UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

FEB 10 1997

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Environmental Assessment for the 1997 Groundfish Total Allowable Catch Specifications implemented under the authority of the Fishery Management Plan for Groundfish of the Gulf of Alaska and the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area

LOCATION: Gulf of Alaska and Bering Sea and Aleutian Islands

SUMMARY: This environmental assessment analyzes the target species stock status, higher and lower trophic level species, and the physical and socioeconomic environment evaluated during the process of recommending the 1997 total allowable catch specifications for the Bering Sea and Aleutian Islands and the Gulf of Alaska.

RESPONSIBLE OFFICIAL: Steven Pennoyer
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The environmental review process led us to conclude that this action will not have a significant impact on the environment. Therefore, an environmental impact statement was not prepared. A copy of the finding of no significant impact, including the environmental assessment, is enclosed for your information. Also, please send one copy of your comment to me in Room 5805, OP/SP, U.S. Department of Commerce, Washington, D.C. 20230

Sincerely,

(for) Donna Wieting
Acting Director, Office of Ecology and Conservation

Enclosure

ENVIRONMENTAL ASSESSMENT
FOR
1997 GROUNDFISH TOTAL ALLOWABLE CATCH SPECIFICATIONS
IMPLEMENTED 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

January 1997

Lead Agency: National Marine Fisheries Service
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Seattle, Washington
and the
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Abstract: The Environmental Analysis documents the analysis of the target species stock status, higher and lower trophic level species, and the physical and socioeconomic environment evaluated during the process of recommending the 1997 total allowable catch specifications for the Bering Sea and Aleutian Islands management area and Gulf of Alaska federally regulated groundfish fisheries. The specified total allowable catch will become the upper limit of groundfish harvested in the fisheries during calendar year 1997.

SUMMARY

This environmental assessment presents a brief analysis of the environmental impacts associated with changing the total allowable catch (TAC) amounts from those set in 1996 to those proposed for 1997 for the federally managed Groundfish Fisheries in the Bering Sea and Aleutian Islands Management Area (BSAI) and in the Gulf of Alaska (GOA). Alternative actions include the final 1997 TAC specifications recommended by the North Pacific Fishery Management Council (Council) as compared to the 1996 TAC specifications as published in the final specification for the 1996 fisheries (BSAI 61 FR 4311, February 5, 1996; GOA 61 FR 4304, February 5, 1996, corrected at 61 FR 9955, March 12, 1996). Potential impacts of the proposed 1997 TAC specifications compared to the 1996 TAC specifications on target groundfish species categories, higher trophic level species, Endangered Species Act listed species, other predators and prey which together constitute the ecosystem, and socioeconomic impacts are addressed.

Updated information on the status of groundfish stocks was reviewed by the Plan Teams for the groundfish fisheries of the BSAI and GOA at their September and November 1996 meetings, and was presented in the final Stock Assessment and Fishery Evaluation (SAFE) Reports for the Groundfish Resources of the BSAI and GOA as Projected for 1997 (NPFMC 1996a, b). Using the best available information, the Plan Teams determined biomass, the overfishing levels (OFLs), and acceptable biological catches (ABC) and TAC for the 1997 fisheries and recommended them to the Council in the SAFE reports. After reviewing the current information, the Council recommended 1997 TAC specifications to the Secretary of Commerce.

The sums of the recommended final 1997 ABC and OFLs specifications from the SAFE reports, and the TAC specifications as recommended by the Council follow. The Optimum Yields (OY) were established in the Fishery Management Plans for the Groundfish Fishery of the BSAI (NPFMC 1995a) and the GOA (NPFMC 1994).

parameters	BSAI	GOA
OY	2,000,000	800,000
ABC	2,464,130	493,050
TAC	2,000,000	282,815
OFL	3,998,839	784,860

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1.0 PURPOSE AND NEED FOR ACTION

The groundfish fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 nautical miles (nm) offshore) off Alaska are managed by the U.S. Department of Commerce approved fishery management plans (FMPs) for Groundfish of the Gulf of Alaska (GOA) (NPFMC 1994) and the Groundfish Fishery of the Bering Sea and Aleutian Island Area (BSAI) (NPFMC 1995a). The GOA is divided into three areas (western, central, and eastern) and eight reporting areas. The BSAI is divided into two areas (eastern Bering Sea and Aleutian Islands) and nineteen reporting areas. Both FMPs were prepared by the Council under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Optimum yield (OY) established in the BSAI FMP is limited to two million metric tons (mt). OY established in the GOA FMP is limited to 800,000 mt. The FMPs also establish that TAC for each fishery be set annually by the Council with oversight by the Secretary of Commerce (Secretary) in response to current stock assessment information. The intended effect is to conserve and manage the groundfish and pelagic resources in the North Pacific Ocean.

Regulation of the groundfish fisheries include a myriad of interrelated regulations directing time and area closures, gear restrictions, upper catch limits of prohibited species and other bycatch species, and community (license specific) quotas. The process of setting TAC is set up by the FMPs as an annual process for target species and other species. Because some of the fisheries are underway before approval of the new TAC specification can occur, the Secretary implements one-fourth of the preliminary TAC specifications and apportionments thereof toward fisheries occurring in the first quarter of the calendar year. Following completion of analysis of any new stock status information and its presentation at the December meeting, the Council forwards the final TAC recommendations to the Secretary. As approved by the Secretary, those replace the preliminary TAC specifications. The entire amount is available to the domestic fishery.

Actions taken to amend FMPs or implement other regulations governing the groundfish fisheries must meet the requirements of Federal laws and regulations. In addition to the Magnuson-Stevens Act, the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Executive Order 12866, and the Regulatory Flexibility Act. Toward maintaining compliance with NEPA, an environmental analysis (EA) document is prepared annually analyzing the next year's proposed TAC in comparison with the current year TAC. This particular EA analyzes possible environmental impacts of harvesting at the proposed 1997 TAC specifications as compared to the 1996 TAC specifications.

Groundfish stock status is monitored and interpreted by the National Marine Fisheries Service (NMFS) to the Council via established and annually repeated pathways. Groundfish population surveys are conducted for the various species and species groups over regularly repeated time intervals by NMFS in the respective areas. Results are reported to the Council appointed Plan Teams for display in their annual Stock Assessment and Fishery Evaluation (SAFE) reports. The SAFE reports contain a review of the latest scientific analyses and estimates of each species' biomass, maximum sustainable yield, acceptable biological catch (ABC) and other biological parameters, as well as summaries of the ecosystem and the economic condition of groundfish fisheries off Alaska. The process of setting ABC and TAC specifications includes an analysis of a level of fishing that constitutes the overfishing level (OFL). Amendment 44 to the GOA and BSAI Groundfish FMPs re-define ABC and OFLs. The revised definitions, used throughout this TAC specification process, replaces the Plan Team's previous policy statements for defining overfishing and creates a buffer between ABC and OFL.

The final 1997 SAFE reports (NPFMC 1996a, b) incorporate biological survey work completed during the summer of 1996, any new methodologies applied to obtaining these data, and ABC and OFL determinations that are based on the most recent stock assessments. At its September and December 1996 meetings, the Council, its Advisory Panel, and its Scientific and Statistical Committee, reviewed the SAFE reports and made recommendations based on that information about the condition of groundfish stocks in the respective fishing areas. The ABC specifications proposed by the Council for the 1997 fishing year, therefore, are based on the best available scientific information, including projected biomass trends, information on assumed distribution of stock biomass, and revised technical methods used to calculate stock biomass. The Council-recommended TAC specifications (Tables 1 and 2), once implemented by the Secretary, define upper harvest limits, or fishery removals, during the 1997 fishing year. Absent Secretarial approval within the first quarter of calendar year 1997, directed fishing in excess of the interim TAC specification is unauthorized.

2.0 ALTERNATIVES INCLUDING PROPOSED ACTION

Alternative 1 - Implement, in 1997, TAC specifications that are equivalent to the 1996 TAC specifications.

Under this alternative, the sums of the BSAI and GOA TAC specifications in 1997 would be the same as those specified for the 1996 groundfish fisheries in the BSAI and GOA.

Alternative 2: Implement the proposed 1997 TAC specifications.

Under this alternative, the BSAI and GOA TAC specifications are adjusted to include updated surveys and new calculations of ABC and OFL by the Plan Teams and recommended by the Council at its November and December 1996 meetings.

3.0 ENVIRONMENTAL CONSEQUENCES

An EA is required by NEPA to determine whether the action considered will result in significant effects on the human environment. If the environmental effects of the action are determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact would be the final environmental documents required by NEPA. If this analysis concludes that the proposal is a major Federal action significantly affecting the human environment, an environmental impact statement must be prepared.

An EA must include a brief discussion of the need for the proposal, alternatives to the proposal, the environmental impacts of the proposed action, and a list of agencies and persons consulted. The purpose and needs are discussed in Sections 1. A description of the alternatives is in Section 2. Section 6 contains the list of agencies and persons consulted. This section contains the discussion of the environmental impacts including impacts on threatened and endangered species and marine mammals.

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 (also known as "cascading effects" National Research Council 1996).

3.1 Overview of Status

The status of each target species category, biomass estimates, and ABC specification is presented both in summary and in detail in the GOA and BSAI SAFE reports (NPFMC 1996a, b). This EA addresses significant changes between the 1996 TAC specifications and the Council recommended 1997 TAC specifications and provides relevant socioeconomic information.

Four categories of species are likely to be taken in the GOA and BSAI groundfish fisheries: (1) Prohibited species--those species and species groups the catch of which must be returned to the sea with a minimum of injury except when their retention is authorized by other applicable law; (2) target species--those commercially important species for which sufficient data exists to allow each to be managed on its own biological merits; (3) other species--those species and species groups currently of slight economic value and not generally targeted for harvest; and (4) nonspecified species--those species and species groups generally of no current economic value taken by the groundfish fishery in Federal waters only as incidental catch.

3.1.1 Status of Groundfish Target Species

For the target species, the Council may split or combine species groups for purposes of establishing individual TAC specifications based on commercial importance of a species or species group and whether sufficient biological information is available to manage a species or species group on its own biological merits. Designated target species and species groups in the BSAI are walleye pollock, Pacific cod, yellowfin sole, Greenland turbot, arrowtooth flounder, rock sole, other flatfish, flathead sole, sablefish, Pacific ocean perch, other rockfish, Atka mackerel, and squid and other species. Designated target species and species groups in the GOA are walleye pollock, Pacific cod, Alaska flatfish, arrowtooth flounder, sablefish, slope rockfish, pelagic shelf rockfish, demersal shelf rockfish, thornyhead rockfish, and Atka mackerel.

ABC and TAC specifications for the target species and other species category are set forth in Tables 1 BSAI groundfish fishery and Tables 2 GOA groundfish fishery. Analysis for each species or category of species is provided and summarized in the 1997 GOA and BSAI SAFE reports (NPFMC 1996a, b).

