FEB 17 2005

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 of the 2005 and 2006 Final Harvest Specifications for the Bering Sea and Aleutian Islands and Gulf of Alaska Groundfish Fisheries

LOCATION: The exclusive economic zone of Alaska waters.

SUMMARY: The implementation of the 2005 and 2006 final harvest specifications is necessary for the management of the groundfish fisheries and the conservation of marine resources, as required by the Magnuson-Stevens Fishery Conservation and Management Act. The harvest specifications provide the limits, seasonal apportionments and fishing sector allocations for target species and prohibited species. NMFS uses the harvest specifications to control fishing activities in the exclusive economic zone off Alaska. The harvest specifications are renewed annually, based on the latest stock assessment information, ensuring the fisheries are managed on the best available scientific information.

RESPONSIBLE OFFICIAL:
James W. Balisger
Administrator, Alaska Region
National Marine Fisheries Service
P. O. Box 21668
Juneau, AK 99802-1668 Phone: 907-586-7228

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.

Please submit any written comments to the responsible official named above. Also, please send one copy of your comments to me at the NOAA Strategic Planning Office (PPI/SP), Room 15603, 1315 East-West Highway, Silver Spring, MD 20910.

Sincerely,

Susan A. Kennedy
Acting NEPA Coordinator

Enclosure

ENVIRONMENTAL ASSESSMENT/FINAL REGULATORY FLEXIBILITY ANALYSIS

for the Harvest Specifications for the Years 2005-2006
Alaska Groundfish Fisheries Implemented Under the Authority of the
BSAI and GOA Groundfish Fishery Management Plans

February 2005

Lead Agency:	National Oceanic and Atmospheric Administration National Marine Fisheries Service Alaska Regional Office Juneau, Alaska
Responsible Official:	James W. Balsiger Regional Administrator Alaska Regional Office
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Abstract: This document contains an Environmental Assessment (EA) and a Final Regulatory Flexibility Analysis (FRFA) that analyze the potential impacts of the 2005-2006 harvest specifications for the groundfish fisheries of the Bering Sea and Aleutian Islands and Gulf of Alaska management areas. The analyses in this document address the requirements of the National Environmental Policy Act (NEPA) and the Regulatory Flexibility Act (RFA).

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List of Acronyms

ABC	Acceptable Biological Catch
ADCED	Alaska Department of Community and Economic Development
ADF&G	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
AKFIN	Alaska Fisheries Information Network
AP	Advisory Panel
APA	Administrative Procedures Act
B	Biomass
BiOp	Biological Opinion
BS	Bering Sea
AI	Aleutian Islands
BSAI	Bering Sea and Aleutian Islands
CDQ	Community Development Quota
CEQ	Council of Environmental Quality
CEY	Constant Exploitation Yield
CFEC	Alaska Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
CP	catcher-processor
CV	catcher vessel
DFA	Directed Fishing Allowance
DFL	Directed Fishing Level
EA	Environmental Assessment
EIS	Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
F	Fishing mortality rate
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRFA	Final Regulatory Flexibility Analysis
GOA	Gulf of Alaska
FRFA	Final Regulatory Flexibility Analysis
HAPC	Habitat Area of Particular Concern
IFQ	Individual Fisherman's Quota
ITAC	Initial Total Allowable Catch
IRFA	Initial Regulatory Flexibility Analysis
MMPA	Marine Mammal Protection Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
mt	metric ton
NEPA	National Environmental Policy Act

nm	nautical mile
NMFS	National Marine Fishery Service
NOA	Notice of Availability
NOAA	National Oceanographic and Atmospheric Administration
OFL	Overfishing Level
OY	Optimum Yield
PBR	Potential Biological Removal
PSC	Prohibited Species Catch
PSQ	Prohibited Species Quota
PSEIS	Programmatic Supplemental Environmental Impact Statement
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation Report
SBREFA	Small Business Regulatory Enforcement Fairness Act
SEIS	Supplemental Environmental Impact Statement
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
USFWS	United States Fish and Wildlife Service

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Executive Summary

The actions evaluated in this document

This document provides National Environmental Policy Act (NEPA) and Regulatory Flexibility Act (RFA) small entity impact analyses for these actions:

- 2005-2006 specifications for the Bering Sea and Aleutian Islands (BSAI)
- 2005-2006 specifications for the Gulf of Alaska (GOA)

Purpose and Need

The implementation of the 2005 and 2006 harvest specifications is necessary for the management of the groundfish fisheries and the conservation of marine resources, as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The specifications provide the limits, seasonal apportionments and fishing sector allocations for target species and prohibited species. NMFS uses the specifications to control fishing activities in the Exclusive Economic Zone off Alaska. The specifications are renewed annually or biennially, based on the latest stock assessment information, ensuring the fisheries are managed on the best available scientific information.

Environmental Assessment

An Environmental Assessment (EA) was prepared for the 2005 and 2006 harvest specifications to address the statutory requirements of the NEPA. The purpose of the EA is to predict whether the impacts to the human environment resulting from setting the 2005 and 2006 harvest specifications will be "significant", as that term is defined under NEPA. If the predicted impacts from the preferred alternatives are found not to be significant, and those alternatives are chosen, then a FONSI will be issued and no further analysis is necessary to comply with the requirements of NEPA.

2005 and 2006 Harvest Specifications Alternatives

TAC specifications define upper retained harvest limits, or fishery removals, for the subject fishing year.

These specifications are made for each managed species or species group, and in some cases, by species and sub-area. Sub-allocations of TAC are made for biological, economic, and socio-economic reasons according to percentage formulas established through FMP amendments.

Each of the five 2005 and 2006 specifications alternatives represents alternative amounts of total allowable catch that could be set for managed species and species groups for the fishing years 2005, and 2006, and for the first part of 2005. The alternatives have been selected to display a wide range of ABCs and TACs and their impacts to the environment. Fishing mortality (retained and discarded) is indicated as *F*. TAC specifications are harvest quotas that include both retained catch and discarded catch. The five alternatives are:

Alternative 1: Set TACs to produce fishing mortality rates, *F*, that are equal to $maxF_{ABC}$, "$maxF_{ABC}$" refers to the maximum permissible value of F_{ABC} under Amendment 56. Historically, TAC has been constrained by ABC, so this alternative provides a likely upper limit for setting TAC within the limits established by the fishery management plan.

Alternative 2: Set TACs that fall within the range of ABCs recommended by the Plan Teams and TACs recommended by the Council. (Preferred alternative). Under this scenario, *F* is set equal to a constant fraction of $maxF_{ABC.}$ The recommended fractions of $maxF_{ABC}$ may vary among species or stocks, based on other considerations unique to individual species or stocks.

Alternative 3: For Tiers 1, 2, and 3, set TAC to produce *F* equal to 50% of $maxF_{ABC}$. For Tiers 4, 5, and 6, set TAC equal to 50% of TAC associated with $maxF_{ABC}$. This alternative provides a likely lower bound on F_{ABC} that still allows future harvest rates to be adjusted downward should stocks fall below reference levels.

Alternative 4: For Tiers 1, 2, and 3, set TAC to produce *F* equal to the most recent five year average actual *F*. For Tiers 4, 5, and 6, set TAC equal to the most recent five year average actual catch. This alternative recognizes that for some stocks, TAC may be set well below ABC, and recent average *F* may provide a better indicator of F_{TAC} than F_{ABC}.

Alternative 5: Set TAC equal to zero. This alternative recognizes that, in extreme cases, TAC may be set at a level close to zero. This is the no action alternative.

Environmental Analysis

The EA evaluated the specifications alternatives with respect to the following classes of effects:

- effects on target species
- effects on incidental catch of non-specified species
- effects on forage fish species
- effects on prohibited species
- effects on marine mammals and ESA listed marine mammals
- effects on seabirds
- effects on marine benthic habitat and essential fish habitat
- effects on the ecosystem
- effects on State of Alaska managed State waters' seasons and parallel fisheries for groundfish
- social and economic effects

NEPA significance is determined by considering the context in which the action will occur and the intensity of the action. The context in which the action will occur includes the specific resources, ecosystem, and the human environment affected. The intensity of the action includes the type of impact (beneficial versus adverse), duration of impact, and other factors (see 40 CFR 1508.27(b)).

The intent of TAC setting deliberations is to balance the harvest of fish during the fishing year consistent with established total optimum yield amounts and ecosystem needs. The effect of the alternatives must be evaluated for all resources, species, and issues that may directly or indirectly interact with the groundfish fisheries within the action area, as a result of specified TAC levels.

The impacts of alternative TAC levels are assessed in section 4 of this EA. The summary of the impacts on the human environment is in section 6.0 of this EA and portions are provided in this Executive Summary.

As stated in section 4.0 of this EA, the intent of TAC setting deliberations is to balance the harvest of fish during the 2005 and 2006 fishing years with established total optimum yield amounts and ecosystem needs. The alternatives must be evaluated for all direct, indirect and cumulative effects on resources, species, and issues within the action area as a result of specified TAC levels. The impacts of alternative TAC levels are assessed in Chapters 4 and 5 of this EA.

In addition to the PSEIS and other NEPA analyses for the groundfish fisheries, the significance of impacts of the actions analyzed in this EA were determined through consideration of the following information, as required by NEPA and 40 CFR 1508.27.

Context

For the 2005 and 2006 harvest specifications action, the setting of the proposed action is the groundfish fisheries of the BSAI and GOA. Any effects of this action are limited to these areas. The effects of the 2005 and 2006 harvest specifications on society within these areas are on individuals directly and indirectly participating in the groundfish fisheries and on those who use the ocean resources. Because this action continues groundfish fisheries in BSAI and GOA into the future, this action may have impacts on society as a whole or regionally.

Intensity

Listings of considerations to determine intensity of the impacts are in 40 CFR 1508.27(b) and in the NOAA Administrative Order 216-6, Section 6. Each consideration is addressed below in order as it appears in the regulations.

Adverse or beneficial impact determinations for marine resources, **including sustainability of target and nontarget species, damage to ocean or coastal habitat or essential fish habitat, effects on biodiversity and ecosystems**, **and marine mammals** Adverse or beneficial impact determinations for marine resources accruing from establishment of year 2005 and 2006 Federal groundfish fisheries harvest specifications are summarized in Table 6.0-1.

<u>Alternative 1</u> Alternative 1 had significant adverse and unknown impacts identified for PSC salmon species, marine mammals, marine benthic habitat, and the ecosystem. Some significant beneficial socioeconomic effects may result from Alternative 1.

<u>Alternative 2 (preferred alternative)</u> No significant adverse impacts were identified for the preferred alternative (Alternative 2) for the harvest specifications. Unknown direct and indirect effects were identified for the PSC salmon and ecosystem under Alternative 2. The PSC salmon effects were limited to the ESA listed chinook salmon for which a bench mark for population is unknown. The effect is likely to be insignificant based on the rarity of surrogate ESA listed species being taken in the BSAI groundfish fishery. For ecosystems, the population status for many top predator seabird, marine mammals, and sharks are unknown so that it is not possible to determine the impacts of fishing under Alternative 2 on these population trends. Unknown effects on HAPC biota were also identified based on the unknown abundance levels needed by structural HAPC species for a functional HAPC biota guild. It is likely that the mitigation measures in place and the application of the ecosystems management policy adopted with Amendments 81 and 74 to the groundfish FMPs will reduce the potential for significantly adverse

effects on the top predator populations and on HAPC biota. Also, this action of annual harvest specifications is for a short duration and at a similar level of harvest in relation to biomass experienced in the groundfish fisheries in the past, reducing the potential for adverse population trend effects for top predator species and adverse effects on HAPC biota. Unknown cumulative effects for nearly all environmental components were detailed in Chapter 5.0 of this EA. These effects were likely to be beneficial or likely to be mitigated by past and future actions so that none of the cumulative effects were likely to be significant.

<u>Alternatives 3 and 4</u> The effects of alternatives 3 and 4 for the environmental components were nearly identical. All effects were either unknown or insignificant. Unknown effects were similar to Alternative 2 with a few exceptions. See Table 6.0-1 for more details.

<u>Alternative 5</u> Under Alternative 5, there would be no groundfish fisheries in 2005 and 2006. Alternative 5 had significantly benefitical impacts for target, non-specified, forage, and PSC species, marine mammals, benthic habitat, and ecosystems components and for social and economic factors of operating costs, management and enforcement costs, and bycatch and discards. It had significantly adverse impacts on social and economic factors of gross revenues, returns to the industry, impacts on related fisheries, consumer impacts, excess capacity, and communities. See Table 6.0-1 for more details.

Public health and safety will not be affected in any way not evaluated under previous actions or disproportionally for Alternatives 1-4. The harvest specifications will not change fishing methods, timing of fishing or quota assignments to gear groups which are based on previously established seasons and allocation formulas in regulations. Alternative 5 affects on safety and health are unknown. It is likely that no fishing would result in a reduction in fishery related injuries and mortality, but the lack of income may result in adverse effects on public health.

Cultural resources and ecologically critical areas: These actions take place in the geographic areas of the Bering Sea, Aleutian Islands, and GOA, generally from 3 nm to 200 nm offshore. The land adjacent to these areas contain cultural resources and ecologically critical areas. The marine waters where the fisheries occur contain ecologically critical area. Effects on the unique characteristics of these areas are not anticipated to occur with these actions and mitigation measures such as a bottom trawling ban in the Bering Sea are part of fisheries management measures.

Controversiality: These action deals with management of the groundfish fisheries. Differences of opinion exist among various industry, environmental, management, and scientific groups on the appropriate levels of TAC to set for various target species and in particular fishery management areas. Alternative 2 is less likely to be controversial compared to the other alternatives analyzed because it continues to apply similar scientific and public processes used for harvest specifications as in the past for the groundfish fisheries. Alternatives 1 and 5 would be more likely to be controversial because of the large increase and decrease in harvest, respectively. Alternatives 3 and 4 also would be more likely than Alternative 2 to be controversial because they do not apply the scientific or public processes for harvest specifications development.

Risks to the human environment, **including social and economic effects:** Risks to the human environment by setting harvest specifications in the BSAI and GOA groundfish fisheries are described in detail in the PSEIS (NMFS 2004d) and in this EA. Because of the mitigation measures implemented with every past action, it is anticipated that there will be minimal or no risk to the human environment beyond that disclosed in the PSEIS (NMFS 2004d) or the Steller Sea Lion Protection Measures SEIS (NMFS 2001b). No significant adverse impacts were identified for the preferred alternative (Alternative 2) for the harvest specifications, including socioeconomic effects. Unknown impacts were identified for marine mammals, HAPC, and ecosystems under this alternative, but current management practices and the action duration likely prevent significant adverse impacts. Additionally, unknown socioeconomic impacts were identified for Alternative 2 regarding these nonconsumptive uses of marine resources.

Future actions related to this action may result in impacts and are addressed in Chapter 5.0 of this EA. NMFS is required to establish fishing harvest levels for up to two years for the BSAI and GOA groundfish fisheries. Changes may occur in the environment or in fishing practices that may result in significant impacts. Additional information regarding marine species may make it necessary to change management measures. All of the future impacts identified in section 5.3 are not likely to result in significant impacts on the environment because of mitigating management measures in place or likely to occur (e.g. Amendments 81/74 and EFH/HAPC management). Pursuant to NEPA, appropriate environmental analysis documents will be prepared to inform the decision makers of potential impacts of future actions on the human environment, and mitigation measures are likely to be implemented to avoid significantly adverse impacts.

Cumulatively significant effects, including those on target and nontarget species
Cumulative impacts of the preferred alternative are analyzed in Chapter 5.0. The cumulative effects of this action, in combination with past actions, and reasonably foreseeable future actions are either insignificant or unknown. Except for (a) the impact of the potential ESA listing of sea otters on State of Alaska fisheries, (b) future harvest specifications on habitat, and (c) impacts associated with cumulative change in incidental BSAI salmon catches, all of the unknown effects on the natural environment are likely to be beneficial. Some socio-economic unknown effects may be adverse. For example cost increases may be associated with various management measures used to reduce adverse effects on the environment. No significant socio-economic impacts, either beneficial or adverse, were identified. Under Council of Environmental Quality regulations, significant socio-economic impacts would not have affected FONSI (40 CFR 1508.14). The environmental components with unknown effects are summarized in Table 5.5-1.

The specifications were determined following a process that has been fully analyzed in the PSEIS. Moreover, this action in and of itself is of short duration, and its effects will be measurable only on a very fine scale. At the population level, the effects of up to two years of harvest specifications may be impossible to detect. The agency will attempt to more fully assess cumulative effects in future editions of the PSEIS when sufficient time has passed for analysts to be able to evaluate more clearly the cumulative environmental consequences of the annual BSAI and GOA specifications.

Districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places: This action will have no effect on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places, nor cause loss or destruction of significant scientific, cultural, or historical resources. This consideration is not applicable to this action.

Impact on ESA listed species and their critical habitat: ESA listed species that range into the fishery management areas are listed in Table 6.0-2. An FMP level Section 7 consultation BiOp completed for the groundfish fisheries in November 2000 (NMFS 2000), is limited to those species under the jurisdiction of NMFS, and covers most of the endangered and threatened species occurring in the action area, including marine mammals, turtles, and Pacific salmon.

Under NMFS' FMP level BiOp (NMFS 2000), the western distinct population segment of Steller sea lions was the only ESA listed species identified as likely to be adversely affected by the groundfish fisheries. A subsequent biological opinion on the Steller sea lion protection measures was issued in 2001 (NMFS 2001b, appendix A). The 2001 BiOp found that the groundfish fisheries conducted in accordance with the Steller sea lion protection measures were unlikely to cause jeopardy of extinction or adverse modification or destruction of critical habitat for Steller sea lions.

The effects of the groundfish fisheries on ESA listed salmon are discussed in section 4.5. The incidental take statement of 55,000 chinook salmon from the 1999 BiOp (NMFS 1999) was exceeded in the 2004 groundfish fishery. NMFS Alaska Region is currently consulting with NMFS NW region to determine if the exceedence of the ITS is likely to adversely affect ESA listed salmon. Given that chinook salmon take in the BSAI groundfish fishery has been under 55,000 animals for 5 of the last 6 years, we believe that the 2005 fishery is likely to take fewer than 55,000 chinook salmon.

Listed seabirds are under the jurisdiction of the USFWS which has completed an FMP level (USFWS 2003a) and project level BiOp (USFWS 2003b) for the groundfish fisheries. Both USFWS BiOps concluded that the groundfish fisheries and the annual setting of harvest specifications were unlikely to cause the jeopardy of extinction or adverse modification or destruction of critical habitat for ESA listed birds.

No consultations are required for the 2005 and 2006 harvest specification because the proposed actions will not modify the actions already analyzed in previous BiOps, are not likely to adversely affect ESA listed species beyond the effects already analyzed, and the incidental take statements of ESA species are not expected to be exceeded. Therefore the triggers to reinitiate consultation were not met. Summaries of the ESA consultations on individual listed species are located in Section 3.0 and accompanying tables of the PSEIS under each ESA listed species' management overview (NMFS 2004d).

This action poses **no known violation of Federal, State, or local laws or requirements for the protection of the environment**. Implementation of the harvest specifications would be conducted in a manner consistent, to the maximum extent practicable, with the enforceable provisions of the Alaska Coastal Management Program within the meaning of section 30(c)(1) of the Coastal Zone Management Act of 1972 and its implementing regulations.

Alternatives 2-4 pose **insignificant effects on the introduction or spread of nonindigenous species** into the BSAI and GOA because they do not change fishing, processing or shipping practices that may lead to the introduction of nonindigenous species. Alternative 1 poses a significant adverse effect by increasing fishing effort leading to increases in activities that may introduce nonindigenous species beyond those potentials impacts under other alternatives. Alternative 5 would have a significant beneficial impact by eliminating activities that may spread nonindigenous species.

Comparison of Alternatives and Selection of a Preferred Alternative

Alternative 1 would set TACs in the BSAI above the upper limit of 2,000,000 mt for OY and has more potential for significantly adverse effects on a number of environmental components compared to Alternatives 2-5. Alternative 5 has the most significantly beneficial impact on environmental components, but setting TACs to zero in both the BSAI and GOA would result in severe socioeconomic impacts. Neither Alternative 3 nor 4 uses the best and most recent scientific information on status of groundfish stocks nor takes into account socioeconomic benefits to the nation.

Alternative 2 is the preferred alternative because: 1) it takes into account the best and most recent information available regarding the status of the groundfish stocks, public testimony, and socio-economic concerns; 2) it sets all TACs at levels equal to or below ABC levels; 3) it falls within the specified range of OY for both the BSAI and GOA, and 4) it is consistent with the ESA and the National Standards and other requirements of the Magunson Stevens Fishery Conservation and Management Act. Unknown effects on the environment are likely to be insignificant. Unknown impacts were identified under the socioeconomic effects. Council of Environmental Quality regulations at 40 CFR 1508.14 described the human environment as including socioeconomic concerns, but those social or economic effects alone are not intended to trigger the need for an EIS.

Table ES-1 Summary of significant determinations with respect to direct and indirect impacts.

Coding: I = Insignificant, S = Significant, + = beneficial, - = adverse, U = Unknown					
Issue	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Target Fish Species (Section 4.2)					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	S+
Change in prey availability	I	I	I	I	S+
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	S+
Other and non-specified species (Section 4.3)					
Incidental catch of other species and non-specified species	U	I	U	U	S+
Forage species (Section 4.4)					
Incidental catch of other species and non-specified species	U	I	U	U	S+
Prohibited Species Management (Section 4.5)					
Benchmark Stock Levels of PSC species	U/I	U/I	U/I	U/I	U/I
Harvest levels in directed fisheries targeting prohibited species	I	I	I	I	I

Coding: I = Insignificant, S = Significant, + = beneficial, - = adverse, U = Unknown					
Issue	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Bycatch levels of prohibited species in directed groundfish fisheries	S-/I	I	I	I	S+
Marine Mammals (Section 4.6)					
Incidental take/entanglement in marine debris	U	I	I	I	I
Spatial/temporal concentration of fishery	I	I	I	I	S+
Global Harvest of prey species	I	I	I	I	I
Disturbance	S-	I	I	I	S+
Northern Fulmar (Section 4.7)					
Incidental take–BSAI	U	I	U	U	U
Incidental take–GOA	U	I	I	U	U
Prey availability	I/U	I	U/I	U/I	U
Benthic habitat	I	I	I	I	U
Short-tailed Albatross (Section 4.7)					
Incidental take	U	I	U	U	U
Prey Availability	I	I	I	I	U
Benthic Habitat	I	I	I	I	U
Other Albatrosses & Shearwaters (Section 4.7)					
Incidental Take	U	I	U	U	U
Prey Availability	I	I	I	I	U
Benthic Habitat	I	I	I	I	U

Piscivorous Seabirds (Also Breeding in Alaska) (Section 4.7)					
Incidental Take	U	I	I	I	U
Prey Availability	U	I	I	I	U
Benthic Habitat	I/U	I	U	U	U
Eiders (Spectacled and Stellers) (Section 4.7)					
Incidental Take	U	I	I	I	U
Prey Availability	I	I	U/I	U/I	U
Benthic Habitat	I	I	I	I	U
Other Seabird Species (Section 4.7)					
Incidental Take	U	I	I	I	U
Prey Availability	I	I	U/I	U/I	U
Benthic Habitat	I	I	I	I	U
Marine Benthic Habitat (Section 4.8)					
Level of mortality and damage to living habitat	S-	I	I	I	S+
Modification of Benthic Community Structure	U	I	I	I	U
Changes in Distribution of Fishing Effort	I	I	I	I	S+
Ecosystem Considerations (Section 4.9)					
Predator-prey relationships					
Pelagic forage availability	I	I	I	I	S+
Spatial and temporal concentration of fishery impact on forage	U	I	I	I	S+
Removal of top level predators — Trophic level of catch	U	I	I	I	I

	Top predator bycatch levels	S-	I	I	I	S+
	Pop status of top predators	U	U	U	U	U
Introduction of nonnative species		S-	I	I	I	S+
Energy flow and balance						
Energy flow and balance	Trends in offal and discard production levels	I	I	I	I	I
	Scavenger population trends	I	I	I	I	I
	Bottom gear effort	S-	I	I	I	S+
Energy removal		I	I	I	I	I
Diversity						
Species diversity	Population levels of target and nontarget relative to MSST or ESA listing thresholds	U	I	U	U	S+
	Bycatch amounts of sensitive species lacking pop. estimates	S-	I	I	I	S+
	Number of ESA listed marine species	I	I	I	I	I
	Area closures	I	I		I	S+
Functional diversity	Guild diversity or size diversity changes linked to fishing	U	I	I	I	I
	Bottom gear effort	S-	I	I	I	S+
	HAPC biota bycatch	U	U	U	U	S+
Genetic diversity	Degree of fishing on spawning aggregations or larger fish	U	I	U	U	U

	Older age group abundances of target groundfish stocks	U	I	U	U	U
State waters seasons (Section 4.10)						
Harvest levels of groundfish in State waters seasons and parallel seasons		I	I	I	I	S-

Economic Indicators (Section 4.11)	Year	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
First wholesale gross revenues	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Operating cost impacts	2005	S-	I	S+	I	S+
	2006	I	I	S+	I	S+
Net returns to industry	2005	S+	I	S-	I	S-
	2006	S+	I	S-	I	S-
Safety and health impacts	2005	U	I	U	U	U
	2006	U	I	U	U	U
Impacts on related fisheries	2005	U	I	U	U	S-
	2006	U	I	U	U	S-
Consumer effects	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Management and enforcement costs	2005	S-	I	I	I	S+
	2006	S-	I	I	I	S+
Excess capacity	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Bycatch and discards	2005	S-/I	I	I	I	S+
	2006	S-/I	I	I	I	S+
Subsistence	2005	U	I	U	U	U
	2006	U	I	U	U	U
Recreation	2005	U	I	U	U	U
	2006	U	I	U	U	U
Non-consumptive use values	2005	U	U	U	U	U
	2006	U	U	U	U	U
Communities	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-

Final Regulatory Flexibility Analysis

A Final Regulatory Flexibility Analysis (FRFA) was prepared to evaluate the impacts of the 2005-2006 harvest level specifications on directly regulated small entities. This FRFA is intended to meet the statutory requirements of the Regulatory Flexibility Act (RFA).

