peter A. A. Berle made on behalf of National Audubon Society concerning the draft Arctic National Wildlife Refuge assessment given January 9, 1987. This letter is written in total support of the statement made by President Berle.

R-26

Let me add a little bit more in opposition to opening the coastal plain to leasing at this time. In the Northwest we have a surfeit of electric energy. Although this energy is not oil, it is directly and integrally related.

When hydro electric energy started becoming surplus in the early 1980's the Northwest public and private utilities aggressively sold their energy to California utilities. Now with the advent of cheap oil, the California companies are switching back to oil generation which produces cheaper electrical energy than can be supplied from here. The Northwest utilities are now in a real financial bind.

The cause of the surplus in the Pacific Northwest in simple terms is two fold, one good and one bad. This area, particularly in the state of Washington, had the greatest per capita electric energy consumption in the United States. Major conservation programs were undertaken both as a consequence of the Northwest Power Act and on the initiative of private utilities. The result has been a major reduction in resident as well as industrial consumption. This has been enhanced by the natural intelligence of the consumer who reacted to higher prices by cutting back.

The bad part is just exactly what is being proposed by the Coastal Plain Resource Assessment. Public and private utilities greatly expanded their resources in the late 60's and early 70's upon the assumption that growth and consumption would continue on a straight line forever. I had the privilege of hearing Donald P. Hodel proclaim to the Idaho Water Resource Board the absolute reliability of Bonneville Power Administration's straight line projection.

The pell mell government effort to increase production led to the Washington Public Power Supply System fiasco that has devastated private bondholders although perhaps enhancing the income of a large number of lawyers. The only good thing that can be said about the WPPSS disaster as designed and promoted by now Secretary Hodel is that most of the plants will never be completed and therefore will not compound the problem.

The Pacific Northwest Power Planning Council has promulgated a Fish and Wildlife Program that is intended to restore the damage wrought by excessive hydroelectric construction. While there are some funding problems implementing this program, the direction is very clear. It is to restore wildlife.

In the Arctic you have the much preferable alternative which is to avoid the destruction in the first place. In the Arctic this is particularly critical because there is little likelihood of subsequent mitigation or restoration.

Those who would promote further drilling in the Arctic either should be committed for psychiatric examination or else they have already been in some type of mental ward out of touch with the energy world over the past ten years. It was only a couple of years ago that Congress was being told it should repeal the ban on exports of oil to Japan so that Alaska could find a financially viable market for what was coming out of its pipeline.

Because of my appointment by National Audubon to the board of the Garrison Trust Fund, I have had the occasion to visit North Dakota a couple of times in the past year. The governor and the legislators of North Dakota would certainly be able to give you an opinion about the desirability of further oil exploration and development at this time.

North Dakota undertook a major oil and coal gasification development program in the 1970's. The voters approved an initiative which imposed a major severance tax. The result was that for a time the North Dakota state treasury was overflowing with oil money which of course got promptly allocated to important state programs such as higher education.

With the collapse of OPEC and the decline in oil prices, development stopped. The coal gasification plant closed. The newspaper in Bismark reported when I was there last week that the remainder of the coal gasification company now occupies one room in an old office building in Minot.

The state is running a $100 million deficit. The only possibility of financial recovery in this farming state is for a return to power by OPEC and a corresponding increase in oil prices. The last thing they need is any further oil development of the type proposed for the Arctic.

My comments have been economic, but my concern is for the wildlife as so well expressed by President Berle. I urge you to go back to the drawing board and to put the entire Arctic National Wildlife Refuge in the deep freeze for which it was designed and intended.

Yours truly,

Scott W. Reed

SWR:gs

cc: Peter A. A. Berle

R-27

STATE OF SOUTH DAKOTA

GEORGE S. MICKELSON
GOVERNOR

EXECUTIVE OFFICE
STATE CAPITOL BUILDING
PIERRE, SOUTH DAKOTA 57501

(605) 773-3212

January 15, 1987

Mr. Frank Dunkle, Director
U.S. Fish and Wildlife Service
Division of Refuges, Room 2343
Main Interior Building
18th and C Street, NW
Washington, D.C. 20240

Dear Mr. Dunkle:

Secure and reliable energy supplies are critically important to South Dakotans who use more gasoline and diesel fuel per capita than the national average to operate our farms and heat our homes.