Bering Sea and Aleutian Islands
AP Recommended 1997 Catch Specifications (mt) | **1996 Specifications**

Species	Area	1997 Biomass	1997 OFL	1997 ABC	1997 TAC	1996 ABC	1996 TAC	1996 Catch*
Pollock	EBS	6,120,000	1,980,000	1,130,000	**1,130,000**	1,190,000	1,190,000	1,098,510
	"A" season				**45%**		45%	45%
	"B" season				**55%**		55%	55%
	AI	100,000	38,000	28,000	**28,000**	35,600	35,600	26,286
	Bogoslof	558,000	43,800	32,100	**1,000**	121,000	1,000	390
Pacific cod	BS/AI	1,590,000	418,000	306,000	**270,000**	305,000	270,000	235,022
Yellowfin sole	BS/AI	2,530,000	339,000	233,000	**230,000**	278,000	200,000	130,009
Greenland turbot	BS/AI	118,000	22,600	12,350	**9,000**	10,300	7,000	6,332
	BS				**67%**	67%	67%	4,679
	AI				**33%**	33%	33%	1,653
Arrowtooth	BS/AI	587,000	167,000	108,000	**20,760**	129,000	9,000	13,803
Rock sole	BS/AI	2,390,000	427,000	296,000	**97,185**	361,000	70,000	46,970
Flathead sole	BS/AI	632,000	145,000	101,000	**43,500**	116,000	30,000	16,795
Other flatfish	BS/AI	616,000	150,000	97,500	**50,750**	102,000	35,000	18,543
Sablefish	EBS	17,900	2,750	1,308	**1,100**	1,200	1,100	622
	AI	18,600	2,860	1,367	**1,200**	1,300	1,200	695
POP complex								
True POP	EBS	72,500	5,400	2,800	**2,800**	1,800	1,800	2,633
Other POP	EBS	29,700	1,400	1,050	**1,050**	1,400	1,260	195
True POP	AI	324,000	25,300	12,800	**12,800**	12,100	12,100	12,785
	Eastern			3,240	**3,240**	3,025	3,025	3,192
	Central			3,170	**3,170**	3,025	3,025	3,034
	Western			6,390	**6,390**	6,050	6,050	6,559
Sharp/Northern	AI	96,800	5,810	4,360	**4,360**	5,810	5,229	6,696
Short/Rougheye	AI	45,600	1,250	938	**938**	1,250	1,125	946
Other rockfish	EBS	7,100	497	373	**373**	497	447	164
	AI	13,600	952	714	**714**	952	857	273
Atka mackerel	AI	450,000	81,600	66,700	**66,700**	116,000	106,157	103,378
	Eastern			15,000	**15,000**	26,700	26,700	27,693
	Central			19,500	**19,500**	33,600	33,600	33,505
	Western			32,200	**32,200**	55,700	45,857	42,180
Squid	BS/AI	n/a	2,620	1,970	**1,970**	3,000	1,000	1,166
Other species	BS/AI	688,000	138,000	25,800	**25,800**	27,600	20,125	20,935
BS/AI TOTAL		17,004,800	3,998,839	2,464,130	2,000,000	2,820,809	2,000,000	1,743,148

EBS = eastern Bering Sea
BS/AI = Bering Sea & Aleutian Islands
BS = Bering Sea
AI = Aleutian Islands

OFL = overfishing level
ABC = acceptable biological catch
TAC = total allowable catch

* = catch as of 10/26/96.

Table 1. Council recommended total allowable catch specifications for the Bering Sea and Aleutian Islands management area. 1996 specifications and 1997 proposed specifications.

GULF OF ALASKA GROUNDFISH ABCs and TACs Final 1997 North Pacific Fishery Management Council Specifications (mt)						
		1996			1997	1997
Species	Area	ABC	TAC	Catch*	ABC	TAC
Pollock	W (61)	25,480	25,480	24,191	18,600	18,600
	C (62)	12,840	12,840	12,283	31,250	31,250
	C (63)	13,680	13,680	13,262	24,550	24,550
	E	2,810	2,810	613	5,580	5,580
	Total	54,810	54,810	50,349	79,980	79,980
Pacific Cod**	W	18,850	18,850	19,801	28,500	24,225
	C	42,900	42,900	47,469	51,400	43,690
	E	3,250	3,250	943	1,600	1,200
	Total	65,000	65,000	68,213	81,500	69,115
Flatfish, Deep Water	W	670	460	19	340	340
	C	8,150	7,500	1,960	3,690	3,690
	E	5,770	3,120	220	3,140	3,140
	Total	14,590	11,080	2,199	7,170	7,170
Rex Sole	W	1,350	800	504	1,190	1,190
	C	7,050	7,050	5,153	5,490	5,490
	E	2,810	1,840	190	2,470	2,470
	Total	11,210	9,690	5,847	9,150	9,150
Flathead Sole	W	8,880	2,000	840	8,440	2,000
	C	17,170	5,000	2,129	15,630	5,000
	E	2,740	2,740	103	2,040	2,040
	Total	28,790	9,740	3,072	26,110	9,040
Flatfish, Shallow Water	W	26,280	4,500	443	22,570	4,500
	C	23,140	12,950	8,861	19,260	12,950
	E	2,850	1,180	31	1,320	1,180
	Total	52,270	18,630	9,335	43,150	18,630
Arrowtooth	W	28,400	5,000	2,020	31,340	5,000
	C	141,290	25,000	19,724	142,100	25,000
	E	28,440	5,000	795	24,400	5,000
	Total	198,130	35,000	22,539	197,840	35,000
Sablefish	W	2,200	2,200	1,647	1,860	1,860
	C	6,900	6,900	6,792	6,410	6,410
	W Yakutat	3,040	3,040	2,890	2,410	2,410
	E Yak SEO	4,940	4,940	4,656	3,840	3,840
	Total	17,080	17,080	15,985	14,520	14,520
Rockfish, Other Slope	W	180	100	19	20	20
	C	1,170	1,170	619	650	650
	E	5,760	750	243	4,590	1,500
	Total	7,110	2,020	881	5,260	2,170
Rockfish, Northern	W	640	640	170	840	840
	C	4,610	4,610	3,193	4,150	4,150
	E	20	20	24	10	10
	Total	5,270	5,270	3,387	5,000	5,000
Pacific Ocean Perch	W	1,460	1,260	987	1,840	1,472
	C	3,860	3,333	5,136	6,690	5,352
	E	2,740	2,366	2,246	4,460	2,366
	Total	8,060	6,959	8,369	12,990	9,190
Shortraker/Rougheye	W	170	170	126	160	160
	C	1,210	1,210	958	970	970
	E	530	530	587	460	460
	Total	1,910	1,910	1,671	1,590	1,590
Rockfish, Pelagic Shelf***	W combined	910	910	183	570	570
	C offshore	3,200	3,200	1,872	3,320	3,320
	C nearshore				260	260
	E combined	1,080	1,080	258	990	990
	Total	5,190	5,190	2,313	5,140	5,140
Rockfish, Demersal Shelf	SEO	950	950	415	950	950
Atka Mackerel	W		2,310	1,577		
	C		925	8		
	E		5	0		
	Total	3,240	3,240	1,585	1,000	1,000
Thornyhead	Gulfwide	1,560	1,248	1,127	1,700	1,700
Other Species	Gulfwide	NA	12,390	4,448	-	13,470
GULF OF ALASKA	TOTAL	475,170	260,207	201,735	493,050	282,815

*catch through December 6, 1996

** reduced by BOF state fishery apportionment

***interim nearshore TAC until AM 46 approved

Table 2. Council recommended total allowable catch specifications for the Gulf of Alaska management area. 1996 specifications and 1997 proposed specifications.

For the GOA, the abundance of Pacific cod, arrowtooth flounder, and thornyheads is above target stock size. The abundance of pollock, Pacific ocean perch, and sablefish is below target stock size. The relative abundance of deep-water flatfish, shallow-water flatfish, flathead sole, demersal shelf rockfish, northern rockfish, pelagic shelf rockfish, other slope rockfish, thornyheads, and Atka mackerel is unknown.

Walleye pollock stocks in the eastern Bering Sea and Shelikof Strait were surveyed in 1996. Other new sources of information included length-frequency data from the 1996 hydroacoustic survey, age composition data from the 1995 fisheries, updated estimates of discard and catch for 1995 and 1996; and results of a sensitivity analysis exploring several assumptions about the emphasis applied to survey biomass estimates and the catchability of the bottom trawl survey.

Pacific cod stock assessments were made for BSAI and GOA for 1997 using nearly identical models for the first time. Standardizing the assessment necessitated a number of changes in the assessment model as detailed in the SAFE reports (NPFMC 1996a, b).

Yellowfin sole in the BSAI are believed to have increased slowly during the 1970s and early 1980s to a peak during the mid-1980s and to have remained abundant and stable since that time. Projected biomass for 1996 was 2.85 million mt.

Greenland turbot female biomass was re-calculated for 1997 using the 1996 survey of eastern Bering Sea shelf at 58,000 mt. Localized depletion of the population due to harvest pressures was a consideration in the determination of ABC and OFL.

For the first time, arrowtooth flounder were given separate consideration from Alaska flatfish in the GOA to reflect single species management rather than species group management. Current biomass for arrowtooth flounder in the GOA is estimated to be greater than the long-term average biomass that would be expected under average recruitment and fishing mortality. Results of the eastern Bering Sea shelf annual trawl survey and the model indicate the arrowtooth flounder resource continues to be in excellent condition. It is thought to be the result of minimal exploitation and steady increases in biomass throughout the 1980s.

BSAI rock sole trawl survey and the age-based synthesis model indicate rock sole abundance increased throughout the 1980s and early 1990s. The 1987 and 1990 year classes appear strong. Rock sole OFL estimate for 1997 (433,000 mt) is higher than 1996 (420,000 mt) due to recalculation incorporating a 3 percent correction factor which should have been used to inflate the OFL for the eastern Bering Sea portion of the stock.

BSAI flathead sole were separated from the other flatfish management category beginning in 1995. Trawl surveys indicated that the biomass of flathead sole had tripled since 1982, remaining high and stable since 1990.

The "other flatfish" complex of species in the BSAI are dominated by Alaska plaice. The complex has remained stable, and presumably high, since 1982 when the present survey net-configuration was adopted for eastern Bering Sea surveys.

Sablefish assessments for 1997 are based on an age-structured model as compared to previous assessments, which were based on the delay-difference equation model. The age-structured model is sensitive to errors in the input catch data and appears to have yielded pessimistic projections in the preliminary assessment due to some source(s) of unreported mortality in the late 1980s. A plausible range of hypothetical levels of unreported catches were analyzed in the final stock assessment model, which improved the model fit and increased the level of absolute biomass estimated by the model. New biomass projections in the final assessment incorporate 1996 sablefish survey data. The ABCs for the 1997 fisheries are more conservative than the new ABC definition based on the fishing mortality rate of 40 percent (adjusted by the ratio of current spawner biomass to long-term average biomass that would be expected under average recruitment and fishing mortality rate of 40 percent).

The Pacific ocean perch species complex consists of true Pacific ocean perch and four other red rockfish species (northern, rougheye, sharpchin, and shortraker). Pacific ocean perch were managed separately in the BSAI since 1991. Rougheye and shortraker were managed separately in the GOA and Aleutian area. Changes in the 1997 biomass estimates compared to 1996's assessment are due to natural and fishing mortality and fish growth as computed in the projections. The TAC for Pacific ocean perch in the GOA is determined from the rebuilding plan for the GOA FMP. It recommends the use of the fishing mortality rate halfway between the optimum fishing mortality rate and the fishing mortality rate estimated to be sufficient to supply unavoidable bycatch of Pacific ocean perch in the GOA based on 1992 bycatch rates.

Pelagic shelf rockfish. The results of the 1996 triennial trawl survey are included in the analysis with a revised estimate of exploitable biomass based on the average of the 1990, 1993, and 1996 surveys, of 55,637 mt and the recommended ABC Gulf-wide 4,880 mt for the offshore component (dusky, widow, and yellowtail rockfish). A new proposal to separate the species assemblage into nearshore (blue and black rockfish) and offshore complexes is being considered for future years.

Demersal shelf rockfish exploitable biomass and ABC are based on results of the 1994 and 1995 line transect submersible survey of yelloweye rockfish in the eastern GOA. No survey was conducted in 1996.

Thornyheads are managed as a single species in the GOA and included in the "other rockfish" complex in the BSAI.

Atka mackerel was not open to a directed fishery in 1995 and was restricted to a 12-hour opening in the Western GOA in 1996. In previous assessments, exploitable biomass and ABC for GOA Atka mackerel have been based on the triennial GOA bottom trawl survey biomass estimates. In 1996, an estimate of biomass could not be determined from trawl survey data due to extreme catch variances. Re-evaluation of abundance estimates from past surveys showed that they have also been compromised by large confidence intervals. It was concluded that the GOA bottom trawl survey and resulting biomass estimates have little or no value as absolute estimates of abundance or as indices of trend for Atka mackerel. A conservative harvest policy for GOA Atka mackerel was recommended because: (1) No reliable estimate of current biomass exists; (2) there appears to be evidence of localized depletion and; (3) the species has exhibited vulnerability to fishing pressure in the past. The recommended harvest was 1,000 mt based on the 1995 catch data to satisfy bycatch needs of other fisheries.

The squid and "other species" complex have represented one percent or less of the total catch of all groundfish. In the BSAI, biomass estimates for the "other species" complex are derived from demersal trawl surveys. These survey data suggest that sculpins and skates constitute most of the "other species" biomass, but the abundance of pelagic species such as smelts and sharks may be substantially underestimated by demersal trawls. Squid abundance estimates are unavailable because squid are mainly pelagic over deep water. No assessment of "other species" biomass is made for the GOA.

