ENVIRONMENTAL ASSESSMENT

FOR

EXEMPTED FISHING PERMIT 99-02

TO TEST THE EFFECTIVENESS OF SEABIRD AVOIDANCE MEASURES USED ON CATCHER-PROCESSOR VESSELS USING HOOK-AND-LINE GEAR TO FISH FOR PACIFIC COD IN THE BERING SEA AND ALEUTIAN ISLANDS MANAGEMENT AREA

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1.0 INTRODUCTION

The groundfish fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 miles offshore) of the Bering Sea and Aleutian Islands Management Area (BSAI) are managed under the Fishery Management Plan for Groundfish Fisheries of the Bering Sea and Aleutian Islands Area (FMP). The FMP was prepared by the North Pacific Fishery Management Council (Council) under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and became effective in 1982. This Environmental Assessment (EA) addresses an exempted fishing permit (EFP) application by the Washington Sea Grant Program (WSGP) to systematically test the effectiveness of seabird avoidance measures on freezer-longliners in the BSAI Pacific cod fishery that are intended to reduce the bycatch of the endangered short-tailed albatross (*Phoebastria albatrus*) and other seabird species.

Under regulations implementing the FMP at 50 CFR sections 679.6 and 600.745, the Administrator, Alaska Region, National Marine Fisheries Service (NMFS), after consulting with the Council, may authorize for limited experimental purposes, fishing for groundfish in a manner that would otherwise be prohibited. In addition to the Magnuson-Stevens Act, such action is governed by the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA).

NEPA requires a description of the purpose and need for the proposed action as well as a description of alternative actions which may address the problem. This information is included in Section 1of this document. Section 2 contains information on the biological and environmental impacts of the alternatives as required by NEPA. Impacts on endangered species and marine mammals are also addressed in this section.

1.1 Purpose of and Need for the Action

Seabird bycatch mortality has been documented by fishery observers in the groundfish fishery. Six of the 7 reported takes of the endangered short-tailed albatross (*Phoebastria albatrus*) since 1983 have occurred in hook-and-line fisheries (NMFS 1999a). Preliminary estimates of the annual seabird bycatch for the Alaska groundfish hook-and-line fisheries, based on 1993 to 1997 data, indicate that approximately 14,000 seabirds are taken annually in the combined BSAI and Gulf of Alaska (GOA) groundfish fisheries (11,600 in the BSAI; 2,400 in the GOA) at the average rates of 0.090 and 0.0568 birds per 1000 hooks in the BSAI and in the GOA, respectively (NMFS 1999a). Of the estimated 14,000 seabirds that are incidentally caught, the species composition is: 67 percent fulmars, 16 percent gull species, 9 percent albatross species, and 8 percent shearwater species. Information is not currently available as to the potential impacts of the seabird bycatch in the Alaska hook-and-line fisheries on the populations of seabird species other than short-tailed albatross.

In recognition of the seabird bycatch problem in Alaska, NMFS issued regulations in 1997 that require operators of groundfish hook-and-line vessels in Alaska to employ seabird bycatch avoidance gear and methods intended to reduce seabird bycatch and incidental seabird mortality. Promulgation of these regulations was expedited in Alaska by the need to reduce the likelihood of "take" of the endangered short-tailed albatross, but reducing mortality of other unlisted seabirds is also a recognized goal. The regulations were based on a request from longline fishermen to the Council, who recognized that seabird bycatch, especially of the endangered short-tailed albatross, could have negative implications for the future of the fishery if unaddressed.

Critics of these regulations have argued that the more stringent measures required by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR 1996) in southern oceans should be adopted in Alaska's fisheries. Although similar to NMFS regulations in many ways, CCAMLR regulations are more stringent in that they require vessels to set longlines only at night, and to deploy streamer lines at all times during fishing operations. However, currently no scientific data exists on the effectiveness of any deterrent measures in Alaska's fisheries. The appropriateness of the CCAMLR measures for the conditions of the GOA and BSAI is therefore unknown. NMFS and USFWS agreed to endorse more flexible requirements initially for Alaska to allow fishermen, managers and scientists to experiment with devices and determine their effectiveness. Testing the effectiveness of seabird bycatch avoidance measures will allow NMFS to better ascertain if they are effective in the Alaskan fisheries. Once measures have been tested, NMFS will be better able to revise regulations to maximize their effectiveness. This may include specific performance standards for the seabird avoidance measures, if appropriate.

Under the Endangered Species Act of 1973, as amended (ESA), the short-tailed albatross is afforded certain protections. Under section 7(a)(2) of the ESA, any agency that authorizes, funds or carries out an activity that may affect a listed species must ensure that the action is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. Compliance with section 7(a)(2) for endangered or threatened seabirds is accomplished through interagency consultation with the USFWS.