That is why we support the proposed recommendation in the U.S. Department of the Interior's draft report that the Congress permit oil and natural gas development activities on the Arctic National Wildlife Refuge (ANWR) coastal plain. We believe that development of the potentially vast oil and gas resources beneath the coastal plain is essential in helping meet future U.S. energy supply needs and reducing our dangerously heavy dependence on oil imports.

At a time of continued political turmoil and terrorism in the Middle East, the national interest requires that we increase the search for and development of the oil and gas resources within our borders. The ANWR coastal plain provides one of the nation's best opportunities for major new discoveries. As the Interior Department's draft report states, "The ANWR coastal plain is clearly the most outstanding oil and gas frontier remaining in the United States and could contribute substantially to our domestic energy supplies.

The petroleum industry's nearly twenty years of experience in developing oil fields on the Alaskan North Slope proves that oil and gas activities are fully compatible with the arctic environment and wildlife and would pose no threat to the coastal plain's ecology. We are aware that such operations must meet strict federal and state environmental standards and are closely monitored by the appropriate environmental agencies.

We applaud the Interior Department's draft report on the ANWR coastal plain and endorse its proposed recommendation that this important area be opened to oil and gas leasing to help meet our future energy needs.

Sincerely,

GEORGE S. MICKELSON

GSM:ls

R-28

January 27, 1987

U.S. Fish and Wildlife Service
Division of Refuge Management Resources
2343 Main Interior Building
18th & C, N.W.
Washington, D.C. 20240

Dear Sir:

I am writing in regards to the U.S. Fish and Wildlife Service report 1002(H) on oil and gas leasing in the ANWR Coastal Plain.

The City of Valdez, Alaska goes on record supporting and strongly urging the Congress of the United States to open the ANWR coastal plain to environmentally responsible oil and gas exploration, development and production.

The development of world-class oil deposits in the refuge proposed for leasing would promote economic development, reduce our dependence on foreign oil, promote environmental sound and orderly development in the absence of an energy crisis, increase revenues from taxes and royalties, strengthen national security interests, restrain the national trade deficit and create thousands of new jobs.

Although there is plenty of oil on the market today, domestic oil reserves are plummeting while consumption is rising. Prudhoe Bay, America's largest oil field, accounts for 20 percent of U.S. domestic crude production. However, it has already been pumped half empty and a steady decline in production will soon begin. As the City of Valdez is the terminus for the pipeline, the economic impact of that decline, based on value alone, is already being felt.

If America forgoes or delays this major opportunity to reverse its increasing dependency on foreign oil, our vulnerability to oil price increases or shortages will increase to dangerously high levels in the next decade. The best way to assure that the United States will have a secure supply of oil is to pursue exploration and development here at home and the best chance to find a new world-class domestic supply of oil is in the coastal plain of ANWR.

The environmental issue is not a wilderness versus no wilderness issue. There are already 8 million acres of designated wilderness in ANWR. The 1.5 million acre coastal plain comprises only eight percent of the refuge. Moreover 92 percent of the refuge is off-limits to oil and gas development. A multi-year record of petroleum development in arctic Alaska clearly demonstrates that such development can and does co-exist with the environment.

P.O. BOX 307 • VALDEZ, ALASKA 99686
TELEPHONE (907) 835-4313 • TELEX 25-381 • TELECOPIER (907) 835-2992

R-29

Now more than ever, we must move ahead with this opportunity, especially since it has been proven that the technology exists today to develop arctic petroleum resources in an environmentally sound manner.

In closing, I appreciate the opportunity to express our local interest and support for this project of national concern.

Sincerely,

CITY OF VALDEZ, ALASKA

John Devens

John Devens, Mayor

JD/DRT/lrf

ASCC

ALASKA STATE CHAMBER OF COMMERCE

Regional Office
801 B Street, Suite 405
Anchorage, Alaska 99501
(907) 278-3741

February 4, 1987

Director
U.S. Fish and Wildlife Service
Division of Refuge
Room 2343 Main Interior Building
18th and "C" Street
Washington, D.C. 20240

Dear Sir:

Speaking on behalf of the Alaska State Chamber of Commerce as its Immediate Past Chairman, we declare our full support for Secretary Hodel's recommendation to open the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas exploration, development and production under reasonable measures to assure the protection of wildlife and the environment.

The Alaska State Chamber of Commerce is served by a Board of 50 representing business communities statewide. . . from Nome to Ketchikan. This communication speaks for 1,196 of our members.

R-30

Our support results from studies of the issues raised in the Secretary of the Interior's Study. We do not fault the conclusions presented in the study and our experiences over the years substantiate the major points made.