3.1.2 Status of Higher Trophic Level Species

Higher trophic level species present in the fishing areas include marine mammals, birds, and many target and nontarget species of fish. The status of these populations is determined at any given time by a combination of temporal and spacial factors played out over many years. Any meaningful analysis of status requires recognition that continual change in size and importance of any given population is the operative norm. Status discussions have limited utility dependant on the window of time in which they are viewed and recognition of forces bringing about population shifts. Attempting to analyze population changes annually is problematic because change may be occurring slowly and may be lagging years behind the causes.

3.1.2.1 Status of Marine Mammal Pinniped Species

Pinniped species that interact with groundfish fisheries either in the fisheries themselves through potential entanglements/ entrapments and possibly mortalities, or through competition for prey directly or indirectly, are Steller sea lion, northern fur seal, harbor seal, spotted seal, bearded seal, ringed seal, and ribbon seal. New information on predator-prey relationships, the population status, and management actions concerning these species is summarized below.

Steller Sea Lions range along the North Pacific Ocean rim from northern Japan to California (Loughlin et al., 1984), with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands, respectively.

In 1996 NMFS and the Alaska Department of Fish and Game (ADF&G) conducted aerial surveys (using similar protocols to past summer surveys) in the area from southeast Alaska westward through Attu Island in the western Aleutian Islands. The survey results are not published yet, but were summarized by Merrick and Ferrero in the 1997 ecosystem considerations chapter appended to the SAFE reports (NPFMC 1996a, b). Highlights of the 1996 survey include the conclusion of an overall decrease of 7.8 percent (from 32,930 to 30,348) since 1994 in non-pup numbers at trend sites in Alaska. Since 1994, numbers have decreased in southeast Alaska (-7.2 percent, from 8,811 to 8,181 non-pups) and in the Gulf of Alaska (-17.6 percent, from 11,871 to 9,782), but not in the Aleutian Islands as a whole (+1.1 percent, from 12,248 to 12,385). Kenai-Kiska area trend site sea lion numbers decreased by 4.6 percent (from 18,713 to 17,847).

The increase in numbers in the eastern Aleutian Islands of +6.6 percent was notable because it affirms observations since 1990 that the sea lion population has stabilized there, particularly in the Krenitzen Islands to Unimak Island area (which increased from 1992 to 1994 despite a decrease in the larger eastern Aleutian Islands area). Declines in southeast Alaska sea lion numbers may be a result of normal interannual variability, but never-the-less, are being watched closely.

NMFS and ADF&G also conducted a partial survey of Steller sea lion pups at nine rookeries in the area from southeast Alaska to the eastern Aleutian Islands during 24 June to 14 July 1996. Since 1994, pup numbers have decreased by 6.1 percent (from 6,494 to 6,098 pups) at the sites counted. Patterns of decrease were similar to those observed for the non-pups--the greatest decreases were observed in the eastern Gulf of Alaska (-37.5 percent, from 903 to 564 pups), while numbers increased at the single site counted in the eastern Aleutian Islands (+23.3 percent at Ugamak Island).

NMFS has the authority to implement regulations necessary to protect Steller sea lions under the ESA and MMPA. Similarly, under the Magnuson-Stevens Act, NMFS has the authority to regulate fishing activities that may be affecting sea lions, directly or indirectly. In 1990, coincident with the ESA listing of Steller sea lion, NMFS: (1) Prohibited entry within three nm of listed Steller sea lion rookeries west of 150° W. long.; (2) prohibited shooting at or near Steller sea lions; and (3) reduced the allowable level of take incidental to commercial fisheries in Alaskan waters (50 CFR 227.12) (Fritz et al., 1995). As a result of ESA section 7 consultations on the effects of the North Pacific federally-managed groundfish fisheries, NMFS implemented additional protective measures in 1991, 1992, and 1993 to reduce the effects of certain commercial groundfish fisheries on Steller sea lion foraging (50 CFR 679.20(a)(5)(ii), 679.22(a)(7) and (a)(8), and 679.22(b)(2))(1994)). Because Steller sea lions are long lived with slow reproductive rates, the effects, if any, of these regulatory mechanisms and protective regulations on the population may be slow to manifest themselves. For perspective, NMFS marine mammal managers estimate that fish harvest regulations may need to be in place a minimum of 10 years to observe effects in the population.

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. Observed incidental mortality occurred in the BSAI groundfish trawl fishery with a mean annual (total) mortality of 14, GOA groundfish trawl fishery was 2, and combined BSAI and GOA groundfish longline fisheries was 1.4. No sea lion mortality was observed by NMFS in the pot fisheries (Hill et al., 1996).

<u>Northern fur seals</u> The range of the northern fur seals is throughout the North Pacific Ocean, however, they only breed at a few sites (Commander, Bogoslof and Pribilof Islands in the southern Bering Sea). During the breeding season, approximately 74 percent of the worldwide population is found on the Pribilof Islands with the remaining animals spread throughout the North Pacific Ocean. Of the seals in U.S. waters outside of the Pribilofs, approximately one percent of the population is found on Bogoslof Island in the southern Bering Sea and San Miguel Island off southern California (NMFS 1993). Two separate stocks of northern fur seals are recognized within U.S. waters: An Eastern Pacific stock and a San Miguel Island stock. The most recent estimate for the number of fur seals in the Eastern Pacific stock is approximately 1,019,192 (Hill et al., 1996).

The Alaska population of northern fur seals recovered to approximately 1.25 million in 1974 after the killing of females in the pelagic fur seal harvest was terminated in 1968. The population then began to decrease with pup production declining at a rate of 6.5-7.8 percent per year into the 1980s (York 1987). By 1983 the total stock estimate was 877,000 (Briggs and Fowler

1984). Annual pup production on St. Paul Island has remained relatively stable since 1981, indicating that stock size has not changed much in recent years (York and Fowler 1992). The most recent stock estimates prior to 1994 were 984,000 in 1992, and 1.01 million in 1990 (NMFS 1993). Northern fur seals were listed as depleted under the MMPA in 1988 because population levels had declined to less than 50 percent of levels observed in the late 1950s and no compelling evidence existed that carrying capacity had changed substantially since the late 1950s (NMFS 1993). Under the MMPA, this stock remains listed as depleted until population levels reach at least the lower limit of its optimum sustainable population (estimated at 60 percent of carrying capacity. Regulations were implemented in 1994 (50 CFR 679.22(a)(6)) to create a Pribilof Island Area Habitat Conservation Zone, in part, to protect the Northern fur seals.

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. Observed incidental mortality occurred in the BSAI groundfish trawl with a mean annual (total) mortality of three. No mortality in the GOA fisheries was observed (Hill et al., 1996).

Harbor seals Harbor seals inhabit coastal and estuarine waters off Baja California, north along the western coasts of the U.S., British Columbia, and southeast Alaska, west through the Gulf of Alaska and Aleutian Islands, and in the Bering Sea north to Cape Newenham and the Pribilof Islands. They haul out on rocks, reefs, beaches, and drifting glacial ice, and feed in marine, estuarine, and occasionally fresh waters.

Three separate stocks of harbor seals are recognized in Alaska waters: (1) The southeast Alaska stock - occurring from the Alaska/British Columbia border to Cape Suckling, (2) the Gulf of Alaska stock - occurring from Cape Suckling to Unimak Pass, including animals throughout the Aleutian Islands, and (3) the Bering Sea stock - including all waters north of Unimak Pass (Hill et al., 1996).

The harbor seal population trend in the Aleutian Islands is unclear because the 1994 survey was the most complete census to date for that region. Previous harbor seal counts in that area are not comparable to the 1994 data as they were conducted incidental to surveys designed to assess other species (i.e., sea otters or Steller sea lions). However, a subset of the 1994 survey in the eastern Aleutian Islands indicated a count of 1,600 in an area that had counts of approximately 1,000-2,500 seals during 1975-77 (Small 1996).

In Prince William Sound, harbor sea numbers declined by 57 percent from 1984 to 1992 (Pitcher 1989, Frost and Lowry 1993). The decline began before the 1989 Exxon Valdez oil spill, was greatest in the year of the spill, and may have lessened thereafter. Between 1989 and 1995, aerial survey counts of 25 trend sites in Prince William Sound showed significant declines in the number of seals during the molt (19 percent) and during pupping (31 percent)(Frost et al., 1996).

A steady decrease in numbers of harbor seals has been reported throughout the Kodiak Archipelago since 1976. On southwestern Tugidak Island, formally one of the largest concentrations of harbor seals in the world, counts declined 85 percent from 1976 (6,919) to 1988 (1,014)(Pitcher 1990). More recently, the Tugidak Island count has increased from 769 in 1992 to 1,810 in 1994 (Small 1996), though still only represents a fraction of its historical size. The populations around Kodiak Island, based on an aerial photographic route established in 1992, appear to be stable or slightly increasing during the 1993-1995 period (Lewis et al., 1996). Despite some positive signs of growth in certain areas, the overall Gulf of Alaska stock size remains small compared to its size in the 1970s and 1980s.

NMFS monitored harbor seal incidental take in the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. Observed incidental mortality occurred in all three fisheries at low levels. The mean annual (total) mortality rate was 1.0 for the Gulf of Alaska groundfish trawl fishery, 0.8 for the combined Bering Sea and Gulf of Alaska longline fisheries, and 0.2 for the combined Bering Sea and Gulf of Alaska pot fisheries (Hill et al., 1996).

Spotted seals are distributed along the continental shelf of the Beaufort, Chukchi, Bering, and Okhotsk Seas south to the northern Yellow Sea and western Sea of Japan (Shaughnessy and Fay 1977). They are known to occur around the Pribilof Islands, Bristol Bay, and the eastern Aleutian Islands. Of eight known breeding areas, three occur in the Bering Sea. Only one stock, the Alaska stock, is recognized in U.S. waters.

A reliable estimate of spotted seal population abundance is currently not available (Rugh et al., 1995). Early estimates of the world population were in the range of 334,000-450,000 animals (Burns 1973). The population of the Bering Sea, including Russian waters, was estimated to be 200,000-250,000 based on the distribution of family groups on ice during the mating season (Burns 1973). Reliable data on trends in population abundance for the Alaska stock of spotted seals are considered unavailable (Hill et al., 1996). An element of concern is the potential for Arctic climate change, which will probably affect high northern latitudes more than elsewhere. A shift in regional weather patterns in the Arctic region has been observed over the last 10-15 years (Tynan and DeMaster 1996). Ice-associated seals, such as the spotted seal, are particularly sensitive to changes in weather and sea-surface temperatures in that these strongly affect their ice habitats. Data are insufficient to make reliable predictions of the effects of Arctic climate change on the Alaska spotted seal stock.

NMFS monitored spotted seal incidental take in the BSAI groundfish trawl, longline, and pot fisheries during 1990-1994. Observers did not report any mortality or serious injury of spotted seals incidental to these groundfish fisheries (Hill et al., 1996).

Bearded seals are circumpolar in their distribution, extending from the Arctic Ocean south to Hokkaido in the western Pacific. In Alaskan waters, bearded seals are distributed over the continental shelves of the Bering, Chukchi, and Beaufort Sea (Ognev 1935; Johnson et al., 1966; Burns 1981a). Only one stock, the Alaska stock, is recognized in U.S. waters.

Early estimates of the Bering-Chukchi Sea population range from 250,000 to 300,000 (Popov 1976; Burns 1981a). Until additional surveys are conducted, reliable estimates of abundance for the Alaska stock of bearded seals are considered unavailable (Hill et al., 1996). Reliable data on trends in population abundance for the Alaska stock of bearded seals are unavailable and no evidence exists that population levels are declining. The concern expressed above regarding regional weather patterns for spotted seals applies as well to bearded seal.

NMFS monitored bearded seal incidental take in the BSAI groundfish trawl, longline, and pot fisheries during 1990-1994. Incidental kill was observed for the Bering Sea trawl fishery of three mortalities in 1991 and four in 1994, which calculates to be a mean annual (total) mortality rate of two bearded seals per year (Hill et al., 1996).

Ringed seals have a circumpolar distribution occurring in all seas of the Arctic Ocean (King 1983). In the eastern North Pacific, they are found in the southern Bering Sea and range as far south as the Seas of Okhotsk and Japan. Only one stock, the Alaska stock, is recognized in U.S. waters.

A reliable abundance estimate for the Alaska stock of ringed seals is currently not available. Crude estimates of the world population have ranged from 2.3 to 7 million, with 1 to 1.5 million in Alaskan waters (Kelly 1988). The most recent abundance estimates of ringed seals are based on aerial surveys conducted in 1985, 1986, and 1987 by Frost et al. (1988) but for only a limited portion of the shorefast ice habitat. Reliable data on trends in population abundance for the Alaska stock of ringed seals are unavailable and no evidence exists that population levels are declining. The concern expressed above regarding regional weather patterns for spotted seals applies as well to ringed seal.