The proposed rule for the BSAI specifications was published in the Federal Register on December 8, 2004 (69 FR 70974). A correction was published on December 22, 2004 (69 *FR* 76682). An Initial Regulatory Flexibility Analysis (IRFA) was prepared for the proposed rule, and described in the classifications section of the preamble to the rule. The public comment period ended on January 7, 2005. No comments were received on the IRFA. The proposed rule for the GOA specifications was published in the *Federal Register* on December 7, 2004 (69 *FR* 70605). An Initial Regulatory Flexibility Analysis (IRFA) was prepared for the proposed rule, and described in the classifications section of the preamble to the rule. The public comment period ended on January 6, 2005. No comments were received on the IRFA.

The 2005-2006 harvest specifications establish harvest limits for the groundfish species and species groups in the BSAI and GOA. This action is necessary to allow fishing in 2005 and 2006. About 758 small catcher vessels, 24 small catcher-processors, and six small private non-profit CDQ groups may be directed regulated by the BSAI and GOA specifications.

Some TACs have risen, while others have fallen. The FRFA focused on the fleet sectors where small entities may experience adverse impacts because fishery TACs are reduced. The FRFA identified adverse impacts on small fishing operations harvesting sablefish and Pacific cod in the BSAI and in the GOA, and on CDQ groups operating in the BSAI.

The aggregate gross revenues for an estimated 53 small BSAI sablefish entities were estimated to decline by about $1.6 million. A reduction in revenues of this magnitude would have accounted for about 2.7% of total 2003 gross revenues from all sources for these small entities.

The aggregated gross revenues for an estimated 120 small BSAI Pacific cod entities were estimated to decline by about $1.7 million. A reduction in revenues of this magnitude would have accounted for about 1.3% of total 2003 gross revenues from all sources for these small entities.

The aggregate gross revenues for six small BSAI CDQ group entities were estimated to decline by about $1.2 million between 2004 and 2006. This is less than 1% of the gross revenues for these allocations in 2004.

The aggregate gross revenues for an estimated 382 small GOA sablefish entities were estimated to decline by about $5.7 million. A reduction in revenues of this magnitude would have accounted for about 3.0% of total 2003 gross revenues from all sources for these small entities.

The aggregate gross revenues for an estimated 207 small GOA Pacific cod entities were estimated to decline by about $3.9 million. A reduction in revenues of this magnitude would have accounted for about 3.2% of total 2003 gross revenues from all sources for these small entities.

This regulation does not impose new recordkeeping or reporting requirements on the regulated small entities.

A FRFA should include “a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected. ”

Four alternatives were evaluated, in addition to the preferred alternative. Alternative 1 set TACs equal to the $_{max}F_{ABC}$ fishing rate. Alternative 1 was associated with high TACs, high revenues, and TACs that exceeded the statutory BSAI OY. Alternative 2, the preferred alternative, set TACs to produce the fishing rates recommended by the Council on the basis of Plan Team and SSC recommendations. Alternative 3 set TACs to produce fishing rates equal to half the maxFABC, and Alternative 4 set TACs to produce fishing rates equal to the last five years' average fishing rate. Alternative 5 set TACs equal to zero.

There are no significant alternatives to the proposed rule that accomplish the stated objectives, are consistent with applicable statutes, and that would minimize the economic impact of the proposed rule on small entities.

Among the fishing sectors adversely impacted by the specifications, BSAI Pacific cod fishermen and CDQ groups would have been better off under one other alternative, Alternative 1, than under the preferred alternative. BSAI sablefish fishermen would not have been better off under any alternative. While Pacific cod fishermen and CDQ groups would have been better off under Alternative 1, total BSAI TACs would have been greater than the two million metric ton BSAI OY mandated by statute, under that alternative. An increase in the TAC for Pacific cod would have had to come at the expense of TACs provided to other operations. Moreover, and most importantly, both the the Pacific cod and sablefish TACs set under the preferred alternative were set equal to the ABCs recommended by the Council's BSAI Plan Team and its SSC. Higher TACs would not be consistent with prudent biological management of the fishery; there TACs have been set as high as possible while still protecting the biological health of the stock.

GOA Pacific cod fishermen would have been better off under two other alternatives, Alternatives 1 and 4, than under the preferred alternative. GOA sablefish fishermen would not have been better off under any alternative. The sablefish TACs are set equal to the recommended ABC. The ABCs are recommended by the Council on the basis of the biological recommendations made to it by its Plan Teams and its SSC. Higher TACs would not be consistent with prudent biological management of the fishery. The situation is very similar for Pacific cod. Although the Pacific cod TACs under the preferred alternative are lower than the ABC, these lower TACs reflect guideline harvest levels for Pacific cod set by the State of Alaska for its own waters. To protect the resource, the sum of the State's GHL and the Federal TAC are not allowed to exceed the ABC. Thus, this TAC also has been set as high as possible while still protecting the biological health of the stock. The Pacific cod Federal TACs and State GHLs under Alternatives 1 and 4 would have exceeded the ABCs.

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1.0 Purpose and Need

1.1 Introduction

This EA/FRFA provides a National Environmental Policy Act (NEPA) Environmental Assessment (EA) and a Regulatory Flexibility Act (RFA) Final Regulatory Flexibility Analysis (FRFA) covering the 2005-2006 BSAI and GOA groundfish specifications.

Location of key parts of the EA/FRFA:	
Description of the alternatives	Chapter 2
NEPA significance criteria	Section 4.1
NEPA direct and indirect effects analysis	Sections 4.2-4.11
Detailed review of AI pollock	Section 4.12
NEPA Cumulative effects analysis	Chapter 5
NEPA conclusions	Chapter 6
Regulatory Flexibility Act small entity analysis	Chapter 7

Each year, the North Pacific Fishery Management Council (Council) recommends, and the Secretary of Commerce (Secretary) publishes, harvest specifications for the Bering Sea and Aleutian Islands (BSAI) and the Gulf of Alaska (GOA) groundfish fisheries. Harvest specifications establish specific limits on the commercial harvest of groundfish and are used to manage the groundfish fisheries. Harvest specifications include the setting of overfishing levels (OFLs), acceptable biological catches (ABCs), total allowable catches (TACs), and prohibited species catches (PSC). Specifications also include the setting of seasonal apportionments and allocations for TACs and PSCs. The purpose of this action is to establish the 2005-06 harvest specifications for the groundfish fisheries in the BSAI and GOA.

In September 2004, the BSAI and GOA Plan Teams met and recommended 2005-2006 OFL and ABC levels to the Council. A draft of this EA/IRFA was prepared after the plan team meetings for review by the Council. In October 2004, the Council met and recommended proposed 2005-2006 OFL, ABC, and TAC levels to the Secretary of Commerce. The EA/IRFA was revised following the Council meeting to incorporate the Council's recommendations for Secretarial review prior to publication of proposed and interim specifications. The BSAI and GOA Plan Teams met again the week of November 15-18 to review the SAFE documents prepared by the assessment authors, and to revise their OFL and ABC recommendations to the Council. A further revision of the EA/IRFA was prepared following this meeting. Copies of these earlier drafts of the EA/IRFA may be found at http://www.fakr.noaa.gov/analyses/list.htm#gf .

The Council met again in December 2004, and made final OFL, ABC, and TAC recommendations to the Secretary. This document contains an EA/FRFA for the final specifications for 2005-2006.[1] This EA/FRFA addresses the statutory requirements of the National Environmental Policy Act (NEPA) and the Regulatory Flexibility Act (RFA). The purpose of the environmental assessment (EA) is to predict whether the 2005-06 final harvest specifications will have significant impacts on the human environment. If the predicted impacts

[1] Specifications are exempt from Regulatory Impact Review (RIR) requirements, per OMB guidance on EO 12291 and 12886, so long as the specifications are statements of annual quota only, and do not include other management measures. Interim specifications are exempt from the requirements of the RFA, because they do not require public comment.

from the preferred alternatives are not significant, and those alternatives are chosen, then a FONSI will be issued and no further analysis is necessary to comply with the requirements of NEPA.[2]

The 2005-06 harvest specifications are necessary for the management of the groundfish fisheries and the conservation of marine resources, as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and as described in the management policy, goals, and objectives in the groundfish Fishery Management Plans.

1.2 The Harvest Specifications Process

Fishing areas and the fishing year

TAC specifications define upper retained harvest limits, or fishery removals, for a fishing year. These specifications are made for each managed species or species group, and in some cases, by species and sub-area.

Sub-allocations of TAC are often made for biological, economic, and/or socio-economic reasons according to percentage formulas established through fishery management plan (FMP) amendments. For particular target fisheries, TAC specifications are further allocated within management areas (Eastern, Central, Western Aleutian Islands; Bering Sea; Western, Central, and Eastern GOA), among management programs (open access or community development quota program), processing components (inshore or offshore), specific gear types (trawl, non-trawl, hook-and-line, pot, jig), and seasons, according to regulations at 50 CFR 679.20, 679.23, and 679.30. TAC can be further allocated to the various gear groups, management areas, and seasons according to pre-determined regulatory actions and by regulatory announcements by NMFS management authorities, opening and closing fisheries accordingly. No foreign fisheries are conducted in the Exclusive Economic Zone (EEZ) off Alaska and therefore, the entire TAC amount is available to the domestic fishery. The gear authorized in the Federally managed groundfish fisheries off Alaska includes trawl, fixed gear, longline gear, pot gear, and non-trawl gear (50 CFR 679.2).

Fishing areas correspond to the defined regulatory areas within the fishery management units. The BSAI is divided into nineteen reporting areas, some of which are combined for TAC specifications purposes. The GOA is divided into eight reporting areas. The Western Gulf is Area 610, the Central Gulf includes Areas 620 and 630, and the Eastern Gulf includes Areas 640 and 650. Area 649 is the State waters in Prince William Sound. State waters in Southeast Alaska is Area 659. The Aleutian Islands group comprises regulatory Areas 541, 542, and 543, representing the Eastern Aleutian Islands, Central Aleutian Islands, and Western Aleutian Islands, respectively. The BSAI and GOA regions, with most management areas, are shown in Figures 1-1 and 1-2 at the end of this chapter.

[2] See chapter 7.0 for the purpose and need of the IRFA.

Figure 1.2-1 Management areas in the Bering Sea and Aleutian Islands

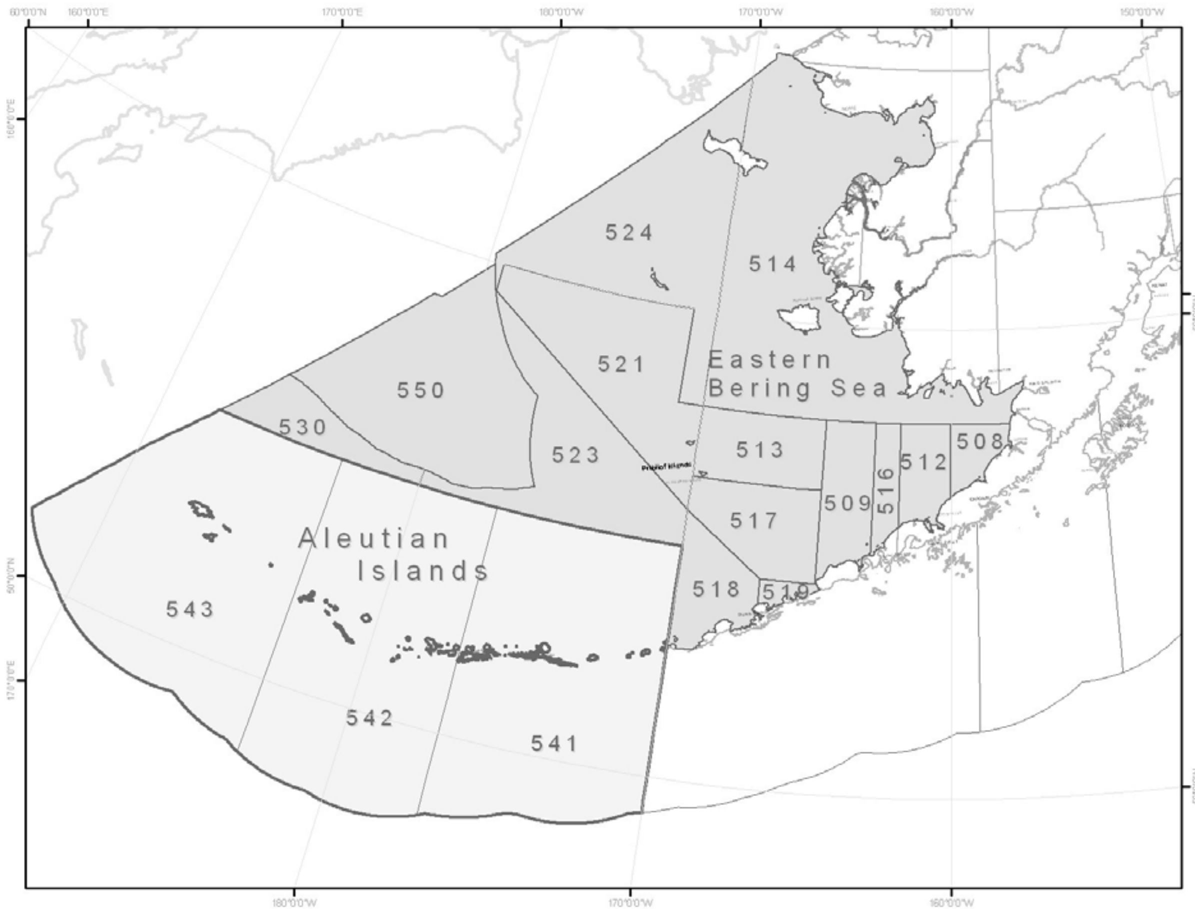
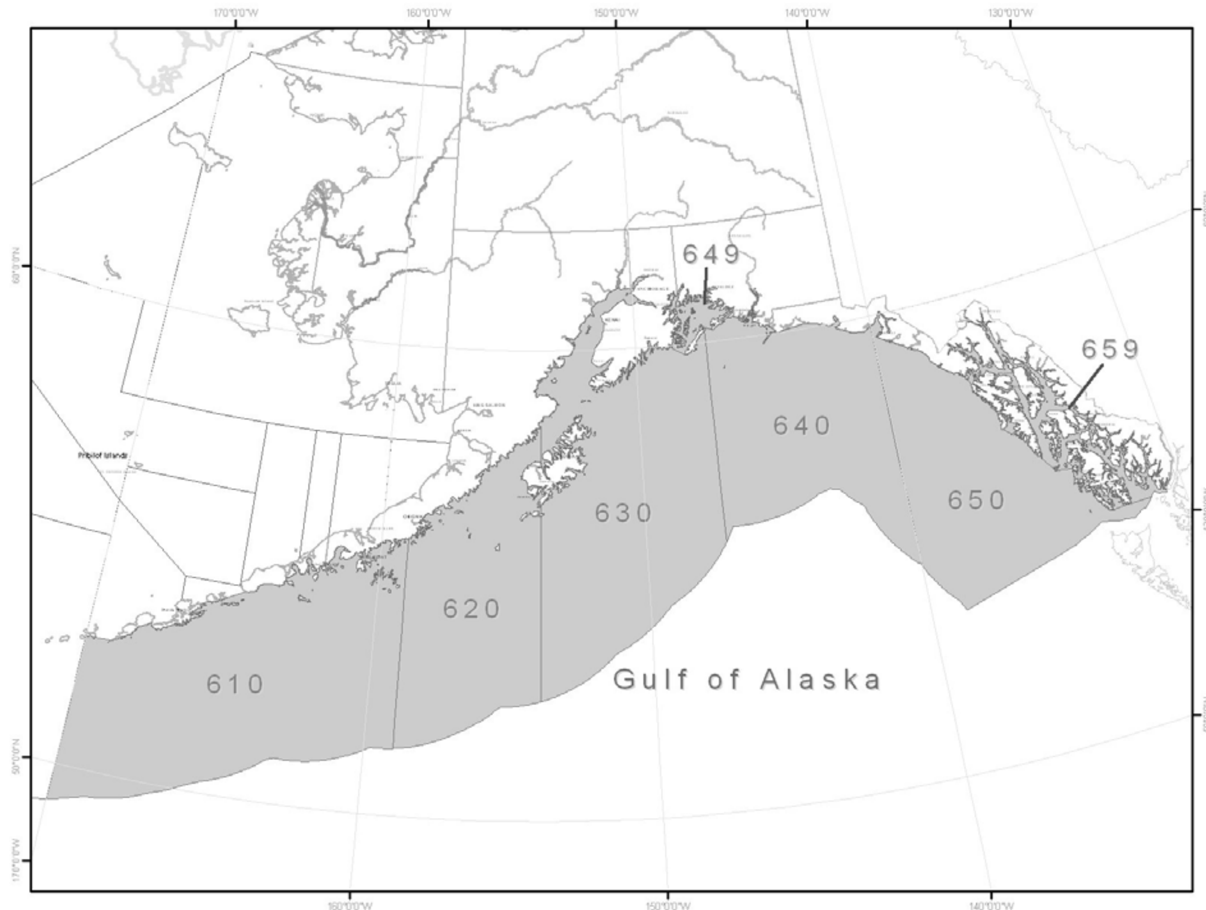


Figure 1.2-2 Management areas in the Gulf of Alaska



The fishing year coincides with the calendar year, January 1 through December 31 (§679.2 and §679.23). Depending on the target species' temporal allocation, additional specifications are made to particular seasons within the fishing year. TACs not harvested during a fishing year are not rolled over from that year to the next (although some CDQ allocations can be). Fisheries are opened and closed by regulatory announcement. Closures are made when inseason information indicates the apportioned TAC, or available prohibited species catch (PSC) limit, has been or will soon be reached, or at the end of the specified season, if the particular TAC has not been taken.

Harvest specifications for the Federal groundfish fisheries are set each year. This process may change to biennial for some species if Amendments 48/48 are approved (See Section 1.4 for more detail). The process includes review of the annual Stock Assessment and Fishery Evaluation (SAFE) reports , including the Ecosystem and Economic reports (Appendices A, B, C, and D) by the North Pacific Fishery Management Council (Council), its Advisory Panel (AP), and Scientific and Statistical Committee (SSC). Using the information from the SAFE reports and the advice from Council committees, the Council makes harvest specification recommendations for the next year. NMFS reviews and makes a determination whether to approve the recommendations.

Plan teams and SAFE documents

Establishing harvest specifications involves the gathering and analysis of fisheries data. The groups responsible for analyzing and packaging the data for Council consideration are the Council's Groundfish Plan Teams (Plan Teams). These teams include NMFS scientists and managers, Alaska, Oregon, and Washington fisheries management agencies scientists, and university faculty.

Using stock assessments prepared annually by NMFS and by the Alaska Department of Fish and Game (ADF&G), Plan Teams calculate biomass, ABC, and OFL for each species or species group, as appropriate, for specified management areas of the EEZ off Alaska. Plan Team meetings are held in September to review potential model changes and are used for developing proposed ABC recommendations. In November, the Plan Teams' rationale, models, and resulting ABC and OFL calculations are documented in annual SAFE reports. The SAFE reports incorporate biological survey work, recently completed, any new methodologies applied to obtain these data, and ABC and OFL determinations based on the most recent stock assessments. Periodically, an independent expert panel reviews the assumptions used in the stock assessments for a selected species or species group and provides recommendations on improving the assessment.

At its December meetings, the Council, its AP, its SSC, and interested members of the public, review the SAFE reports and make recommendations on harvest specifications based on the information about the condition of groundfish stocks in the BSAI and GOA fishing areas. The harvest specifications recommended by the Council for the upcoming year's harvest quotas, therefore, are based on scientific information, including projected biomass trends, information on assumed distribution of stock biomass, and revised technical methods used to calculate stock biomass. SAFE reports are part of the permanent record on the fisheries.

Proposed, interim, and final specifications

The specification of the upcoming year's harvest levels is currently a three-step process. In the first step, proposed harvest specifications including OFLs, ABCs, TACs, and PSC limits[3] are recommended by the Council at its October meeting and published in November or December in the *Federal Register* for public review and comment.

The proposed BSAI specifications for 2005-2006, were published on December 8, 2003 (69 *FR* 70974). These were followed by a correction on December 22, 2004 (69 FR 76682). Proposed GOA specifications for 2005-2006, were published on December 7, 2004 (69 *FR* 70605).

In October, most current year stock assessments are not yet available. Proposed harvest specifications for a number of target species are based on projections from the current SAFE reports; the proposed specifications for other species, for which little stock assessment information is available, are based on rollovers of the current year's harvest specifications.

For most BSAI target species, the initial TAC (ITAC) is calculated as 85 percent of the proposed TACs (50 CFR § 679.20(b)). The remaining 15 percent is split evenly between the Western

[3]BSAI crab, halibut, salmon, and herring limits are established in regulations and the Council recommends target fishery and seasonal apportionments of these PSC limits. The Council recommends the GOA halibut PSC limits, fishery, and seasonal apportionments.

Alaska Community Development Quota (CDQ) program reserve and a non-specified groundfish reserve. Pollock is handled somewhat differently; 10% of the TAC is allocated to a CDQ reserve, and the remainder is allocated to a pollock ITAC. There is no pollock reserve. Sablefish is also handled differently; 20% of the sablefish hook-and-line and pot gear allocations are placed in the CDQ reserve.

In the GOA, ITACs equal the full TAC, except for pollock, Pacific cod, flatfish, and "other" species. The ITACs for these four species or species groups equal 80 percent of the TACs. The remaining 20 percent of the TACs are established as a species-specific reserve.

The Council's recommended proposed OFL, ABC, and TAC levels do not become available until the end of its October meetings. It is difficult for NMFS to publish proposed specifications before late November or early December, making it unlikely that final specifications can be published before January 1 of the new fishing year. In fact, final specifications have typically been published in February or March of the new year. NMFS uses interim specifications to allow the fishery to open in January and operate until the final specifications are published.

In the second step, therefore, NMFS publishes interim specifications to manage the fisheries from January 1 until they are superseded by the final specifications. As specified in 50 CFR § 679.20(c)(2), interim specifications are one-fourth of each proposed ITAC in the BSAI and proposed TAC in the GOA and apportionment thereof, one-fourth of each proposed PSC allowance, and the first seasonal allowance of GOA and BSAI pollock, Pacific cod, and BSAI Atka mackerel. These interim specifications are in effect on January 1, and remain in effect until superseded by final specifications.

The interim PSC limits are one quarter of the annual limit and PSC reserves. Seven and one-half percent of the PSC limits are set aside to establish the prohibited species quota (PSQ) for the CDQ program (50 CFR § 679.21(e)(1)(i)). For interim specifications, PSQ reserves are subtracted from the previous year's PSC limit, and 25 percent of the remaining amount is established as an interim value, until final specifications are adopted.

NMFS publishes the interim specifications in the *Federal Register* as soon as practicable after the October Council meeting. The 2004 interim specifications for the BSAI were published on December 8, 2003 (68 *FR* 68265), and for the GOA on December 5, 2003 (68 *FR* 67964).

Retention of sablefish in the BSAI with fixed gear is not currently authorized under interim specifications. Further, existing regulations do not provide for an interim specification for the CDQ non-trawl sablefish reserve or for an interim specification for sablefish managed under the IFQ program. This means that retention of sablefish in the BSAI taken with hook-and-line or pot gear is prohibited prior to the effective date of the final harvest specifications.

In the third step, final TAC and PSC specifications are recommended by the Council at its December meeting following completion of analysis of any new stock status information. These TAC specifications and PSC limits, and apportionments thereof, are recommended to the Secretary for implementation in the upcoming fishing year. With the final specifications, most of the non-CDQ reserves are released and the final TAC is increased by the amount of reserves released. Currently, the final specifications are typically implemented in February or March, and replace the interim specifications as soon as they are in effect.

Rulemaking process and publication of the specifications rule

The current process used by the Alaska Region to publish most rules involves the Sustainable Fisheries Division drafting the rule package, with review by the Regional Enforcement Division, Protected Resources Division, Habitat Conservation Division, Restricted Access Management Division, the Regional Economist, and the Regional General Counsel. After Regional review is completed, the rule is forwarded to NMFS Headquarters, the Office of Sustainable Fisheries in Silver Spring, Maryland, where it undergoes reviews within NMFS before being forwarded to NOAA General Counsel. After clearing NOAA, the rule is reviewed by Department of Commerce (DOC) and usually the Office of Management and Budget. OMB review has been waived for harvest specifications in the past on the basis that the harvest specifications process was part of a framework process. After the rule has cleared NOAA, DOC, and OMB, the rule is forwarded to the Office of the Federal Register. This Headquarters' review process normally takes at least 30 days for a proposed rule, but can take much longer depending on the complexity of the rule, degree of controversy, or other workload priorities within different review tiers. The review process is repeated for the final rule and may or may not include additional OMB review, depending on the nature of the action.

Public involvement may occur at a number of stages during harvest specifications development. Table 1.2-1 provides an overview of the points of decision-making and the opportunity for public comment. Public comments are welcomed and encouraged throughout the Council process. Comments received before and during the December Council meeting are considered in developing the final specification. When the Council makes a recommendation, the Secretary is required by the Administrative Procedure Act (APA) and the Magnuson-Stevens Act to provide opportunity for public review and comment on the action that the Secretary will take, based on the Council's recommendations. NMFS is the final decision maker for approval and implementation of fishery specifications.