Biological Opinions prepared by USFWS on the effects of the groundfish and halibut fisheries on the endangered short-tailed albatross determined that the fisheries are not likely to jeopardize the continued survival and recovery of the species. The accompanying incidental take statements authorize incidental take of up to 4 short-tailed albatrosses every 2 years in the groundfish fishery, and up to 2 short-tailed albatrosses every 2 years in the halibut fishery. If the 2-year incidental take limit is exceeded, NMFS must immediately reinitiate section 7 consultation and review with USFWS the need for possible modification of the mandatory reasonable and prudent measures established to minimize take of the short-tailed albatross. It is possible that fishing operations would be altered and closures imposed during the reinitiated section 7 consultation.

The reasonable and prudent measures which NMFS is required to undertake are : 1) require the use of seabird deterrent devices, 2) develop a plan to test the effectiveness of the required seabird bycatch avoidance gear and methods, and 3) implement the test plan. The ESA also requires, under section 7(a)(2) that federal agencies utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of listed species. A seabird test plan has been completed. Completion of the WSGP effectiveness study on seabird avoidance measures, as facilitated by two EFPs, would partially fulfill NMFS requirements under the Biological Opinion issued by the USFWS. According to the Biological Opinion, the effectiveness studies are to begin no later than 1999 and a final report on the studies is to be submitted to USFWS by December 31, 2000.

The first EFP has been approved and already issued to WSGP (64 FR 25478, May 12, 1999). It authorizes the control treatments (no seabird avoidance measures) for the entire WSGP seabird study, both the experiments on smaller vessels in the GOA and BSAI and the experiments on the larger freezer-longliner vessels in the BSAI Pacific cod fishery. On March 22, 1999, NMFS received from WSGP an application for a second EFP to test the effectiveness of seabird avoidance measures on freezer-longliners in the BSAI Pacific cod fishery that are intended to reduce the bycatch of the endangered

short-tailed albatross and other seabird species. The application was reviewed and approved by the Council at its April 1999 meeting. This EFP would authorize additional groundfish harvest during a closed season. The first EFP does not authorize additional groundfish harvest and the experiments are occurring during the open-access fishery.

The goal of the WSGP seabird study, as facilitated by the EFPs, is to reduce seabird bycatch in North Pacific hook-and-line fisheries and eliminate the threat of fishery closures stemming from the incidental capture of endangered seabirds and/or all seabirds protected under the Migratory Bird Treaty Act (MBTA). The objectives of the second part of the WSGP study are to:

- work cooperatively with the fishing industry to select and then test the effectiveness of seabird deterrent devices in the freezer-longliner groundfish fishery in the BSAI region,
- characterize the species-specific behavioral interactions of seabirds with hook-and-line fishing gear on active fishing vessels, with and without deterrent devices,
- work cooperatively with the fishing industry and federal regulatory agencies to develop recommendations for specific seabird bycatch avoidance regulations and performance standards based on the results of this industry-university collaborative research, and
- recommend future research and research protocols.

1.2 Alternatives Considered

1.2.1 Alternative 1: No Action

An EFP would not be issued. Under this alternative, any experimentation on the effectiveness of seabird avoidance measures would have to occur at times when directed fisheries are open under regulations at 50 CFR 679. Owner/operators of freezer-longliners have voiced concerns that experimental operations would interfere with the highly competitive open access fishery, resulting in potential economic loss. Therefore, it is highly unlikely that the necessary participation of vessel owners would occur unless the experimentation could occur outside of the open-access fishery.

As noted in section 1.1, testing the effectiveness of seabird bycatch avoidance measures will allow NMFS to better ascertain if they are effective in the Alaskan fisheries. Once measures have been tested, NMFS will be better able to revise regulations to maximize their effectiveness. If required measures are not maximally effective, an increased incidental take of short-tailed albatrosses could occur, possibly resulting in the established incidental take limit being exceeded. As noted previously, NMFS must then reintiate section 7 consultation and possible modification of the mandatory reasonable and prudent measures established to minimize take of the short-tailed albatross could ensue. It is possible that fishing operations would be altered and closures imposed during the reinitiated section 7 consultation.

1.2.2 Alternative 2: (Preferred)

Issue the proposed EFP to test the effectiveness of seabird avoidance measures that are intended to reduce the bycatch of the endangered short-tailed albatross and other seabird species.

This EFP augments EFP #99-01 that was recently issued to WSGP to conduct effectiveness studies of seabird avoidance measures. This second EFP is necessary to assure that freezer-longliner vessels will be available in the BSAI Pacific cod fishery to conduct the second part of the WSGP study and

authorizes the harvest of 1,597 metric tons (mt) of groundfish, 1,306 mt of that amount being Pacific cod. The experiment will be conducted on two pre-selected vessels in the BSAI for approximately 40 to 50 days during July through October 1999 and for approximately 40 to 50 days in 2000. Prohibited species bycatch amounts of Pacific halibut are also authorized (17.2 mt of Pacific halibut, per year).