NMFS monitored ringed seal incidental take in the BSAI groundfish trawl, longline, and pot fisheries during 1990-1994. Incidental kill observed for the Bering Sea trawl fishery was two mortalities in 1992 which calculates to be a mean annual (total) mortality rate of 0.6 ringed seals per year (Hill et al., 1996).

Ribbon seals inhabit the North Pacific Ocean and adjacent fringes of the Arctic Ocean. In Alaskan waters, ribbon seals are found in the open sea, on the pack ice, and only rarely on shorefast ice (Kelly 1988). They range northward from Bristol Bay in the Bering Sea into the Chukchi and western Beaufort Seas. Only one stock, the Alaska stock, is recognized in U.S. waters.

A reliable abundance estimate for the Alaska stock of ribbon seals is currently not available. Burns (1981b) estimated the worldwide population of ribbon seals at 240,000 in the mid-1970s, with an estimate for the Bering Sea at 90,000-100,000. Reliable data on trends in population abundance for the Alaska stock of ribbon seals are unavailable and no evidence exists that population levels are declining. The concern expressed above regarding regional weather patterns for spotted seals applies as well to ribbon seal.

NMFS monitored ribbon seal incidental take in the BSAI groundfish trawl, longline, and pot fisheries during 1990-1994. Incidental kill observed for the Bering Sea trawl fishery was one mortalities both in 1990 and 1991 which calculates to be a mean annual (total) mortality rate of 0.4 ribbon seals per year (Hill et al., 1996).

3.1.2.2 Status of Marine Mammal Cetacean Species

Large cetaceans with ranges (or historical occurrence) in the areas of the fisheries include humpback, grey, sei, fin, blue, right, sperm, minke, and bowhead whales (Bering Sea only). Small cetaceans include beluga whales, killer whales, Pacific white-sided dolphin, harbor porpoise, Dall's porpoise Population estimates and status determinations of most stocks of small cetaceans are poorly known. Cetacean species may interact with groundfish fisheries either in the fisheries themselves through potential entanglements/entrapments and possibly mortalities, or through competition for prey directly or indirectly. NMFS (1991a) reviewed population status of the ESA listed great whales throughout the world. Hill et al. (1996) reviewed stock status and potential biological removals by fisheries of all cetaceans. New information on the population status and management actions concerning Cetaceans is summarized below.

Beluga whales Beluga whales are distributed throughout seasonally ice-covered Arctic and subarctic waters of the Northern Hemisphere (Gurevich 1980). Three stocks of beluga whales are recognized in the Gulf of Alaska and Bering Sea

(Norton Sound, Bristol Bay, and Cook Inlet) (Hill et al., 1996). The total corrected population abundance estimate for Norton Sound is 7,986 (DeMaster 1996), Bristol Bay 1,555 (Frost and Lowry 1995), and Cook Inlet 981 (DeMaster 1996). The Norton Sound population is less likely to be declining than it is to be stable or increasing (Hill et al., 1996) and the Bristol Bay and Cook Inlet populations are considered stable (Frost and Lowry 1990; Shelden 1994). NMFS monitored beluga incidental take in the BSAI groundfish trawl, longline, and pot fisheries during 1990-1994. No mortality or serious injuries were observed incidental to these groundfish fisheries (Hill et al., 1996).

Killer whales have been observed in all oceans and sea of the world (Leatherwood and Dahlheim 1978). In Alaska waters, killer whales occur along the entire Alaska coast from the Chukchi Sea, into the Being Sea, along the Aleutian Islands, Gulf of Alaska, and into southeast Alaska (Braham and Dahlheim 1982). Four killer whale stocks are recognized along the west coast of North America from California to Alaska with two of them occurring in Alaska, the Eastern North Pacific Northern Resident stock and the Eastern North Pacific Transient stock (Hill et al., 1996). The combined count of resident killer whales in Alaskan waters is 601 and transient whales is 187 (Dahlheim and Waite 1993; Dahlheim 1994; Dahlheim et al., 1996). Reliable data on trends in population abundance for either stock are considered unavailable (Hill et al., 1996).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. Observed incidental mortality occurred in the groundfish trawl fishery with a mean annual (total) mortality of 1.0, and combined BSAI and GOA groundfish longline fisheries 0.2. No killer whale mortality was observed by NMFS in either pot fishery (Hill et al., 1996). Killer whale have added interaction with the longline fisheries in that some individuals feed off longline gear as it is being retrieved (Dahlheim 1996).

Pacific White-Sided dolphins are found throughout the temperate North Pacific Ocean. In the eastern North Pacific the species occurs from the Southern Gulf of California, north to the Gulf of Alaska, west to Amchitka in the Aleutian Islands, and is rarely encountered in the southern Bering Sea. Two stocks are recognized with the Central North Pacific stock the one present in Alaska (Hill et al., 1996). Buckland et al. (1993a) calculated population abundance at 931,000 animals. Buckland et al. (1993a), however, suggested that Pacific white-sided dolphins show strong vessel attraction. A correction factor has not been estimated, but abundance estimates may be biased upwards by more than five-fold. No reliable information exists on trends in abundance for the stock.

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. The Bering Sea groundfish trawl fishery had one observed mortality during 1992 resulting in a mean annual (total) mortality rate of 0.2 (Hill et al., 1996).

Harbor porpoises in the eastern North Pacific Ocean range from Point Barrow, along the Alaskan coast, and down the west coast of North America to Point Conception, California (Gaskin 1984). Available data are insufficient to justify recognizing three biological stocks of harbor porpoise in Alaska, however three separate management units are established (southeast Alaska, Gulf of Alaska, and Bering Sea stocks). Estimated corrected abundance for the three stocks is 29,744 animals. No reliable information on trends in abundance exists (Hill et al., 1996).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. One harbor porpoise mortality was observed in the 1994 Bering Sea groundfish trawl fishery. The mean annual (total) mortality rate resulting from the observed mortality was 0.4 (Hill et al., 1996).

Dall's porpoises are widely distributed across the entire North Pacific Ocean (Leatherwood and Reeves 1983). One stock of Dall's porpoise is recognized in Alaska waters (Hill et al., 1996). The Alaska stock of Dall's porpoise is estimated at 417,000. This number, however, may be overestimated by as much a five fold because of vessel attraction behavior (Hill et al., 1996; Turnock and Quinn 1991). No reliable information on trends in abundance exists (Hill et al., 1996).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. No mortalities of Dall's porpoise were observed by NMFS in either pot fishery. The mean annual (total) mortality was 5.4 for the BSAI groundfish trawl fishery, 0.6 for the GOA groundfish trawl fishery, and 0.8 for the combined BSAI and GOA groundfish longline fisheries.

Sperm whales are distributed widely in the North Pacific from Cape Navarin to the Pribilof Islands (Omura 1955). They feed primarily on medium-sized to large-sized squids (Gosho et al., 1984). One stock is recognized in Alaska, the North Pacific stock (Hill et al., 1996). The number of sperm whales occurring within Alaskan waters is unknown. Reliable information on trends in abundance are currently not available (Braham 1992).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. No mortalities were observed, however, sperm whale interaction with fisheries operating in the Gulf of Alaska are known to occur and may be increasing in frequency. In the first six months of 1996, NMFS observers aboard longline vessels targeting both sablefish and halibut have documented sperm whales feeding off the longline gear (NMFS Observer Program, unpubl. data, NMFS, AFSC, 7600 Sand Point Way NE, Seattle, WA, 98115).

Beaked whales present include the Baird's, Cuvier's, and Stejneger's. Baird's beaked whale extends north to at least the Pribilof Islands (Balcomb 1989), Cuvier's range to southeastern Alaska and the Aleutian and Commander Islands (Rice 1986), and Stejneger's north through the Gulf of Alaska to the Aleutian Islands, into the Bering Sea to the Pribilof and Commander Islands (Loughlin and Perez 1985). Reliable estimates of population size or trends in population abundance are unavailable (Hill et al., 1996).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. No mortalities were observed (Hill et al., 1996).

Gray whales migrate near shore along the coast of North America from Alaska to the central California coast (Rugh et al., 1993). Two stocks are recognized in the North Pacific, the eastern Pacific stock and the western Pacific or "Korean" stock. Most of the eastern North Pacific stock spends the summer feeding in the northern Bering, Chukchi, and Beaufort Seas (Rice and Wolman 1971). The eastern North Pacific stock abundance estimate is 22,571 (Hobbs et al., 1996). The population has been increasing over the past several decades with estimated annual rate of increase at 3.29 percent (Buckland et al., 1993b).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. No mortalities were observed (Hill et al., 1996).

Humpback whales in the North Pacific are seasonal migrants that feed on zooplankton and small schooling fishes (NMFS 1991b). The historic summering range in the North Pacific encompasses coastal and inland waters around the Pacific rim from Point Conception, California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk (Tomlin 1967; Nemoto 1957; Johnson and Wolman 1984). The humpback whale population in much of this range was considerably reduced as a result of intensive commercial exploitation during this century. Four stocks are recognized in the North Pacific: The two that come to Alaska are the Central North Pacific, and the Western North Pacific. No reliable abundance estimate or information on trends in abundance exists for the Western North Pacific stock (Hill et al., 1996). The Central North Pacific stock is more well known in terms of feeding aggregations in Prince William Sound and southeastern Alaska (Baker et al., 1986). Baker and Herman (1987) estimated the stock at 1,407 animals between 1980-1983. The robustness of that estimate is questionable, however, due to opportunistic nature of the survey methodology in conjunction with a small sample size. A current abundance estimate is considered unknown though the stock is believed to have increased since those data were collected (DeMaster 1995).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. No mortalities were observed (Hill et al., 1996).

Fin whales in the North Pacific Ocean can be found from above the Arctic Circle to lower latitudes of around 20 degrees North (Leatherwood et al., 1982). Within U.S. waters in the Pacific, fin whales are distributed seasonally off the coast of North America and near and around the waters of Hawaii. The fin whales present in the Gulf of Alaska and Bering Sea are considered part of the Alaska stock. Reliable estimates of current and historical abundance or population trends for the Alaska stock are not available (Braham 1992).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. No mortalities were observed (Hill et al., 1996).

Minke whales occur from the Bering and Chukchi Seas south to near the equator (Leatherwood et al., 1982). Minke whales are relatively common in the Bering and Chukchi Seas and in the inshore waters of the Gulf of Alaska (Mizroch 1992). Minke whales in Alaska are considered a separate stock from those in California, Oregon, and Washington. No estimates have been made for the number of minke whales in the entire North Pacific or for the number that occur in waters of Alaska. No data exist on trends in abundance in Alaskan waters (Hill et al., 1996).

NMFS observers monitored incidental take on the BSAI and GOA groundfish trawl, longline, and pot fisheries during 1990-1994. No mortalities were observed during that time. One minke whale mortality was observed in 1989 in the joint-venture groundfish trawl fishery (Hill et al., 1996).

Northern Right whales exceeded 11,000 animals before the stock was exploited (NMFS 1991c). Based on sighting data, Wada (1973) estimated a total population of 100-200 in the North Pacific. Rice (1974) stated that only a few individuals remained in the eastern North Pacific stock, and that for all practical purposes was extinct because no sightings of a cow with calf have been confirmed since 1900. On July 30, 1996, however, a group of 3-4 right whales were sighted in western Bristol Bay (P. Goddard, per. com., NMFS, Alaska Fisheries Science Center, 7600 Sand Point Way, NE, Seattle, WA 98115). A reliable estimate of abundance for the North Pacific right whale stock is not available nor is there any estimate of population trend (Hill et al., 1996).

In 1983, a right whale was reported to be incidentally killed in a gillnet in Russian water (NMFS 1991c). Gillnets were also implicated in the death of another right whale off the Kamchatka Peninsula in October of 1989 (Kornev 1994). (Gillnets are not an authorized gear as defined at 50 CFR 679.2 in the Federally managed groundfish fisheries off Alaska.) No other incidental takes of right whales have occurred in the North Pacific. Any mortality incidental to commercial fisheries would be considered significant (Hill et al., 1996).