Of major concern is Alaska's present oil production that yields 20% of our nation's production is declining with nothing coming up to sustain this contribution to our national security. Even with much of the infrastructure needed to bring ANWR Coastal Plain oil to U.S. markets already in place, it will take 10 years to bring any new fields into production. In the meantime, our nation's dependence on foreign oil grows right along with our trade deficit.

How can anyone in good conscience jeopardize our nation's security by ignoring the responsible petroleum development in Alaska's giant Prudhoe Bay field just 65 miles to the West of the Coastal Plain? How many billions of dollars must be wasted in repeated studies of identical issues and concerns?

We recognize our support is critical to the opening of the Coastal Plain of ANWR and want you to know it is in place, 1,196 times.

Sincerely,

Alvin H. Fleetwood

Alvin H. Fleetwood
Director, Executive Committee

Washington Environmental Council

P.O. Box 4445
76 S. Main Street
Seattle, Washington 98104
206-623-1483

February 2, 1987

AAUW — Washington State Division
Admiralty Audubon Society
Air Quality Coalition
Alpine Lakes Protection Society
Audubon Nature Center at Nisqually Reach
Black Hills Audubon Society
Blue Mountain Audubon Society
Camano Island Homeowner's Association
Cascade Bicycle Club
Cascade Wilderness Club
Citizens to Save Puget Sound
Council for Land Care and Planning
Everett Garden Club
Evergreen Islands Inc.
Floating Homes Association
Friends of Cypress Island
Friends of the Columbia Gorge
Friends of Discovery Park
Friends of the Earth — E. WA. N. ID
Greenpeace — Seattle
Hanford Oversight Committee of WA.
Hood Canal Environmental Council
Issaquah Alps Trails Club
Izaak Walton League of America
Kingsley Rural Association
Kitsap Audubon Society
Lower Columbia Basin Audubon Society
Mt. Baker Watershed Protection Association
North Cascades Audubon Society
North Cascades Conservation Council
North Central Washington Audubon Society
North University Garden Club
Northwest Fly Anglers
Northwest Steelhead Salmon Council of Trout Unlimited
Oak Harbor Garden Club
Olympic Park Associates
Olympic Peninsula Audubon Society
People for Fair Taxes in Washington
Pilchuck Audubon Society
Plateau Preservation Society
PRO Salmon
Protect the Peninsula's Future
Recreational Equipment, Inc.
Save A Valuable Environment
Seattle Audubon Society
Seattle Shoreline Coalition
Sierra Club — Cascade Chapter
Spokane Mountaineers, Inc
Spokane Audubon Society
Tahoma Audubon Society
The Ptarmigans
The Mountaineers
Town Forum, Inc.
Vancouver Audubon Society
Washington Citizens for Recycling
WA. Council of Fed. of Fly Fishers
Washington Fly Fishing Club
Washington Kayak Club
Washington Roadside Council
Washington Trollers Association
Wetlands of West Hylebos
Western Washington Solar Energy Association
Whidbey Island Audubon Society
Wildlife Society — Washington Chapter
Yakima Valley Audubon Society

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
Resources
2343 Main Interior Building
18th & C Streets Northwest
Washington, D.C. 20240

Re: ANWR Coastal Plan Resource Assessment

Dear Director:

These comments are submitted on behalf of the Washington Environmental Council. The Washington Environmental Council, or WEC, is a non-profit umbrella organization made up of over 65 separate conservation and recreation organizations. In addition the WEC has a separate membership of over 1100 persons.

The WEC does not usually comment upon activities outside of Washington. An exception to that practice has been made here on account of the important national interests at stake in the Arctic National Wildlife Refuge. A number of WEC's own members have visited the refuge; a much larger number expect to be able to enjoy such an opportunity.

The value of the refuge is self evident. It is the sole protected conservation unit on the north slope of Alaska. It offers the greatest hope of preserving a portion of the unique Arctic environment in its pristine state; its importance is more than national. As an integrated intact ecosystem the refuge is subject to no fewer than six international treaties and maintains importance for the entire northern hemisphere. Because of these outstanding attributes the WEC urges the selection of Alternative E, wilderness designation.

During the debates that led to the Section 1002 compromise, the Senate fully appreciated the wilderness characteristics of the coastal plain by recognizing that it, of all other areas, should be the last to be explored for petroleum resources. Nothing in the draft resource assessment warrants changing that priority. As it currently lies, the coastal plain by no means holds the last remaining hope for America's petroleum needs. In the six years since the passage of ANCILA hundreds of thousands of acres of both onshore and offshore lands have been opened for oil exploration and development. America's potential for petroleum production literally remains untapped.