NMFS will review the experimental work and pending successful completion of the first year of the experiment in 1999, the same amount of groundfish harvest would be authorized during the same time period in 2000 for the second year of the experiment. No more than approximately 1,306 mt of the authorized amount may be Pacific cod. Groundfish and halibut bycatch mortality associated with this experiment will not be deducted from total allowable catch (TAC) or halibut bycatch allowances specified for the 1999 groundfish fisheries.

1.3 Background

1.3.1 Other Effectiveness Studies and Justification for WSGP Study

To date, seabird bycatch avoidance measures in longline fisheries such as those adopted by CCAMLR, New Zealand, and Alaska have been developed primarily from anecdotal evidence. There have been no rigorous, statistically robust tests of deterrent efficacy in any fishery, scientific or active. Most published studies on longline fishery seabird bycatch are experimental questions imposed on observer data after the fact (e.g., Brothers 1991, Murray et .al. 1993, Klaer and Polacheck 1995, Duckworth 1995). As such these studies do not test the degree to which deterrents reduce bycatch relative to controls (i.e., no deterrent). These studies also fail to provide rigorous documentation of seabird interaction with deployed gear and/or seabird behavioral response to deterrent presence. Nevertheless, the observer studies do provide evidence that certain seabird bycatch reduction measures tend to reduce overall seabird bycatch, at least within the geographic scope of the fishery.

In contrast to the observer studies, there are three pilot experiments addressing the efficacy of specific deterrent measures (Lokkeborg and Bjordal 1992, Cherel et. al., 1995, Lokkeborg 1996) one of which included data on seabird-bait interactions (Cherel et. al., 1995). Working in waters off Finmark, Lokkeborg and Bjordal (1992) compared bait loss from bird depredation with and without a bird scaring device and between two baits. In this one day trial in which they deployed and immediately retrieved 800 hooks, bait loss was significantly less using a bird scaring device regardless of bait type. Lokkeborg (1996) carried out seabird bycatch and bait loss experiments on a single vessel in 12 days of fishing (number of hooks unknown) in the torsk and ling fishery in waters off mid-Norway as a function of three treatments: a setting funnel that deployed hooks subsurface, a tori line and traditional gear deployment (the control). Tori lines were most successful at repelling birds and diminishing bait loss. Fish catch did not vary among treatments.

In the most comprehensive study to date, Cherel et. al. (1995), working in the Patagonian toothfish, (*Dissostichus eleginoides*) fishery in the South Indian Ocean compared the effects of discarding offal during gear deployment and day versus night fishing on seabird hooking rates and attacks on bait. The research was carried out on a single vessel and spanned 13 days (174,000 hooks). Discarding offal during gear setting resulted in dramatically reduced (20 times) bird hooking rates compared to traditional deployment and significantly reduced bird attacks on the baits for all but one species. In sets without offal discharge (the control), bird hooking rates were 2.6 times lower during night sets and night hooking was further reduced (4 times) in the absence of deck lighting. Based on these results, Cherel et. al.

(1995) recommended specifications for offal dumping during line setting as a valid seabird bycatch mitigation measure.

The observer and experimental studies provide insight and guidance in the design and testing of seabird deterrent for longline fisheries; however, they are far from comprehensive studies which rigorously test a range of deterrents in a statistically valid study design. Furthermore, all studies (with the possible exception of Cherel et. al. 1995) fail to link patterns of seabird abundance and behavior to observed hooking rates. These are crucial steps for several reasons. First, although many seabirds may be hooked in aggregate, seabird bycatch in longline fisheries is a rare event (that is, birds per hook). Therefore, even experiments with a few hundred thousand hooks may not catch enough birds to adequately test deterrent efficacy. In essence, the results become suggestive rather than definitive. Second, tests on a single vessel run the risk of bias introduced due to individual fisher behavior and/or anomalies associated with restricted geographic locations. More comprehensive studies, encompassing several vessels, over more than one season, are needed to reduce the chance that "significant" results are outcome of fisher effort rather than gear tested. Third, deterrents work because they can successfully alter seabird behavior, reducing the likelihood that the bird will encounter the bait. A comprehensive study must address this linkage, allowing researchers to not only explain why certain deterrents are effective but to also suggest avenues for future deterrent development. Finally, changes in fishery regulation can be costly to the effected industry. Therefore, it is reasonable to require that all proposed changes be rigorously tested to increase the certainty that they will work.

The WSGP seabird study will build on the experimental approach used by Cherel et. al (1995) and test at least two required seabird mitigation devices (62 FR 23176, April 29, 1997; 63 FR 11161, March 6, 1998) on active fishing vessels in the groundfish BSAI and the halibut GOA fisheries, collecting data on seabird abundance, behavior, and hooking rates. The WSGP seabird study conforms to and extends the NMFS seabird test plan (NMFS 1998a) by: 1) calling for direct collaboration with industry throughout the research activity, 2) occurring on active fishing vessels, and 3) exceeding minimum suggested sampling levels.