Bowhead whales are distributed in seasonally ice-covered waters of the Arctic and near-Arctic, generally north of 54 degrees North (Moore and Reeves 1993). The largest remnant population, and only stock found within U.S. waters is the Western Arctic stock. The stock migrates annually from wintering areas in the northern Bering Sea, through the Chukchi Sea to the Beaufort Sea (Braham et al., 1980). The Western Arctic stock is estimated at 8,200 animals (RIWC 1996) and increasing at a rate of 3.1 percent from 1978 to 1993 (Raftery et al., 1995).

No observer program records of bowhead whale mortality incidental to commercial fisheries in Alaska exist (Hill et al., 1996).

3.1.2.3 Status of Seabirds

Alaska supports North America's greatest concentration of seabirds, owing to its productive marine waters and abundant nesting habitat. Approximately 50 million seabirds of 38 species nest in more than 1600 colonies. Alaskan seabirds are members of the orders Procellariiformes, Pelecaniformes, and Charadriiformes. These birds nest on steep seacoasts or remote islands and spend up to 80 percent of their lives at sea. Food is obtained at sea by picking prey from the surface or by diving and pursuing it underwater. Characteristics of seabird populations vary among species, but general features include delayed maturity (breeding starts at two to nine years of age), long life (annual adult survival rates are 0.80-0.96), and low reproductive rates (approximately 0.2-1.5 young fledged annually).

Seabirds have been studied in the Bering Sea and Gulf of Alaska since the early 1970's. The location, species composition, and approximate size of breeding colonies are stored in a database at the USDI Fish and Wildlife Service (FWS) office in Anchorage, Alaska. Approximately 30 million breeding seabirds at 470 colonies occur in the Bering Sea and Aleutian Islands and 12 million breeding seabirds at 20,000 colonies occur in the Gulf of Alaska. In addition up to 50 million shearwaters and three albatross species feed in Alaskan waters but breed elsewhere.

Population trends and productivity are monitored by FWS every 1 to 3 years at approximately six colonies in each area. The species monitored are common and thick-billed murres, red-legged and black-legged kittiwakes, northern fulmar, tufted puffin, fork-tailed and Leach's storm-petrel, and red-faced and pelagic cormorant. Diets also are monitored in some studies. Populations of marine seabirds are monitored on the water along parts of Kodiak Island and in Prince William Sound and Cook Inlet.

Some seabird populations in the Bering Sea, Aleutian Islands, and Gulf of Alaska regions have declined during part or all of the past two decades. Most declines were concentrated on islands of the southeastern Bering Sea and in the northern Gulf of Alaska. The principal colony of the red-legged kittiwake on St. George Island has declined by 50 percent during the past 20 years (Hatch et al., 1993); other species on the Pribilofs, including red-faced cormorants, black-legged kittiwakes, and murres, have declined to a lesser extent (Climo 1993; Dragoo and Sundseth 1993). In the northern Gulf of Alaska, declines have been documented in black-legged kittiwakes, murres, pigeon guillemots, and marbled murrelets) (Hatch et al., 1993; Klosiewski and Laing 1994; Kuletz 1996; Oakley and Kuletz 1996; Piatt and Anderson 1996). These declines probably began before the <u>Exxon</u> <u>Valdez</u> oil spill. Populations in other areas, including the Aleutian Islands, generally have been stable or have increased (reviewed in Hatch and Piatt 1995; National Research Council 1996).

Most population trends in high-latitude seabirds have been associated with changes in food availability (Birkhead and Furness 1985; Piatt and Anderson 1996). The most serious non-food threat to seabird populations in Alaska has been (and remains) the introduction of alien predators, both foxes (Bailey 1993) and rats that might be introduced from vessels (Loy 1993).

Forage fish are the principal diet of more than two-thirds of seabirds that occur in Alaska. The only seabird species that do not depend on fish during the breeding season are very small ones such as auklets. The four seabirds that commonly visit Alaskan waters during their nonbreeding season also depend on forage fish here. Capelin and sand lance are crucial to many bird species; other forage fish include Myctophids, herring, Pacific saury, and walleye pollock. Many seabirds can subsist on a variety of invertebrates and fish during nonbreeding months but can only raise their nestlings on forage fish (Sanger 1987; Vermeer et al., 1987).

Seabird population trends are largely determined by forage fish availability (Birkhead and Furness 1985). Although seabirds are adapted to occasional years of poor reproduction, a long-term scarcity of forage fish leads to population declines, usually through breeding failure rather than adult mortality. Breeding failure can result when adults lack sufficient energy reserves to complete a nest, lay eggs, or complete incubation, or when they cannot feed the nestlings adequately (e.g., Kuletz 1983; Baird 1990; Murphy et al., 1984, 1987; Springer 1991).

Seabirds depend on forage fish that are small (5 to 20 cm), high in energy content, and form schools within efficient foraging range of the breeding colony. Foraging distances range from 20 km or less for inshore feeders such as terns, guillemots, and cormorants to 60 km or farther for kittiwakes and murres (Schneider and Hunt 1984). Seabirds such as kittiwakes and terns can take prey only when they are concentrated at the surface; these species are affected more frequently by food shortage than are diving seabirds such as murres, murrelets, puffins, and cormorants.

Although seabirds consume several species of fish, only one or two forage species are available near most of the colonies in Alaska. If an important fish stock is depleted locally, birds may have no other food source that could support successful breeding. Regional variations in dominant forage fish include sand lance along most of the Aleutians and most parts of the Bering Sea (Springer 1991; Springer et al., 1986); capelin and walleye pollock on most of the Alaska Peninsula (Springer 1991; Hatch and Sanger 1992); and pollock and formerly capelin on St. Matthew Island and the Pribilof Islands (Hunt et al., 1981a, b; Springer et al., 1986; Decker 1995). The preferred forage species in each area usually is essential for successful seabird reproduction (Springer et al., 1986, 1987; Baird 1990; Piatt and Anderson 1996). Capelin have increased again near some Gulf of Alaska colonies since 1994, and kittiwake breeding success has improved there recently (D.B. Irons, per. com.).

The status of the ESA listed bird species are also discussed in section 3.1.5.

3.1.3 Status of Prohibited Species Bycatch

Prohibited species taken incidentally in groundfish fisheries include: Pacific salmon (chinook, coho, sockeye, chum, and pink salmon), steelhead trout, Pacific halibut, Pacific herring, and Alaska king crab and Tanner crab. The Council recommends prohibited species catch (PSC) limits in tandem with TAC specifications.

Bycatch limits of prohibited species in the groundfish fisheries frequently limit the groundfish fishery reaching the target species TAC specifications. The catches are managed through gear specifications, time-area closures, and bycatch limits. During haul sorting these species or species groups are to be returned to the sea with a minimum of injury except when their retention is authorized by other applicable law.

Pacific salmon production in the northeast Pacific exhibits time and space variability that is closely linked to similar dynamics in the North Pacific atmosphere and ocean physics. Alaska's Pacific salmon catches have been on a general increase since the 1970s, reaching record levels in recent years (Rigby et al., 1991; Wertheimer, 1997). In 1991, Alaska produced 79 percent of the North American harvest (in numbers) of Pacific salmon, compared to 17 percent from British Columbia and four percent total from Washington, Oregon, Idaho, and California (Rigby et al., 1991; Canada Department of Fisheries and Oceans 1993; Henry 1993). The hatchery program begun in 1974 by the State of Alaska provides 35 million salmon in the commercial catch, primarily in pink and chum salmon.

Pacific salmon bycatch data are sorted by species only for chinook and other salmon. Sockeye salmon are most common in the eastern Bering Sea area groundfish bycatch though all five species are found in lesser degrees of abundance. Steelhead trout are accounted in the other salmon category. Pink salmon dominate groundfish bycatch in the western Bering Sea. The BSAI 1996 take of chinook salmon was 64,659 fish and 79,011 other salmon (NMFS per. comm. 1997). The GOA 1996 take of chinook salmon was 15,988 fish and 4,073 other salmon (NMFS per. comm. 1997). Pacific salmon catch limits are set for specific fishing areas and by gear type for specific periods of time. Due to catch trauma, time involved in sorting, and sensitivity of the species, all of the prohibited species salmon bycatch is assumed to be mortally wounded.

Pacific halibut biomass in the Bering Sea increased significantly throughout the 1980s, as did recruitment and catch. Similar increases were estimated to have occurred over the entire range of the species in the northeast Pacific. The International Pacific Halibut Commission (IPHC) (1982) determined that biomass in the 1980s was at a record high level. Halibut abundance entered a period of decline in the 1990s, although large year classes are expected to maintain commercial fisheries near peak levels for some time. Size of Pacific halibut at the age of maturity (8 years) has been on a declining trend for several years. Size is assumed to be related to competition and/or a lower carrying capacity in marine waters, however, definitive explanations are unavailable. The IPHC introduced a revised population biomass model in December 1996. The new biomass determinations are higher than previous ones resulting in increases in harvestable amount over many of the management areas.

Annual Pacific halibut prohibited species mortality limits are established for trawl and hook-and-line gear and may soon be established for pot gear. Inseason regulation of the fishery monitors the reported halibut bycatch and results in closures of specific areas and gear types when the limits are reached or exceeded. Due to the catch trauma, time involved in sorting, and sensitivity of the species, a percentage of halibut bycatch is assumed mortally wounded when returned to the water. The IPHC calculates discard mortality rates for each region/gear/target and the rates are used in bycatch monitoring (Williams 1996). Pacific halibut PSC limits are published in the 1997 Interim and Proposed Specifications for the BSAI and GOA Management Areas.

Herring biomass in the eastern Bering Sea has ranged between 1,600,000 and 10,000 tons. Large year classes appeared in 1957, 1958, 1977, years of significant pulse warming in the eastern Bering Sea. These year classes apparently supported the two major increases in population biomass observed over the last four decades (Wespestad 1991).

Herring bycatch in the groundfish fisheries is managed by time area closures that correspond to locations and times of predicted presence of large herring schools. These time area closures are not expected to change between the 1996 and 1997 groundfish fisheries.

Tanner crab and Alaska king crab PSC limits are set in the BSAI groundfish fisheries FMP for Tanner crab and Alaska king crab. Currently no PSC limit for crab in the GOA groundfish fisheries exists.

Bering Sea Tanner crab stocks are currently at historic low levels based on bottom trawl survey data (Stevens et al., 1996). Recruitment and exploitable biomass of Bristol Bay red king crab (Paralithodes camtschaticus), Bering Sea Tanner crab (Chionoecetes bairdi), and snow crab (C. opilio) stocks are near historically low levels. In 1994 and 1995, Bristol Bay was closed to red king crab fishing because the female threshold (8.4 million lb (3,810 mt)) was not reached. Also, the area east of 163 degrees West longitude was closed to Tanner crab fishing to minimize the bycatch of female red king crabs. The 1995 Tanner crab season produced only 4.5 million lb (2,041 mt) for the 196 vessels participating. This amount is the lowest catch since the fishery reopened in 1988.

Concerns by the groundfish fisheries for the crab populations include relative rates of predation by groundfish on crab, bycatch, and benthic habitat alteration that may be result of trawl gear deployment.

3.1.4 Status of Forage Species

Forage fish species that are considered to be primary food resources for other marine animals include Clupeiformes (herring), Osmeridae (which includes capelin and eulachon), Myctophidae, Bathylagidae, Ammodytes spp. (sand lance), and Pacific sandfish. With the exception of herring, which are considered prohibited species, these species are currently managed in the BSAI and GOA under the "other species" or "non-specified" species categories. For those in the "other species" category (capelin, eulachon, and other Osmeridae), average annual catch is recorded. The management tradition in BSAI is to specify a single TAC for the entire "other species" category which also includes octopus, squid, skates, etc. The management tradition in GOA is to specify the "other species" category as five percent of the sum of the TAC specifications for all the species and species group categories. For forage fish species in the "non-specified" category (sand lance, Pacific sandfish, lanternfish, etc.) a TAC is not specified but is defined in the FMPs as the amount taken incidentally while fishing for other groundfish. No reporting is required and no ABC is estimated of "non-specified" species. A regulation prohibiting establishment of commercial fisheries on forage species (other than herring and pollock) is underway by the Council.