The prospects of the coastal plain do not call for a reordering of priorities. A less than twenty percent chance of economically recoverable deposits hardly justifies a one hundred percent chance of desecration of this pristine environment. Even if best estimates proved true, the coastal plain would only render a minute fraction of the U.S. oil demand during the period of production. Development of the coastal plain will not make the U.S. any more energy independent. Nor will it save the economy of Alaska. Predicated upon the price of oil at $33 - $40 per barrel, it is highly unlikely that the price will escalate sufficiently for the state to realize any of its royalty interests. Moreover, even if development proceeds, any return is at least 15 years away.

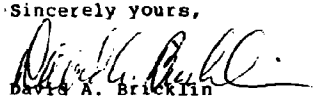
Events of the past six years, if anything, have dictated that the fate of the coastal plain be sealed with wilderness designation. The Section 1002 study was directed at a time when the American economy was suffering the consequences of the Arab oil cartel. Since then the cartel has dissolved, oil prices have dropped to their true relative value, most areas of the continental shelf with high petroleum potential have been opened for leasing and exploration, and the true prospects of the coastal plain have been determined. Through the 1002 report Congress now knows that the coastal plain is not another Prudhoe Bay. In view of all of these factors, Congress can now confidently designate the coastal plain for wilderness without the fear of sacrificing America's energy independence.

It should be kept in mind that much is preserved and nothing is lost by such designation. The ANWR, with its coastal plain, is one of the true wilderness areas of our nation. In keeping with the spirit of the Wilderness Act it is one of the few areas of our country which truly remains in its primeval state. To preserve such areas is far more imporant for our heritage than the immediate financial gain of short term exploratory activities. Should we ever get to the point where the coastal plain is our last prospect for petroleum development, it could, with congressional approval, be resorted to in desperation. Until that time, such a treasure as the coastal plain should not be hocked, especially at fire sale conditions.

In closing we would have to agree with Ted Stevens' metaphor that was articulated during the ANILCA debates: Indeed a pipeline across the coastal plain would be tantamount to a slash across the face of the Mona Lisa.

Thank you for your consideration of these comments.

Sincerely yours,



David A. Bricklin
President

cc: Senator Bennett J. Johnston
Senate Energy and Natural Resources Committee

Honorable Steve Cowper
Governor of the State of Alaska

Glen W. Elison
U.S. Fish and Wildlife Service

PUFFIN DIVING & CONSULTING

February 2, 1987

U.S. Fish and Wildlife Service
ATTENTION: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

REFERENCE: ANWR Draft Environmental Impact Statement

Dear Sirs:

We endorse the recommendations contained in the recently released Draft Section 1022 (h) Report and draft Environmental Impact Statement that the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) should be opened to oil and gas leasing, exploration and development with environmental safeguards.

R-32

ANWR is the most probable place to find oil in North America in significant amounts. This is important to the nation because of our strong current dependence upon foreign oil and because, in the future, our reliance upon foreign oil will be even more significant (by the year 2000, when ANWR production could be obtained, it is estimated that America will import upwards of 65% of its oil).

The environmental record of the oil industry on the North Slope is spotless--no significant environmental harm has resulted from the major developments there so far. The oil industry will operate safely in ANWR, without affecting the caribou and other wildlife which are present there, just like it has in Prudhoe Bay and Kuparuk, where the Central Arctic Caribou herd has increased in size 5 times in the last 15 years.

Thank you for this opportunity to comment upon the draft Section 1002 (h) Report and Environmental Impact Statement.

Sincerely,

William H. Curtis
Owner

2312 Lincoln Avenue • Anchorage, Alaska 99517 • (907) 248-4933

ALASKA CONTROLS, INC.

MANUFACTURERS' REPRESENTATIVE

P.O. Box [illegible] Anchorage, Alaska 99[illegible] TELEX [illegible] Phone [illegible]

February 2, 1987

U.S. Fish and Wildlife Service
ATTENTION: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

REFERENCE: ANWR Draft Environmental Impact Statement

Dear Sirs:

We endorse the recommendations contained in the recently released draft Section 1022 (h) report and draft Environmental Impact Statement that the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) should be opened to oil and gas leasing, exploration and development with environmental safeguards.