Table 1.2- 1 Current Groundfish Harvest Specifications Setting Process

Time	Activity	Opportunity for public involvement	Decision points
January to August (of year prior to fishing year)	Plan and conduct stock assessment surveys	Casual (staff and public may interact directly with stock assessment authors)	Cruise Plans finalized. Scientific Research Permits issued. Finalize lists of groundfish biomass and prediction models to be run. Staff assignments and deadlines set
August-September	Preparation of proposed specifications recommendations. Groundfish Plan Teams meeting	Open Public Meetings. *Federal Register* Notice of Plan Team's meeting	Stock assessment teams fully scope out work necessary to complete SAFE reports, models to run, emerging ecosystem issues
September	Staff start drafting proposed and interim harvest specifications notices and EA/IRFA based on current year's specifications or current report projections	None	Proposed specifications initially based on current year's specs. or projections. Interim specifications are formula driven based on proposed harvest specifications
October 1-7 or so	October Council Meeting Presentation of proposed specifications, highlights of differences seen in recent surveys and ecosystem from past years. Council recommends proposed and interim specifications.	Open Public Meeting. *Federal Register* Notice of initial action on next year's harvest specifications as an agenda item	Council recommends proposed harvest specifications
November	NMFS reviews interim and proposed specifications	None	NMFS publishes proposed and interim specs
November	November Plan Team Meetings. Staff start drafting EA/IRFA for final specs. Finalize SAFE Reports. Initiation of informal Section 7 Consultation on final specs if needed	Open Public Meetings. *Federal Register* Notice of Plan Teams' Meetings	Plan Teams make their ABC recommendations. Determination of whether Section 7 Consultation is needed and if it has to be formal or informal
November- December	File proposed and interim specification rules with *Federal Register.* Interim specs. EA	Written comments accepted on for 30 days comment period for proposed rule. Comments welcome on EA/IRFA for proposed specs. Some specifications announced in the proposed rule **are not** the same as the final specifications that will be in the final rule	Interim specifications effective on Jan. 1 or date of publication if after Jan. 1. Not realistic documents for which to invite public comments; however, by regulation, comments are accepted and are responded to in preamble to the final rule
December 10-17	December Council Meeting. Release and present Draft EA/IRFA containing Final SAFE Reports, Ecosystem information, Economic SAFE report	Open Public Meeting *Federal Register* notice. Agenda includes next year's harvest specifications. Last meaningful opportunity for comments on the next year's quotas	Determine amount to nearest mt of next year's TAC and PSC quotas.
Late December-January	NMFS staff draft final harvest specifications rule.	Comments related to information released prior to	ESA Section 7 and EFH consultation concluded on final specifications. FONSI

Time	Activity	Opportunity for public involvement	Decision points
	Harvest specifications EA/FRFA finalized	and during December Council meeting may still be trickling in. Those comments are given consideration in final edits of the EA/FRFA. No public comment period for EA/FRFA	determination.
February of **subject fishing year**	Submit final rule to Secretary for filing with Office of Federal Register	None	Secretarial determination whether to approve Council recommendation.
February or March of **subject fishing year**	*Federal Register* publication of Final Rule	None. Administrative Procedure Act sets up 30 day cooling off period that may be waived for good cause.	Final harvest specifications replace interim specifications on date of effectiveness.

1.3 Amendments 48/48 and the Transition to a New Specifications Process

Amendments 48/48 were unanimously recommended by the Council in October 2003. A notice of availability (NOA) for the FMP amendments was published on July 14, 2004 (69 *FR* 42128), and a proposed rule was published on July 27, 2004 (69 *FR* 44634). The Secretary approved the amendments, and the final rule was published on November 8, 2004 (69 *FR* 64683).

These amendments would revise the administrative process used to establish harvest specifications for the groundfish fisheries of the BSAI and GOA. Amendments 48/48 provide a process that allows for adequate prior public review and comment on the annual harvest specifications and supporting information and allows the groundfish fisheries to be managed based on the best available scientific information.

Each year in October, in consideration of the current stock assessment survey schedules, regulatory procedures, and quality of stock assessment information for the GOA and BSAI target species, the proposed harvest specifications process would authorize specifications that would be effective for up to 2 years. NMFS would review the recommendations and publish proposed harvest specifications in November or early December, including detailed descriptions of what the final harvest specifications are likely to be and the new information anticipated to support them. In November, the new SAFE reports would be forwarded to the Council by the Council's Groundfish Plan Teams. The Council would consider the new SAFE reports, public comments on the proposed harvest specifications, and public testimony and then develop recommendations for the final harvest specifications in December. NMFS would review those recommendations and public comment on the proposed harvest specifications, and specifically determine if the final harvest specifications are a logical outgrowth of the proposed harvest specifications. If the final harvest specifications recommendations are consistent with applicable law and are a logical outgrowth of the proposed harvest specifications, the final harvest specifications may be published without additional public review and comment.

If the final harvest specifications recommendations are not a logical outgrowth of the proposed harvest specifications, an additional publication of proposed harvest specifications may be needed to provide an additional opportunity for prior public review and comment under the APA. In May or June of the following year, the final harvest specifications would be published based on the additional proposed harvest specifications and after consideration of public comment. Alternatively, depending on the circumstances, NMFS may find "good cause" to waive the additional publication of proposed harvest specifications for prior public review and comment. In this case, the final harvest specifications likely would become effective in March.

To provide opportunity for an additional public comment period after the Council's final harvest specifications recommendation in December, the groundfish fisheries in the new fishing year would be managed on the specifications that had been published previously. Each year the harvest specifications would be superseded by the new annual harvest specifications. This proposed specification process would eliminate the need for the interim harvest specifications. Having harvest specifications effective in the second fishing year would allow time for NMFS to complete an additional public review and comment period, if needed, while preventing disruption of the fisheries.

To provide consistency between the groundfish FMPs for the harvest specifications process and flexibility during the harvest specifications process, Amendments 48/48 allow specifications to be effective for up to 2 fishing years. The stock assessment models used for determining the harvest specifications would use 2- year projections for biomass and acceptable biological catch. The frequency of fishery resource surveys also affects whether specifications should be done on a more or less frequent basis. Allowing specifications to be effective for up to 2 years would fit well with the frequency of stock projections that must be used for the harvest specifications, and would provide the Council and NMFS the flexibility to adjust the specifications time periods in response to potential changes in the frequency of stock assessment surveys or other stock assessment data or administrative issues.

The Council recommended that harvest specifications for the hook-and-line gear and pot gear sablefish individual fishing quota (IFQ) fisheries be limited to the succeeding fishing year to ensure those fisheries are conducted concurrent with the halibut IFQ fishery. Having the sablefish IFQ fisheries concurrent with the halibut IFQ fishery would reduce the potential for discards of halibut and sablefish in these fisheries. The sablefish IFQ fisheries would remain closed at the beginning of each fishing year, until the final harvest specifications for the sablefish IFQ fisheries are in effect. The trawl sablefish fishery would be managed using harvest specifications for two years, along with the remaining target species in the BSAI and with GOA pollock, Pacific cod, and the "other species" complex.

The years 2005-2006 are a transitional period in the introduction of Amendments 48/48. Until a two-year sequence of specifications is in place, it is necessary to continue to use interim specifications for one more year. To implement harvest specifications in the time period between January 2005, and the effective date of the final 2005 harvest specifications, the 2004 harvest specifications process will have to include an interim rule provision for 2005. The harvest specifications would apply in 2005 and 2006, with harvest specifications for most species being superseded in 2006, by the 2005 harvest specifications process setting specifications for 2006 and 2007. The interim specifications will be used to manage the fishery until the final specifications are in place in approximately March 2005. This would be the only time interim specifications would be permitted for implementing harvest specifications.

A year from now, in October and December 2005, the Council would make recommendations for proposed and final rulemaking for 2006, and the first half of 2007, for most species and for all of 2007 and 2008 for certain GOA species. No interim specifications would be needed because specifications would be in place from final specifications for 2005 and 2006. Development of harvest specifications for GOA species on a biennial schedule will not be required in 2006, and the following even years. See Table 1.3-1 for Amendments 48/48.

Under this approach, the IFQ sablefish specifications developed in 2004, would apply to 2005 only. In the following years, the harvest specifications for most species will be implemented for up to two years and the harvest specifications for IFQ sablefish will be needed for only the first year, as separate rulemaking would be used to ensure the IFQ specifications are in place by the beginning of the fishery in March, if necessary. For example, harvest specifications recommended for the groundfish fisheries, except IFQ sablefish, in 2005, would be implemented for 2006 and 2007, with those 2007 specifications superseded by the new 2007 specification. IFQ sablefish harvest specifications, developed in 2005, would only need to cover 2006.

Table 1.3-1 Amendment 48/48 Implementation Schedule

Council Recommendation Year	Council Recommends	Annual Harvest Specifications process, except IFQ sablefish	Biennial Harvest Specifications process.	IFQ Sablefish Specifications
2004 (initial year)	proposed , interim, and final harvest specs.	2005 and 2006	2005 and 2006	2005
2005	proposed and final harvest specs.	2006 and 2007	2007 and 2008	2006
2006	proposed and final harvest specs.	2007 and 2008		2007
2007	proposed and final harvest specs.	2008 and 2009	2009 and 2010	2008
2008	proposed and final harvest specs.	2009 and 2010		2009

1.4 Required analyses

Compliance with the Magnuson-Stevens Act, NEPA, the Endangered Species Act (ESA), and the Regulatory Flexibility Act (RFA) requires the development of detailed analyses of the potential impacts of the harvest specifications. This process usually involves the development of the SAFE, NEPA, and RFA documents first, with consultations on ESA listed species, and essential fish habitat (EFH), based on the preliminary preferred alternative in the NEPA document. These analyses are drafted to inform decision makers within the Council and NMFS.

An EA is normally written each year for the harvest specifications. The draft ESA and EFH consultations may be included in the draft EA as appendices to provide opportunity for public review and comment, and for the decision makers to consider ESA and EFH concerns before making a final decision. The RFA documents provide analysis of the potential impacts of the action on small entities.

Four versions of the 2005-06 harvest specification EA [along with associated Initial Regulatory Flexibility Analysis (IRFA) and Final Regulatory Flexibility Analysis (FRFA) required by the RFA] will be prepared. Each version reflects updated information on fish stocks and TACs, and each is addressed to the public and decision makers at a different point in the decision making process. Table 1.4-1 summarizes the four versions.

Table 1.4-1 2005-06 EA/IRFA/FRFA Versions

Version	New information on ABCs and TACs	Decision-making audience
September EA/IRFA	$_{Max}F_{ABC}$ and TACs for different F rates updated by rerunning models based on projected 2004 and 2005 harvests, or by rolling over 2004 ABCs and TACs for species for which this was not possible.	October AP, SSC, and Council deliberations on recommendations for proposed harvest specifications. (Proposed specifications are used for interim specifications.)
October EA/IRFA	Recommendations from the Council on ABCs and TACs.	Secretarial decision-making on interim specifications.
November EA/IRFA	SAFE reports finalized; November Plan Team recommendations.	December AP, SSC, and Council deliberations on recommended specifications.
January EA/FRFA	Council December recommendations. Public comment on proposed specifications and IRFA.	Secretarial decision-making on final specifications.

The current document is the January version, prepared following the December meeting of the Council, for the Secretary's use as he considers the publication of final specifications. This, and the other, versions of the EA/IRFA/FRFA may be found on the National Marine Fisheries Service, Alaska Region, analyses web page: http://www.fakr.noaa.gov/analyses/.

1.5 The Groundfish Programmatic Supplemental Environmental Impact Statement (PSEIS) and the Harvest Specifications EA

The implementation of the 2005-06 harvest specifications is a project level action within the fishery management programs under the groundfish FMPs. In September 2004, NMFS completed an SEIS that analyzed the impacts of the groundfish fisheries program on the human environment. The following provides background information on this PSEIS and the relationship between this EA/FRFA and the PSEIS.

The EISs for the GOA and BSAI Groundfish FMPs were prepared in 1978, and 1981, respectively. NEPA requires preparation of an EIS or SEIS when significant environmental changes have occurred. Significant changes have occurred in the GOA and BSAI groundfish fisheries, and the GOA and the BSAI environment since the original EISs for the GOA and BSAI FMPs were published approximately 25 years ago. These changes include (but are not limited to) the following: the fisheries have shifted from primarily foreign fisheries to completely domestic fisheries; the FMPs governing the fisheries have been amended numerous times; new information is available about the ecosystem; the science of fisheries management has progressed substantially; public opinion about the management of these fisheries has changed; and several bird and marine mammal species have been listed as threatened or endangered under the Endangered Species Act.

While EAs and several EISs have been prepared for BSAI and GOA FMP amendments over the ensuing years, none has comprehensively examined the groundfish FMPs at a programmatic level. In 1999, U.S. District Court Judge Thomas S. Zilly issued a ruling in *Greenpeace v. National Marine Fisheries Service*, 55 F.Supp.2d 1248 (W.D.Wash.1999) that a 1998 SEIS prepared for BSAI and GOA FMPs was legally inadequate and remanded the document to NOAA for additional analyses, directing NOAA Fisheries to produce a "programmatic" SEIS.

The Alaska Groundfish Fisheries PSEIS has multiple purposes. First, it serves as the central environmental document supporting the management of the BSAI and GOA groundfish fisheries. The historical and scientific information and analytical discussions contained therein are intended to provide a broad, comprehensive analysis of the general environmental consequences of fisheries management in the Exclusive Economic Zone (EEZ) off Alaska. The document also provides agency decision-makers and the public with an analytical reference document necessary for making informed policy decisions in managing the groundfish fisheries and sets the stage for future management actions. In addition, it describes and analyzes current knowledge about the physical, biological, and human environment in order to assess impacts resulting from past and present fishery activities. The PSEIS is intended to bring both the decision-maker and the public up to date on the current state of the environment, while describing the potential environmental consequences of alternative policy approaches and their corresponding management regimes for management of the groundfish fisheries off Alaska. In doing so, it serves as the overarching analytical framework that will be used to define future management policy with a range of potential management actions.

The Council on Environmental Quality (CEQ) regulations encourages agencies preparing NEPA documents to "tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review":

> Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action. (40 CFR 1502.20)

In 40 CFR 1508.28, the CEQ regulations further define tiering as

> the coverage of general matter in broader environmental impact statements …with subsequent narrower statements of environmental analyses….incorporating by reference the general discussion and concentrating solely on the issues specific to the statement subsequently prepared.

This section of the CEQ regulations further notes that

> "tiering is appropriate when the sequence of statements or analysis is
>
> (a) From a program, plan, or policy environmental impact statement to a program, plan, or policy statement or analysis of lesser scope or to a site-specific statement or analysis…" (40 CFR 1508.28)

This EA thus tiers off of the PSEIS, incorporating by reference information on the status of the environment and impacts of groundfish fisheries on the human environment. The 2005-06 harvest specifications would implement a portion of the goals and objectives of the preferred alternative in the PSEIS. The preferred alternative was implemented as Amendments 81 and 74 to the BSAI and GOA FMPs, respectively (69 FR 31091, June 2, 2004, approved August 26, 2004). See Appendix G for the complete amendments. The specific goals (italicized) and numbered objectives of Amendments 81and 74 that are related to this proposed action are:

Prevent Overfishing:

1. Adopt conservative harvest levels for multi-species and single species fisheries and specify optimum yield.
2. Continue to use the existing optimum yield cap for the BSAI (as stated in current law) groundfish fisheries.
3. Continue to improve the management of species through species categories.

Promote Sustainable Fisheries and Communities:

6. Promote conservation while providing for optimum yield in terms of providing the greatest overall benefit to the nation with particular reference to food production, and sustainable opportunities for recreational, subsistence, and commercial fishing participants and fishing communities.
7. Promote management measures that, while meeting conservation objectives, are also designed to avoid significant disruption of existing social and economic structures.
8. Promote fair and equitable allocation of identified available resources in a manner such that no particular sector, group or entity acquires an excessive share of the privileges.

Preserve Food Web:

13. Incorporate ecosystem-based considerations into fishery management decisions, as appropriate.

Manage Incidental Catch and Reduce Bycatch and Waste:

14. Continue and improve current incidental catch and bycatch management programs.
16. Continue to manage incidental catch and bycatch through seasonal distribution of TAC and geographical gear restrictions.
19. Continue to account for bycatch mortality in TAC accounting and improve the accuracy of mortality assessments for target, PSC bycatch, and non-commercial species.
20. Control the bycatch of prohibited species through PSC limits or other appropriate measures.

Avoid Impacts to Seabirds and Marine Mammals:

22. Continue to cooperate with USFWS to protect ESA-listed seabird species, and if appropriate and practicable, other seabird species.
23. Maintain or adjust current protection measures as appropriate to avoid jeopardy of extinction or adverse modification to critical habitat for ESA-listed Steller sea lions.
25. Continue to cooperate with NMFS and USFWS to protect ESA-listed marine mammal species, and if appropriate and practicable, other marine mammal species.

Promote Equitable and Efficient Use of Fishery Resources:

31. Provide economic and community stability to harvesting and processing sectors through fair allocation of fishery resources.
33. Develop management measures that, when practicable, consider the efficient use of fishery resources, taking into account the interest of harvesters, processors, and communities.

Improve Data Quality, Monitoring, and Enforcement:

45. Continue to cooperate and coordinate management and enforcement programs with the Alaska Board of Fish, Department of Fish and Game, and Alaska Fish and Wildlife Protection, the U.S. Coast Guard, NMFS Enforcement, IPHC, Federal agencies, and other organizations to meet conservation requirements; promote economically healthy and sustainable fisheries and fishing communities; and maximize efficiencies in management and enforcement programs through continued consultation, coordination, and cooperation.

This EA tiers from the PSEIS for two reasons: (1) the 2005-06 harvest specifications would implement a portion of the program analyzed in the PSEIS and (2) except for the no-action alternative (Alternative 5), the alternatives in this EA are within the scope of the preferred alternative in the PSEIS. The PSEIS analysis covers the groundfish fisheries program up to January 2002, including the Steller sea lion protection measures as currently implemented.

Because this document is tiered from the PSEIS, detailed discussions that are provided in the PSEIS that are applicable to this analysis are referenced and, as necessary, summarized in this EA. The Affected Environment Section (Chapter 3) of this document adopts by reference much of the affected environment discussion in the PSEIS. Additional detailed information is provided if new information became available after January 2002, or if the PSEIS did not cover the topic in sufficient detail to support this analysis. For instance, the Stock Assessment and Fishery Evaluation (SAFE) reports are not part of the PSEIS but are crucial analyses developed each year for the harvest specifications process. The most recent SAFE reports (2004) are appended to this EA/FRFA for the harvest specifications (Appendices A and B).

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2.0 Description of Alternatives

2.1 Introduction

This chapter is organized in four sections:

1. Introduction and description of the five alternatives
2. The Council's OFL, ABC, and TAC recommendations from the December 2004 Council meeting
3. Bering Sea and Aleutian Islands management area (BSAI) specifications for each of the five alternatives (with separate sub-sections for the years 2005 and 2006)
4. Gulf of Alaska (GOA) specifications for each of the five alternatives (with sub-sections for 2005 and 2006)

Where to find it in this chapter:

Council's December 2004 recommendations: Section 2.2
Comparison of BSAI TACs for all alternatives: Section 2.3
Comparison of GOA TACs for all alternatives: Section 2.4

Harvest specifications are management measures used to control groundfish fishing. Overfishing levels (OFLs) and acceptable biological catches (ABCs) are published with the harvest specifications and provide guidance to the Council and NMFS on the development of TACs. These values are scientifically developed, based on the management schemes specified in the FMPs.

The activities of the regulated community are controlled by the enforcement of TAC and prohibited species catch (PSC) limits, and the seasonal and area apportionments, and allocations, of those limits. TAC seasonal apportionments and allocations are specified in the regulations at 50 CFR part 679.

PSC limits are mostly set in regulation or in specifications recommended by the Council. The Council has discretion about how the PSC is apportioned and allocated, but these decisions are primarily driven by the amounts of groundfish TAC allocated to different fishing sectors. For instance, the Council will recommend allocating enough halibut PSC to the Pacific cod hook-and-line sector to avoid unnecessarily burdening the fishery and increasing the risk that it will not fully harvest its Pacific cod TAC allocation, due to a fishery closure from reaching its halibut PSC limit.

Because the harvest specifications are driven by the available TAC amounts, and because the Council must decide on the TAC amounts to recommend to NMFS, the alternatives in this analysis are based on a range of TACs. Each of the five specifications alternatives represents alternative amounts of TAC that could be set for managed species and species groups for the fishing years 2005 and 2006. The alternatives have been selected to display a wide range of TACs, and their impacts on the environment. TAC specifications are harvest quotas that include both retained catch and discarded catch. The five alternatives are:

Alternative 1: Set TACs to produce fishing mortality rates, *F*[4], that are equal to $maxF_{ABC}$, "$maxF_{ABC}$" refers to the maximum permissible value of F_{ABC} under Amendment 56 to the groundfish fishery management plans (FMPs). Historically, TAC has been set at or below ABC, so this alternative provides a likely upper limit for setting TAC within the limits of ABC.

Alternative 2: Set TACs that fall within the range of ABCs recommended by the Plan Teams and TACs recommended by the Council. (Preferred alternative). Under this scenario, F is set equal to a constant fraction of $maxF_{ABC.}$ The recommended fractions of $maxF_{ABC}$ may vary among species or stocks, based on other considerations unique to each.

Alternative 3: For Tiers 1, 2, and 3, set TAC to produce *F* equal to 50% of $maxF_{ABC}$. For Tiers 4, 5, and 6, set TAC equal to 50% of TAC associated with $maxF_{ABC}$. This alternative provides a likely lower bound on F_{ABC} that still allows future harvest rates to be adjusted downward should stocks fall below reference levels.

Alternative 4: For Tiers 1, 2, and 3, set TAC to produce *F* equal to the most recent five year average actual *F*. For Tiers 4, 5, and 6, set TAC equal to the most recent five year average actual catch. This alternative recognizes that for some stocks, TAC may be set well below ABC, and recent average F may provide a better indicator of F_{TAC} than F_{ABC}.

Alternative 5: Set TAC equal to zero. This alternative recognizes that, in extreme cases, TAC may be set at a very low level, perhaps zero. This is the no action alternative, but does not reflect the *'status quo'* or baseline.

Except for Alternative 5, the alternatives analyzed in this EA/FRFA are within the scope of the Preferred Alternative in the PSEIS. See Table 4.2-2 in the PSEIS for the Preferred Alternative bookends. This action is the TAC setting process within the FMP framework. The alternatives are based on setting TAC at various levels. The bookends for the action of setting TAC under the Preferred Alternative in the PSEIS are, (1) setting the sum of the TACs to be within optimum yield range, and (2) setting TAC less than or equal to ABC for all target and other species categories. Alternatives 2, 3, and 4 would establish TAC within the optimum yield range, and therefore, meet the first bookend described. Alternative 1 would set TAC at the ABC level, meeting the upper threshold defined by the second bookend of the PSEIS Preferred Alternative. Alternative 5 would set TAC at zero for target species and is considered the no action alternative, as required by NEPA for environmental analysis.

2.2 The Council's December 2004 OFL, ABC, and TAC Recommendations

The BSAI and GOA Plan Teams met jointly at the Alaska Fisheries Science Center (AFSC) at Sand Point from November 15 to 19, 2004, to review the 2004 stock assessment author SAFE documents, and to make OFL and ABC recommendations to the Council. The SAFE documents may be viewed at the AFSC website: http://www.afsc.noaa.gov/refm/stocks/assessments.htm .

The Council, and its Scientific and Statistical Committee (SSC) and Advisory Panel (AP) met the week of December 6 in Anchorage. The Council reviewed the recommendations of its Plan

[4] "F" stands for the fishing mortality for a stock (a ratio between fishing mortality and biomass size). Fishing mortality includes both retained and discarded catch mortality.

Teams, its SSC and its AP, and recommended OFL, ABC, and TAC levels for 2005-2006. The Council's recommendations are summarized in Tables 2.2-1 and 2.2-2 below.