Forage fish perform a critical role in the complex ecosystem by providing the transfer of energy from the primary or secondary producers to higher trophic levels. Many species undergo large, seemingly unexplainable fluctuations in abundance. Most of these species have high reproductive rates, are short-lived, attain sexual maturity at young ages, and have fast individual growth rates (termed r-selected species) such as Walleye pollock, herring, Atka mackerel, capelin, and sand lance. Predators which utilize r-selected fish species as prey, have evolved in an ecosystem in which fluctuations and changes in relative abundances of these species have repeatedly occurred. These species (termed K-selected species) include rockfish, many flatfish, marine mammals, and seabirds. K-selected species have comparatively lower fecundity, higher adult survival rates, and delayed maturity compared to r-selected species. K-selected species, to some degree, are generalists who are not dependent on the availability of a single species to sustain them, but on a suite of species, any one (or more) of which is likely to be available each year.

Some evidence exists, mostly anecdotal, that osmerid abundances, particularly capelin and eulachon, have declined significantly since the mid 1970s. Evidence for this comes from marine mammal food habits data from the Gulf of Alaska (Calkins and Goodwin 1988), as well as from data collected in biological surveys of the Gulf of Alaska (not designed to sample capelin) (Anderson et al., 1994) and commercial fisheries bycatch from the eastern Bering Sea (Fritz et al., 1993). It is not known, however, whether smelt abundances have declined or whether their populations have redistributed vertically, due presumably to warming surface waters in the region beginning in the late 1970s. Yang (1993), documented considerable consumption of capelin by arrowtooth flounder, a demersal lower-water column feeder, in the Gulf of Alaska which also indicates redistribution.

Some fish species utilize the same food sources and some fish species are predators of other fishes. The size ranges of prey consumed by fish predators is important to predicting population biomass in future years and competition between species on time-lag basis (overview and references to other studies are found in Livingston et al,, 1986; Brodeur and Livingston 1988; Livingston 1991, 1993; Livingston et al., 1993; and Yang 1993).

3.1.5 Status of ESA Listed Species

The ESA provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The program is administered jointly by the Department of Commerce (NMFS) for most marine species, and the Department of Interior (FWS) for terrestrial and freshwater species.

The ESA procedure for identifying or listing imperiled species involves a two-tiered process, classifying species as either threatened or endangered, based on the biological health of a species. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. The Secretary, acting through NMFS, is authorized to list marine mammal and fish species. The Secretary of Interior, acting through the FWS, is authorized to list all other organisms.

The following species are currently listed as endangered under the ESA and occur in the GOA and/or BSAI groundfish management areas:

Northern Right Whale	Balaena glacialis
Bowhead Whale[1]	Balaena mysticetus
Sei Whale	Balaenoptera borealis
Blue Whale	Balaenoptera musculus
Fin Whale	Balaenoptera physalus
Humpback Whale	Megaptera novaeangliae
Sperm Whale	Physeter macrocephalus
Snake River Sockeye Salmon	Oncorhynchus nerka
Short-tailed Albatross	Diomedia albatrus

The following species are currently listed as threatened and occur in the BSAI and GOA management areas:

Snake River Fall Chinook Salmon	Oncorhynchus tshawytscha
Snake River Spring/Summer Chinook Salmon	Oncorhynchus tshawytscha

[1]species present within the Bering Sea area only.

Steller Sea Lion — *Eumetopias jubatus*
Spectacled Eider — *Somateria fishcheri*

Because both groundfish fisheries are federally authorized activities, any negative affects of the fisheries on listed species or critical habitat and any takings that may occur are subject to ESA section 7 consultation. NMFS initiates the consultation and the resulting biological opinions are issued to NMFS. The Council may be invited to participate in the compilation, review, and analysis of data used in the consultations. The determination of whether the action "is likely to jeopardize the continued existence of" endangered or threatened species or to result in the destruction or modification of critical habitat, however, is the responsibility of the appropriate agency (NMFS or FWS). If the action is determined to result in jeopardy, the opinion includes reasonable and prudent measures that are necessary to alter the action so that jeopardy is avoided. If an incidental take of a listed species is expected to occur under normal promulgation of the action, an incidental take statement is appended to the biological opinion.

In addition to listing species under the ESA, the critical habitat of a species must be designated concurrent with its listing to the "maximum extent prudent and determinable" [16 U.S.C. § 1533(b)(1)(A)]. The ESA defines critical habitat as those specific areas that are essential to the conservation of a listed species and that may be in need of special consideration. The primary benefit of critical habitat designation is that it informs Federal agencies that Steller sea lions are dependent upon these areas for their continued existence, and that consultation with NMFS on any Federal action that may affect these areas is required.

Section 7 consultations have been done for all the above listed species, some individually and some as groups. Below are summaries of the consultations.

Endangered Cetaceans These species of great whales were initially listed in 1969 with the Endangered Species Conservation Act, and maintained in the status of endangered when the ESA passed into law in 1973. No critical habitat has been designated for these listed cetaceans.

NMFS concluded a formal section 7 consultation on the effects of the BSAI and GOA groundfish fisheries on endangered cetaceans within the BSAI and GOA on December 14, 1979, and April 19, 1991, respectively. These opinions concluded that the fisheries are unlikely to jeopardize the continued existence or recovery of endangered whales. Consideration of the bowhead whale as one of the listed species present within the area of the Bering Sea fishery was not recognized in the 1979 opinion, however, its range and status are not known to have changed. No new information exists that would cause NMFS to alter the conclusion of the 1979 or 1991 opinions.

Steller sea lion is currently listed under the ESA as threatened throughout its U.S. range, which extends from California and associated waters to Alaska, including the BSAI and GOA. On October 4, 1995, NMFS proposed to reclassify the Steller sea lion to list the U.S. western population of Steller sea lion as endangered and to retain the threatened status for the eastern population (60 FR 51968). Under the new proposal, NMFS would manage the Steller sea lion as two distinct population segments under the ESA, and classify the population west of 144 W. longitude (a line near Cape Suckling, Alaska) as endangered and to maintain the threatened listing to the east of this line. A final rule is to be issued in 1997.

NMFS designated critical habitat (58 FR 45278, August 27, 1993) for the Steller sea lion based on the Recovery Team's determination of habitat sites that are essential to reproduction, rest, refuge, and feeding. Listed critical habitats in Alaska include all rookeries, major haul-outs, and specific aquatic foraging habitats of the BSAI and GOA. The designation does not place any additional restrictions on human activities within designated areas.

NMFS determined that both groundfish fisheries may adversely affect Steller sea lions, and therefore has conducted section 7 consultation on the overall fisheries, proposed changes in the fisheries, and the annual TAC specification process since the 1990 ESA listing. The most recent biological opinion considered the annual process of proposing TAC specifications (NMFS 1996). NMFS considered whether reinitiation of section 7 consultation for Steller sea lions as effected by the proposed 1997 TAC specifications was warranted at this time and found that it did not (Memorandum from James Balsiger, January 22, 1997). The reasons include: No significant new information regarding the relationship between the fishery and the Steller sea lion population, no significant alterations in fishing practices either spatially or temporally, no specific management actions which would obviously conflict with ongoing efforts to recover Steller sea lion populations, and the estimated incidental take of Steller sea lions in groundfish operations during 1996 was less than the MMPA authorized level of 77 animals in the BSAI and GOA.

Pacific Salmon No species of Pacific salmon originating from freshwater habitat in Alaska are listed under the ESA. These listed species originate in freshwater habitat in the headwaters of the Columbia (Snake) River. During ocean migration to the Pacific marine waters a small (undetermined) portion of the stock go into the Gulf of Alaska as far east as the Aleutian Islands.

In that habitat they are mixed with hundreds to thousands of other stocks originating from the Columbia River, British Columbia, Alaska, and Asia. The listed fish are not visually distinguishable from the other, unlisted, stocks. Mortal "take" of them in the chinook salmon bycatch portion of the fisheries is assumed based on sketchy abundance, timing, and migration pattern information.

NMFS designated critical habitat (57 FR 57051, December 2, 1992) for the for the Snake River sockeye, Snake River spring/summer chinook, and Snake River fall chinook salmon, however, it did not include any marine waters, therefore, does not include any of the habitat where the groundfish fisheries are promulgated.

Formal consultation resulting in biological opinions and no-jeopardy determinations were completed for listed Pacific salmon in the groundfish fisheries for 1994 and future years (NMFS 1994, 1995). Conservation measures were recommended to reduce salmon bycatch and improve the level of information about the salmon bycatch. The no jeopardy determination was based on the assumption that if total salmon bycatch is controlled, the impacts to listed salmon are also controlled. The incidental take statement appended to the biological opinion allowed for take of one Snake River fall chinook and zero take of either Snake River spring/summer chinook or Snake River sockeye per year. As explained above, it is not technically possible to know if any have been taken. Compliance with the biological opinion is stated in terms of limiting salmon bycatch to under 55,000 and 40,000 for chinook salmon in the BSAI and GOA fisheries, respectively, and 200 and 100 sockeye salmon in the BSAI and GOA fisheries, respectively.

<u>Short-tailed albatross</u> The entire world population in 1995 was estimated as 800 birds; 350 adults breed on two small islands near Japan (H. Hasegawa, per. com.). The population is growing but is still critically endangered because of its small size and restricted breeding range. Past observations indicate that older short-tailed albatrosses are present in Alaska primarily during the summer and fall months along the shelf break from the Alaska Peninsula to the Gulf of Alaska, although 1- and 2-year old juveniles may be present at other times of the year (FWS 1993). Consequently, these albatrosses generally would be exposed to fishery interactions most often during the summer and fall--during the latter part of the second and the whole of the third fishing quarters.

Three short-tailed albatrosses have been reported caught in the longline fishery since 1990: two in 1995 and one in October 1996. Both 1995 birds were caught in the vicinity of Unimak Pass and were taken outside the observers' statistical samples.

Formal consultation on the effects of the groundfish fisheries on the short-tailed albatross under the jurisdiction of the FWS concluded that BSAI and GOA groundfish fisheries would adversely affect the short-tailed albatross and would result in the incidental take of up to two birds per year, but would not jeopardize the continued existence of that species (FWS 1989). Subsequent consultations for changes to the fishery that might affect the short-tailed albatross concluded that no additional adverse impacts beyond those considered in 1989 would occur. Those subsequent consultations included: (1) 1992 GOA and BSAI TAC specifications, January 17, 1992; (2) 1993 GOA and BSAI TAC specifications, February 1, 1993, and clarified February 12, 1993; (3) delay of the second quarter pollock fishing season in the GOA, December 22, 1992; (4) careful release of halibut in hook-and-line fisheries, March 12, 1993; (5) delay of the second pollock fishing seasons in the GOA and BSAI, March 12, 1993; (6) BSAI Amendment 28 that established three districts for the purposes of distributing TAC spatially, April 14, 1993; (7) GOA Amendment 31 that established Atka mackerel as a separate target species, July 21, 1993; (8) 1994 GOA and BSAI TAC specifications, February 14, 1994; (9) experimental trawl fishery, Kuskokwim Bay to Hooper Bay, June 22, 1994; and (10) 1995 GOA and BSAI TAC specifications, February 7, 1995. Following two short-tailed albatross takings in 1995, NMFS requested reinitiation of consultation on the 1995 GOA and BSAI TAC specifications. By letter of October 1, 1996, the FWS reaffirmed that the incidental take for the 1996 groundfish fisheries was two short-tailed albatross. Per FWS direction, NMFS requested reinitiation of consultation for the proposed 1997 TAC specifications by letter of November 7, 1996. By letter of December 20, 1996, FWS stated that they would reinitiate consultation with the expectation of completing a new biological opinion before February 12, 1997.

Spectacled Eider These sea ducks feed on benthic mollusks and crustaceans taken in shallow marine waters or on pelagic crustaceans. The marine range for spectacled eider is not known, although Dau and Kistchinski (1977) review evidence that they winter near the pack ice in the northern Bering Sea. Spectacled eider are rarely seen in U.S. waters except in August through September when they molt in northeast Norton Sound and in migration near St. Lawrence Island. The lack of observations in U.S. waters suggests that, if not confined to sea ice polyneas, they likely winter near the Russian coast (FWS 1993). Although the species is noted as occurring in the GOA and BSAI management areas no evidence that they interact with these groundfish fisheries exists.

For all ESA listed species, consultation must be reinitiated if: the amount or extent of taking specified in the Incidental Take Statement is exceeded, new information reveals effects of the action that may affect listed species in a way not previously considered, the action is subsequently modified in a manner that causes an effect to listed species that was not considered in the biological opinion, or a new species is listed or critical habitat is designated that may be affected by the action.