ANWR is the most probable place to find oil in North America in significant amounts. This is important to the nation becasue of our strong current dependence upon foreign oil and becasue, in the future, our reliance upon foreign oil will be even more significant (by the year 2000, when ANWR production could be obtained, it is estimated that America will import upwards of 65% of its oil).

The environmental record of the oil industry on the North Slope is spotless--no significant environmental harm has resulted from the major developments there so far. The oil industry will operate safely in ANWR, without affecting the caribou and other wildlife which are present there, just like it has in Prudhoe Bay and Kuparuk, where the Central Arctic Caribou herd has increased in size 5 times in the last 15 years.

Thank you for this opportunity to comment upon the draft Section 1002 (h) Report and Environmental Impact Statement.

Sincerely,

Mack Hudson
Vice President

January 19, 1987

U. S. Fish & Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th & C Streets, N.W.
Washington, D.C. 20240

RE: U.S. Department of Interior 1002 Report Concerning ANWR

Gentlemen:

As interested individuals we want to express our support of oil and gas exploration in the Artic National Wildlife Refuge (ANWR).

Alaska currently supplies twenty percent of the U.S. consumption of oil, most of which is from the large Prudhoe Bay field, now beginning to decline in production. America needs to find new sources of petroleum in order to keep foreign dependence at a minimum.

The development of the ANWR would be in harmony with the enviroment. The twenty year history of the near Prudhoe Bay field shows that wildlife and oil development are indeed compatible. Caribou in North Slope oil fields have tripled since development and bioligists expect ANWR caribou to adapt as well.

If the ANWR Coastal Plain is approved for exploration, the multi-billion dollar investments required for development would provide jobs and economic benefits throughout the entire United States.

Concerned Citizens,

Robert Layfield 2730 WATERGATE WAY, KENAI, AK. 99611
R. W. Larson PO Box 1410 Kenai AK 99611
Stanley [illegible], PO Box [illegible] Soldotna, AK [illegible]
W.G. Zimmerman P.O. Box 10 Kenai Ak. 99611

Sandra M. Jones P.O.Box 352 Kasilof, AK 99610
Dale H. Croft P.O. Box 2742 Kenai, AK 99611
Stephen W. Croft
C. Rainwater 710 Harbor Circle, Anchorage AK 99515

R-33

DEPARTMENT OF THE INTERIOR

U.S. Fish and Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th & C Streets, N.W.
Washington, D.C. 20240

RE: U.S. Department of Interior 1002 Report Concerning ANWR

Gentlemen:

I am writing to express my full support for the Secretary of the Interior's recommendation to open the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas exploration, development and production under reasonable measures to assure the protection of wildlife and the environment.

The resource estimates ranging up to 29.4 billion barrels of oil and 64.5 trillion cubic feet of natural gas in-place, which are set forth in the Coastal Plain Resource Assessment of November 24, 1986, are very significant. If petroleum reserves of this magnitude are to be found on the Coastal Plain, this would represent a substantial contribution to the energy security of our nation.

A decision to open the Coastal Plain would also represent thousands of jobs and billions of dollars in business opportunities all across our nation. The potential benefits to our economic well-being make it unthinkable that the Coastal Plain may be closed to development.

The petroleum industry's proven record in developing the super-giant Prudhoe Bay field demonstrates that oil and gas development can be undertaken while still protecting wildlife and environmental resources.

Sincerely, Jack C Jordan
Rt 2 Box 261 B
Rusk, Tx. 75785

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Re: ANWR Draft Environmental Impact Statement

Dear Sirs:

We endorse the recommendations contained in the recently released draft Section 1002(h) Report and draft Environmental Impact Statement that the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) should be opened to oil and gas leasing, exploration and development with environmental safeguards.

ANWR is the most probable place to find oil in North America in significant amounts. This is important to the nation because of our strong current dependence upon foreign oil (approximately 43% of America's oil is imported in 1986) and because, in the future, our reliance upon foreign oil will be even more significant (by the year 2000, when ANWR production could be obtained, it is estimated that America will import upwards of 65% of its oil).

The environmental record of the oil industry on the North Slope is spotless -- no significant environmental harm has resulted from the major developments there so far. The oil industry will operate safely in ANWR, without affecting the Caribou and other wildlife which are present there, just like it has in Prudhoe Bay and Kuparuk, where the Central Arctic Caribou herd has increased in size 5 times in the last 15 years.