Table 2.2-1 Council December 2004 BSAI Groundfish OFL, ABC, and TAC Recommendations for the 2005-2006 Fisheries

Species	Area	2004				2005			2006		
		OFL	ABC	TAC	Catch**	OFL	ABC	TAC	OFL	ABC	TAC
Pollock	EBS	2,740,000	2,560,000	1,492,000	1,248,817	2,100,000	1,960,000	1,478,500	1,944,000	1,617,000	1,487,756
	Aleutian Islands	52,600	39,400	1,000	1,128	39,100	29,400	19,000	39,100	29,400	19,000
	Bogoslof District	39,600	2,570	50	0	39,600	2,570	10	39,600	2,570	10
Pacific cod	BSAI	350,000	223,000	215,500	166,776	265,000	206,000	206,000	226,000	195,000	195,000
Sablefish	BS	4,020	3,000	2,900	748	2,950	2,440	2,440	2,690	2,310	2,310
	AI	4,620	3,450	3,100	912	3,170	2,620	2,620	2,880	2,480	2,480
Yellowfin sole	BSAI	135,000	114,000	86,075	68,822	148,000	124,000	90,686	133,000	114,000	90,000
Greenland turbot	Total	19,300	4,740	3,500	2,136	19,200	3,930	3,500	11,100	3,600	3,500
	BS	—	3,162	2,700	1,730		2,720	2,700		2,500	2,500
	AI	—	1,578	800	406		1,210	800		1,100	1,000
Arrowtooth flounder	BSAI	142,000	115,000	12,000	17,130	132,000	108,000	12,000	103,000	88,400	12,000
Rock sole	BSAI	166,000	139,000	41,000	47,875	157,000	132,000	41,500	145,000	122,000	42,000
Flathead sole	BSAI	75,200	61,900	19,000	16,611	70,200	58,500	19,500	56,100	48,400	20,000
Alaska plaice	BSAI	258,000	203,000	10,000	7,624	237,000	189,000	8,000	115,000	109,000	10,000
Other flatfish	BSAI	18,100	13,500	3,000	4,669	28,500	21,400	3,500	28,500	21,400	3,000
Pacific Ocean perch	BSAI	15,800	13,300	12,580	11,032	17,300	14,600	12,600	17,408	14,600	12,600
	BS	—	2,128	1,408	701		2,920	1,400		2,920	1,400
	AI total	—	11,172	11,172	10,331		11,680	11,200		11,680	11,200
	WAI	—	5,187	5,187	4,998		5,305	5,085		5,305	5,085
	CAI	—	2,926	2,926	2,970		3,165	3,035		3,165	3,035
	EAI	—	3,059	3,059	2,363		3,210	3,080		3,210	3,080
Northern rockfish	BSAI	8,140	6,880	5,000	4,166	9,810	8,260	5,000	9,480	8,040	5,000
Shortraker	BSAI	701	526	526	207	794	596	596	794	596	596
Rougheye	BSAI	259	195	195	189	298	223	223	298	223	223
Other rockfish	BSAI					1,870	1,400	1,050	1,870	1,400	1,050
	BS	1,280	960	460	304		810	460		810	460
	AI	846	634	634	309		590	590		590	590
Atka mackerel	Total	78,500	66,700	63,000	54,789	147,000	124,000	63,000	127,000	107,000	63,000
	WAI	—	24,360	20,660	17,341		46,620	20,000		40,230	20,000
	CAI	—	31,100	31,100	27,832		52,830	35,500		45,580	35,500
	EAI/BS	—	11,240	11,240	9,616		24,550	7,500		21,190	7,500
Squid	BSAI	2,620	1,970	1,275	814	2,620	1,970	1,275	2,620	1,970	1,275
Other species	BSAI	81,150	46,810	27,205	21,795	87,920	53,860	29,000	87,920	57,870	29,200
Total	BSAI	4,193,736	3,620,535	2,000,000	1,676,853	3,509,332	3,044,769	2,000,000	3,093,360	2,547,259	2,000,000

Table 2.2-2 Council December 2004 GOA Groundfish OFL, ABC, and TAC Recommendations for 2005-2006

SPECIES		OFL	ABC	TAC	Catch	OFL	ABC	TAC	OFL	ABC	TAC
		2004	2004	2004	2004**	2005	2005	2005	2006	2006	2006
Pollock	W (61)		22,930	22,930	22,930		30,380	30,380		30,452	30,452
	C (62)		26,490	26,490	23,736		34,404	34,404		34,485	34,485
	C (63)		14,040	14,040	14,332		18,718	18,718		18,762	18,762
	WYAK		1,280	1,280	144		1,688	1,688		1,691	1,691
	Subtotal	91,060	64,740	64,740		144,340	85,190	85,190	103,250	85,390	85,390
	EYAK/SEO	8,690	6,520	6,520	0	8,690	6,520	6,520	8,690	6,520	6,520
	TOTAL	99,750	71,260	71,260	61,142	153,030	91,710	91,710	111,940	91,910	91,910
Pacific Cod	W		22,610	16,957	15,218		20,916	15,687		18,396	13,797
	C		35,800	27,116	26,794		33,117	25,086		29,127	22,064
	E		4,400	3,960	112		4,067	3,660		3,577	3,219
	TOTAL	102,000	62,810	48,033	42,124	86,200	58,100	44,433	65,800	51,100	39,080
Sablefish	W		2,930	2,930	1,986		2,540	2,540		2,407	2,407
	C		7,300	7,300	7,002		7,250	7,250		6,870	6,870
	WYAK		2,550	2,550	2,133		2,580	2,580		2,445	2,445
	SEO		3,770	3,770	3,726		3,570	3,570		3,383	3,383
	TOTAL	22,160	16,550	16,550	14,847	19,280	15,940	15,940	17,530	15,105	15,105
Deep water flatfish[1]	W		310	310	7		330	330		330	330
	C		2,970	2,970	614		3,340	3,340		3,340	3,340
	WYAK		1,880	1,880	55		2,120	2,120		2,120	2,120
	EYAK/SEO		910	910	4		1,030	1,030		1,030	1,030
	TOTAL	8,010	6,070	6,070	680	8,490	6,820	6,820	8,490	6,820	6,820
Rex sole	W		1,680	1,680	526		1,680	1,680		1,680	1,680
	C		7,340	7,340	936		7,340	7,340		7,340	7,340
	WYAK		1,340	1,340	0		1,340	1,340		1,340	1,340
	EYAK/SEO		2,290	2,290	0		2,290	2,290		2,290	2,290
	TOTAL	16,480	12,650	12,650	1,462	16,480	12,650	12,650	16,480	12,650	12,650
Shallow water flatfish[2]	W		21,580	4,500	136		21,580	4,500		21,580	4,500
	C		27,250	13,000	2,806		27,250	13,000		27,250	13,000
	WYAK		2,030	2,030	1		2,030	2,030		2,030	2,030
	EYAK/SEO		1,210	1,210	0		1,210	1,210		1,210	1,210
	TOTAL	63,840	52,070	20,740	2,942	63,840	52,070	20,740	63,840	52,070	20,740
Flathead sole	W		13,410	2,000	831		11,690	2,000		11,111	2,000
	C		34,430	5,000	1,559		30,020	5,000		28,527	5,000
	WYAK		3,430	3,430	0		3,000	3,000		2,842	2,842
	EYAK/SEO		450	450	0		390	390		370	370
	TOTAL	64,750	51,720	10,880	2,390	56,500	45,100	10,390	53,800	42,850	10,212

SPECIES		OFL 2004	ABC 2004	TAC 2004	Catch 2004**	OFL 2005	ABC 2005	TAC 2005	OFL 2006	ABC 2006	TAC 2006
Arrowtooth flounder	W		23,590	8,000	2,837		26,250	8,000		27,924	8,000
	C		151,840	25,000	12,227		168,950	25,000		179,734	25,000
	WYAK		10,590	2,500	76		11,790	2,500		12,539	2,500
	EYAK/SEO		8,910	2,500	34		9,910	2,500		10,543	2,500
	TOTAL	228,130	194,930	38,000	15,174	253,900	216,900	38,000	270,050	230,740	38,000
Other Slope rockfish[3]	W		40	40	242		40	40		40	40
	C		300	300	527		300	300		300	300
	WYAK		130	130	76		130	130		130	130
	EYAK/SEO		3,430	200	27		3,430	200		3,430	200
	TOTAL	5,150	3,900	670	872	5,150	3,900	670	5,150	3,900	670
Northern rockfish[3]	W		770	770	1,025		808	808		755	755
	C		4,100	4,100	3,711		4,283	4,283		3,995	3,995
	E		0	0	0		0	0		0	0
	TOTAL	5,790	4,870	4,870	4,736	6,050	5,091	5,091	5,640	4,750	4,750
Pacific Ocean perch	W	2,990	2,520	2,520	2,195	3,076	2,567	2,567	3,019	2,525	2,525
	C	9,960	8,390	8,390	8,446	10,226	8,535	8,535	10,008	8,375	8,375
	WYAK		830	830	877		841	841		813	813
	SEO		1,600	1,600	0		1,632	1,632		1,579	1,579
	E(subtotal)	2,890				2,964			2,860		
	TOTAL	15,840	13,340	13,340	11,518	16,266	13,575	13,575	15,887	13,292	13,292
Shortraker	W						155	155		155	155
	C						324	324		324	324
	E						274	274		274	274
	TOTAL					982	753	753	982	753	753
Rougheye	W						188	188		188	188
	C						557	557		557	557
	E						262	262		262	262
	TOTAL					1,531	1,007	1,007	1,531	1,007	1,007
Shortraker/rougheye rockfish	W		340	254	270						
	C		870	656	328						
	E		550	408	375						
	Total	2,510	1,760	1,318	973						
Pelagic shelf rockfish	W		370	370	277		377	377		366	366
	C		3,010	3,010	2,158		3,067	3,067		2,973	2,973
	WYAK		210	210	199		211	211		205	205
	EYAK/SEO		880	880	11		898	898		871	871
	TOTAL	5,570	4,470	4,470	2,645	5,680	4,553	4,553	5,510	4,415	4,415
Demersal rockfish	**SEO**	690	450	450	228	640	410	410	640	410	410

SPECIES		OFL 2004	ABC 2004	TAC 2004	Catch 2004**	OFL 2005	ABC 2005	TAC 2005	OFL 2006	ABC 2006	TAC 2006
Thornyhead rockfish	W		410	410	270		410	410		410	410
	C		1,010	1,010	400		1,010	1,010		1,010	1,010
	E		520	520	135		520	520		520	520
	TOTAL	2,590	1,940	1,940	805	2,590	1,940	1,940	2,590	1,940	1,940
Atka mackerel	**GW**	6,200	600	600	817	6,200	600	600	6,200	600	600
Big Skate	W						727	727		727	727
	C						2,463	2,463		2,463	2,463
	E						809	809		809	809
	Total					5,332	3,999	3,999	5,332	3,999	3,999
Longnose skate	W						66	66		66	66
	C						1,972	1,972		1,972	1,972
	E						780	780		780	780
	Total					3,757	2,818	2,818	3,757	2,818	2,818
CGOA Big and Longnose		4,435	3,284	1,423							
Other skates	GW		3,709	3,709	1,385	1,769	1,327	1,327	1,769	1,327	1,327
All skates (2003)		10,859		6,993	2,808						
Other Species	GW	NA	NA	12,942	1,625	NA	NA	13,871	NA	NA	13,525
TOTAL		660,319	507,534	271,776	166,365	713,667	539,263	291,298	662,918	542,456	284,023

catch through October 2, 2004 (BOLD** = Catch >TAC)

1/ Deep water flatfish includes Dover sole, Greenland turbot and deepsea sole.

2/ "Shallow water flatfish" includes rock sole, yellowfin sole, butter sole, starry flounder, English sole, Alaska plaice, and sand sole.

3/ The EGOA ABC of 2 mt for northern rockfish has been included in the WYAK ABC for other slope rockfish.

* Indicates rollover from previous year (no age-structured projection data available)

4/ The ABC for sablefish has been reduced by 5 % in the SEO and added to the WYK to allow for 5% of the EGOA TAC to be made available for trawl incidental catch

5/ Other skates means big and longnose skates in the W and E GOA and bathyraja sp. Gulfwide

NOTE:

ABCs and TACs are rounded to nearest mt.

GW means Gulfwide.

Catch data source: NMFS Blend Reports.

2.3 BSAI Alternatives

TACs have been projected for each of the alternatives.

2005 TACs

Table 2.3-1 summarizes the TACs for each of the five alternatives. The Alternative 2 TACs are those recommended by the Council in December 2004. The Alternative 1, 3, 4, and 5 TACs are set equal to harvest mortality estimates associated with the different alternatives as summarized from the SAFE documents prepared for the November 2004 Plan Team meetings.

In some instances, particularly for Tier 5 species, SAFE reports did not contain information on harvest mortality estimates for some alternatives, particularly for Alternatives 3 and 4. In these instances, Alternative 3 was set equal to ½ of the Alternative 1 mortality (instead of the mortality needed to produce a fishing rate equal to one half of the Alternative 1 rate). Alternative 4 was set equal to the most recent five year average harvest reported in the SAFE document (instead of an ABC to produce a fishing rate equal to the average rate over the most recent five years).

2006 TACs

Table 2.3-2 summarizes the 2006 BSAI TACs for each of the five alternatives. The TACs in this table were set following the same procedures used above for the 2005 TACs. For reasons noted at the start of this chapter, for stocks managed under Tiers 1 to 3, 2006 OFLs and ABCs are likely to be biased downward. This downward bias could affect some 2006 TAC projections, in cases were TACs are projected to be equal to 2006 ABCs. OFL and ABC estimates recommended in next year's SAFE reports are likely to differ from this year's projections for 2006.

Table 2.3-1 2005 BSAI TACs for Alternatives 1 through 5 (in metric tons)

Species	Area	Alt 1.	Alt 2.	Alt 3.	Alt 4.	Alt 5.
Pollock	EBS	1,960,000	1,478,500	1,014,000	1,300,000	0
	Aleutian Islands	19,000	19,000	19,000	1,177	0
	Bogoslof District	29,700	10	14,850	30	0
Pacific cod	BSAI	227,000	206,000	119,000	179,000	0
Sablefish	BS	2,440	2,440	1,255	1,929	0
	AI	2,620	2,620	1,347	2,071	0
Yellowfin sole	BSAI	124,338	90,686	63,761	39,559	0
Greenland turbot	Total	15,547	3,500	8,283	3,928	0
	BS	10,727	2,700	5,715	2,710	0
	AI	4,820	800	2,568	1,218	0
Arrowtooth flounder	BSAI	107,718	12,000	56,836	8,444	0
Rock sole	BSAI	131,928	41,500	68,224	25,057	0
Flathead sole	BSAI	58,458	19,500	30,480	10,660	0
Alaska plaice	BSAI	188,595	8,000	108,377	11,022	0
Other flatfish	BSAI	21,391	3,500	10,696	3,021	0
Pacific Ocean perch	BSAI	14,615	12,600	7,388	11,703	0
	BS	2,923	1,400	1,478	2,341	0
	AI total		11,200			
	WAI	4,019	5,085	2,032	3,218	0
	CAI	3,961	3,035	2,002	3,172	0
	EAI	6,635	3,080	3,354	5,313	0
Northern rockfish	BSAI	8,260	5,000	4,178	5,190	0
Shortraker	BSAI	596	596	298	237	0
Rougheye	BSAI	223	223	112	307	0
Other rockfish	BSAI		1,050			
	BS	810	460	405	311	0
	AI	590	590	295	477	0
Atka mackerel	AI	123,859	63,000	67,721	74,883	0
	Area 543	46,571	20,000	25,463	28,156	0
	Area 542	52,764	35,500	28,849	31,900	0
	Area 541	24,524	7,500	13,409	14,827	0
Squid	BSAI	1,970	1,275	985	1,236	0
Other species	BSAI	68,810	29,000	34,405	26,449	0
Total	BSAI	3,090,885	2,000,000	1,631,900	1,706,691	0

Notes: Alternative 5 is the no action alternative; AI pollock TAC equals 19,000 mt so long as ABC is greater than 19,000 mt.

Table 2.3-2 2006 BSAI TACs for Alternatives 1 through 5 (in metric tons)

Species	Area	Alt 1.	Alt 2.	Alt 3.	Alt 4.	Alt 5.
Pollock	EBS	1,420,000	1,487,756	1,010,000	1,250,000	0
	Aleutian Islands	19,000	19,000	19,000	1,177	0
	Bogoslof District	29,700	10	14,850	30	0
Pacific cod	BSAI	207,000	195,000	125,000	174,000	0
Sablefish	BS	2,312	2,310	1,290	1,906	0
	AI	2,483	2,480	1,385	2,046	0
Yellowfin sole	BSAI	114,389	90,000	61,703	39,559	0
Greenland turbot	Total	10,124	3,500	6,803	3,662	0
	BS	6,986	2,500	4,694	2,527	0
	AI	3,138	1,000	2,109	1,135	0
Arrowtooth flounder	BSAI	88,439	12,000	51,923	8,466	0
Rock sole	BSAI	110,868	42,000	61,241	23,469	0
Flathead sole	BSAI	48,369	20,000	27,353	10,108	0
Alaska plaice	BSAI	109,388	10,000	81,012	10,634	0
Other flatfish	BSAI	21,391	3,000	10,696	3,021	0
Pacific Ocean perch	BSAI	14,620	12,600	7,725	11,870	0
	BS	2,924	1,400	1,545	2,374	0
	AI total		11,200			
	WAI	4,021	5,085	2,124	3,264	0
	CAI	3,962	3,035	2,093	3,217	0
	EAI	6,637	3,080	3,507	5,389	0
Northern rockfish	BSAI	8,044	5,000	4,162	5,142	0
Shortraker	BSAI	596	596	298	237	0
Rougheye	BSAI	223	223	112	307	0
Other rockfish	BSAI		1,050			
	BS	810	460	405	311	0
	AI	590	590	295	477	0
Atka mackerel	AI	89,167	63,000	58,014	62,817	0
	Area 543	33,527	20,000	21,813	23,619	0
	Area 542	37,985	35,500	24,714	26,760	0
	Area 541	17,655	7,500	11,487	12,438	0
Squid	BSAI	1,970	1,275	985	1,236	0
Other species	BSAI	68,810	29,200	34,405	26,449	0
Total	BSAI	2,349,580	2,000,000	1,560,640	1,636,924	0
Notes: Alternative 5 is the no action alternative; AI pollock TAC equals 19,000 mt so long as AI pollock ABC is greater than or equal to 19,000 mt.						

2.4 GOA TAC Alternatives

TACs have been projected for each of the alternatives.

2005 TACs

Table 2.4-1 summarizes estimated 2005 GOA TACs for each of the five alternatives. The Alternative 2 TACs are those recommended by the Council in December 2004. The Alternative 1, 3, 4, and 5 TACs are set equal to ABC levels from the SAFE documents as summarized during the November 2004 GOA Plan Team meeting.

In some instances, particularly for Tier 5 species, SAFE reports did not contain information on harvest mortality estimates for some alternatives, particularly for Alternatives 3 and 4. In these instances, Alternative 3 was set equal to ½ of the Alternative 1 mortality (instead of the mortality needed to produce a fishing rate equal to one half of the Alternative 1 rate). Alternative 4 was set equal to the most recent five year average harvest reported in the SAFE document (instead of an ABC to produce a fishing rate equal to the average rate over the most recent five years).

2006 TACs

Table 2.4-2 summarizes the 2006 GOA TACs for each of the five alternatives. The TACs in this table were set following the same procedures used above for the 2005 TACs. For reasons noted at the start of this chapter, for stocks managed under Tiers 1 to 3, 2006 OFLs and ABCs are likely to be biased downward. This downward bias could affect some 2006 TAC projections, in cases were TACs are projected to be equal to 2006 ABCs.

Harvest specifications for most long-lived target species and complexes in the GOA would be set on a biennial basis. The target species considered for biennial specifications are limited to species on a biennial survey schedule in the GOA and for which annual stock assessments are not practicable. In the GOA, these species include: deep water flatfish, rex sole, shallow water flatfish, flathead sole, arrowtooth flounder, "other" slope rockfish, northern rockfish, Pacific Ocean perch, shortraker/rougheye rockfish, pelagic shelf rockfish, thornyhead rockfish, demersal shelf rockfish, skates, and Atka mackerel.

Stocks recommended for biennial specifications are, in general, longer-lived species (such as the rockfish and flatfish stocks) which are surveyed biennially in the GOA trawl survey. Rulemaking would set specifications for two years, based on projected OFLs, ABCs, and TACs, for years 1 and 2. For these stocks, the projected specifications for year 2 do not vary appreciably from those established for year 1 (where the ABC was established by incorporating recent survey results into the assessment).

The following GOA stocks are not recommended for biennial specifications: pollock, Pacific cod, sablefish, and the "other species" complex. For these stocks, annual specifications should continue.

Table 2.4-1 2005 GOA TACs for Alternatives 1 through 5 (in metric tons)

Species	Area	Alt 1.	Alt 2.	Alt 3.	Alt 4.	Alt 5.
Pollock	610	44,506	30,380	23,373	30,983	0
	620	50,401	34,404	26,469	35,087	0
	630	27,421	18,718	14,401	19,090	0
	640	2,471	1,688	1,298	1,720	0
	Subtotal	124,800	85,190	65,540	86,880	0
	650	6,520	6,520	3,260	4	0
	Total	131,320	91,710	68,800	86,884	0
Pacific cod	W	26,568	15,687	13,968	20,448	0
	C	42,066	25,086	22,116	32,376	0
	E	5,166	3,660	2,716	3,976	0
	Total	73,800	44,433	38,800	56,800	0
Sablefish	W	2,540	2,540	1,045	1,606	0
	C	7,250	7,250	2,983	4,585	0
	WYK	2,580	2,580	1,061	1,632	0
	SEO	3,570	3,570	1,469	2,258	0
	Total	15,940	15,940	6,558	10,080	0
Flatfish (deep water)	W	330	330	165	44	0
	C	3,340	3,340	1,674	442	0
	WYK	2,120	2,120	1,063	280	0
	EYAK/SEO	1,030	1,030	516	136	0
	Total	6,820	6,820	3,419	902	0
Rex sole	W	1,680	1,680	840	406	0
	C	7,340	7,340	3,670	1,772	0
	WYK	1,340	1,340	670	324	0
	EYAK/SEO	2,290	2,290	1,145	553	0
	Total	12,650	12,650	6,325	3,055	0
Flatfish (shallow)	W	21,580	4,500	10,790	2,192	0
	C	27,250	13,000	13,625	2,768	0
	WYK	2,030	2,030	1,015	207	0
	EYAK/SEO	1,210	1,210	605	103	0
	Total	52,070	20,740	26,035	5,270	0
Flathead sole	W	11,690	2,000	6,099	531	0
	C	30,020	5,000	15,657	1,363	0
	WYK	3,000	3,000	1,559	136	0
	EYAK/SEO	390	390	205	18	0
	Total	45,100	10,390	23,520	2,048	0
Arrowtooth flounder	W	26,250	8,000	12,119	1,913	0
	C	168,950	25,000	78,000	12,315	0
	WYK	11,790	2,500	5,442	860	0
	EYAK/SEO	9,910	2,500	4,575	722	0
	Total	216,900	38,000	100,136	15,810	0
Other slope rockfish	W	40	40	21	9	0
	C	300	300	156	68	0
	WYAK	130	130	66	29	0
	EYAK/SEO	3,430	200	1,764	769	0
	Total	3,900	670	2,007	875	0
Northern rockfish	W	808	808	379	390	0
	C	4,283	4,283	2,010	2,070	0
	E	0	0	0	0	0
	Total	5,091	5,091	2,389	2,460	0
Pacific ocean perch	W	2,567	2,567	1,276	1,996	0
	C	8,535	8,535	4,241	6,637	0
	WYK	841	841	418	654	0
	SEO	1,632	1,632	811	1,269	0
	E (subtotal)					0

Species	Area	Alt 1.	Alt 2.	Alt 3.	Alt 4.	Alt 5.
	Total	13,575	13,575	6,746	10,556	0
Shortraker	W	155	155	83	148	0
	C	324	324	216	389	0
	E	274	274	135	244	0
	Total	753	753	434	781	0
Rougheye	W	188	188	110	198	0
	C	557	557	289	520	0
	E	262	262	181	326	0
	Total	1,007	1,007	580	1,044	0
Pelagic shelf rockfish	W	377	377	266	295	0
	C	3,067	3,067	2,164	2,399	0
	WYAK	211	211	149	165	0
	EYAK/SEO	898	898	634	703	0
	Total	4,553	4,553	3,213	3,562	0
Demersal rockfish	SEO	514	410	257	410	0
Thornyhead rockfish	W	410	410	308	293	0
	C	1,010	1,010	758	722	0
	E	520	520	391	372	0
	Total	1,940	1,940	1,457	1,387	0
Atka mackerel	GW	4,700	600	2,350	232	0
Big skate	W	727	727	364	149	0
	C	2,463	2,463	1,232	727	0
	E	809	809	405	56	0
	Total	3,999	3,999	2,000	932	0
Longnose skate	W	66	66	33	23	0
	C	1,972	1,972	986	1,164	0
	E	780	780	390	370	0
	Total	2,818	2,818	1,409	1,557	0
Other skates	GW	1,327	1,327	664	1,035	0
Other species	Gulf wide	29,939	13,871	14,855	10,284	0
Total		628,716	291,298	311,953	215,964	0
Notes: Alternative 5 is the no action alternative.						

Table 2.4-2 2006 GOA TACs for Alternatives 1 through 5 (in metric tons)

Species	Area	Alt 1.	Alt 2.	Alt 3.	Alt 4.	Alt 5.
Pollock	610	33,643	30,452	21,604	27,763	0
	620	38,100	34,485	24,466	31,440	0
	630	20,729	18,762	13,311	17,105	0
	640	1,868	1,691	1,199	1,541	0
	Subtotal	94,340	85,390	60,580	77,850	0
	650	6,520	6,520	3,260	4	0
	Total	100,860	91,910	63,840	77,854	0
Pacific cod	W	21,888	13,797	12,960	18,036	0
	C	34,656	22,064	20,520	28,557	0
	E	4,256	3,219	2,520	3,507	0
	Total	60,800	39,080	36,000	50,100	0
Sablefish	W	2,407	2,407	1,343	1,984	0
	C	6,870	6,870	3,832	5,662	0
	WYK	2,445	2,445	1,364	2,015	0
	SEO	3,383	3,383	1,887	2,788	0
	Total	15,105	15,105	8,425	12,448	0
Flatfish (deep water)	W	330	330	104	29	0
	C	3,340	3,340	1,628	447	0
	WYK	2,120	2,120	1,044	287	0
	EYAK/SEO	1,030	1,030	504	138	0
	Total	6,820	6,820	3,279	901	0
Rex sole	W	1,680	1,680	840	406	0
	C	7,340	7,340	3,670	1,772	0
	WYK	1,340	1,340	670	324	0
	EYAK/SEO	2,290	2,290	1,145	553	0
	Total	12,650	12,650	6,325	3,055	0
Flatfish (shallow)	W	21,580	4,500	10,790	2,192	0
	C	27,250	13,000	13,625	2,768	0
	WYK	2,030	2,030	1,015	207	0
	EYAK/SEO	1,210	1,210	605	103	0
	Total	52,070	20,740	26,035	5,270	0
Flathead sole	W	11,111	2,000	5,270	526	0
	C	28,527	5,000	13,529	1,351	0
	WYK	2,842	2,842	1,347	135	0
	EYAK/SEO	370	370	177	18	0
	Total	42,850	10,212	20,323	2,030	0
Arrowtooth flounder	W	27,924	8,000	12,236	2,002	0
	C	179,734	25,000	78,756	12,882	0
	WYK	12,539	2,500	5,494	899	0
	EYAK/SEO	10,543	2,500	4,620	756	0
	Total	230,740	38,000	101,106	16,539	0
Other slope rockfish	W	40	40	21	9	0
	C	300	300	156	68	0
	WYAK	130	130	66	29	0
	EYAK/SEO	3,430	200	1,764	769	0
	Total	3,900	670	2,007	875	0
Northern rockfish	W	755	755	364	375	0
	C	3,995	3,995	1,928	1,982	0
	E	0	0	0	0	0
	Total	4,750	4,750	2,292	2,357	0
Pacific ocean perch	W	2,525	2,525	1,279	2,039	0
	C	8,374	8,375	4,241	6,761	0
	WYK	813	813	412	656	0
	SEO	1,579	1,579	800	1,275	0
	E (subtotal)					0

Species	Area	Alt 1.	Alt 2.	Alt 3.	Alt 4.	Alt 5.
	Total	13,292	13,292	6,732	10,731	0
Shortraker	W	143	155	83	148	0
	C	375	324	216	389	0
	E	235	274	135	244	0
	Total	753	753	434	781	0
Rougheye	W	191	188	110	198	0
	C	501	557	289	520	0
	E	315	262	181	326	0
	Total	1,007	1,007	580	1,044	0
Pelagic shelf rockfish	W	366	366	183	295	0
	C	2,973	2,973	1,488	2,400	0
	WYAK	205	205	102	165	0
	EYAK/SEO	871	871	435	702	0
	Total	4,415	4,415	2,208	3,562	0
Demersal rockfish	SEO	514	410	257	1,035	0
Thornyhead rockfish	W	410	410	312	298	0
	C	1,010	1,010	769	733	0
	E	520	520	396	377	0
	Total	1,940	1,940	1,477	1,408	0
Atka mackerel	GW	4,700	600	2,350	232	0
Big skate	W	727	727	364	1,387	0
	C	2,463	2,463	1,232	149	0
	E	809	809	405	727	0
	Total	3,999	3,999	2,000	56	0
Longnose skate	W	66	66	33	932	0
	C	1,972	1,972	986	23	0
	E	780	780	390	1,164	0
	Total	2,818	2,818	1,409	370	0
Other skates	GW	1,327	1,327	664	1,557	0
Other species	Gulf wide	28,266	13,525	14,387	9,610	0
Total		593,576	284,023	302,129	201,815	0
Notes: Alternative 5 is the no action alternative.						