1.3.2 Importance of the Experiment

The WSGP seabird study, as facilitated by this EFP, is important for several reasons:

- it satisfies USFWS requirements and conforms to the NMFS Research Plan,
- it empowers the industry to maintain its leadership role in developing techniques to reduce seabird bycatch,
- it would be the first comprehensive study on the effectiveness of seabird bycatch deterrents in any fishery,
- it paves the way toward reduced seabird bycatch and enhanced conservation of many seabird species, and
- it minimizes the likelihood of short-tailed albatross takes that could triggering the closure of these multi-million dollar fisheries.

Results from this study will be used to help develop recommendations for specific seabird bycatch avoidance regulations and performance standards in the North Pacific hook-and-line fisheries. Without regulations which work, the industry could be faced with potential costly and ineffective bycatch measures, and in the extreme case, fishery closures if the incidental take limit of short-tailed albatrosses

is exceeded. Because the WSGP study will not only test deterrent efficacy but also provide insight on future deterrent design based on quantification of seabird-bait-deterrent behavioral interactions, significant strides are expected towards the goal of elimination of seabird bycatch in these fisheries.

The WSGP study is more comprehensive than other studies and will rigorously test a range of deterrents in a statistically valid study design. In addition, it is designed to link patterns of seabird abundance and behavior to observed hooking rates, heretofore not accomplished in other studies.

1.3.3 Timing of the Experiment

The proposed timing for the experiment is approximately 40 to 50 days during the months of July thorough October 1999 and the same timing in 2000. The effective date for the EFP may be revised to other dates in 1999 pending agreement between the permit holder and the Regional Administrator. The July through October timing for the experiment is desirable because this is during a closed season for the open-access fishery and is a time when few longline opportunities are available and this will help to maximize the attractiveness of the EFP fishing time. This time also provides an opportunity to maximize the potential for seabird/fishery interactions, given the increased number of seabirds that seem to be in the BSAI at that time.

The projected duration of the exempted fishery is based on calculations made of the estimated number of interactions between seabirds and fishing vessels. Because actual seabird hookings in North Pacific hook-and-line fisheries are rare events, WSGP estimated that a minimum of three million deployed hooks and 150 observer days over two years will be needed to adequately address deterrent device efficacy relative to a control of no device. This equates to two vessels per year in the BSAI Pacific cod fishery, with seabird observer coverage for a total of 40 days per year (approximately 2 trips), assuming a total hook retrieval observation rate of 40 percent.

1.3.4 Structure of the Experiment

Experiments will be conducted at times and in locations that maximize fishery interactions with albatross species and, secondarily other seabirds, as determined by available NMFS fishery observer data as well as anecdotal reports of vessel operators and fishery observers.

The WSGP study, as facilitated by the EFP, will compare two mitigation devices to a control of no device, for a total of three independent treatments (device 1, device 2, and control). Priority will be given to testing deterrent devices now required or proposed as a future regulation in the fishery, but the study may also consider new techniques being tested elsewhere in the world that show great promise to reduce seabird bycatch in the North Pacific fishery. Selection of test devices, as well as specifications for their construction, deployment and use in each fishery, will be determined by an informal fishery advisory committee composed of participating vessel operators and designees of longline industry associations, and in consultation with NMFS and USFWS. Each vessel in the exempted fishery will be supplied with test devices, such that all vessels will encompass an independent test of deterrent efficacy. Vessels will fish in the manner and location normal to the fishery, except for the following: Test treatments will be rotated throughout all observed set deployments (i.e., device 1, device 2, control). Treatment rotation will be predetermined to minimize the effects of time of day and insure even coverage of all treatments across all times of day fished.

Special seabird observers will take data on a range of species-specific seabird abundance and behavioral data during gear deployment and seabird hooking rates as observed during gear retrieval, as well as tally the catch of all species (target and non-target species, all taxa).

Although hooking rates are extremely low, vessels deploying baited lines frequently attract tens to hundreds of seabirds, including albatross (Cherel et. al. 1996). Thus, crucial questions are how these birds behave in the vicinity of deploying gear and whether deterrent devices sufficiently alter bird behavior such that the likelihood of hooking is reduced to virtually zero. The WSGP experimental approach focuses on linking seabird abundance and behavioral data collected during gear deployment with observed hooking rates. Within the BSAI Pacific cod fishery, the abundance of seabirds will be estimated within the general exempted fishery area, as well as species-specific abundance and behavioral data in the immediate vicinity of test vessels (the interaction zone) during gear deployment. To maximize the probability of linking seabird behavior in the vicinity of the gear to the likelihood of hooking, particular attention will be given to interactions occurring within the area within which hooking is physically possible. Although data will be collected on all seabird species, the emphasis will be on characterizing the interaction of albatross species, particularly short-tailed albatross, with deployed gear with and without deterrent devices. Following from the NMFS seabird test plan (NMFS 1998a), seabird abundance and behavioral data will include but is not limited to:

Scan sampling for species-specific distribution, abundance, and bait attacks:

- For total abundances of 50 or less - species-specific estimates of abundance per unit time, from immediately before gear deployment to immediately after gear has been fully deployed, within the interaction zone, defined as a 50 meter radial hemisphere centered on the vessel stern (at least 9 samples per set).
- Species-specific estimates of abundance per unit time, from immediately before gear deployment to immediately after gear has been fully deployed, within the vulnerable zone, defined as a 6-12 m wide rectangle centered on the deployed gear running from the vessel stern to the point of gear submersion (at least 9 samples per set). Should seabird numbers rise above 300, the will be recorded in aggregate as 300+, except for albatross, which will be counted individually.
- Time, location relative to vessel stern, location relative to following edge of deterrent device, and species for all attacks on deployed bait.
- Time, location relative to vessel stern, location relative to following edge of deterrent device, and species for all observed hookings.

Focal animal sampling of individual albatross:

- Constant observation of select albatross during gear deployment, including: dominant behavior (flying, seated on water, diving for bait), location relative to vessel stern, and location relative to following edge of deterrent device, where all measures are collected per unit time.
- SLR 35mm and video cameras may be used to help quantify bird abundance and behavior, respectively, especially during protocol refinement and observer training.

Each observed set will be predetermined as a scan sample or a focal animal sample, and the distribution of scan and focal sampling will be even across observer effort, treatment type, and time of day. All hookings will be recorded regardless of sample type. Location of hooking will be noted on cartoon plans of the vessel, gear, and test deterrent device. Any snagging of the deterrent device during gear deployment will also be recorded such than subsequent increases in attacks on bait and/or seabird hookings can be explained in the analysis. Seabird behavior and abundance protocols will be finalized

prior to the Year 1 exempted fishery during a pilot cruise using a chartered commercial hook-and-line vessel.

In addition to catch data and the seabird abundance and behavioral data collection described above, a range of physical and vessel-specific data will be recorded for each observed set, including but not limited to:

> date; observer name; vessel name; weather condition (cloud cover, precipitation, barometric pressure); sea state (Beaufort scale); wind speed and direction; target species; primary bait; hook type; gangion length; distance between hooks; hooks per set; vessel location at start of gear deployment (DGPS); vessel speed and direction; gear deployment start and finish time (military time); deterrent type (device 1, device 2, control); offal discarded? y/n; distance to line submersion (meters, mapped); distance to following edge of deterrent device (meters, mapped); width of deterrent zone (meters, mapped); and comments as needed.

1.3.5. Analysis of Experimental Data

Following each trip, observer data will be entered into a database for multivariate analysis. Preliminary analysis of Year 1 data will be used to adjust experimental design as needed (e.g., verify adequacy of projected sample sizes). The focus of the preliminary and final analyses will be two-fold:

First, the extent to which each tested deterrent device significantly reduces seabird bycatch will be determined, in total as well as by species, and the effect of deterrents on target catch and bycatch of all species (weight and number). Interactions with physical parameters (see list above) will also be examined. Because hooking is a rare event, the data is expected to be non-normally distributed. Past experience analyzing rare-event seabird bycatch data has indicated to that use of a tailored, iterative model based on a Poisson distribution can adequately address these statistical concerns (e.g., GLIM; Melvin et. al. 1997). In these analyses, each fishery will be analyzed independently.

Second, the relationship between seabird abundance and behavior in the vicinity of the vessel (i.e., the interaction zone) and the gear (i.e., the vulnerable zone) will be examined, as well as the hooking probabilities as a conditional function of deterrent device. This latter analysis will allow the determination of both the specific behaviors leading to hooking, as well as how deterrent devices may alter these behaviors, leading to significant reductions in hooking rate. It is expected that the behavioral analysis will be useful in qualifying the results of the primary analysis as well as paving the way for additional deterrent work, should such be merited.

1.3.6 Major Products and Milestones

Following the Year 1 field season and subsequent analysis, a draft first year report for relevant fishery and seabird resource managers within NMFS, USFWS, and state agencies will be submitted by 1 February 2000. At the conclusion of the WSGP study, a final report will be delivered by April 1, 2001, which details the results of the aforementioned analyses. WSGP will organize and/or participate in agency and relevant stakeholder forums designed to improve regulatory effectiveness as a consequence of this research. During these forums WSGP will outline its research, highlight the results, and present its conclusions relative to both current regulatory change and future research direction(s).

In addition to these reports and agency forums, WSGP expects to produce one or more papers for submission to peer-reviewed scientific journals, as well as for presentation at relevant national and international meetings convened by scholarly societies (e.g., Pacific Seabird Group, American Fisheries Society, Society for Conservation Biology).

Perhaps the most important product will be the ability to help direct potential regulatory change in the North Pacific hook-and-line fisheries to reduce and/or eliminate seabird bycatch. These changes will be based on best-available science, accomplished in collaboration with the active fishery and relevant Federal agencies. Such partnerships are a necessity for proactive solutions to natural resource conservation issues.