Thank you for this opportunity to comment upon the draft Section 1002(h) Report and Environmental Impact Statement.

Sincerely yours,

Bernard J. Marsh, Broker
Ben Marsh + Associates
2550 Denali, Suite 1608
Anchorage, AK 99503

R-34

January 28, 1987

U.S. Fish and Wildlife Service
ATTN: Division of Refuge Management
2343 Main Interior Building
18th & C Streets, N.W.
Washington, D.C. 20240

RE: U.S. Department of Interior Draft Report and Recommendation to the U.S. Congress and Legislative Environmental Impact Statement (i.e., 1002 Report)

Gentlemen:

I am writing to express my full support for the Secretary of the Interior's recommendation to open the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas exploration, development, and production under reasonable measures to assure the protection of wildlife and the environment.

The resource estimates ranging up to 29.4 billion barrels of oil and 64.5 trillion cubic feet of natural gas in-place, which are set forth in the Coastal Plain Resource Assessment of November 14, 1986, are very significant. If petroleum reserves of this magnitude are to be found on the Coastal Plain, this would represent a substantial contribution to the energy security of our nation.

A decision to open the Coastal Plain would also represent thousands of jobs and billions of dollars in business opportunities all across our nation. The potential benefits to our economic well-being make it unthinkable that the Coastal Plain may be closed to development.

The petroleum industry's proven record in developing the super-giant Prudhoe Bay field demonstrates that oil and gas development can be undertaken while still protecting wildlife and environmental resources.

Sincerely,

AN, AK 99518

THE GARDEN CLUB OF MICHIGAN

January 10, 1987

Dear Secretary Hodel,

1599 87 JN 21 AM

I feel that the Department of Interior would be unconscionably wrong to develop oil and gas in the costal plains of the Arctic National Wildlife Refuge.

First, it is an uneconomical plan. I understand that if you could recover the small amount of 600 million barrels it would be at a cost of $33. a barrel.

Secondly, and most important, this area is the calving ground of millions of caribou and building of roads, pipelines, machinery and men would be irreparable in that fragile environment.

There would be tremendous decline of caribou, polar bear, musk oxen, arctic fox and millions of birds that utilize that costal plain.

Lastly the Eskimo require these birds and animals for their survival. We have no right to convert their hunting lands for our own purposes.

Please abandon this very bad plan.

Sincerely,

Mrs. Miles O'Brien
171 Kenwood Road
Grosse Pointe Farms, MI
48236

R-35

U.S. Fish & Wildlife Service
Division of Refuge Mgmt.
2343 Main Interior Building
18th and C Sts., N.W.
Washington D.C. 20240

532 S. Gramercy Pl.
Apartment # 407
Los Angeles, CA 90020

14 January 1987

Gentlemen:

I am appalled to learn that the Interior Department proposes to allow oil and gas development on the Coastal plain of the Arctic National Wildlife Refuge.

I used to actually believe that the Department of the Interior was there to protect the land. Obviously you see your mission as one of rape and pillage.

For a 20% chance of finding a few months' supply of oil, you and the Oil industry are eager to damage irreparably a unique and fragile ecosystem and decimate the diverse and, in some instances, endangered wildlife population which lives therein.

The spirit of James Watt lingers like the odor of bad drains.

America's wildlife and wilderness areas belong to all Americans not solely to a handful of myopic bureaucrats and greedy oil tycoons.

But another way, you are selling something which is not yours to sell, to people who have no right to buy.

Your Collective job is that of Caretaker. If you can't, or won't discharge your duties properly, you can all be replaced.

The Arctic National Wildlife Refuge and it's inhabitants must be protected at all costs. The Coastal plain should be designated as Wilderness. Anything less is unacceptable.

No exploration, no exploitation.

Yours Truly,

Lynn Mills

R-36

January 14, 1987

U.S. Fish & Wildlife Service
Attn: Division of Refuge Management
2343 Main Interior Building
18th and C Sts., NW
Washington, D.C. 20240

Re: Proposed Oil Leases in the Arctic Coastal Plain in Alaska

Dear Sir or Madam:

I am writing to express my disbelief and outrage with regard to the Department of the Interior's proposed exploitation of a national treasure, namely, Alaska's Arctic Coastal Plain, an awesome 1.5 million acre expanse of American wilderness.

This is an ill-considered development in that this refuge is one of the most expansive, fragile, and diverse areas that is still intact in this country -- and which can be enjoyed by future generations of Americans. To allow oil and gas development in this area would mean the destruction of an internationally significant wildlife and wilderness resource for what amounts to an insignificant gain on the part of the oil and gas industry.