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3.0 Affected Environment

The NEPA documents listed below contain extensive information on the fishery management areas, marine resources, ecosystem, social, and economic parameters of these fisheries, and the TAC setting process. Rather than duplicate an affected environment description here, readers are referred to those documents, which are incorporated by reference into this document.

Additionally, the Ecosystem Considerations section of the 2004 SAFE reports is included as Appendix C to this EA. It contains summaries and pointers to recent studies and information applicable to understanding and interpreting the criteria used to evaluate significance of impacts that will result from setting harvest quotas at levels contemplated under these five alternatives.

Detailed descriptions of the fishery may be found in the following reports. All of these are public documents and are readily available in printed form or over the Internet at links given in the references.

<u>TAC-Setting EIS</u> The original EISs for the BSAI and GOA FMPs were completed in 1981 and 1979, respectively. The TAC setting process was not revisited in an EIS until 1998, when an SEIS on the process of TAC setting was completed 1998 (NMFS1998). In that document the impacts of groundfish fishing over a range of TAC levels were analyzed. The five alternatives were very similar to the alternatives considered in this 2004-2005 TAC specifications EA. The Record of Decision in that action was affirmation of the status quo alternative for TAC-setting which contained regulations and fishery management plans as they stood in 1997. Impacts to the human environment from the Federal groundfish fisheries were displayed in that EIS. Setting TAC under the status quo procedures was not found to be having significant impacts on the issues evaluated.

<u>Annual TAC-Specification EAs</u> In addition to the TAC-setting EIS analysis, environmental assessments have been written to accompany each new year's TAC specifications since 1991. One exception was the 2001 harvest specifications, which were promulgated by an emergency rule published in January 2001 without an accompanying NEPA analysis. That was done because the TAC specifications were set by Congressional action at the 2000 levels (Pub. L. No. 106-554). An EA was prepared on the 2001 TAC specifications in July 2001 (NMFS 2001a). The 2003 TAC specifications were analyzed in an EA and a FONSI determination was made prior to publication of the rule (NMFS 2003a).

<u>Steller Sea Lion Protection Measures SEIS</u> A supplemental environmental impact statement was completed in 2001 (NMFS 2001b) to evaluate modifications of fishery management measures being made to mitigate impacts on Steller sea lions. The purpose of that SEIS was to provide information on potential environmental impacts that could occur from implementing a suite of fisheries management measures such that the western population of Steller sea lions existence is not jeopardized nor its critical habitat adversely modified by the groundfish fisheries in the GOA and the BSAI. Fisheries management measures considered were designed to allow commercial groundfish fishing in the North Pacific while assuring that the fisheries would neither jeopardize the continued existence of both western and eastern Steller sea lion stocks, nor adversely affect their critical habitat. Alternative 4, the area and fishery specific approach, was selected in the Record of Decision. Revision of fishery management measures in accordance with that decision has been promulgated through proposed and final rulemakings in accordance with Magnuson-Stevens Act procedures.

American Fisheries Act Amendments 61/61/13/8 EIS This EIS (NMFS 2002a) was prepared to evaluate sweeping changes to the conservation and management program for the pollock fishery of the BSAI and to a lesser extent, the management programs for the other groundfish fisheries of the BSAI and GOA, the king and Tanner crab fisheries of the BSAI, and the scallop fishery off Alaska. Under the Magnuson Act, the Council prepared Amendments 61/61/13/8 to implement the provisions of the AFA in the groundfish, crab and scallop fisheries. Amendments 61/61/13/8 incorporated the relevant provisions of the AFA into the FMPs and established a comprehensive management program to implement the AFA. The EIS analysis provided an evaluation of the environmental and economic effects of the management program that was implemented under these Amendments, as well as developed scenarios of alternative management programs for comparative use.

Groundfish PSEIS A final programmatic SEIS (PSEIS) has been prepared to evaluate the fishery management policies embedded in the BSAI and GOA groundfish FMPs against policy level alternatives. NOAA Fisheries issued a Record of Decision on August 26, 2004, and with the simultaneous approval of Amendments 74 and 81 to the GOA and BSAI Groundfish FMPs, respectively, this decision implements a new management policy that is ecosystem-based and is more precautionary when faced with scientific uncertainty. While effecting the public decision-making process prescribed by the National Environmental Policy Act, the PSEIS also serves as a primary environmental document for subsequent analyses of environmental impacts on the groundfish fisheries. For more information see the http://www.fakr.noaa.gov/sustainablefisheries/seis/default.htm website.

As discussed in Chapter 1, this EA tiers off of the analyses and information provided in the PSEIS, as recommended by the Council for Environmental Quality regulations (see Section 1.5 above). Chapter 3 of the PSEIS establishes an environmental baseline, a description of existing conditions that serves as the starting point for the document's analyses. That description of baseline environmental conditions was developed using the best available scientific information, which at the time that the PSEIS was drafted incorporated data up to 2002. In tiering off of the PSEIS, this EA uses the PSEIS baseline as a starting point for the present evaluation of environmental effects and, therefore, incorporates the PSEIS baseline by reference into this document.

The PSEIS provides a recent, complete description of the environment that may be affected by groundfish fishing activities in the following sections:

Features of the physical environment, Section 3.3.
Threatened and endangered species, Section 3.4
Groundfish resources, Section 3.5,
Prohibited species, Section 3.5.2
Other species, Section 3.5.3
Habitat, Section 3.6.
Seabirds, Section 3.7
Marine mammals, Section 3.8.
Socioeconomic Conditions, Section 3.9
Ecosystem, Section 3.10.

4.0 Environmental Impacts

4.1 Significance analysis

An EA must consider whether an environmental impact is significant. Significance is determined by considering the contexts (geographic, temporal, societal) in which the action will occur, and the intensity of the action. The evaluation of intensity should include consideration of the magnitude of the impact, the degree of certainty in the evaluation, the cumulative impact when the action is related to other actions, the degree of controversy, and violations of other laws.

This section describes the criteria by which the impacts of the specifications are analyzed for each of the following impact areas:

- Target species and fisheries
- Incidental catch of other and non-specified species
- Incidental catch of forage fish species
- Incidental catch of prohibited species
- Marine mammals and ESA listed marine mammals
- Seabirds and ESA listed seabirds
- Habitat
- Ecosystem
- State managed and parallel fisheries
- Social and economic effects

The above categories are used in the annual specifications EA documents and are relevant potential receptors in the action. Because the interim specifications are a subset of the annual specifications, and exist for a short duration in the beginning of the fishing year, interim specifications alternatives impacts on the environment are limited. Interim specifications are likely to be a concern only for those environmental components that are affected by fishing activities in the early part of the fishing year. Steller sea lion protection measures require control of fishing in the early part of the fishing year and, therefore, may be affected by interim specifications. The level of interim specifications may also have an impact on economic aspects of the resources and should also be analyzed.

Each of the environmental categories is associated with significance criteria that have previously been developed and used to evaluate alternative quotas in the annual specifications document. Use of these provides consistency with the significance criteria used in these related documents.

Five significance assignments are made in this EA. These are:

Significantly adverse (S-): Significant adverse effect in relation to the reference point and based on ample information and data and the professional judgment of the analysts who addressed the topic.

Insignificant impact (I): Insignificant effect in relation to the reference point; this determination is based on information and data, along with the professional judgment of the analysts, that suggest that the effects will not cause a significant change to the reference point condition.

Significant beneficial (S+): Significant beneficial effect in relation to the reference point and based on ample information and data and the professional judgment of the analysts who addressed the topic.

Unknown (U): Unknown effect in relation to the reference point; this determination is characterized by the absence of information and data sufficient to adequately assess the significance of the impacts, either because the impact is impossible to predict, or because insufficient information is available to determine a reference point for the resource, species, or issue.

No effect (NE): No known impact

The "reference point condition", where used, may be considered the state of the environmental component being analyzed where it is believed to be in healthy condition, in equilibrium with its physical or biological environment, or is in a condition judged to be not threatened adversely at the present time. For example, a "reference point condition" for a fish species would be the state of that species such that it is in healthy condition, able to sustain itself, successfully reproducing, and not threatened with an adverse population-level decline.

Table 4.1-1 Reference points for significance determinations

Reference Point	Application
Current population trajectory or harvest rate of subject species	(1) Marine mammals (2) Target commercial fish species (3) Incidental catch of non-specified species (4) Forage species (5) Prohibited species bycatch (6) ESA list Pacific salmon (7) Seabirds
Global harvest of prey species. Temporal dispersion of harvest of prey species.	Steller sea lions
Current size and quality of marine benthic habitat and other essential fish habitat	Marine benthic habitat and other essential fish habitat
Application of principles of ecosystem management	Ecosystem
Current management and enforcement activities	(1) State of Alaska managed fisheries (2) Management complexity and enforcement
Current rates of fishing accidents	Human safety and private property (vessels)

Effects on Target Species

The FMP describes the target fisheries as, "those species which are commercially important and for which a sufficient data base exists that allows each to be managed on its own biological merits. Accordingly, a specific TAC is established annually for each target species. Catch of each species must be recorded and reported. This category includes pollock, Pacific cod, yellowfin sole, Greenland turbot, arrowtooth flounder, rock sole, "other flatfish," sablefish, Pacific Ocean perch, "other rockfish," Atka mackerel, and squid." (BSAI FMP, page 286). A fishing operation can affect its own target, but it can also affect other target species (for example, through incidental catches).

Alternatives are evaluated with respect to four potential impacts:

1. How much effect does the alternative have on fishing mortality?
2. How much effect does the alternative have on spatial or temporal concentration of the species (as manifested by changes in genetic structure of the population or changes in reproductive success)?
3. How much effect does the alternative have on the availability of prey for the target species?
4. How much effect does the alternative have on the target species' habitat?

The reference point against which each question is assessed is the current population trajectory or harvest rate of the subject target fish species (Table 4.1-1).

The ratings utilize a minimum stock size threshold (MSST) as a basis for positive or negative impacts of each alternative. Any stock that is below its MSST is defined to be overfished. Any stock that is expected to fall below its MSST in the next two years is defined to be approaching an overfished condition. A thorough description of the rationale for the MSST can be found in the National Standard Guidelines 50 CFR Part 600 (Federal Register Vol. 63, No. 84, 24212 - 24237). It is currently impossible to evaluate the status of stocks in Tiers 4 through 6 with respect to MSST, because stocks qualify for management under these tiers only if reference stock levels (such as MSST) cannot be estimated reliably.

Table 4.1-2 Criteria used to estimate the significance of effects on targeted groundfish stocks in the Bering Sea, Aleutian Islands, and Gulf of Alaska

Intensity of the Effects				
Direct Effects	Significant Adverse	Unknown	Insignificant Impact	Significant Beneficial
Fishing mortality	Reasonably expected to jeopardize the capacity of the stock to produce MSY on a continuing basis	Unknown fishing mortality rate	Reasonably *not* expected to jeopardize the capacity of the stock to produce MSY on a continuing basis	Action allows the stock to return to its unfished biomass

Spatial and temporal distribution of catch	Leads to change in genetic structure of population	Evidence of genetic sub-population structure and evidence that the distribution of harvest leads to a detectable reduction in genetic diversity such that it jeopardizes the ability of the stock to sustain itself at or above the MSST	MSST and genetic structure is unknown, therefore no information to evaluate whether distribution of the catch changes the genetic structure of the population such that it jeopardizes *or* enhances the ability of the stock to sustain itself at or above the MSST	Evidence that the distribution of harvest is *not* sufficient to alter the genetic sub-population structure such that it jeopardizes the ability of the stock to sustain itself at or above the MSST	Evidence of genetic sub-population structure and evidence that the distribution of harvest leads to a detectable increase in genetic diversity such that it enhances the ability of the stock to sustain itself at or above the MSST
	Change in reproductive success	Evidence that the distribution of harvest leads to a detectable decrease in reproductive success such that it jeopardizes the ability of the stock to sustain itself at or above MSST	MSST is unknown therefore no information regarding the potential impact of the distribution of the catch on reproductive success such that it jeopardizes *or* enhances the ability of the stock to sustain itself at or above the MSST	Evidence that the distribution of harvest will *not* change reproductive success such that it jeopardizes the ability of the stock to sustain itself at or above the MSST	Evidence that the distribution of harvest leads to a detectable increase in reproductive success such that it enhances the ability of the stock to sustain itself at or above MSST
Change in prey availability		Evidence that current harvest levels and distribution of harvest lead to a change prey availability such that it jeopardizes the ability of the stock to sustain itself at or above the MSST	MSST is unknown therefore no information that current harvest levels and distribution of harvest lead to a change in prey availability such that it enhances *or* jeopardizes the ability of the stock to sustain itself at or above the MSST	Evidence that current harvest levels and distribution of harvest do *not* lead to a change in prey availability such that it jeopardizes the ability of the stock to sustain itself at or above the MSST	Evidence that current harvest levels and distribution of harvest lead to a change in prey availability such that it enhances the ability of the stock to sustain itself at or above the MSST

Habitat: Change in suitability of spawning, nursery, or settlement habitat, etc. due to fishing	Evidence that current levels of habitat disturbance are sufficient to lead to a decrease in spawning or rearing success such that it jeopardizes the ability of the stock to sustain itself at or above the MSST	MSST is unknown therefore no information that current levels of habitat disturbance are sufficient to lead to a detectable change in spawning or rearing success such that it enhances *or* jeopardizes the ability of the stock to sustain itself at or above the MSST	Evidence that current levels of habitat disturbance are not sufficient to lead to a detectable change in spawning or rearing success such that it jeopardizes the ability of the stock to sustain itself at or above the MSST	Evidence that current levels of habitat disturbance are sufficient to lead to an increase in spawning or rearing success such that it enhances the ability of the stock to sustain itself at or above the MSST

Effects on Incidental Catch of Non-specified Species

The non-specified species category contains a huge diversity of species, including invertebrates, that are not defined in the FMP as target, other, forage, or prohibited species, except for animals protected under the MMPA or the ESA. Jellyfish and grenadiers, a group of deep-sea species related to hakes and cods, appear to have dominated non-specified catches in recent years. (Grenadier biology and management are discusses in Section 3.5.5.1 of the PSEIS (NMFS 2004d)). Other non-specified species caught in recent years include prowfish, smooth lumpsucker, eels, sea cucumbers, Pacific lamprey, greenling, and Pacific hagfish.

There is currently no active management and limited monitoring for the species in this category, and the retention of any non-specified species is permitted. No reporting is required for non-specified species, and there are no catch limitations or stock assessments. Most of these animals are not currently considered commercially important and are not targeted or retained in groundfish fisheries.

The criteria applied to target species are arguably relevant for non-specified species, however the information available for non-specified species is much more limited than that available for target fish species. Estimates of biomass, seasonal distribution of biomass, and natural mortality are unavailable for most non-specified species. Management concerns, data limitations, research in progress, and planned research to address these concerns are discussed in Section 5.1.2.6 of the PSEIS (NMFS 2004d).

Predictions of impacts from different levels of harvest are therefore qualitatively described. Direct effects include the removal of non-specified species from the environment as incidental catch in the groundfish fisheries. Indirect effects can include habitat disturbance by fishing gear and disruption of food web interactions by disproportionate removal of one or more trophic levels.

The reference point against which significance was assessed was the current population trajectory or harvest rate of the non-specified species. For analytical purposes, this is assumed to be the trajectory or rate in a recent year. The criterion for evaluating significance was whether a substantial difference in harvest of non-specified species would occur (+>50% = adverse or - > 50%=beneficial).

Table 4.1-3 Criteria used to estimate the significance of effects on incidental catch of other species and non-specified species in the Aleutian Islands

Effect	Significant Adverse	Insignificant	Significant Beneficial	Unknown
Incidental catch of other species and non-specified species	Reasonably expected to increase harvest levels by >50%.	Reasonably expected to not increase or decrease harvest levels by >50%.	Reasonably expected to decrease harvest levels by >50%.	Insufficient information available to predict harvest change.

Effects on Forage Fish Species

Forage fish are fish eaten by larger predatory fish, seabirds, or marine mammals, usually swimming in large schools. In this analysis the species referred to as forage fish species are limited to those species included in FMP Amendments 36 in the BSAI and 39 in the GOA. Listings of GOA forage fish species may be found in Section 3.1 of the FMP while listings of BSAI forage fish species may be found in regulations in Table 2 to 50 CFR §679. The forage fish species categories include (but are not limited to) eulachon, capelin, smelts, lanternfishes, Pacific sand lance, Pacific sand fish, gunnels, pricklebacks, krill, and Pacific herring. A great many other species occupy similar trophic levels in the food chain to forage fish as species preyed upon by higher trophic levels at some period during their life history, such as juvenile pollock and Pacific cod.

Management concerns, data limitations, research in progress, and planned research to address these concerns are discussed in Section 5.1.2.5 of the Draft PSEIS (NMFS 2003b) and the Ecosystems Considerations for 2004 (NMFS 2003a, Appendix C). Bottom trawl surveys of groundfish conducted by NMFS are not designed to assess the biomass of forage fish species. Estimates of biomass and seasonal distribution of biomass are poor for forage fish species, therefore the effects of different levels of target species harvest on forage fish species are not quantitatively described.

Direct effects include the removal of forage fish species from the environment as incidental catch in the groundfish fisheries. Indirect effects may include competition between groundfish (particularly juveniles) and forage fish for available prey, habitat disturbance by fishing gear, and disruption of food web interactions by disproportionate removal of one or more trophic levels. Insufficient information is available to estimate the effects of changes in the incidental catch of forage species quantitatively.

The reference point against which forage fish effects are assessed is the current population trajectory or harvest rate of the subject target fish species (Table 4.1-1). For analysis purposes, this is assumed to be rates in 2004. The criterion for evaluating significance was a substantial change in incidental catch amount (+>50% = adverse or -> 50%= beneficial).

Table 4.1-4 Criteria used to estimate the significance of effects on incidental catch of forage fish species in the Aleutian Islands

Effect	Significant Adverse	Insignificant	Significant Beneficial	Unknown
Incidental catch of other species and non-specified species	Reasonably expected to increase harvest levels by >50%.	Reasonably expected to not increase or decrease harvest levels.	Reasonably expected to decrease harvest levels by >50%.	Insufficient information available to predict change in harvest levels.

Effects on Prohibited Species

Prohibited species in the groundfish fisheries include: Pacific salmon (chinook, coho, sockeye, chum, and pink and ESA listed salmon), steelhead trout, Pacific halibut, Pacific herring, and Alaska king, Tanner, and snow crab.

This analysis focuses on the effects of the specifications alternatives on three aspects of prohibited species management measures: 1) effects on the stocks of prohibited species; 2) effects on harvest levels in the directed fisheries for salmon, halibut, herring, and crab managed by the State; and 3) effects on recent levels of incidental catch of prohibited species in the groundfish fisheries. The significance criteria are summarized in Tables 4.1-5.

Table 4.1-5 Criteria used to estimate the significance of effects on stocks of prohibited species in the BSAI and GOA

Effect	Significant Adverse	Insignificant	Significant Beneficial	Unknown
Benchmark Stock level	Reasonably expected to jeopardize the capacity of the stock to maintain benchmark population levels	Reasonably not expected to jeopardize the capacity of the stock to maintain benchmark population levels	Reasonably expected to increase harvest levels in directed fisheries targeting prohibited species without jeopardizing capacity of stock to maintain benchmark population levels.	Insufficient information available
Harvest levels in directed fisheries targeting catch of prohibited species	Substantial decrease in harvest levels in directed fisheries targeting prohibited species (>20%)	No substantial increase or decrease (<20%) in harvest levels in directed fisheries targeting prohibited species	Substantial increase in harvest levels in directed fisheries targeting prohibited species (>20%)	Insufficient information available
Harvest levels of prohibited species in directed fisheries targeting groundfish species	Substantial increase in harvest levels of prohibited species in directed fisheries targeting groundfish species (>50%)	No substantial increase or decrease (<50%) in harvest levels of prohibited species in directed fisheries targeting groundfish species	Substantial decrease in harvest levels of prohibited species in directed fisheries targeting groundfish species (>50%)	Insufficient information available

Benchmarks: Salmon - minimum escapement goals, Pacific halibut - estimated long term CEY level, Pacific herring - minimum spawning biomass threshold, crab - minimum stock size threshold. NA: not applicable.

Effects on Marine Mammals and ESA Listed Marine Mammals

Direct and indirect interactions between marine mammals and groundfish harvest may occur due to overlap in the size and species of groundfish harvested in the fisheries that are also important marine mammal prey, and due to temporal and spatial overlap in marine mammal foraging and commercial fishing activities. Impacts of the various alternative sets of 2005 and 2006 harvest levels are analyzed by addressing four core questions, modified from Lowry (1982):

1. Do the proposed harvest levels result in increases in direct interactions with marine mammals (incidental take and entanglement in marine debris)?
2. Do the proposed harvest levels remove prey species at levels that could compromise foraging success of marine mammals (harvest of prey species)?
3. Do the proposed harvest levels result in temporal or spatial concentration of fishing effort in areas used for foraging by marine mammals (spatial and temporal concentration of removals with some likelihood of localized depletion)?
4. Do the proposed harvest levels modify marine mammal foraging behavior to the extent that population level impacts could occur (disturbance)?

The reference point for determining significant impact to marine mammals is predicting whether the proposed harvest levels will impact the current population trajectory of any marine mammal species or if the impact is likely to be different from the impact in 2004. Significance ratings for each question are summarized in Table 4.1-6.

Table 4.1-6 Criteria for determining significance of effects to marine mammals.

Effects	Significance Criteria			
	Significant Adverse	**Insignificant**	**Significant Beneficial**	**Unknown**
Incidental take/ entanglement in marine debris	Take rate increases downward change in population trajectory by >10%	Level of take below that which would have an effect on population trajectories by > 10%	Not Applicable	Insufficient information available on take rates
Spatial/ temporal concentration of fishery	More temporal and spatial concentration in key areas than 2004 protection measures	Temporal and spatial concentration of fishery same as 2004 protection measures.	Much less temporal and spatial concentration of fishery in all key areas than 2004 protection measures	Insufficient information as to what constitutes a key area or important time of year
Global harvest of prey species*	Harvest level exceeds harvest allowed by the harvest control rule	Harvest level at or below harvest control rule	Not applicable	Insufficient information to determine level of harvest in relation to available prey biomass
Disturbance	More disturbance (closed areas reopened) than 2004 protection measures	Similar level of disturbance as that which was occurring in 2004	Much less disturbance by groundfish fishery	Insufficient information as to what constitutes disturbance

* applies to western DPS of Steller sea lions

ESA listed Steller sea lions have significance criteria based on the Steller sea lion protection measures. These measures require the overall harvest of pollock, Pacific cod, and Atka mackerel to fall within the harvest control rule specified in regulations at 50 CFR 679.20(d)(4). Seasonal apportionment of harvest also is specified for these prey species at 50 CFR 679.20(a)(5), (a)(7), and (a)(8). Closure areas providing spatial dispersion of these fisheries and closures for protection of other marine mammals are at 50 CFR 679.22.

Effects on Seabirds

Seabird Groups and Effects to Consider: For reasons explained in the Steller Sea Lion Protection Measures SEIS (NMFS 2001b), the following species or species groups are considered: northern fulmar, short-tailed albatross, spectacled and Steller's eiders, albatrosses and shearwaters, piscivorous seabird species, and all other seabird species not already listed.

The fishery effects that may impact seabirds are direct effects of incidental take (in gear and vessel strikes), and indirect effects on prey (forage fish and fishery waste) abundance and availability, and benthic habitat (NMFS 2004d). ESA listed seabirds are under the jurisdiction of the USFWS, which has completed an FMP level (USFWS 2003a) and a project level BiOp (USFWS 2003b) for the groundfish fisheries and the setting of annual harvest specifications. Both BiOps concluded that the groundfish fisheries and the annual setting of harvest specifications were unlikely to cause the jeopardy of extinction or adverse modification or destruction of critical habitat for ESA listed birds.

Incidental take The effects of incidental take of seabirds (from fishing gear and vessel strikes) are described in Section 3.7.1 of the PSEIS (NMFS 2004d). Birds are taken incidentally in longline (hook and line), trawl, and pot gear. Estimation of seabird incidental take from longline and pot vessels is very straightforward. On trawlers, however, the estimation procedure is confounded by sample size issues (Appendix C). This unfortunately creates the need to provide two estimates of total seabird takes for trawl fisheries, depending on the sample size for hauls where seabirds were not recorded. Further, while observers are able to see all gear-related mortalities from longline and pot vessels, on trawl vessels there is anecdotal evidence that seabird mortalities occur from collisions with the trawl sonar cable and main net cables. The degree of that mortality is currently unknown, as observers are fully tasked with sampling the catch. Note that the amount of mortality contributed by the pot fleet is very minimal, accounting for less than one half percent annually. The trawl fleet contributes from 10.6% to 44.9% of the overall mortality, depending on which estimation methodology is used, with the actual amount likely being somewhere between these two bounds. Longline operations contribute the remainder. Due to its minimal contribution to overall seabird mortality, the pot fleet will not be considered in this analysis.