1.3.7 Vessel Participation

Guidelines for NMFS Exempted Fishing Permits stipulate that the name of companies and their participating vessels be listed in the application. WSGP has established an industry-university collaboration and will conduct the seabird research on active fishing vessels in the BSAI Pacific cod freezer-longliner fishery on vessels in the greater than 124 foot class. Participating vessels were selected in collaboration with the North Pacific Longline Association (NPLA) based on fishing experience, demonstrated leadership in the seabird bycatch issue, and willingness to cooperate in the study. The two selected vessels were identified in the EFP application.

2.0 NEPA REQUIREMENTS: ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

An environmental assessment (EA) is required by the National Environmental Policy Act of 1969 (NEPA) to determine whether the action considered will result in significant impact on the human environment. If the action is determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact (FONSI) would be the final environmental documents required by NEPA. An environmental impact statement (EIS) must be prepared for major Federal actions significantly affecting the human environment.

An EA must include a brief discussion of the need for the proposal, the alternatives considered, the environmental impacts of the proposed action and the alternatives, and a list of document preparers. The purpose and alternatives were discussed in Sections 1.1 and 1.2, and the list of preparers is in Section 5. This section contains the discussion of the environmental impacts of the alternatives including impacts on threatened and endangered species and marine mammals.

2.1 Environmental Impacts of the Alternatives

The environmental impacts generally associated with fishery management actions are effects resulting from: (1) harvest of fish stocks that may result in changes in food availability to predators, changes in population structure of target fish stocks, and changes in community structure; (2) changes in the physical and biological structure of the benthic environment as a result of fishing practices (e.g., gear effects and fish processing discards); (3) entanglement/entrapment of non-target organisms in active or inactive fishing gear; and (4) major shifts in the abundance and composition of the marine community as result of disproportionate fishing pressure on a small set of species.

A summary of the effects of the 1999 groundfish total allowable catch amounts on the biological environment and associated impacts on marine mammals, seabirds, and other threatened or endangered species are discussed in the final environmental assessment for the annual groundfish total allowable catch specifications (NMFS 1999b) and the final supplemental environmental impact statement (FSEIS) on the groundfish total allowable catch specifications and prohibited species catch limits under the authority of the fishery management plans for the groundfish fishery of the Bering Sea and Aleutian Islands Area and Groundfish of the Gulf of Alaska (NMFS 1998b).

The effects of no action (status quo alternative) and the preferred alternative (issue an EFP) are discussed in sections 1.2.1 and 1.3.2, respectively.

2.1.1 Anticipated Groundfish Mortality

The EFP proposal estimates that 1,597mt of groundfish are necessary to conduct the full experiment. Based on catch composition data obtained from Fisheries Information Service for freezer-longliners in the Bering Sea Pacific cod fishery, the expected species composition (principle components) of the 1,597 mt groundfish allocation are as follows:

TABLE 1.

Species	Anticipated catch (mt)
Pacific cod	1,306
Arrowtooth flounder	72
Flathead sole	12
Yellowfin sole	10
Other species	192
Pollock	5 ✓ 60
Groundfish Total	1597 ✓ 1652

The data in Table 1 provide an example of expected species composition of the total catch under the EFP. These data are based on historical catch records of the participating vessels during the open-access fishery (Janet Smoker, Fisheries Information Services). [The estimated catch levels were reviewed by NMFS and found to be consistent with the historical catch records maintained by the NMFS Groundfish Observer Program.] * insert replace last sentence

For the 6 different groundfish species/species groups listed in Table 1, the 1999 TACs were set equal to the 1999 acceptable biological catch (ABC) levels except for arrowtooth flounder and yellowfin sole which had TAC levels set below the ABC (NMFS 1999b). Thus, the estimated catches for the 4 remaining species/species groups would be expected to exceed the TAC as well as the ABC specified for that species, if the TAC is fully harvested in the directed fisheries. Of the 6 species/species groups listed,

the TAC could potentially be exceeded, but only by less than 1 percent (Table 2). Table 2 displays 1999 TACs and actual landings for the species in question through mid-May. TACs for all species are set well below the overfishing levels (OFLs). The ABC is a preliminary description of the acceptable harvest (or range of harvests) for a given stock or stock complex. Its derivation focuses on the status and dynamics of the stock, environmental conditions, other ecological factors, and prevailing technological characteristics of the fishery (NPFMC 1998). The ABC is a conservatively developed scientific estimate used by the Council and NMFS for monitoring the health of the stock. ABCs are developed by the appropriate plan team and are recommended to the Council for its consideration in the annual determination of TACs. NMFS inseason management objectives are to manage conservatively and thereby avoid the overfishing of any fish stocks or stock complexes.