3.1.6 Socioeconomic summary

The most recent description of the groundfish fishery is contained in the Economic Status of the Groundfish Fisheries Off Alaska, 1996 (Kinoshita et al., 1996). The report includes information on the catch and ex-vessel and product value of the fisheries, the numbers and sizes of fishing vessels and processing plants, and other economic variables that describe or affect the performance of the fisheries.

For purposes of this analysis, the types of socioeconomic impacts are those related to gross earnings by the fishing fleet and impacts on bycatch management of prohibited species.

3.1.6.1 Summary of 1995 Exvessel Values

The commercial groundfish catch off Alaska totaled 2.15 million mt in 1995 (Kinoshita et al., 1996). A 28 percent increase in average ex-vessel price of groundfish and the estimated ex-vessel value of the catch was realized from 1994 to 1995. Although reliable processed product prices are not yet available for 1995, the value of the 1995 catch after primary processing was probably about $1.3 billion.

Ex-vessel value of the commercial groundfish catch off Alaska are not yet available for 1996. Average ex-vessel prices, including the value added by at-sea processing, in 1994 were up slightly from $0.102 per pound in 1993 to $0.107 per pound, round weight in 1994. The average price of pollock increased from $0.07 per pound in 1993 to $0.075 in 1994. Average prices of sablefish rose by 37 percent from 1993. Pacific cod prices were down 6.4 percent, and rockfish prices declined by 16 percent. Average prices of flatfish and Atka mackerel in 1994 were down 22 percent and 5.4 percent, respectively, from 1993.

3.1.6.2 Description of the Groundfish Fishing Fleet

NMFS blend estimates and fish ticket data were examined to determine the current composition of the domestic groundfish fishing fleet. Preliminary data through June 1995 indicates a total of 1,425 vessels landed groundfish in the GOA and BSAI groundfish fisheries in 1995.

The number of vessels harvesting groundfish off Alaska did not consistently increase, on an annual basis, as did landings. The total number fluctuated from 1,449 in 1986 to 1,859 in 1987, declined to 1,576 in 1989, increased to 2,341 in 1992, and stood at 2,077 in 1994. During this period, the number of trawl vessels increased annually from 80 in 1986 to 296 in 1992, but was 254 in 1994. The greatest impact has been the increase of the largest vessel classes. The number of trawlers greater than 185 feet (56 m) in length increased from 8 in 1987 to 30 in 1989, and to 50 in 1991. However, this group fell to 40 in 1993 but increased to 45 in 1994. From 1986 to 1992, the number of vessels using hook and line gear increased from 1,356 to 1,948, dropped to 1,649 vessels in 1993, then bounced back to 1,807 vessels in 1994. Vessels using pot gear jumped from 24 in 1986 to 285 in 1992, the number declined by one-half to 132 in 1993, but increased by 14 vessels to 146 in 1994.

3.1.6.3 Current Bycatch Management Regime

In the trawl and fixed gear groundfish fisheries, incidental harvest is tallied as bycatch. Species included are Pacific halibut, herring, Pacific salmon, Alaska king crab, and Tanner crab. Conflicts arise when bycatch in one fishery reduces the amount of a species available for harvest in another fishery. The bycatch problem is a particularly contentious allocation issue because crab, halibut, herring, and salmon fishers are directing their fisheries to the species that groundfish fishers are harvesting inadvertently. The GOA and BSAI bycatch management measures and associated fishery bycatch apportionments are in Section 3.1.3 of this document and in the SAFE reports (NPFMC 1996a, b).

The Council annually reviews bycatch, including prohibited species, and recommends apportionment of PSC limits to fishery categories as bycatch allowances. Based on the SAFE reports, the Plan Teams, Advisory Panel, Scientific and Statistical Committee, and interested public provide recommendations for apportionments of PSC limits to the target fisheries.

Interim closures of fisheries, authorized by the FMPs, are used to control the fisheries so the harvest per fishery stays within allocated amounts. In general, these closures are implemented under a framework established by regulatory amendment. Detailed information concerning bycatch limitations and specific amounts apportioned by gear type and area are found in the annual specification notices (50 CFR part 679). Closures by Federal action from one year to the next are similar in number and timing, though never exactly the same. The 1996 closures are listed in the 1997 SAFE reports (NPFMC 1996a, b).

3.2 Physical and Biological Impacts

Reduction of one component of an ecosystem by fishing can have consequences for other components, especially for predators, competitors, and prey of the target species (National Research Council 1996). Below are interpretations of the physical and biological impacts of fishing.

Alternative 1 - Implement in 1997 TAC specifications that are equivalent to the 1996 final specifications of TAC.

Alternative 2: Implement the proposed 1997 TAC specifications.

Physical impacts are those that would be caused by (1) trawling activity on the sea bed and associated benthos (i.e., attached animals and plants) and (2) deposition of fish wastes resulting from processing activities. Some disturbance to the benthic environment occurs in all trawl fisheries. Though the total extent of physical impacts is unknown several studies to develop techniques for seafloor habitat monitoring were initiated by NMFS during the summer of 1996 (NMFS per. com.). It will takes years, perhaps decades, with annual obligation of several million dollars before conclusions can be reached.

Biological impacts on the environment are those caused by changes in the status of target species categories of groundfish, other groundfish species, marine mammals, birds, and other predators and prey. These impacts are discussed below.

3.2.1 Impacts on GOA and BSAI Target Groundfish Categories

The levels of TAC specifications that are implemented in 1997, as in 1996, will be within the guidelines of the ABC specifications. The ABC specifications are set on the basis of the best scientific information on each stock's abundance, distribution, life history, and commercial fishing history as discussed in the SAFE reports (NPFMC 1996a, b), and are less than the respective OFLs. Therefore, the sums of TAC and ABC specifications for 1997 are less than the sum of 1997 OFLs. The proposed harvest levels are not anticipated to have significant effects on groundfish stocks, because groundfish removal does not exceed the OFLs. Furthermore, in some cases the TAC specifications established are substantially below the ABC levels because of uncertainty in stock assessments or for bycatch considerations. Bycatch restrictions will likely curtail groundfish harvests short of the TAC specified.

3.2.2 Impacts on Higher Trophic Level Species

Changes in the abundance of high-level predators including marine mammals and birds may be indications of major shifts in the ecosystem. Limited data sets preclude definitive analyses of the effect of fish removals on population trends. The effect of localized prey depletion through fishing activities on high-level predators remains a concern. In addition to changes in food availability, disease, illegal shooting, predation, subsistence harvest, and incidental takes may also contribute to the decline of the Steller sea lion population.

Some populations of marine mammals and seabirds are known to be declining since 1975. These declines may be attributed to the effects of commercial fishing activity off Alaska, however, the complexity of ecosystem interaction and the lack of data make it difficult to sort out how natural and anthropogenic factors have affected the carrying capacity of the ecosystems for marine mammals of the GOA and BSAI. Since first passage of the Magnuson-Stevens Act, the fisheries off Alaska have grown to account for a significant portion of all U.S. seafood landings. Change in food availability is a plausible reason for declining marine mammal and seabird populations; however, research has yet to demonstrate a cause and effect relationship for most species.

3.2.2.1 Marine Mammals

Northern fur seals The decline evidenced in the 1960s and early 1970s was associated with commercial and scientific harvests in the 1950s and early 1960s (Swartzman and Hofman 1991). Cause(s) of the decline observed in the late 1970s are largely unknown, but may be related to entanglement in marine debris and discarded fishing gear, incidental take, or reduced prey availability.

Cetaceans The cetacean species present in the GOA and BSAI may interact with fisheries either through a common prey, such as walleye pollock, cod, flatfish, or Atka mackerel (Lowry et al., 1989), or by occasionally being caught in trawl nets, currently at the rate of only several per year (Hill et al., 1996). The former includes all ten species while the latter includes only the six small-to-medium-sized cetacean species.

Fish comprise varying proportions of the diet of large baleen whales, ranging from approximately 16 percent of the diet of fin whales and 29 percent of the diet of humpback whales to 60 percent of the diet of minke whales (Perez and McAllister 1988). Fish ingested by the large baleen whales are almost exclusively small schooling fish, such as capelin, herring, and eulachon, or juveniles (not recruited to the fishery) of commercially exploited groundfish species, such as pollock, cod, and Atka mackerel. Large baleen whales and the target species of the fisheries therefore compete for food indirectly.

Fish generally comprise a greater proportion of the diet of the smaller cetaceans, with over 50 percent being reported for the killer whale, harbor porpoise, Dall's porpoise, and Beluga whale (Perez and McAllister 1988). These species are considered opportunistic and feed on a wide variety of fish species, including osmerids, clupeoids, gadids, salmonids, myctophids, flatfish, sand lance, and Atka mackerel. Killer whales have been documented to take fish off longlines in the sablefish and Greenland turbot fisheries. Some are incidentally taken in GOA and BSAI fisheries; although current levels of take are not considered significant (Small and DeMaster 1995).

The following target species harvest specifications are important relative to marine mammals because they are their primary prey species:

		1995 TAC	1996 TAC	1997 Proposed TAC
GOA:	Pollock	65,360	54,810	79,980
	Pacific cod	69,200	65,000	69,115
	Atka mackerel	3,240	3,240	1,000
EBS:	Pollock	1,250,000	1,190,000	1,130,000
AI:	Pollock	56,600	35,600	28,000
Bogoslof	Pollock	1,000	1,000	1,000
BSAI:	Pacific cod	250,000	270,000	270,000
	Atka mackerel	80,000	106,157	66,700

Analysis of Alternatives

Alternative 1 would not take into account the most current information available on the status of groundfish species populations, including the declining GOA pollock population. Harvest at levels equivalent to the 1996 TAC specifications in 1997 would result in a level of fishing above that recommended for pollock and Atka mackerel, but lower than that recommended for Pacific cod. Retention of the BSAI TAC specifications into 1997 would result in a level of fishing higher than that recommended for pollock and Atka mackerel but no different for Pacific cod. Either alternative would not be likely to have a longterm adverse effect the physical or biological ecosystem.

3.2.2.2 Seabirds

Impacts of fishing activity on seabirds occurs through direct mortality from (1) collisions with vessels, (2) entanglement with fishing gear, (3) entanglement with discarded plastics and other debris, and (4) shooting. Indirect impacts include (1) competition with the commercial fishery for prey, (2) alteration of the food web dynamics due to commercial fishery removals, (3) disruption of avian feeding habits resulting from developed dependence on fishery waste, (4) fish-waste related increases in gull populations that prey on other bird species, and (5) marine pollution and changes in water quality. Competition between seabirds and fisheries for forage fish is difficult to evaluate. Climatic fluctuations undoubtedly contribute to fluctuations in seabird food resources (Wooster 1993), but so may fisheries (Duffy 1983, Steele 1991).

Fish processing provides food directly to scavenging species such as Northern Fulmars and large gulls. This can benefit populations of some species, but it can be detrimental to others which they may displace or prey upon (Furness and Ainley 1984). Predation by birds has impacts on fish populations that have variously been estimated as minor to significant (reviewed by Croxall 1987).

Seabirds are caught incidentally to all types of fishing operations, but the vulnerability of bird species to gear types differs with feeding ecology. As described previously, fishing gear used in these groundfish fisheries include trawl, hook-and-line, and pot. Hook-and-line gear occasionally catches surface-feeding seabirds that are attempting to capture the baits as the line is being set; some birds are caught on hooks and drown. Trawl gear appears to catch surface-feeding and diving birds that are feeding and scavenging fragments of fish as the net is being hauled. Pot gear does not commonly catch birds, though rare reports of dead diving and surface-feeding birds exist for pot gear.

Seabirds consume some of the target fish species such as walleye pollock, Atka mackerel, and Pacific herring, although non-target fish and invertebrate species such as capelin, sand lance, squid, and zooplankton generally make up a larger portion of the birds' diets. The fish species consumed by seabirds and harvested in the fisheries are generally of different year classes. Seabirds consume juvenile groundfish age-0 and age-1, while fisheries target the larger fish. Pollock are the only food species of seabirds in the management areas for which large directed fisheries occur. The fishery may have impacted this food source by temporarily depleting forage concentrations near the breeding bird colonies (National Research Council 1996). There may also have been indirect ecosystem effects on other forage species (National Research Council 1996; Piatt and Anderson 1996).