As noted in Section 3.7.1 of the PSEIS (NMFS 2004d), several factors are likely to affect the risk of seabird incidental catch. It is reasonable to assume that risk goes up or down, partly as a consequence of fishing effort (measured as total number of hooks in the longline fleet, and total haul time in the trawl fleet) each year (NMFS 2004d). In the longline fleet, if seabird avoidance measures used to prevent birds from accessing baited hooks are effective, then effort levels would probably be less of a critical factor in the probability of a bird getting hooked. Seabird bycatch avoidance measures are outlined on pages 3.7-7 through 3.7-10 of the PSEIS (NMFS 2004d). New regulations became effective in February 2004. However, a sizeable portion of the longline fleet began, in January 2002, to use the seabird avoidance measures recommended by Washington Sea Grant (Melvin, et al., 2001) and approved by the North Pacific Fisheries Management Council at their December 2001 meeting. While the incidental take of seabirds has exhibited some large inter-annual variations, it is worth noting that the overall take of seabirds was reduced by about 60% from 2001 to 2002. Continued collection of seabird incidental take data by groundfish observers will provide the data necessary to evaluate whether the rates continue to decrease.

In the trawl fleet, improved instructions to observers will help refine the estimates, which will in turn allow a better assessment of whether the numbers taken pose a conservation concern. At the same time, the trawl industry, the NMFS, Washington Sea Grant, and the University of Washington are collaborating on a project to reduce or eliminate mortality associated with sonar transducer and net cables.

<u>Prey (forage fish and fishery waste) abundance and availability</u> A description of the effects of prey abundance and availability on seabirds is in Section 3.7.1 of the PSEIS (NMFS 2004d). Detailed conclusions or predictions cannot be made regarding the effects of forage fish bycatch on seabird populations or colonies. However, the present understanding is that fisheries management measures affecting abundance and availability of forage fish or other prey species could affect seabird populations (NMFS 2004d; NMFS 2001b), although commercial fisheries do not compete directly with seabirds. There is no directed commercial fishery for those species which compose the forage fish management group, and seabirds typically target juvenile stages rather than adults for those target species where there is an overlap between seabirds and commercial fisheries.

The volume of offal and processing wastes probably changes approximately in proportion to the total catch in the fishery. Whereas some bird populations may benefit from the food supply provided by offal and processing waste, the material also acts as an attractant that may lead to increased incidental take of some seabird species (NMFS 2001b). For example, there seems to be little interaction between trawl sonar cables and seabirds in the shoreside delivery fleet, which has minimal discards and offal, while the interactions are higher near catcher/processor vessels (McElderry, et al, in prep). These conclusions are drawn on very limited samples and should be used with caution. It is also worth noting the apparent reduction in seabird incidental take for the longline fleet described earlier and the research underway in the trawl fishery. Should the use of seabird avoidance gear prove effective over time, the negative aspects of seabird attraction to vessels will be reduced. TAC levels under various alternatives could reduce the amount of processing waste and offal available to scavenging seabirds, particularly in some areas near major breeding colonies. This impact would need to be considered in the balance of the beneficial and detrimental impacts of the disposal actions.

Benthic habitat The fishery effects on benthic habitat are described in Section 3.6.4 of the PSEIS (NMFS 2004d). The indirect fishery effects on benthic habitat as utilized by seabirds are described in the seabird summaries provided in each alternative (Sections 4.5.7, 4.6.7, etc. to the PSEIS) (NMFS 2004d). The seabird species most likely to be impacted by any indirect gear effects on the benthos would be diving sea ducks such as eiders and scoters as well as cormorants and guillemots (NMFS 2001b). Bottom trawl gear has the greatest potential to indirectly affect seabirds via their habitat. Thus, this analysis will be limited to the impacts of bottom trawl gear on benthic foraging habitat.

Criteria used to determine significance of effects on seabirds Significance of impacts is determined by considering the context in which the action will occur and the intensity of the action. The significance criteria used for this analysis are similar to the criteria used in the PSEIS (NMFS 2004d). Because the action is applied throughout the BSAI and the GOA for the first part of 2005 and for the 2005 and 2006 fishing years and individual colony impacts are difficult to relate to overall population impacts, the effects on most seabirds are analyzed in terms of impacts on the population in the same manner as analysis in the PSEIS (NMFS 2004d). The exceptions are ESA listed eiders which have critical habitat designated. Because critical habitat has been identified for these species, impacts on benthic habitat may be considered at the colony level. Impacts at the colony level for an ESA listed species is more likely to result in impacts on the population level compared to seabirds that are not at population levels that warrant ESA listing. The US Fish and Wildlife Service collects reproduction and population information for selected colonies for many seabird species (USFWS 2003a). The population trends are specific to the colonies and may or may not be representative of the overall population trend in the BSAI and GOA, as population trends for a species in a particular year on several colonies may differ. Because the ESA populations are reduced compared to other seabirds and overall population information is available for ESA listed species, information at the colony level for ESA listed species is more likely to be understood in terms of overall population trends and may be considered for significance criteria for effects that may be localized. When complete information is not available to reach a strong conclusion regarding impacts, the rating of ‘unknown’ is used. Table 4.1-7 outlines the qualitative significance criteria or thresholds that are used for determining if an effect has the potential to create a significant impact on seabirds.

Table 4.1-7 Criteria used to determine significance of effects on seabirds.

Effects	Rating		
	Significant	**Insignificant**	**Unknown**
Incidental take in gear and vessel strikes	Level of take increases or decreases substantially from baseline and/or level of take likely to have population level effect on species.	Level of take similar or less than baseline and/or level of take not likely to have population level effect on species.	Insufficient information available on take rates or population levels.
Prey availability and fishery wastes	Food availability decreased or increased substantially from baseline such that seabird survival or reproduction success is likely to decrease or increase.	Food availability similar to baseline and such that seabird survival or reproduction success is likely not affected.	Insufficient information available on abundance of key prey species or the scope of fishery impacts on prey
Benthic habitat	Impact to benthic habitat decreases seabird prey base substantially from baseline such that seabird survival or reproductive success is likely to increase or decrease.	Impact to benthic habitat similar to baseline such that seabird survival or reproductive success is likely not affected.	Insufficient information available on the scope or mechanism of benthic habitat impacts on food web.

Effects on Marine Benthic Habitat and Essential Fish Habitat Assessment

The PSEIS uses the following criteria to determine significance for habitat:

1. Level of mortality and damage to living habitat;
2. Benthic community diversity;
3. Geographic diversity of impacts.

The reference point, or baseline for purpose of this EA/FRFA, against which the criteria are applied, is the current size and quality of marine benthic habitat and other essential fish habitat.

Table 4.1-8 Significance Criteria for Habitat

Effect	S-	I	S+	U
Level of mortality and damage to living habitat	Likely to increase substantially from baseline; continued long-term irreversible impacts to long-lived slow growing species	Likely to be similar to baseline	Likely to decrease substantially from baseline	Insufficient information available on baseline habitat data
Changes to Benthic Community Structure	Likely to decrease substantially from baseline	Likely to be similar to baseline	Likely to increase from baseline	Insufficient information available on baseline habitat data
Changes in Distribution of Fishing Effort Geographic Diversity of Management Measures	Likely to decrease substantially from baseline	Likely to be similar to baseline	Likely to increase from baseline	Not applicable

Effects on the Ecosystem

Ecosystem effects evaluated include (1) predator-prey relationships, (2) energy flow and balance, and (3) Diversity.

Table 4.1-9 Significance criteria for fishery induced effects on ecosystem attributes.

Issue	Effect	Significance criteria	Indicators
Predator-prey relationships	Pelagic forage availability	Fishery induced changes outside the natural level of abundance or variability for a prey species relative to predator demands	• Population trends in pelagic forage biomass (quantitative – pollock, Atka Mackerel, catch/bycatch trends of forage species, squid and herring)
	Spatial and temporal concentration of fishery impact on forage	Fishery concentration levels high enough to impair the long term viability of ecologically important, non-resource species such as marine mammals and birds	• Degree of spatial/temporal concentration of fishery on pollock, Atka mackerel, herring, squid and forage species (qualitative)
	Removal of top predators	Catch levels high enough to cause the biomass of one or more top level predator species to fall below minimum biologically acceptable limits.	• Trophic level of the catch • Sensitive top predator bycatch levels (quantitative: sharks, birds; qualitative: pinnipeds) • Population status of top predator species (whales, pinnipeds, seabirds) relative to minimum biologically acceptable limits.
	Introduction of nonnative species	Fishery vessel ballast water and hull fouling organism exchange levels high enough to cause viable introduction of one or more nonnative species, invasive species	• Total catch levels
Energy flow and balance	Energy redirection	Long-term changes in system biomass, respiration, production or energy cycling that are outside the range of natural variability due to fishery discarding and offal production practices	• Trends in discard and offal production levels (quantitative for discards) • Scavenger population trends relative to discard and offal production levels (qualitative) • Bottom gear effort (qualitative measure of unobserved gear mortality particularly on bottom organisms)
	Energy removal	Long-term changes in system-level biomass, respiration, production or energy cycling that are outside the range of natural variability due to fishery removals of energy	• Trends in total retained catch levels (quantitative)

Issue	Effect	Significance criteria	Indicators
Diversity	Species diversity	Catch removals high enough to cause the biomass of one or more species (target, nontarget) to fall below or to be kept from recovering from levels below minimum biologically acceptable limits	• Population levels of target, nontarget species relative to MSST or ESA listing thresholds, linked to fishing removals (qualitative) • Bycatch amounts of sensitive (low potential population turnover rates) species that lack population estimates (quantitative: sharks, birds, HAPC biota) • Number of ESA listed marine species • Area closures
	Functional (trophic, structural habitat) diversity	Catch removals high enough to cause a change in functional diversity outside the range of natural variability observed for the system	• Guild diversity or size diversity changes linked to fishing removals (qualitative) • Bottom gear effort (measure of benthic guild disturbance) • HAPC biota bycatch
	Genetic diversity	Catch removals high enough to cause a loss or change in one or more genetic components of a stock that would cause the stock biomass to fall below minimum biologically acceptable limits	• Degree of fishing on spawning aggregations or larger fish (qualitative) • Older age group abundances of target groundfish stocks

Effects on State of Alaska Managed State Waters Seasons and Parallel Fisheries for Groundfish

The State of Alaska manages State water seasons for several species of groundfish in internal waters: sablefish in Statistical Areas 649 (Prince William Sound) and 659 (Southeast Inside District), pollock in Area 649 (Prince William Sound), and Pacific cod in Areas 610 (South Peninsula District), 620, 630 (Chignik, Kodiak, and Cook Inlet Districts), and 649 (Prince William Sound).

The State also manages groundfish fisheries for which Federal TACs are established within State waters. Unless otherwise specified by the State, open and closed seasons for directed fishing within State waters are concurrent with Federal seasons. These fisheries have been referred to as parallel fisheries or parallel seasons in State waters. Harvests of groundfish in these fisheries accrue towards their respective Federal TACs.

The criteria used in estimating the effects are outlined below in Table 4.1-10. If an alternative was deemed by NMFS as likely to result in a decrease in harvest levels in these fisheries of more than 50%, it was rated significantly adverse. If the alternative was deemed to likely result in an increase in harvest levels of more than 50%, it was rated significantly beneficial. If the alternative was deemed likely to neither decrease nor increase harvest levels by more 50%, it was rated insignificant. Where insufficient information was available to make such determinations, the effect was rated as unknown. The level of a 50% change in harvest levels is more a qualitative than quantitative assessment. A change of 50% or more in either direction was clearly a significant change and a change of less than 50% in either direction is likely insignificant as stocks of groundfish may change over the short term within this range. Individual fishing operations with greater reliance upon participation in these State fisheries may experience adverse or beneficial effects at lower percent changes in harvest levels, but information is not available to determine the significance difference between 50 % and lesser values. Harvest levels in a recent year are used as the benchmark for comparison.

Table 4.1-10 Criteria used to estimate the significance of effects on harvest levels in State managed groundfish fisheries in the BSAI and GOA.

Effect	Significant Adverse	Insignificant	Significant Beneficial	Unknown
Harvest levels of groundfish in State waters seasons and parallel seasons	Substantial decrease in harvest levels (>50%)	No substantial decrease or increase in harvest levels (<>50%)	Substantial increase in harvest levels (>50%)	Insufficient information available

Social and Economic Effects

The significance criteria used to evaluate effects of the proposed action include a quantitative and qualitative assessment of gross revenues, operating costs, net returns, safety and health, impacts on related fisheries, consumer effects, management and enforcement, excess capacity, bycatch and discards, subsistence use, impacts on benefits from marine ecosystems, and community impacts. These significance criteria are provided in Table 4.1-11.

Table 4.1-11 Economic and socio-economic significance criteria

Issue	Indicators	Significance threshold
Gross revenues	Changes in estimated gross revenues to relevant fishing and fish processing operations.	With exceptions noted below, the term “significant” for an expected change in a quantitative indicator means a 20 percent or greater change (either plus or minus) relative to the comparative baseline. If the expected change is less than 20 percent, the change is not considered to be significant. Roughly, the same threshold is used to assess changes in qualitative indicators (e.g., fishing vessel safety). However, whereas changes in quantitative indicators are based on model projections, predicted changes in qualitative indicators are based on the judgment of the economic analysts. (PSEIS, 4.1-10)
Operating costs	Cost information is generally unavailable for North Pacific fishing and/or processing operations. Only a qualitative discussion of operating costs will generally be possible.	
Net returns	Measured net returns (gross revenues net of variable and/or fixed costs, as appropriate). Operating cost information is generally unavailable for North Pacific fisheries or fish processors. Only a qualitative analysis of net returns will generally be possible, based on inferences from knowledge of changes to gross revenues and of the characteristics of fishery management regime.	

Issue	Indicators	Significance threshold
Safety and health	Changes in risk of death, injury, or morbidity for the relevant population. In general, models making it possible to project changes in the risk of death, injury, or morbidity associated with changes in fishery management regulations are not available. It may only be possible to make informed conjectures about the direction of likely impacts. Only qualitative analyses will be possible.	
Related fisheries	Changes in fishing activity in one groundfish fishery can have impacts on other groundfish fisheries, (and on non-groundfish fisheries, such as those for crab, salmon, herring, and halibut). Behavioral models that would make quantitative projections of impacts possible are not, in general, available. A qualitative analysis will often be necessary.	
Consumer effects	Alternatives that change the quantity or quality of fish harvested, or that change the cost of harvesting fish, may affect product form, availability, and the prices faced by consumers and, thus, the size of the consumers' surplus they receive from the fisheries. In the absence of information on consumers' demand curves and demand elasticities, this analysis must necessarily be qualitative.	
Management and enforcement	The Council, NMFS, NOAA Enforcement, and the U.S. Coast Guard incur costs for the management of North Pacific fisheries, and for the enforcement of fisheries regulations. The U.S. Coast Guard also incurs costs to provide emergency services to the fishing industry. (Private sector costs associated with safety are considered under the "safety" impact category.) The private sector may also incur costs associated with observer, catch accounting and reporting, or VMS requirements. Analysis of this impact will be quantitative and qualitative.	
Excess capacity	Actions may impact fishery overcapacity. Impacts in the directly regulated fishery should be considered, as well as impacts in related fisheries (for example, will restrictions or rationalization in one fishery lead to increased deployment of capacity in a second fishery). In the absence of behavioral models, this discussion will generally be qualitative.	

Issue	Indicators	Significance threshold
Bycatch and discards	The impacts of the alternatives on the bycatch and discard of the target species, of other groundfish and non-groundfish species that support fishing activities by other sectors, and of PSC, may have economic impacts.	The significance criteria for PSC species, and for bycatch and discards of other species, which are targeted by other fishing sectors, are adopted here.
Subsistence use	The mechanisms relating changes in the harvest of groundfish prey to changes in populations of animals used for subsistence purposes, and the mechanisms relating changes in populations of animals to changes in subsistence use, are poorly understood. In addition, as noted earlier in this section, prohibited species bycatch is limited by bycatch caps and area closures. This issue will require a qualitative analysis.	The 20% utilization criterion above is adopted here.
Impacts on benefits from marine ecosystems	Groundfish fishing rules may directly impact marine ecosystem benefits through effects on groundfish populations, or indirectly through impacts on predators, prey, or habitat. Other than those benefits related to commercial or subsistence groundfish fisheries (addressed above), these may include non-market (existence value and option value, etc.), and other uses of the ecosystem such as recreational fishing or tourism.	Any action that places a species listed as endangered under the ESA in jeopardy or creates adverse modification to the species' habitat will be significant, by definition. The 20% utilization criteria will be used for actions affecting recreational fishing or tourism.
Community impacts	Income, employment, and other impacts to onshore communities associated with actions. Simple quantitative models may be employed in some cases, although qualitative analysis will often be necessary.	The 20% utilization criterion above is adopted here

4.2 Effects on Target Species

In the BSAI, the groundfish target species are pollock, Pacific cod, sablefish, yellowfin sole, Greenland turbot, arrowtooth flounder, rock sole, flathead sole, Alaska plaice, "other flatfish", Pacific Ocean perch, northern rockfish, shortraker rockfish, rougheye rockfish, "other rockfish", Atka mackerel, and squid. (Council, 2004, page 9)

In the GOA, the groundfish target species are walleye pollock, Pacific cod, sablefish, shallow and deep water flatfish, rex sole, flathead sole, arrowtooth flounder, Pacific Ocean perch, shortraker/rougheye rockfish, northern rockfish, "other slope" rockfish, pelagic shelf rockfish, demersal shelf rockfish, thornyhead rockfish, Atka mackerel, and skates. (Council, 2004, page 9)

In each area there is also an "Other species" target fishery. "Other species" are those species or "species groups that currently are of slight economic value and not generally targeted upon. This category, however, contains species with economic potential or which are important ecosystem components, but insufficient data exist to allow separate management. Accordingly, a single TAC applies to this category as a whole. Catch of this category as a whole must be recorded and reported." In the BSAI this category includes sculpins, sharks, skates, and octopus, and in the GOA it includes squid, sculpins, sharks, and octopus. (Council, 2004a, page 9 (BSAI definition); a similar definition for GOA in Council, 2004b, page 9).

The general impacts of fishing mortality within FMP Amendment 56/56 ABC/OFL definitions are discussed in Section 4.1.3 of the PSEIS (NMFS 2003b), and apply to all fish species for which a TAC is specified. Since 2002, a modified harvest control rule has applied to the directed fisheries for pollock, Pacific cod, and Atka mackerel. This rule closes directed fishing when the spawning biomass is estimated to be less than 20% of the projected unfished spawning biomass. This harvest control rule was evaluated in the Steller Sea Lion Protection Measures SEIS (NMFS 2001b).

Detailed stock assessment and fishery evaluation analyses are prepared for each stock, species, or species group in the BSAI and the GOA. These may be found in the stock assessment and fishery evaluation (SAFE) reports, considered as Appendices A and B to this EA. Copies of the reports are available online at http://www.afsc.noaa.gov/refm/stocks/assessments.htm .

The criteria used to estimate the significance of direct and indirect impacts of TAC setting Alternatives 1 through 5 on the BSAI and GOA stocks of target species are summarized in Section 4.1 and in Table 4.1-2. The significance ratings for the target species criteria are summarized in Table 6.0-1. The criteria utilize a minimum stock size threshold (MSST) as a basis for positive or negative impacts of each alternative. A thorough description of the rationale for the MSST can be found in the National Standard Guidelines 50 CFR Part 600 (Federal Register Vol. 63, No. 84, 24212 - 24237).

Under all alternatives, the spawning stock biomass of all target species that have calculated spawning stock biomasses are expected to be above their MSST. The probability that overfishing would occur is low for all of the stocks. The target species stocks that have calculated MSSTs are currently above their MSSTs and the expected changes that would result from harvest at the levels proposed are not substantial enough to expect that the genetic diversity or reproductive success of these stocks would change. None of the alternatives would allow overfishing of the spawning stock. Therefore the genetic integrity and reproductive potential of the stocks should be preserved.

For these reasons, impacts to target species stocks, species, or species groups, are predicted to be insignificant for all target fish evaluated under Alternatives 1, 2, 3, and 4. This action is not expected to: (1) jeopardize the capacity of the stock to produce maximum sustainable yield on a continuing basis; (2) alter the genetic sub-population structure such that it jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold; (3) decrease reproductive success in a way that jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold; (4) alter harvest levels or distribution of harvest such that prey availability would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold; and (5) disturb habitat at a level that would alter spawning or rearing success such that it would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold. Detailed information may be found in the SAFE documents described above.

Alternative 5 would not allow fishing in 2005 and 2006. The impact of this action on fishing mortality is insignificant because the cessation of fishing for two years is not likely to result in stocks returning to their unfished biomass, especially for long-lived species. No fishing in 2005 and 2006 is likely to allow for increases in genetic diversity, reproductive success, increased prey availability, and a reduction on impacts on habitat that may enhance reproductive success. The effects of Alternative 5 on these measurements of target species health are expected to be positively significant.

4.3 Effects on Incidental Catch of Non-specified Species

"Non-specified species" "are those species and species groups of no current economic value taken by the groundfish fishery only as an incidental catch in the target fisheries… Virtually no data exist which would allow population assessments. No record of catch is necessary. The allowable catch for this category is the amount which is taken incidentally while fishing for target and other species, whether retained or discarded." (Council, 2004a, page 9 (BSAI definition); a similar definition for GOA in Council, 2004b, page 9).

The non-specified species category contains a huge diversity of species, including invertebrates, that are not defined in the FMP as target, other, forage, or prohibited species, except for animals protected under the MMPA or the ESA. Jellyfish and grenadiers, a group of deep-sea species related to hakes and cods, appear to have dominated non-specified catches in recent years. (Grenadier biology and management are discussed in Section 3.5.5.1 of the Final PSEIS (NMFS 2004d)). Other non-specified species caught in recent years include prowfish, smooth lumpsucker, eels, sea cucumbers, Pacific lamprey, greenling, and Pacific hagfish.

The information available for non-specified species is much more limited than that available for target fish species. Estimates of biomass, seasonal distribution of biomass, and natural mortality are unavailable for most non-specified species. Management concerns, data limitations, research in progress, and planned research to address these concerns are discussed in Section 5.1.2.6 of the PSEIS (NMFS 2004d).

Direct effects include the removal of other and non-specified species from the environment as incidental catch in the groundfish fisheries. Indirect effects include habitat disturbance by fishing gear and disruption of food web interactions by disproportionate removal of one or more trophic levels. Insufficient information exists to make quantitative estimates of the effects of changes in the incidental catch of non-specified species. Indicators of ecosystem function relating to non-specified species are summarized in a table at the start of Appendix C to this EA, on "Ecosystems Considerations for 2005."

The reference point against which significance was assessed was the current harvest rate of non-specified species. For analytical purposes, this is assumed to be catch in 2004. The criterion for evaluating significance was whether a substantial difference in incidental catch would occur (+>50% = adverse or - > 50%=beneficial).

Qualitative estimates of the direction of change in non-specified species harvests are made assuming that non-specified harvests are roughly proportional to target species harvests. Alternatives that constrain target harvests relative to those in 2004, are assumed to reduce non-specified species harvests relative to 2004, those that allow larger harvests are assumed to permit larger harvests of non-specified species. Alternative 1 allows larger harvests of target species and could thus be associated with larger harvests of non-specified species. Alternative 2 is associated with target harvests that are, in general similar to those in 2004. Alternatives 3 and 4 are associated with lower harvests than in 2004, and Alternative 5 is associated with no harvests.

Because of the lack of information on the relationship between changes in target harvests and changes in non-specified species harvests, Alternatives 1, 3, and 4 have been given an "unknown" rating. Alternative 2 has been rated "insignificant", due to the relatively minor harvest changes likely to be associated with it. The positively significant rating for Alternative 5 is due to its impact on non-specified catches, since the significance criterion is defined in terms of increasing or decreasing catches by 50 percent. The elimination of fishing would reduce the bycatch of non-specified species by more than 50 percent. Alternative 5, which does not permit target harvests, is assumed to end non-specified harvests as well, and has been given a "positively significant" rating. However, it is not clear that the elimination of incidental forage fish catches would have a significant impact on non-specified fish populations.

4.4 Effects on Forage Fish Species

Forage fish are defined as fish eaten by larger predatory fish, seabirds, or marine mammals, usually swimming in large schools.

While target species, such as pollock, play a functional role as forage species. However, in this analysis, forage fish are those species included in FMP Amendments 36 in the BSAI and 39 in the GOA. Listings of GOA forage fish species may be found in Section 3.1 of the FMP, while listings of BSAI forage fish species may be found in regulations in Table 2 to 50 CFR §679. The forage fish species categories include, but are not limited to, eulachon, capelin, smelts, lanternfishes, Pacific sand lance, Pacific sand fish, gunnels, pricklebacks, and krill.

A great many other species occupy similar trophic levels in the food chain to forage fish as species preyed upon by higher trophic levels at some period during their life history, such as juvenile pollock and Pacific cod. Other species forage on Pacific herring, however herring are considered under the prohibited species category in the next section (Section 4.4).

Management concerns, data limitations, research in progress, and planned research to address these concerns are discussed in Section 5.1.2.5 of the PSEIS (NMFS 2004d) and the Ecosystems Considerations for 2004 (NMFS 2003a, Appendix C). Bottom trawl surveys of groundfish conducted by NMFS are not designed to assess the biomass of forage fish species. Estimates of biomass and seasonal distribution of biomass are poor for forage fish species, therefore the effects of different levels of target species harvest on forage fish species are not quantitatively described.

Direct effects include the removal of forage fish species from the environment as incidental catch in the groundfish fisheries. Indirect effects include competition between groundfish (particularly juveniles) and forage fish for available prey. For analysis purposes, the incidental catch is compared to incidental catch that would occur in 2004. The criterion for evaluating significance was a substantial change in incidental catch amount (+>50% = adverse or -> 50%= beneficial).