The EA prepared for the 1999 groundfish specifications (NMFS 1999b) considered the environmental effects of fishing within the specified 1999 TAC and ABC levels and concluded that fishing within these levels would not threaten groundfish stocks or species dependent on them. The fishing conducted under the EFP could be additional harvest amounts in excess of the 1999 TACs. However, estimated groundfish removals under the EFP likely would not measurably approach or exceed the overfishing levels already considered in EA for the 1999 specifications. Fishing activity under the EFP, therefore, would not threaten the affected groundfish stocks or species that depend on them because estimated total removals under the EFP are very small compared to the overall TACs for these species and would not contribute in a meaningful way to approaching overfishing levels already considered in the EA for 1999 specifications.

TABLE 2.

Species	OFL	ABC	TAC	EFP (mt)	TAC + EFP	Potential EFPmt/TAC (%)	exceed ABC?*	exceed OFL?	Estimated catch thru (5/01/99)	% TAC harvested
Pacific cod	264,000	177,000	177,000	1,306	178,306	0.74	yes	no	121,415	68.6
Arrowtooth flounder	219,000	140,000	134,354	72	134,426	0.054	no	no	2,846	2.1
Flathead sole	118,000	77,300	77,300	12	77,312	0.02	yes	no	6,943	9.0
Yellowfin sole	308,000	212,000	207,980	10	207,990	0.005	no	no	33,425	16.1
Pollock--BS or	1,720,000	992,000	992,000	60 ~~5~~	992,060	~~0.0005~~ .0060	yes	no	178,846	18.0
Pollock--AI	31,700	23,800	2,000	60 ~~5~~	~~2,005~~ 2,060	~~0.25~~ 2.9	yes	no	384	19.2
Other species	129,000	32,860	32,860	192	33,052	0.58	yes	no	10,797	32.9

*ABC would be exceeded only if the TAC was fully harvested in the directed fishery.

Source: NMFS 1999 BSAI final TAC specifications and 1999 preliminary catch reports.

2.1.2 Anticipated Bycatch Mortality

The groundfish harvest by vessels using hook-and-line gear in the BSAI groundfish fishery may be limited by prohibited species catch (PSC) limits that are established annually by the Council in its TAC specification process and implemented by regulations at 50 CFR section 679.21. In the hook-and-line fisheries, a PSC limit exists for Pacific halibut but not for Tanner crab or red king crab. Although some crab is incidentally caught in the hook-and-line fisheries, the levels are very low and insignificant. Thus, even though the EFP application requested a bycatch amount for Tanner crab, it is not appropriate to authorize such an amount because PSC limits are not established for crab species in the hook-and-line fisheries. NMFS monitors crab bycatch in those fisheries but does not limit groundfish harvest in the hook-and-line fisheries with crab PSC limits.

For 1999, the Pacific halibut bycatch mortality PSC limit for non-trawl BSAI groundfish fisheries is 832 mt. It is expected that the catch of 1,597 mt of groundfish in the hook-and-line Pacific cod fishery in the BSAI will incur 17.2 mt of Pacific halibut bycatch mortality. This estimate is consistent with historic information as reviewed by NMFS which was based on data from the NMFS Groundfish Observer Program and the fishing industry. This estimate assumes an 11 percent halibut bycatch mortality rate, using the Council's recommended 1999 NMFS halibut mortality rate.

The anticipated Pacific halibut bycatch mortality amount is typical of what would occur in the open-access fishery and does not represent a significant amount relative to the Pacific halibut bycatch mortality limit of 833 mt for the open access non-trawl fisheries. In 1998, the Pacific halibut bycatch mortality PSC limit for non-trawl BSAI groundfish fisheries was 833mt of which 812 mt of mortality was taken (97 percent). 21 mt of Pacific halibut PSC remained in the PSC limit at the end of 1998. Thus far in 1999, the hook-and-line Pacific cod fishery has taken 267 mt of the first seasonal allocation of 467 mt (for the period January 1 through May 1). Therefore, although the additional 17.2 mt of Pacific halibut bycatch mortality that would be authorized by the EFP under Alternative 2 is in addition to the amount authorized in the Final 1999 Harvest Specifications for the BSAI, it is likely that given the current and historic halibut bycatch rates in the non-trawl fisheries, the specified 1999 Pacific halibut PSC limit would not even be reached. Because the EFP would authorize PSC amounts in addition to those in the 1999 TAC, the anticipated bycatch amount is in addition to what is included in the 1999 TAC.

2.2 Impacts on Endangered, Threatened or Candidate Species

The EA prepared for the 1999 groundfish specifications (NMFS 1999b) considered the environmental effects of fishing within the specified 1999 TAC and ABC levels and concluded that fishing within these levels would not threaten groundfish stocks or species dependent on them. The fishing conducted under the EFP could be additional harvest amounts in excess of the 1999 TACs. However, estimated groundfish removals under the EFP likely would not measurably approach or exceed the overfishing levels already considered in EA for the 1999 specifications. Fishing activity under the EFP, therefore, would not threaten the affected groundfish stocks or species that depend on them because estimated total removals under the EFP are very small compared to the overall TACs for these species and would not contribute in a meaningful way to approaching overfishing levels already considered in the EA for 1999 specifications.