Different levels of harvest yield different amounts of processing wastes which may effect localized seabird populations dependent of the processing wastes. Fish processing provides food directly to scavenging species such as northern fulmars and large gulls. This can benefit populations of some species, but it can be detrimental to others which they may displace or prey upon (Furness and Ainley 1984). Gulls are attracted to the fish wastes discharged during processing, and may be subject to population expansion in response to sustained processing and discharge activities (Vermeer and Irons 1991). Such artificially expanded gull populations may result in increased predation on other seabird species and displacement of other species from nesting sites. The spectacled eider may be indirectly affected by increased predation by populations of large gulls, that expanded in relation to availability of fish processing wastes. Finally, closures of commercial fisheries and curtailment of processing can stress localized populations of fish-waste dependent seabirds, which then suffer mortality resulting from weakened physical condition or aberrant behaviors (letter FWS to Environmental Protection Agency, September 13, 1994).

Ingestion of plastic debris has become an increasing phenomenon for short-tailed albatrosses, with unknown population effects (FWS 1993).

In accordance with procedures outlined by the FWS to minimize negative interactions between groundfish activities and short-tailed albatross as well as other seabird species, NMFS will continue to (1) maintain and improve observer training in identifying seabirds and reporting the encounters; (2) encourage fishermen to recognize and avoid situations likely to be hazardous to seabirds; and (3) foster improved compliance regarding disposal of debris by ships at sea, as required by the Marine Plastic Pollution Research and Control Act (MARPOL) as well as the International Convention for the Prevention of Pollution by Ships, 1973, with annexes and protocol of 1978 relating to the MARPOL Convention. Additionally, the Council voted to establish regulations requiring several operational and gear modifications to vessels fishing hook-and-line gear to minimize the potential for hooking birds during gear deployment (NPFMC per. com.). If approved by NMFS, these measures are intended to be implemented as soon as possible.

The 1997 proposed TAC specifications would take into account the most current information regarding the status of individual groundfish species populations. The management measures to minimize negative interactions between groundfish activities and birds would continue regardless of TAC specifications.

3.2.3 Impacts on Prohibited Species

The Council recommends prohibited species catch (PSC) limits and seasonal apportionments of crab and halibut, and provides bycatch information on other prohibited species annually. Regulations have been implemented to reduce bycatch of red king crab, Tanner crab, halibut, herring, and salmon taken in the groundfish fisheries. The following is a summary of these management measures:

Red King Crab: In June 1996, the Council adopted a stairstep based PSC limit for red king crab in Zone 1 as part of the BSAI Groundfish FMP Amendment 37. These will become effective for the 1997 fishery. PSC limits will be based on abundance of Bristol Bay red king crab as follows:

(A) When the number of mature female red king is equal to or below the threshold number of 8.4 million crab, or the effective spawning biomass (ESB) is less than 14.5 million lb (6,577 mt), the Zone 1 red king crab PSC limit would be 35,000 crabs;

(B) when the number of mature female red king crab is above threshold, and the ESB is equal to or greater than 14.5

but less than 55 million lb (24,948 mt), the Zone 1 red king crab PSC limit would be 100,000 crabs; and

(C) when the number of mature female red king crab is above threshold, and the ESB is equal to or greater than 55 million lb (24,948 mt), the Zone 1 red king crab PSC limit would be 200,000 crabs.

The red king crab limit has generally been allocated among the pollock/mackerel/other species, Pacific cod, rock sole, and yellowfin sole fisheries. Once a fishery exceeds its red king crab PSC limit, Zone 1 is closed to that fishery for the remainder of the year, unless further allocated by season.

Tanner Crab: Separate Tanner (C. bairdi) crab PSC limits are set for Zone 1 and Zone 2. These limits may be further allocated among the pollock/mackerel/other species, Pacific cod, rock sole, turbot/sablefish/arrowtooth, rockfish, and yellowfin sole fisheries. When a fishery exceeds its PSC limit in one zone, trawling is closed for that zone for the remainder of the year.

In September 1996, the Council approved the agreement negotiated by affected industry groups regarding PSC limits for C. bairdi Tanner crab taken in BSAI trawl fisheries. NMFS published a proposed rule in the Federal Register on January 2, 1997 (62 FR 85) to implement the BSAI Groundfish FMP Amendment 41. The PSC limits for C. bairdi in Zones 1 and 2 would be based on total abundance of C. bairdi crab as indicated by the NMFS' trawl survey. Based on the proposed rule and pending approval of Amendment 41 by NMFS, based on 1996 abundance (185 million crabs), the PSC limit for C. bairdi in 1997 would be 750,000 crabs in Zone 1 and 2,100,000 crab in Zone 2. Crab bycatch accrued from January 1 until publication of the final rule would be applied to revised bycatch limits established for specified fisheries. It should also be noted that in December 1996, the Council considered establishing a PSC limit for C. opilio. A final decision on proposed Amendment 41 is expected to be made in March 1997.

Halibut: The PSC limit is measured in metric tons of halibut mortality and allocated among trawl (3,775 mt) and hook & line (900 mt) gear. The BSAI annual trawl halibut PSC limit is allocated among the Pacific cod, yellowfin sole, rock sole, pollock/mackerel/other species, rockfish, and sablefish/turbot/arrowtooth fisheries. Both the trawl and hook-and-line PSC limits are seasonally allocated among fisheries. When a fishery exceeds its seasonal limit, the entire FMP area is closed for that fishery for the remainder of the season.

Herring: The herring PSC limit is set at 1 percent of stock biomass. Once the PSC limit has been obtained, one or all of the three designated Herring Savings Areas closes, depending on the time of the year.

Chinook Salmon: The chinook PSC reduction plan established by BSAI Groundfish FMP will close three areas to trawling if and when 48,000 chinook salmon are taken as bycatch. These areas will be then re-opened to trawling on April 16 for the remainder of the year.

Chum Salmon: A chum salmon PSC reduction plan was established by the BSAI Groundfish FMP. Under this plan, the Chum Salmon Savings Area is closed from August 1 to September 1, but this area opens September 2, unless the 42,000 fish limit is reached (accounting to begin August 15 in the catcher vessel only area). Even though the limit is reached, the fishery will open October 15.

3.2.4 Impacts on Forage Species

Marine ecosystems in the North Pacific Ocean are complex webs of predator/prey relationships. Since the status of each component stock in the groundfish complex in these management areas may change from year to year, predator/prey relationships are also expected to vary. Any amount of groundfish harvest removes animals that otherwise would have remained in the ecosystem where they would have preyed on other animals and/or would be preyed upon. Many of the target species are large-sized fish that prey on juvenile groundfish target species or on other non-target fish and shellfish. The groundfish stocks assessment process includes adjusting for natural mortality and predation although it is limited by incomplete understanding of the dynamic parameters for growth, recruitment, and mortality.

The sum of the proposed 1997 TAC specifications is the same as the sum of the 1996 TAC specifications for the BSAI and somewhat higher than the sum of the 1996 TAC specifications for the GOA. Therefore, if these TAC specifications are implemented in 1997, more groundfish biomass would, in theory, be removed from the ecosystem. The 1997 TAC specifications are close enough to the 1996 TAC specifications to assume food sources available to predators and prey remain constant.

3.2.5 Impacts on ESA Listed Species

Either of the alternatives would have the same approximate effect on the continued recovery, or lack thereof, of ESA listed great whales, Pacific salmon, Steller sea lion, and short-tailed albatross. As part of the evaluation of Steller sea lion recovery status, NMFS plans to review in 1997 all management actions enacted to date to conserve the U.S. population, but would promulgate no changes that would affect restricted areas during the 1997 fishing year. Retention of sea lion buffers, observer, and enforcement programs are included at whatever TAC specification the fishery is promulgated. The observer programs result in reliable quantification of any take of Steller sea lions, great whales, and short-tailed albatross. There will continue to be no way to determine if ESA listed Pacific salmon are taken.

3.3 Socioeconomic Impacts

3.3.1 Impacts on Gross Earnings

The actual value realized from the groundfish harvest is dependent on factors unquantifiable at present, including market demand, costs of harvesting and processing, proportion of catch processed at sea (value added), and the degree to which the harvests are constrained by PSC limits.

For comparative purposes estimates can be made on the gross difference in ex-vessel value of target species. Based on the ex-vessel values ($/lb round weight) shown in paragraph 3.1.6.1, the value of each of the major target species categories can be calculated.

3.3.2 Impacts on Bycatch

The prohibited species bycatch management regime in the GOA and BSAI is the same whatever the annual TAC specification. Bycatch management measures implemented to date specify PSC limits for GOA and BSAI Pacific halibut, and Pacific herring, and BSAI Pacific herring, red king crab, and C. bairdi Tanner crab. Attainment of a PSC limit triggers fishery closures that are intended to limit further bycatch amounts of the prohibited species. The PSC limits are set at levels that are not believed to pose biological concern, although significant allocative and other socioeconomic concerns arise when bycatch restrictions imposed on the groundfish fleet reduce revenue to the groundfish industry through foregone groundfish harvests, or to other directed fisheries through reduced quotas to compensate for bycatch removals in the groundfish fisheries. Effects of harvest and PSC limits are analyzed in environmental documents prepared when new or revised seasonal, location or gear limits are set or adjusted.

Prohibited species bycatch restrictions for the Alaska groundfish fisheries triggered closures in 1996 (NPFMC 1995b, c). Although these closures limited additional amounts of prohibited species bycatch in Alaska groundfish operations, they also resulted in foregone revenues to Alaska groundfish fishermen. The amount and type of fishing activity that would have occurred absent halibut restrictions is uncertain.

No significant effects on stocks of prohibited species are expected under either Alternatives 1 or 2. Specified PSC limits will control total amounts of Pacific halibut, crab, and herring that might be caught as bycatch.

4.0 CONCLUSIONS

Alternative 1 would not take into account the most current information available on the status of groundfish species populations. Alternative 2 would take into account the most current information regarding the status of individual groundfish species populations.

Groundfish stocks

Under Alternative 2, 1997 TAC specifications for each target groundfish category are equal to or less than respective ABC specifications, and each ABC is less or equal to the respective OFLs. Under this alternative, the sum of the BSAI and GOA TAC specifications would be 2,000,000 mt and 282,815 mt, respectively.

In the BSAI, the sum of the 1997 final groundfish TAC specifications is 2,000,000 mt, identical to the TAC specified for 1996 and below the sum of the 1997 ABC specifications (2,464,130 mt). Under the BSAI FMP, TAC specifications are limited by OY to 2,000,000 mt. Within the OY, harvests are anticipated to continue to be limited by halibut, herring, salmon, and crab PSC limits in 1997.

In the GOA, the sum of the 1997 groundfish TAC specifications is 282,815 mt which is higher than the TAC specifications for 1996 (260,207 mt) and below the sum of the 1997 ABC specifications (493,050 mt). The sum of 1997 TAC specifications are less than OFLs for target species.

Species listed as threatened or endangered under the ESA

Implementing either Alternative 1 or 2 would result in little change in the rate or locations of groundfish removals or in the methods of fishing from those utilized in 1996. As previously determined by NMFS, the groundfish fisheries may have an adverse affect on the Steller sea lion, short-tailed albatross, and listed Pacific salmon. Pursuant to section 7 of the ESA, NMFS determined that the groundfish fisheries operating under either the 1996 or the proposed 1997 TAC specifications are unlikely to adversely affect any endangered or threatened species or adversely modify critical habitat in any way or to any additional degree than considered in previous section 7 consultations (cited previously in section 3.1.5).

As of December 1996, the FWS is in the process of consulting on the proposed 1997 TAC specifications with regard to short-tailed albatross. No consultations are presently underway, or considered to be necessary, for ESA listed cetaceans, Pacific salmon, or Steller sea lion.

Species prohibited in groundfish fisheries harvest

Neither alternative is expected to adversely affect stocks of fish or invertebrates prohibited in groundfish fisheries harvest. Catches of Pacific halibut, crabs, salmon, and herring are controlled by PSC limits established parallel with the 1997 TAC specification process.

Socioeconomic impacts

Alternatives 1 and 2 are anticipated to have different net economic benefits. The actual value realized is dependent on factors unquantifiable at present, including market demand, costs of harvesting and processing, proportion of catch processed at sea, and the degree to which the TAC specifications are constrained by PSC limits. Additional information is needed to fully assess impacts of commercial fishing activities on marine food webs and ecosystems.

FINDING OF NO SIGNIFICANT IMPACT

For the reasons discussed above, implementation of either Alternative would not significantly affect the quality of the human environment. Therefore, the preparation of an environmental impact statement is not required by section 102(2)(C) of NEPA or its implementing regulations.

Gary Matlock — FEB 5 1997

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