Indirect effects include habitat disturbance by fishing gear and disruption of food web interactions by disproportionate removal of one or more trophic levels. Insufficient information is available to estimate the indirect effects of changes in the incidental catch of forage species. Even though the amount of biomass and seasonal distribution is unknown for the individual forage fish groups, the small amount of average incidental catch in the is not likely to affect stocks (abundance) of forage fish species (2004d, page 4.9-196). In both the BSAI and the GOA, most of the incidental catch by weight of all forage fish species are smelt (Appendix C, page 227) .

Qualitative estimates of the direction of change in forage fish species harvests are made assuming that forage fish harvests are roughly proportional to target species harvests. Alternatives which constrain target harvests, relative to those in 2004, are assumed to reduce forage fish harvests relative to 2004; those that allow larger target harvests are assumed to allow larger harvests of forage fish. Direct and indirect forage fish impacts are assumed to be correlated with forage fish catches, and thus with target species catches.

Alternative 1 allows larger harvests of target species, and could thus be associated with larger harvests of forage fish. Alternative 2 is associated with target harvests that are, in general, similar to those in 2004. Alternatives 3 and 4 are associated with lower harvests than in 2004, and Alternative 5 is associated with no harvests. Because of the lack of information on the relationship between changes in target harvests and changes in forage fish harvests, Alternatives 1, 3, and 4 have been given an “unknown” rating. Alternative 2 has been rated “insignificant”, due to the relatively minor harvest changes likely to be associated with it.

Alternative 5, which does not permit groundfish harvest is assumed to end forage fish harvests as well, and has been given a “positively significant” rating. The positively significant rating for Alternative 5 is due to its impact on catches, since the significance criterion is defined in terms of reducing catches by more than 50 percent compared to 2004. However, it is not clear that the elimination of incidental forage fish catches would have a significant impact on forage fish populations.

4.5 Effects on Prohibited Species

Prohibited species in the groundfish fisheries include: Pacific salmon (chinook, coho, sockeye, chum, and pink and ESA listed salmon in Table 6.0-2), steelhead trout, Pacific halibut, Pacific herring, and Alaska king crab, Tanner crab, and snow crab.

The effects of the groundfish fisheries in the BSAI and GOA on prohibited species are primarily managed by conservation measures developed and recommended by the Council over the entire history of the FMPs for the BSAI and GOA and implemented by Federal regulation. These measures can be found at 50 CFR part 679.21 and include prohibited species catch (PSC) limitations on a year round and seasonal basis, year round and seasonal area closures, gear restrictions, and an incentive plan to reduce the incidental catch of prohibited species by individual fishing vessels.

These management measures are discussed in the draft EIS for Essential Fish Habitat (NMFS 2004a), Section 3.5 of the PSEIS (NMFS 2004d), the Final EIS for Bering Sea and Aleutian Islands Crab Fisheries (NMFS 2004b), and in a review paper by Witherell and Pautzke (1997). The most recent review of the status for the prohibited species and the effects of the groundfish fisheries on the stocks can be found in Section 3.5 of the PSEIS (NMFS 2004d) and for crab in the EIS for Bering Sea and Aleutian Islands Crab Fisheries (NMFS 2004b).

Table 4.5-3 presents the total catch of groundfish by target, area, and gear, and the prohibited species catch that was incidental to those groundfish fishing activities in 2004. Table 4.5-3 is subdivided into subordinate tables 4.5-3a to 4.5-3h. The subordinate tables summarize information on PSC bycatch by gear type, and by GOA and BSAI area. The subordinate tables with information on the BSAI (Tables 4.5-3a through 4.5-3d) do not include the groundfish catch and associated prohibited species incidental catch in the Community Development Quota (CDQ) fisheries, except for pollock that are part of the incidental catch allowance of pollock and squid, which are exempted from CDQ allocations. CDQ allocations are based on 10 % of the annual pollock TAC and 7.5 % of other target species TACs in the BSAI. A proportionate share of the PSC limits is also allocated to the CDQ fisheries in the BSAI.

In 2004, for all groundfish targets in the BSAI, the total allocation of groundfish to the CDQ program was187,696 mt and the total groundfish catch by all participating gear types was 182,590 mt. The CDQ prohibited species catch limits and catch for 2004 are presented in Table 4.5-1. In 2004 none of the PSC limits were exceeded except for chinook salmon in the chinook Salmon Savings Area.

Table 4.5-1 CDQ Prohibited Species Catch Limits and Catch in 2004. (halibut in metric tons, all others in number of animals)

PSC Category	PSC limit	Catch	Amount Remaining	Percent Remaining
Zone 1 Red King Crab	14,775	175	14,600	99
Zone 1 Bairdi Tanner Crab	73,500	1,679	71,821	98
Zone 2 Bairdi Tanner Crab	222,751	13,483	209,268	94
Opilio Tanner Crab	326,251	29,860	296,391	91
Pacific Halibut	343	152	191	56
chinook Salmon	2,177	2966	(789)	(36)
Non-chinook Salmon	3,151	960	2,191	70

This analysis focuses on the effects of the alternatives on three prohibited species management criteria; 1) effects of the alternatives on the stocks of prohibited species; 2) effects of the alternatives on harvest levels in the directed fisheries for salmon, halibut, herring, and crab managed by the State; and 3) effects of the alternatives on incidental catch of prohibited species in the groundfish fisheries.

The three criteria used to evaluate the environmental significance of the groundfish specifications alternatives on PSC are summarized in Section 4.1 and in Table 4.1-5. The following three subsections provide more detail on how those three criteria are applied. The significance analysis in this section is summarized in Table 6.0-1. The baseline comparison year for total catches of PSC in the groundfish fisheries is 2004, and these catch amounts by fishery are displayed in Table 4.5-3. PSC limits and catch data for 2004 are similar to amounts in 2003, with the exception of salmon in the BSAI.

1. Stocks of prohibited species criterion

Pacific salmon Pacific salmon are managed by the State of Alaska on a sustained yield principal. Predetermined escapement goals for each salmon stock are monitored on an inseason basis to insure long term sustainable yields. When escapement levels are low, commercial fishing activities are curtailed. If escapement levels exceed goals, commercial fishing activities are enhanced by longer open seasons. In instances where minimum escapement goals are not met, sport and subsistence fishing activities may also be curtailed.

The effect of the groundfish fisheries on Pacific Northwest salmon and ESA listed salmon is limited to incidental take during groundfish harvest. Designated critical habitat for ESA listed salmon does not occur in the EEZ. The potential impacts of implementation of Steller sea lion protection measures on ESA listed salmon was determined to be insignificant in the Steller sea lion protection measures SEIS (Section 4.6.4, NMFS 2001b). Additional information is available on the effects of the groundfish fisheries on Pacific Northwest and listed salmon, and can be found in Section 3.4 of the PSEIS (NMFS 2004d).

Chinook salmon incidental catch in the BSAI in 2004 was 62,471 fish in the BSAI groundfish fisheries. Chinook salmon incidental catch in the GOA fisheries in 2004 was 17,784 fish. Incidental catch in the BSAI area is above the amount stated in the incidental take statement. Approximately 86 percent and 69 percent of the incidental catch of chinook salmon were taken in the pelagic trawl fisheries targeting pollock in the BSAI and GOA, respectively. In 2004 in the BSAI 456,857 "other" salmon (mostly chum) were incidentally taken, 98 percent in the pelagic trawl fisheries targeting pollock. In the GOA in 2004, 5,811 "other" salmon (mostly chum) were incidentally caught, 10 percent in the pelagic trawl fisheries targeting pollock.

Regulations at 50 CFR part 679 authorize the incidental catch of no more than 29,000 chinook salmon, annually, in the Chinook Salmon Savings Area of the BSAI by trawl vessels targeting pollock for 2004, and future years. The incidental catch of chinook salmon in the BSAI pollock trawl fishery exceeded the 29,000 fish limit and as a result the Chinook Salmon Savings Areas were closed to pollock trawling September 5, 2004. On September 14, 2004, the chum salmon savings area was also closed, due to the trawl fishery reaching the 42,000 non-chinook salmon PSC limit in the Catcher Vessel Operating Area (CVOA). The high incidental catch of salmon in the BSAI in 2004 may well have been exacerbated by the closure of the salmon savings areas. Following these closures, the pollock fleet moved into areas where they experienced higher incidental catch rates of salmon. It is not known if 2004 was an anomalously high year for the incidental catch of salmon in the BSAI or if similar rates of incidental take of salmon during the 2005 and 2006 groundfish fisheries can be expected.

The ESA incidental take statement for listed salmon is 55,000 chinook salmon in the BSAI and 40,000 chinook salmon in the GOA. (NMFS, 1999) NMFS has requested reinitiation of formal Section 7 consultation of the ESA listed chinook salmon incidental takes in the BSAI groundfish fishery because the groundfish fisheries exceeded the amount stated in the incidental take statement in 2004. (Balsiger)

For non-ESA listed salmon species, the benchmark used to determine the significance of effects on salmon stocks, under each alternative was whether or not salmon minimum escapement needs would be reasonably expected to be met. If the alternative was reasonably expected not to jeopardize the capacity of the salmon stocks to produce long term sustainable yields it was deemed insignificant; if the alternative was reasonably expected to jeopardize the capacity of the salmon stocks to produce long term sustainable yields it was deemed significantly adverse; the alternative is rated unknown where insufficient information exists to reach conclusions about the alternative's effects. The Alaska Department of Fish and Game does not provide stock projections for chinook or chum salmon, which are likely to be taken in the BSAI groundfish fisheries (Plotnick and Eggers 2004). Information is not available to compare the take of chinook and chum salmon to stock abundance. The most recent information available for determining an abundance benchmark for ESA listed salmon is the escapements listed in the 1999 biological opinion (NMFS 1999). Because of the changes in the environment and the age of the data, the authors question the accuracy of using these data for benchmark purposes today.

Halibut The International Pacific Halibut Commission (IPHC) is responsible for the conservation of the Pacific halibut resource. The IPHC uses a policy of harvest management based on constant exploitation rates. The constant exploitation rate is applied annually to the estimated exploitable biomass to determine a constant exploitation yield (CEY). The CEY is adjusted for removals that occur outside the commercial directed hook-and-line harvest (incidental catch in the groundfish fisheries, wastage in halibut fisheries, sport harvest, and subsistence use) to determine the commercial directed hook-and-line quota.

Incidental catch of halibut in the groundfish fisheries results in a decline in the standing stock biomass, a lowering of the reproductive potential of the stock, and reduced short and long term yields to the directed hook-and-line fisheries. Beginning in 1997 the IPHC divided the halibut bycatch mortality into two size groups, legal-sized halibut (greater than 32 inches in length) and sublegal-sized halibut (less than 32 inches in length), these groupings are based on length samples collected by observers each year. To compensate the halibut stock for these removals over the short term, the legal sized halibut mortality in the groundfish fisheries is deducted on a pound for pound basis each year from the directed hook-and-line quota. The sublegal-sized halibut mortality results in further impacts on the long term reproductive potential of the halibut stock. The impact of sublegal-sized halibut mortality is addressed within the target exploitation rate used by the IPHC to set harvest policy. In essence, the target harvest rate is reduced to account for the sublegal halibut mortality. Currently this amount is approximately 2 percent. This method is discussed in greater detail by Clark and Hare, 1998.

The most recent halibut stock assessment was conducted by the IPHC in December 2003. The halibut resource is considered to be healthy, with total catch near record levels. For 2004, the exploitable halibut biomass in Alaska was estimated to be 215,912 mt. In December 2004 IPHC staff made preliminary recommendations for commercial catch limits totaling 35,822 mt (round weight equivalents) in Alaskan waters for 2005. The 2004 catch of halibut in the commercial fisheries totaled 34,100 mt (round weight equivalents) in Alaskan waters. Additional information on the life history of halibut and management measures in the groundfish fisheries to conserve halibut stocks can be found in Section 3.5 of the PSEIS (NMFS 2004d). In 2004 halibut mortality in the groundfish fisheries totaled 3,803 mt of the annual 4,575 mt PSC limit in the BSAI. In 2004 halibut mortality in the groundfish fisheries totaled 2,552 mt of the annual 2,300 mt PSC limit in the BSAI. Similar levels of halibut bycatch during the 2004 groundfish fisheries are expected for the 2005 and 2006 groundfish fisheries.

The benchmark used to determine the significance of effects under each alternative on the halibut stock was whether or not incidental catch of halibut in the groundfish fisheries would be reasonably expected to lower the total CEY of the halibut stock below the long term estimated yield of 80 million pounds. If the alternative was reasonably expected not to decrease the total CEY of the halibut stock below the long term estimated yield of 80 million pounds, it was rated insignificant; if the alternative was reasonably expected to lower the total CEY of the halibut stock below the long term estimated yield of 80 million pounds, it was rated significantly adverse; where insufficient information exists to reach conclusions, the alternative's effects are rated unknown.

Pacific herring Pacific herring are managed by the State of Alaska on a sustained yield principal. Pacific herring are surveyed each year and the Guideline Harvest Levels (GHLs) are based on an exploitation rate of 20% of the projected spawning biomass, these GHLs may be adjusted in-season based on additional survey information to insure long term sustainable yields. The ADF&G has established minimum spawning biomass thresholds for herring stocks that must be met before a commercial fishery may occur.

The most recent herring stock assessment for the EBS stock was conducted by ADF&G in December 2004. For 2005 and 2006, the herring biomass in the EBS is estimated to be 201,180 mt. Additional information on the life history of herring and management measures in the groundfish fisheries to conserve herring stocks can be found in Section 3.5 of the PSEIS (NMFS 2004d). In the BSAI, the herring PSC limit for the groundfish trawl fisheries is set at one percent (2,012 mt) of the estimated herring biomass. In 2004, 1,095 mt of the 1,876 mt PSC limit of herring in the groundfish trawl fisheries in the BSAI was incidentally caught. Similar levels of herring bycatch during the 2004 groundfish trawl fisheries are expected for the 2005 and 2006 groundfish trawl fisheries.

The benchmark used to determine the significance of effects on herring stocks under each alternative was whether the minimum spawning biomass threshold levels would be reasonably expected to be met. If the alternative was reasonably expected not to jeopardize the capacity of the herring stocks to reach minimum spawning biomass threshold levels, it was deemed insignificant; if the alternative was reasonably expected to jeopardize the capacity of the herring stocks to reach minimum spawning biomass threshold levels, it was rated significantly adverse; where insufficient information exists to reach conclusions, the alternative's effects are rated unknown.

<u>Crab</u> Alaska king, Tanner, and snow crab stocks in the BSAI and GOA are managed by the State of Alaska (with Federal oversight in the BSAI) on a sustained yield principal. The crab stocks are surveyed each year (by NMFS in the BSAI and by ADF&G in the GOA) and Guideline Harvest Levels (GHLs) are established for each stock, based on an exploitation rate that varies with the abundance of legal sized male crab in each stock. These GHLs may be adjusted in-season, based on additional harvest information, to insure long term sustainable yields.

The most recent stock assessment for eastern Bering Sea crab stocks was conducted by NMFS in November 2004. Additional information on the life history of crab and management measures in the groundfish fisheries to conserve crab stocks can be found in Section 3.5 of the PSEIS (NMFS 2004d) and in the EIS for Bering Sea and Aleutian Islands Crab Fisheries (NMFS 2004b). Four stocks of crab; Saint Matthew Island blue king crab, Pribilof Islands blue king crab, Bering Sea Tanner crab (C. bairdi) and Bering Sea snow crab (C. opilio), are presently being managed under rebuilding plans, approved by the NPFMC. As in 2003, the 2004 directed Saint Matthew Island blue king and Pribilof Islands red and blue king crab fisheries remained closed, due to low abundance. The 2004/2005 Bering Sea hair crab fishery will remain closed this coming year due to the low abundance of hair crab. The Bristol Bay red king crab season opened on October 15, 2004 at noon and closed at 11:59 PM October 18 the GHL for the crab fishery was approximately 14.3 million pounds. ADF&G has announced 2005 GHLs for the Tanner crab season in the Eastern Aleutian District of 200,000 pounds and approximately 20.9 million pounds for the Bearing Sea snow crab fishery. Both of these fisheries are scheduled to open January 15, 2005. In addition to area closures for trawl gear in both the BSAI and GOA, in the BSAI PSC limits have been established for the trawl groundfish fisheries in several areas. These PSC limits and areas are described in 50 CFR 679.21.

In 2004 in the C. opilio bycatch limitation zone (COBLZ), the 2004 PSC limit was set at 4,350,000 animals. In 2004, 1,722,961 animals were incidentally caught in this area. In Zone 1 of the Bering Sea the 2004 PSC limit for Bairdi Tanner crab was set at 980,000 animals, and 209,971 were incidentally caught. In Zone 2 of the Bering Sea, the 2004 PSC limit for Bairdi Tanner crab was set at 2,970,000 animals, and 397,488 were incidentally caught. In Zone 1 of the Bering Sea, the 2004 PSC limit for red king crab was set at 197,000 animals and 69,363 were incidentally caught. Similar levels of crab bycatch during the groundfish trawl fisheries are expected for the 2005 and 2006 groundfish fisheries.

The benchmark used to determine the significance of effects on crab stocks under each alternative was whether MSST levels would be reasonably expected to occur. If the alternative was reasonably expected not to jeopardize the capacity of the crab stocks to maintain MSST levels, it was rated insignificant; if the alternative was reasonably expected to jeopardize the capacity of the crab stocks to reach or maintain MSST levels, it was rated significantly negative; where insufficient information exists to reach conclusions the alternative's effects are rated unknown. These criteria are summarized in Table 4.1-5.

2. Harvest levels of prohibited species criterion

For all prohibited species, if under the alternative considered the catch in the directed fisheries for those species was expected to increase or decrease by more than 20% from 2004 levels, the effect was rated significantly beneficial or adverse, respectively. Management measures in 2004 are similar to those for 2005 and 2006. If under the alternative considered, the catch in the directed fisheries for those species was not expected to increase or decrease by more than 20 % from 2004 levels (Tables 4.5-3d and h), the effect was rated insignificant, as harvest levels based on stock conditions often vary over this range from year to year. If under the alternative considered, insufficient information exists to estimate changes in harvest levels, the effect was rated as unknown. The authors acknowledge that individual fishing operations with substantial reliance upon participation in these State fisheries may experience adverse or beneficial effects at changes in harvest levels below the 20% level. These criteria are summarized in Table 4.1-5.

3. Bycatch levels of prohibited species criterion

The establishment by the Council of annual halibut PSC limits in the directed fisheries of the GOA, and the annual and seasonal apportionments thereof of all PSC limits to gear types and targets in the BSAI and GOA, is of critical importance each year in both minimizing the incidental catch of prohibited species and in maximizing the optimum yield from the groundfish resources to the fishing industry. In this analysis, 2004 prohibited species incidental catch and directed groundfish catch is presented for comparison to the groundfish TAC alternatives in Table 4.5-3.

Under the Magnuson-Stevens Act, National Standard 9 directs that when a regional council prepares an FMP they shall, to the extent practicable, minimize bycatch, and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch. Over the years since the enactment of the Magnuson-Stevens Act in 1976, over 30 FMP amendments designed to help minimize the incidental catch and mortality of prohibited species have been implemented. Levels of incidental catch of prohibited species in each fishery in 2004, (Table 4.5-3) were used to estimate the effects TAC levels set for each fishery on incidental catch levels of prohibited species under each alternative. It was assumed for each fishery that an increase or decrease in TAC would result in a proportional increase or decrease in incidental catch. Increases were not assumed to exceed PSC limitations, where applicable.

For all prohibited species, if under the alternative considered the incidental catch of prohibited species in the directed fisheries for groundfish was expected to increase or decrease by more than 50% from 2004 levels, chosen as the benchmark year for purpose of comparison (Tables 4.5-3d and h), the effect was rated significantly beneficial or adverse. If, under the alternative considered, the incidental catch in the directed fisheries for groundfish was not expected to increase or decrease by more than 50% from 2004 levels, the effect was rated insignificant as incidental catch of prohibited species in the directed groundfish fisheries often vary over this range from year to year. If under the alternative considered insufficient information exists to estimate changes in harvest levels the effect was rated as unknown.

Effects of Alternative 1

Under Alternative 1, catch quotas would be set at the $maxF_{abc}$ level. In the GOA, this would amount to 628,716 mt for 2005, and 593,576 mt in 2006, which falls within the optimum yield range of 116,000 mt to 800,000 mt. However, in the BSAI this would amount to 3,090,885 mt in 2005, and 2,349,580 mt in 2006, which would be constrained by the upper limit established for optimum yield of 2,000,000 mt for the BSAI (50 CFR § 679.20(a)).

Alternative 1 sets catch quotas at the highest levels considered. Even so, PSC limits established for the BSAI by regulation and halibut PSC limitations recommended by the Council for the GOA in 2005 and 2006, along with other factors such as market demand for the different groundfish targets, will likely constrain the harvest of groundfish in both the BSAI and the GOA as in previous years. In the worst case, the entire PSC limit for each prohibited species would be reached in both the BSAI and GOA, and in the GOA, for prohibited species without PSC limits, incidental catch rates would be similar to those in 2004 (Tables 4.5-3d and h) and BSAI CDQ fisheries.

<u>Stocks</u> For Pacific salmon these PSC numerical limits are very low compared to recent average returns and would not be expected to prevent salmon returns from reaching escapement goals. In recent years, there have been concerns for several chinook and chum stocks in the Yukon and Kuskokwim Rivers, which empty into the Bering Sea. Over the last 20 years the average run size of chinook and chum in western Alaska have declined. The ten year (1990-2000) average returns are 540,000 chinook and 5,500,000 chum salmon to western Alaska. However, for 2004 ADF&G has estimated that minimum escapement goals for these stocks have been met, subsistence fishing was not curtailed and that subsistence and some commercial harvests were be permitted. In an analysis on the effects on salmon returns, in the EA prepared for BSAI FMP Amendment 21b to reduce chinook salmon bycatch, it was estimated that with the elimination of all incidental catch in the groundfish fisheries, chinook salmon returns, on average, would increase by 4.4% in the Nushagak and by 1.7% in the Yukon Rivers.

In a more recent study by Witherell, Ackley, and Coon (2002) the proportion of salmon of western Alaska origin taken by trawl gear in the BSAI was estimated to be 60 percent for chinook salmon and 27 percent for chum salmon. For the chinook salmon in western Alaska it was further estimated that 37 percent were from the Yukon drainage system and 63 percent from Bristol Bay. Natural mortality before returning to the salmon's natal stream was estimated to be 19 percent. Using 2004 as an example, where incidental catch is the highest on record, the 62,471 chinook would be expected to contain 37,483 salmon (60%) of western Alaska origin. Natural mortality (19%) would reduce the number of salmon returning to spawn to 30,361 fish. This level of incidental catch would reduce an average return by 5.6 percent. In the case of chum salmon 27 percent of the 456,885, 123,359 fish would be expected to be of western Alaska origin. Natural mortality would reduce that number to 99,920 fish returning to spawn. This number represents about 2 percent of an average run of chum salmon to western Alaska. For these reasons the effect of Alternative 1 on salmon stocks is rated insignificant, with the exception of ESA listed salmon in the BSAI.

The incidental catch of ESA listed salmon and the impacts on the capacity of ESA listed stocks to maintain a benchmark level is unknown but likely to be insignificant. Information is not available to determine the impact on the capacity of the stock to maintain a benchmark level. Coded wire tag (CWT) studies of surrogates of ESA listed chinook salmon showed no ESA chinook salmon taken in the BSAI groundfish fisheries in 2003 and 2004 (NMFS Auk Bay Lab, 2004). Out of 20 years of annual CWT studies, only one fish has been taken in each of 5 years. It is not likely that this low incidence of CWT salmon take will change for 2005 and 2006 fisheries. The 1999 BiOp on ESA listed salmon and the BSAI and GOA groundfish fisheries determined that the taking of ESA listed chinook salmon in the BSAI groundfish fisheries is a rare event, and the CWT studies continue to support this finding (Balsiger). Therefore, even with increased TACs under Alternative 1, it is unlikely that an ESA listed chinook salmon would be taken in the BSAI groundfish fisheries.

Because incidental catch of halibut in the groundfish fisheries, as well as all other removals, is accounted for in setting the directed hook-and-line fishery CEY for halibut, and the total CEY for the fishery is above the estimated long term CEY of 80 million pounds, the effect of incidental catch of halibut on the halibut stock under Alternative 1 is rated insignificant.

The PSC limitation for herring of 1% of current biomass estimates in the BSAI and the low volume of herring bycatch in the GOA (1997 through 1999 average 15 mt (NMFS 2001b)) would not be expected to reduce herring stocks below minimum spawning biomass thresholds under Alternative 1 and the effects are rated insignificant.

In the BSAI, PSC limits for crab are set at a proportion of the estimated number of animals, with upper limits approximately 0.5% for red king crab, 1.2% for Tanner crab, and 0.1 % for snow crab. Given these low levels, even if crab PSC limits were reached, it is unlikely that any effects on crab stocks could be detected. Incidental catch of crab in the GOA is very low. In 2004, a total of 367 red king crab and 71,808 bairdi Tanner crab were taken (Table 4.5-3e and f). Because incidental catch is small, relative to other sources of mortality, time and area closures for trawl gear in the BSAI and GOA are thought to be more effective in reducing effects on crab stocks (Witherell and Harrington 1996) and the effect of Alternative 1 on all crab stocks in the BSAI and GOA is rated insignificant.