None of the alternatives, including fishing activities under the EFP, are expected to affect endangered, threatened, or candidate species or their critical habitat in a manner or to an extent not considered in the EA or in previous Endangered Species Act section consultations on the groundfish fisheries of the BSAI.

The USFWS has issued a section 10 research permit under the Endangered Species Act to the WSGP. Such a permit authorizes the incidental take of a short-tailed albatross in the unlikely event that one were taken during the course of the WSGP experiment to test the effectiveness of the seabird avoidance measures.

2.3 Impacts on Marine Mammals

The EA prepared for the 1999 groundfish fisheries (NMFS 1999b) assessed the effect of the 1999 groundfish fisheries on marine mammals not listed under the Endangered Species Act that may be present in Federal waters off Alaska. That EA considered the environmental effects of fishing within the specified 1999 TAC and ABC levels and concluded that fishing within these levels would not threaten groundfish stocks or species dependent on them. The fishing conducted under the EFP could be additional harvest amounts in excess of the 1999 TACs. However, estimated groundfish removals under the EFP likely would not measurably approach or exceed the overfishing levels already considered in EA for the 1999 specifications. Fishing activity under the EFP, therefore, would not threaten the affected groundfish stocks or species that depend on them because estimated total removals under the EFP are very small compared to the overall TACs for these species and would not contribute in a meaningful way to approaching overfishing levels already considered in the EA for 1999 specifications.

None of the alternatives, including fishing activities under the EFP, are expected to affect marine mammals in a manner or to an extent not considered in the 1999 EA. As a result, NMFS has determined that fishing activities conducted under this EFP would not adversely affect marine mammals.

2.4 Impacts on Seabirds

Over 40 species of seabirds occur over waters off Alaska and could potentially be impacted by interactions with the BSAI Pacific cod fishery (NMFS 1998b). Little is known about the effects of the incidental take of seabirds in Alaska hook-and-line fisheries on seabird populations. USFWS conducts an Alaska breeding seabird monitoring program for the purpose of collecting data to enable the assessment of conservation needs of seabirds. Breeding success is monitored to predict future population trends and as a reflection of fluctuations in the marine environment (Byrd *et. al.* 1998). Further analyses would be necessary to determine to what extent the incidental take in hook-and-line fisheries effected these seabird breeding populations (NMFS 1999a).

The EA prepared for the 1999 groundfish fisheries (NMFS 1999b) assessed the effect of the 1999 groundfish fisheries on seabird species not listed under the Endangered Species Act that may be present in Federal waters off Alaska. That EA considered the environmental effects of fishing within the specified 1999 TAC and ABC levels and concluded that fishing within these levels would not threaten groundfish stocks or species dependent on them. The fishing conducted under the EFP could be additional harvest amounts in excess of the 1999 TACs. However, estimated groundfish removals under the EFP likely would not measurably approach or exceed the overfishing levels already considered in EA for the 1999 specifications. Fishing activity under the EFP, therefore, would not threaten the affected groundfish stocks or species that depend on them because estimated total removals under the EFP are

very small compared to the overall TACs for these species and would not contribute in a meaningful way to approaching overfishing levels already considered in the EA for 1999 specifications.

None of the alternatives, including fishing activities under the EFP, are expected to affect seabird species in a manner or to an extent not considered in the 1999 EA. As a result, NMFS has determined that fishing activities conducted under this EFP would not adversely affect seabird species.

2.5 Impacts on Essential Fish Habitat (EFH)

The EFP proposed under Alternative 2 would potentially involve all BSAI species noted in the environmental assessment prepared for EFH (NPFMC 1999). The impacts of fishing gear on substrates and benthic communities was analyzed in the FSEIS (NMFS 1998b). A specific discussion of impacts of longline gear on substrates and benthic communities can be found in section 3.1.2.2 of the FSEIS. Because the estimated total removals under the EFP are very small compared to the overall TACs for the groundfish species noted in Table 2 and for PSC amounts of Pacific halibut and would not contribute in a meaningful way to approaching overfishing levels already considered in the EA for 1999 specifications, fishing activity under the EFP, therefore, would not adversely effect EFH.

2.6 Coastal Zone Management Act

Implementation of the preferred alternative would be conducted in a manner consistent, to the maximum extent practicable, with the Alaska Coastal Management Program within the meaning of Section 30(c)(1) of the Coastal Zone Management Act of 1972 and its implementing regulations.

2.7 Conclusions or Finding of No Significant Impact

For the exempted fishing permit 99-02 to test the effectiveness of seabird avoidance measures used on catcher-processor vessels using hook and line gear to fish for Pacific cod in the Bering Sea and Aleutian Islands Management Area, none of the alternatives are likely to significantly affect the quality of the human environment. Therefore, the preparation of an environmental impact statement for the proposed action is not required by Section 102(2)(C) of the National Environmental Policy Act or its implementing regulations.

_____ _____

Assistant Administrator for Fisheries, NOAA Date

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