Although this letter of opposition against the interests of the oil and gas industry in the development of this area is similar to the efforts of David fighting Goliath, I still believe that in this country, the voice of the "little" people does matter. The beauty of the Arctic National Wildlife Refuge must be preserved in its natural state--to develop it in this fashion will rob us, and our children, of a unique national asset. The coastal plain should be designated as wilderness.

Respectfully,

Alvita M. Porter

(Alvita M. Porter)
Champion International
805 Third Avenue
New York, NY 10022

cc: Hon. Alfonse M. D'Amato
Hon. Daniel P. Moynihan

January 19, 1987

We do not believe it's worth endangering a fragile and diverse wildlife treasure for the chance of finding a few years' supply of oil. The unique wilderness and wildlife of the Arctic National Wildlife Refuge must take priority over oil development. Everday we are destroying the habitat of our wild animals, it must stop. This is the nation's opportunity to protect the wildlife left in this region. This particular refuge comprises one of the most extensive, fragile and diverse ecosystems that we have and should be designated as wilderness. It should be the last place to go for oil and gas.

We are writing today to let you know how very important it is to **INCLUDE THE ARCTIC NATIONAL WILDLIFE REFUGE IN THE NATIONAL WILDERNESS PRESERVATION SYSTEM.** We must preserve this critically important habitat for so many of our beautiful wild animals, many of which are already endangered.

NAME	ADDRESS
TRUDIE HARRIS	232 Skyland Dr. Columbia SC
DAVE HUFFMAN	" " " "
Chuck Ledford	1102 Fairwood Dr. Columbia, S.C. 29209
Vernon Ray Bristow	6004 Woodberry RD Lexington, SC 29072
Clarkene Bruce	4618 Oakwood Rd, Columbia, S.C. 29206
Jay SALTER	6228 N. TRENHOLM Rd. Columbia, S.C. 29206
Mary Lynn Anuck	409 Fireside dr Cola, SC 29210
Curtis Anuck	409 Fireside Dr Cola SC 29210
LOIS KENICK	409 FIRESIDE DR COLA SC 29210
Tara Thompson	RT 5 BOX 317 Chapin S.C 29036
Robin Dow	1611 Hollywood DR. Cola SC 29205
Tammy Bixby	126 A Pond Dr Lex SC 29072
Hannah Jones	Rt 2 Box 273-D IRMO S.C 29063
Irene VanSteenberg	213 Irwin Rd Lexington, S.C. 29072
Shawn Knight	Rt 2 Box 120-D Groton, S.C. 29053

R-37

cc: Interior Secretary Donald Hodel✓
Senator Strom Thurmond
Senator Ernest F. Hollings
Congressman Floyd Spence
Defenders of Wildlife

Madison Audubon Society Inc.

January 20, 1987

U.S. Fish & Wildlife Service
Washington, DC

Dear People:

On behalf of our 2500 members in the Madison Audubon Society, I wish to protest the developing plans to open the areas of the Arctic National Wildlife Refuge to oil and gas leases. In our opinion, this represents poor planning and poor stewardship of our national resources. It is Madison Audubon's understanding that the draft reppprt has misleading deficiencies in its data. We believe that the resource assessment should be redone and time should be given for public input.

There is no national need for the marginal amount of energy which is projected to be available in this coastal area. Yet, the wildlife diversity is some of the richest on earth. Our interests are best served by the protection of this diversity. We strongly urge that you realize that the suggestion to open the coast to energy development is ill-advised and that you withdraw the plan.

Sincerely,
Sharon Clark Caskill

Sharon Clark Caskill
President, Madison Audubon Society
111 King Street
Madison, Wisconsin 53703

DONALD HODEL
SECRETARY OF THE INTERIOR
18TH & C STREETS N.W.
WASHINGTON, D.C. 20240

25 NOVEMBER 1986

MR. HODEL,

OIL DRILLING IN A WILDLIFE REFUGE IS A BLASPHEMOUS AND ARROGANT ACT UPON NATURE AND THIS COUNTRY.

NO! NO! NO! NO! NO! NO!

YOUR SUGGESTIONS OF INCREASED USE OF ALTERNATE ENERGY SOURCES AND REDUCTION IN OIL CONSUMPTION ARE WONDERFUL. PLEASE PURSUE THEM!

IF POSSIBLE, TAKE A TRIP INTO THE WILDERNESS AND SPEND SOME TIME BY YOURSELF WITH NATURE. YOU CANNOT HELP BUT COME AWAY WITH A GREATER APPRECIATION FOR THE NEED TO PRESERVE THE LAND IN ITS NATURAL STATE.

R-38

Oil Drilling Proposed for Alaska Refuge

Washington

The Interior Department, setting the stage for a battle with conservationists, tentatively proposed yesterday that oil drilling be allowed in a huge wildlife refuge on Alaska's arctic coast.

A draft report made public by the department's Fish and Wildlife Service recommended that the coastal plain within the Arctic National Wildlife Refuge be opened for oil and gas development.

William P. Horn, assistant interior secretary for fish and wildlife, said that the wildlife refuge offers the possibility of "a supergiant oil field that does not exist anywhere else in the United States."

The report said the field's large oil and gas potentials are needed for the nation's economic well-being and for national security.

"The numbers say that there is a good prospect here of another Prudhoe Bay," Horn said. Prudhoe

TAKE A STAND FOR CONSERVATION, NOT EXPLOITATION!!
CREATE, DO NOT DESTROY!!

MOST SINCERELY,

Stevan Bosanac

STEVAN BOSANAC
78 MARS
SAN FRANCISCO, CA 94115

CC: WILLIAM P. HORN, ASST. SEC. OF INTERIOR
GEORGE KELLER, CHEVRON

Carpenter St. Croix Valley Nature Center
12805 St. Croix Trail • Hastings, Minnesota 55033 • 612-437-4359

December 9, 1986

DEPT OF INTERIOR
1103 '86 DEC 15 A11:33
OFF OF THE EXECUTIVE SECRETARIAT

Donald Hodel
Department of the Interior
Interior Bldg.
C. Street NW
Washington, DC 20240

Dear Secretary Hodel:

This letter is in response to the Interior Department's call for public comments on the draft report regarding oil and gas potential on Arctic National Wildlife Refuge.

Wildlife refuges are extremely important sanctuaries for all wildlife species. During a time when nature, as unaltered by man, is being pushed onto smaller and smaller parts of our planet, the refuge system becomes of the utmost importance.

R-39

By opening the Arctic National Wildlife Refuge to drilling oil and gas, we are endangering wildlife in many ways.

First, in wildlife/man confrontations such as when a human or his property is injured by a bear, it is the animal which is removed or destroyed. If situations like this arose during construction or drilling exercises, how would the animal's refuge be upheld?

Secondly, by moving man and his machines onto the Refuge, the safety of refuges everywhere is in jeopardy. The refuge system becomes something which can be altered and twisted to meet the needs of people, instead of the plants and animals which should be the benefactors of the Refuge.

Furthermore, while Bill Horn stated that "Development must result in no unnecessary adverse effects, and unavoidable habitat losses should be fully compensated.", any habitat loss is an unnecessary adverse effect. After all the Refuge was set up for the wildlife. What would compensation do if an environmental catastrophe, like a major oil spill occured? While the compensation may temper human concern, it could not return the habitat or restore ecological balance.

Carpenter St. Croix Valley Nature Center
12805 St. Croix Trail • Hastings, Minnesota 55033 • 612-437-4359

It is possible and somewhat easy to calculate the billions of barrels of oil and the trillions of cubic feet of gas which lies under the Refuge. What is not as easy to compute, but even more important, is the wealth in biological diversity, the long term effects of man's activity in the Arctic and the need for wildlife to have wilderness areas free from man's influence.

I urge you to recommend that the Arctic National Wildlife Refuge be designated as wilderness. Please include my thoughts in your final report to Congress.

Thank you for giving me the opportunity to comment on this issue.

Sincerely,

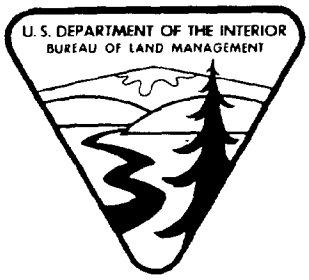
Tom Lewanski

Tom Lewanski
Interpretive Naturalist

TL/lk

cc: J. Fitzpatrick, Director of CNC
Congressman, Timothy Penny
Congressman, Vin Weber
Congressman, Bill Frenzel
Congressman, Bruce Vento
Congressman, Martin Sabo
Congressman, Gerry Sikorski
Congressman, Arlan Stangeland
Congressman, James Oberstar

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



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