<u>Directed PSC fisheries</u> Because there is no commercial fishery for ESA listed salmon, the effect on the harvest of ESA listed salmon in a target fishery is not applicable. Due to the low incidental take of salmon in the GOA, and salmon PSC limitation in savings areas for chum and chinook salmon savings areas in the BSAI, present levels of salmon incidental catch are not likely to affect escapement totals. For those western Alaska stocks of chinook salmon of concern in the EA prepared for Amendment 21b to the BSAI FMP, a reduction in incidental catch of 40,000 chinook was estimated to increase commercial catches on average by 2,700 chinook in the Nushagak and 2,200 chinook in the Yukon Rivers. Similar estimates on effects on chum salmon are not available. As an increase or decrease of less than 20% to the commercial salmon fisheries would not be expected, given the reduced chinook PSC limit of 29,000 fish for 2004 and future years in the chinook Salmon Savings Area in the BSAI, the current PSC limit of 42,000 chum in the Chum Salmon Savings Area in the BSAI, and current incidental catch rates in the GOA, the effect of incidental catch on the commercial catch of salmon under Alternative 1 is rated insignificant.

IPHC staff have made preliminary recommendations for harvests of Pacific halibut for the 2005 fishing year, these recommendations total CEY for the Alaska region was 35,882 mt (round weight equivalents) mt. The combined halibut PSC limit for 2005 and 2006 is unchanged from 2004. If these combined halibut PSC limits, totaling 6,865 mt for 2005 and 2006, were reached, this would represent a reduction in the amount of the total CEY available to the directed fishery of about 19% and as such Alternative 1 is rated insignificant. However, it is worth noting that the reductions in CEY amounts for the directed commercial fishery are not proportional over all halibut management areas. The halibut PSC limits are fixed, rather than floating with the condition of halibut stocks. Indirect effects of a downstream reduction in the potential yield of the halibut stock, due to the mortality of sub-legal sized halibut, has been accounted for by lowering the harvest rates in the directed commercial halibut fishery. This coupled with projected declines in the exploitable biomass in the halibut stock suggest that at some future time the effect of incidental catch of halibut in the groundfish fisheries could have an adverse effect on the directed halibut fishery.

Due to the herring PSC limit of 1% of estimated biomass in the BSAI and the present low volume of incidental catch in the GOA, and normal increase or decrease in the commercial catches, herring would not be likely to increase or decrease by more than 20% under Alternative 1 and the effect on the commercial herring fisheries is rated insignificant.

Due to the crab PSC limits in the BSAI, which like herring are also based on a very small percentage of the estimated biomass of the crab and the present low numbers of crab taken in the GOA, the effect of incidental catch in the groundfish fisheries along with seasonal and area closures to trawl gear on all crab stocks, the effect on commercial crab fisheries is rated insignificant.

Directed groundfish fisheries The apportionment of annual and seasonal PSC limits to the groundfish targets by gear type is of critical importance in order to optimize the harvest of groundfish within PSC limitations. Although average incidental catch of prohibited species by gear type, season, and target are extremely useful in anticipating incidental catch needs to support the harvest of the different groundfish targets, the complex interactions between the distribution of fishing effort and variation in incidental catch rates of prohibited species invariably result in grounding fishing closures due to reaching PSC limits each year. Where PSC limits can be expected to constrain the groundfish fisheries, apportionments are based primarily on socioeconomic concerns. One such example is in the trawl fisheries in the GOA. During the first quarter of the year when incidental catch of halibut in the Pacific cod fishery is at its lowest a greater proportion of the annual halibut allowance is apportioned to the shallow water targets (which include Pacific cod) than at other times of the year. Likewise, during the summer months, when the incidental catch of halibut in the deep-water complex fisheries is at its lowest, a greater proportion of the annual halibut allowance is apportioned to the deep-water targets (which include rockfish). With such apportionments the intent is to maximize, up to TAC levels, the harvest of the most valuable species.

Assuming incidental catch rates of prohibited species in 2005 and 2006, are similar to 2004 levels in the BSAI and GOA (Tables 4.5-3a and h), TAC levels under Alternative 1 in combination with existing seasonal and fishery specific PSC apportionments, and PSC limit closure areas, the total incidental catch of each prohibited species group in those areas would not be expected to increase or decrease by more than 50%. The effect of Alternative 1 on levels of incidental catch of prohibited species in the groundfish fisheries is therefore rated insignificant in the BSAI and GOA.

In 2004 the incidental catch of other salmon in the BSAI rose from 197,091 animals in 2003 to 456,885 animals in 2004, an increase of 132 percent. This increase is further analyzed in section 5 as a past action that may have a cumulative effect. The effect on other salmon stocks taken in the groundfish fisheries is rated significantly adverse. It is likely that the large increase in TAC for the trawl fisheries under Alternative 1 would result in more than a 50 percent increase in the take of other salmon.

The effect on ESA listed salmon is rated adversely significant for the harvest of ESA salmon in the BSAI groundfish fisheries because the potential amount of incidental take in the 2005 and

2006 may be more than 50 percent of the amounts taken in 2004 based on the increased TACs in the trawl fisheries. The taking of only one CWT surrogate fish would exceed the significance criteria.

Effects of Alternative 2

Stocks Under Alternative 2, TACs for the 2005 and 2006 specifications would be set at levels recommended by the Council at its December 2004 meeting. In the BSAI this amounts to a total of 2,000,000 mt in both 2005 and 2006, in the GOA total TACs would amount to 291,298 mt in 2005 and 284,023 mt in 2006. For the reasons discussed under Alternative 1, the effect of Alternative 2 on stocks of prohibited species is rated insignificant (Table 6.0-1) because PSC limits, even if reached, would not have a significant impact on stocks of prohibited species, with the possible exception of ESA listed salmon as discussed above under Alternative 1. Under Alternative 2 the effect on ESA listed salmon in the BSAI is rated unknown, but likely insignificant for the reasons provided under Alternative 1.

Directed PSC fisheries Additionally, for the reasons discussed under Alternative 1, the effects of Alternative 2 on the directed fisheries for prohibited species are rated insignificant (Table 6.0-1) because PSC limits, even if reached, would not significantly reduce the amount harvested by the State managed directed fisheries which are permitted to target prohibited species.

Directed groundfish fisheries In section 4.5.1.4 of the Steller sea lion Protection Measures SEIS (NMFS 2001b), the effects of the preferred alternative on the incidental catch levels of prohibited species were estimated to result in an increase of herring and “other” salmon incidental catches in the pollock fisheries of 16% and 7%, respectively, while the incidental catch of chinook salmon was estimated to be reduced by 9%. In the Pacific cod fisheries, reductions of incidental catch of halibut (11%), Tanner crab (30%), chinook (25%) and “other” salmon (8%) were expected. For chinook salmon in the BSAI, the amount of change in the past four years is usually less than 20 percent (Table 4.5-2). A large change was seen between 2000 and 2001 due to the trawl fisheries being closed in 2000 by court order for Steller sea lion concerns.

Table 4.5-2 Chinook Salmon Incidental Harvest in the BSAI Groundfish Fisheries. (includes CDQ fisheries)

Year	Gear Type	Groundfish (mt)	Chinook salmon (#'s)	"Other" salmon (#'s) Primarily chum salmon
2004	Trawl	1,816,853	62,407	456,674
	Hook and Line	124,077	64	211
	Pot Gear	18,356	0	0
	Jig	215	0	0
	TOTAL	1,959,501	62,471	456,885
2003	Trawl	1,807,391	54,898	197,032
	Hook and Line	138,441	13	59
	Pot Gear	23,594	0	0
	Jig	156	0	0
	TOTAL	1,969,582	54,911	197,091
2002	Trawl	1,787,189	36,360	81,329
	Hook and Line	131,365	25	135
	Pot Gear	16,398	0	6
	Jig	0	0	0
	TOTAL	1,934,952	36,385	81,470
2001	Trawl	1,658,935	40,531	60,678
	Hook and Line	137,128	17	46
	Pot Gear	17,858	0	7
	Jig	0	0	0
	TOTAL	1,813,921	40,548	60,731
2000	Trawl	1,461,212	8,219	59,306
	Hook and Line	126,200	4	16
	Pot Gear	20,136	0	5
	Jig	0	0	0
	TOTAL	1,607,548	8,223	59,327
1999	Trawl	1,295,548	14,583	47,199
	Hook and Line	112,107	7	35
	Pot Gear	17,096	9	0
	Jig	0	0	0
	TOTAL	1,424,751	14,599	47,234

Numbers were generated using blend reports, CDQ catch reports, and queries on the catch accounting databases. Estimates prepared by NMFS, Sustainable Fisheries, Alaska Region. Data up to 11-15-04.

Assuming incidental catch rates of prohibited species in 2005 and 2006, are similar to 2004 levels in the BSAI (Table 4.5-3d) TAC levels under Alternative 2, in combination with seasonal and fishery specific PSC apportionments and management measures, the total incidental catch of each prohibited species group would not be expected to increase or decrease from 2004 levels by more than 50%. Because the levels of 2005 and 2006 harvest are similar to 2004, the effect of Alternative 2 on levels of incidental catch of prohibited species in the groundfish fisheries is rated insignificant in the BSAI (Table 6.0-1). It is unlikely that the amount of other salmon harvest in 2005 and 2006 would exceed levels in 2004 by 50 percent, and therefore the effect of TAC levels under Alternative 2 on other salmon in the BSAI is rated insignificant.

In section 4.5.2.4 the Steller sea lion Protection Measures SEIS (NMFS 2001b), the effects of the preferred alternative on the incidental catch levels of prohibited species in the GOA were estimated to range from an increase of up to 15% (Tanner crab in the pollock fishery), to a decease of 11% ("other" salmon in the pollock fishery) for TACs set at 2000 levels. Assuming incidental catch rates of prohibited species in 2005 and 2006, are similar to 2004 levels in the

GOA (Table 4.5-3h) TAC levels under Alternative 2, in combination with seasonal and fishery specific PSC apportionments, the total incidental catch of each prohibited species group would not be expected to increase or decrease from 2004 levels by more than 50%. The effect of Alternative 2 on levels of incidental catch of prohibited species in the groundfish fisheries is therefore rated insignificant in the GOA (Table 6.0-1).

Effects of Alternative 3

Stocks Under Alternative 3, catch quotas would set TACs to produce F equal to 50% of the $maxF_{abc}$ level for stocks at or above Tier 3, and set TACs equal to 50% of TACs associated with the $maxF_{abc}$ level for stocks at or below the Tier 4 level. In the BSAI this would amount to 1,631,900 mt, and in the GOA 311,953 mt, for 2005, and somewhat lower values in 2006. For the reasons discussed under Alternative 2, the effect of Alternative 3 on stocks of prohibited species, except ESA listed chinook salmon, is rated insignificant (Table 6.0-1) because PSC limits, even if reached, would not have a significant impact on stocks of prohibited species. For reasons given under Alternative 1, the effect of Alternative 3 on the capacity of the stock to maintain a benchmark level for ESA listed salmon in the BSAI is rated unknown, but likely insignificant.
Directed PSC fisheries Additionally, for the reasons discussed under Alternative 1 the effects of Alternative 3 on the directed fisheries for prohibited species is rated insignificant (Table 6.0-1) because PSC limits, even if reached, would not significantly reduce the amount harvested by the directed fisheries which are permitted to target prohibited species.

Directed groundfish fisheries Assuming incidental catch rates of prohibited species in 2005 and 2006, are similar to 2004 levels in the BSAI (Table 4.5-3d), TAC levels under Alternative 3, in combination with seasonal and fishery specific PSC apportionments, the total incidental catch of each prohibited species group in the BSAI would not be expected to increase or decrease by more than 50%. Similarly, assuming incidental catch rates of prohibited species in 2005 and 2006, are similar to 2004 levels in the GOA (Table 4.5-3h), TAC levels under Alternative 3, in combination with annual halibut PSC limits and seasonal and fishery specific halibut PSC apportionments, the total incidental catch of each prohibited species group in the GOA would not be expected to increase or decrease from 2004 levels by more than 50%. As described under Alternative 2, the effect of Alternative 3 on incidental catch levels of prohibited species in the groundfish fisheries is therefore rated insignificant in the BSAI and GOA.

Effects of Alternative 4

Stocks Under Alternative 4, catch quotas would be set at levels equal to the most recent 5 year average actual F for stocks at a Tier 3 level and above, and at the recent 5 year average actual catch for stocks at a Tier 4 level and below. In the BSAI, this would amount to 1,706,691 mt, and in the GOA 215,964 mt, with somewhat lower levels in 2006. Alternative 4 sets TAC at levels that fall within the range of 1,400,000 to 2,000,000 mt in the BSAI and 116,000 mt to 800,000 mt in the GOA, established for optimum yield. For the reasons discussed under Alternative 1, the effect of Alternative 4 on stocks of prohibited species is rated insignificant (Table 6.0-1), except for ESA listed chinook salmon, because PSC limits, even if reached, would not have a significant impact on stocks of prohibited species. The effect on ESA listed chinook salmon is rated unknown but likely insignificant for the reasons provided under Alternative 1.

Directed PSC fisheries Additionally, for the reasons discussed under Alternative 2, the effects of Alternative 4 on the directed fisheries for prohibited species is rated insignificant (Table 6.0-1) because PSC limits, even if reached, would not significantly reduce the amount harvested by the directed fisheries which are permitted to target prohibited species.

Directed groundfish fisheries In combination with TAC recommendations and seasonal and fishery specific PSC apportionments and incidental catch rates in the different fisheries unchanged from 2004 (Table 4.5-3), the total incidental catch of each prohibited species group would not be expected to increase or decrease from 2004 levels by more than 50%. As described under Alternative 2, the effect of Alternative 4 on incidental catch levels of prohibited species in the groundfish fisheries is therefore rated insignificant in the BSAI and GOA (Table 6.0-1).

Effects of Alternative 5

Under Alternative 5, catch quotas would be set at zero and, if adopted, the effect of this alternative would be to close directed fishing for groundfish for the 2005 and 2006 fishing years. The adoption of this alternative is considered unlikely, as harvest levels would be set at levels below the lower limits established for optimum yield in the BSAI of 1,400,000 mt and in the GOA of 116,000 mt. Another effect of Alternative 5 would be to reduce incidental catch of prohibited species in the groundfish fisheries to zero. However, for the reasons discussed under Alternative 1, even if incidental catch were reduced to zero, the effect on stocks of prohibited species and harvest levels in the directed fisheries for these species would be insignificant (Table 6.0-1). A 100% reduction in harvest levels of groundfish (to zero) would reduce the incidental catch level of prohibited species in the groundfish fisheries also to zero (>50%) and is rated significantly positive (Table 6.0-1).

Table 4.5-3 Catch of Groundfish and Prohibited Species in the Groundfish Fisheries in the BSAI and GOA in 2004 by Target, Area, and Gear Type

Table 4.5-3a Groundfish and Prohibited Species Catch by Trawl Gear in the BSAI

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of Chinook Salmon	Numbers of Other Salmon[3]
Atka mackerel	64,816	65	348	37	648	346
Pacific cod	109,014	1519	211,566	1,786	5582	990
Other flatfish	2,640	55	8,597	0	0	0
Flathead sole	28,473	427	163,625	68	499	174
Rock sole	46,756	515	165,756	37,820	657	0
Greenland turbot	285	2	0	0	0	0
Arrowtooth	3,389	81	3,901	45	846	9
Yellowfin sole	98,487	459	257,807	39,137	29	520
Rockfish	10,430	57	197	0	0	0
Sablefish	124	2	99	0	0	0
Other species	182	7	2,625	0	18	19
Pollock (bottom)	19,527	3	14	17	640	1,745
Pollock (midwater)	1,433,838	92	1,192	10	53444	185,578
Unidentified Target					44	9,482
Total	1,817,962	3,283	815,727	78,920	62,408	456,692

Target	Total Catch[1] (mt)	Numbers of Snow crab[2]	Herring (mt)
Rock sole, flathead sole, and other flatfish	77,869	312,286	7
Pacific cod	109,014	88,028	8
Pollock, Atka mackerel, and other species	1,518,363	13,070	997
Yellowfin sole	98,487	1,388,007	3380
Rockfish	10,430	0	0
Greenland turbot, sablefish, and arrowtooth	3798	1,034	1
Total	1,817,962	1,802,425	1094

Table 4.5-3b Groundfish and Prohibited Species Catch by Hook-and-Line Gear in the BSAI

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of chinook Salmon	Numbers of Other Salmon[3]
Pacific cod	126,808	440	9962	14,550	39	91
Greenland turbot	1,669	21	11	0	17	80
Sablefish	742	9	0	0	0	8
Rockfish	4	0	0	0	0	6
Other species	129	3	6	26	0	0
Arrowtooth	0	0	0	0	0	0
Other groundfish	13	0	0	0	0	0
Total	129,365	472	9979	14,576	56	184

Table 4.5-3c Groundfish and Prohibited Species Catch by Pot Gear in the BSAI.

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of chinook Salmon	Numbers of Other Salmon[3]
Pacific cod	17489	3	28025	299	0	0
Sablefish	727	1	45	11	0	0
Total	18,390	4	28,071	309	0	0

Table 4.5-3d Total Groundfish and Prohibited Species Catch by All Gear Types in the BSAI.

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of Chinook Salmon	Numbers of Other Salmon[3]
All	1,965,932	3,759	853,777	93,806	62,408	456,857

Table 4.5-3e Groundfish and Prohibited Species Catch by Trawl Gear in the GOA.

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of Chinook Salmon	Numbers of Other Salmon[3]
Pacific cod	16,650	969	1,179	0	979	52
Deep water flatfish	1,185	58	0	0	0	2
Rex sole	3,521	189	9,016	0	496	1,048
Flathead sole	3,075	63	7,276	0	1,392	91
Shallow water flatfish	3,871	347	10,018	0	461	3,405
Arrowtooth	8,482	298	32,989	0	294	2
Rockfish	25,735	298	1,416	272	866	446
Other species	552	24	0	0	0	0
Sablefish	156	2	0	0	0	0
Pollock (bottom)	11,041	8	879	58	5,362	165
Pollock (midwater)	52,118	1	139	0	7,922	433
Total	126,387	2,256	62,911	331	17,772	56,44

Table 4.5-3f Groundfish and Prohibited Species Catch by Hook-and-Line Gear in the GOA.

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of Chinook Salmon	Numbers of Other Salmon[3]
Pacific cod	11143	295	0	0	13	8
Rockfish	263	7	0	0	0	0
Other species	339	0	0	0	0	0
Sablefish	15733	259	31	0	12	158
Arrowtooth	2	0	0	0	0	0
Deep water flatfish	0	0	0	0	0	0
Total[4]	27,481	561	31	0	25	166

Table 4.5-3g Groundfish and Prohibited Species Catch by Pot Gear in the GOA.

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of Chinook Salmon	Numbers of Other Salmon[3]
Pacific cod	25,148	24	8,866	36	0	0
Total	25,296	24	8,866	36	0	0

Table 4.5-3h Total Groundfish and Prohibited Species Catch by All Gear Types in the GOA.

Target	Total Catch[1] (mt)	Halibut Mortality (mt)	Numbers[2] of Bairdi Crab	Numbers of Red King Crab	Numbers of Chinook Salmon	Numbers of Other Salmon[3]
All	182,509	2,841	71,808	367	17,797	5,811

Source: NMFS 2004 catch accounting system through November 22, 2004
Notes:
[1] Total catch includes all groundfish harvested, the targeted species as well as incidental catch of all other groundfish except for the CDQ groundfish fisheries in the BSAI.
[2] Numbers are estimates of individual animals and include estimates (in the case of crab) all animals, male and female, juvenile and adult, and should not be interpreted as an estimate of legal sized males that are targeted in directed crab fisheries.
[3] other salmon numbers include pink, chum, coho, and red salmon.
[4] The halibut mortality estimates includes those from the pot and hook-and-line sablefish fisheries which are exempt from halibut PSC limits.

4.6 Effects on Marine Mammals and ESA Listed Marine Mammals

Marine mammals were considered in two groups: (1) ESA listed Steller sea lions and (2) ESA listed great whales, other cetaceans, northern fur seals, harbor seals, other pinnipeds, and sea otters. The western distinct population segment (DPS) of Steller sea lions and its critical habitat has been determined to be likely to be adversely affected by the groundfish fisheries (FMP BiOp, NMFS 2000a and NMFS 2001). Implementation of the groundfish fisheries must be done in compliance with the Steller sea lion protection measures (68 FR 204, January 2, 2003) to avoid the likelihood of jeopardy of extinction or adverse modification or destruction of Steller sea lion critical habitat. For this reason, particular attention is warranted for Steller sea lions. No other ESA listed marine mammal has been determined to be likely to be adversely affected by the groundfish fisheries, hence the separate consideration of Steller sea lions from other marine mammals.

The information contained in this analysis, including the SAFE reports (Appendices A and B), comprise the biological assessment the action agency is required to present to the consulting agency under section 7 of the Endangered Species Act. NMFS is both the action and the consulting agency for ESA listed species under NMFS' jurisdiction, including Steller sea lions. As noted in Section 3.2, the groundfish fisheries have recently been evaluated under the Marine Mammal Protection Act (MMPA) and are included in the List of Fisheries published in the Federal Register on August 10, 2004 (69 FR 48407). All groundfish fisheries are listed as Category III fisheries in 2004, based on the criterion that the annual marine mammal mortality in each fishery is expected to be less than or equal to one percent of each marine mammal species potential biological removal (PBR) level.[5]

The causes of impacts on marine mammals are difficult to identify and can be controversial. Changes detected in populations may result from impacts by groundfish fisheries or from other causes. Springer, et al. (2003) discuss a possible mechanism that could explain the decline over

[5] The MMPA (16 U.S.C. 1362 (20)) defines the PBR level as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

recent decades in some north Pacific marine mammal species, including seals, sea lions, and sea otters. Their thesis is that industrial whaling in the mid 20th Century may have removed the primary prey (great whales, particularly fin, sei, and sperm) important to killer whales, thus causing killer whales to shift to feeding on smaller marine mammal prey, in a sequential fashion causing a one-by-one collapse in population size of harbor seals, fur seals, sea lions, and most recently sea otters. The scientific community is not unified in acceptance of this hypothesis. But it is a potential factor that may have influenced marine mammal populations in the north Pacific, with the consequence of either absolving fishery activities as possible causes, or reducing marine mammal population sizes to such a low level that they are more susceptible to effects from smaller perturbations. Most scientists and managers likely agree that there is great uncertainty about the ways these various factors interweave and affect the population dynamics of the various species of marine mammals in this region.

The reference point for determining significant impact to marine mammals is whether the proposed harvest levels will impact the current population trajectory of any marine mammal species or result in impacts different from impacts in 2004. Criteria for determining significance are contained in Table 4.1-6. Significance ratings for each question are summarized in Table 6.0-1. The impacts of the preferred alternative in the PSEIS on marine mammals are analyzed in detail in section 4.9.8 of the PSEIS. In Table 4.9-5, the direct and indirect effects of the preferred alternative in the PSEIS on marine mammals were determined to be insignificant. Cumulative effects were either significantly adverse, insignificant, or conditionally significantly adverse for the preferred alternative in the PSEIS. The cumulative effects of the alternatives for this action are presented in section 5 of this document. Alternatives 1 through 4 of this EA are within the scope of the Preferred Alternative in the PSEIS.

The 2005-2006 harvest specifications include provisions for the opening of the directed pollock fishery in the Aleutian Islands subarea. This fishery has been closed since 1999, but was considered and included in the Steller sea lion protection measures SEIS (NMFS 2001a) and in the EA for the Aleutian Island Pollock fishery FMP and regulatory amendments recommended by the Council in June 2004 (NMFS 2004c). Because the potential approval of Amendment 82 to the BSAI FMP and 2005-2006 harvest specifications would implement the AI pollock fishery after being closed for six years and harvest levels are proposed, detailed discussions regarding the impacts of various TAC alternatives for the Aleutian Islands directed pollock fishery on marine mammals is warranted and found in Section 4.12 of this EA.

Incidental Take/Entanglement in Marine Debris

Annual levels of incidental mortality are estimated by comparing the ratio of observed incidental takings that result in mortality to observed groundfish catch (stratified by area and gear type). Incidental bycatch frequencies also reflect locations where fishing effort is highest. In the Aleutian Islands and GOA, incidental takes are often within Steller sea lion critical habitat. In the Bering Sea, takes are farther off shore and along the continental shelf. Otherwise there seems to be no apparent “hot spot” of incidental catch disproportionate with fishing effort. Therefore, estimated incidental take and entanglement, based on estimated TACs are appropriate.

TACs under Alternatives 2 through 5 are similar to, or less than past harvest amounts and are unlikely to result in mortality levels beyond those seen previously. Under Alternative 5, the no fishing alternative, incidental take will not occur, but marine debris may still be present, posing an entanglement risk for Steller sea lions and for other marine mammals, even with the fisheries not operating. Because mortality amounts are likely to be the same or less than those experienced in 2004, TACs established under Alternatives 2 through 5 are not likely to change the population trajectories by more than 10% and are therefore insignificant.

Alternative 1 would provide for significantly higher amounts of TAC than in 2004. This increase in TACs raises concerns that the amount of incidental take and entanglement may also be higher than with the other alternatives. To determine the possible effects on population trajectory, the stock assessment reports for marine mammals can be used. Stock assessment reports are completed by the National Marine Mammal Laboratory (NMML) every few years for marine mammals occurring in waters in and off Alaska (Angliss and Lodge 2004). The reports are available at the NMFS NMML website at http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/individual_sars.html. These reports provide population estimates, population trends, and potential biological removal amounts. The reports also identify potential causes of mortality and whether the stock is considered a strategic stock under the MMPA. A number of marine mammal stocks have unknown population trends. Two examples of marine mammals that may be taken in the groundfish fisheries are the Eastern North Pacific stock of Killer Whales and the Western North Pacific stock of humpback whales. Both of these species have been observed taken in the BSAI groundfish trawl fishery and are likely to experience more incidental takes with increased fishing effort. These species have very low PBRs, (0.7 for humpback whales, and 7.2 for killer whales). Any additional take of these species may be a concern because the current estimated mortality and serious injury due to all commercial fisheries, exceed 10 percent of the PBR for each of these species and is considered significant in terms of the stock assessment. Because (1) the population trend is unknown for these species, (2) they are likely to be taken in the groundfish fishery, and (3) a similar level of information is available for other marine mammals, the impact of Alternative 1 on the population trajectory through the incidental take and entanglement of other marine mammals is also unknown, but likely to be adverse.

Because of the potential change in Northern sea otter status it is being mentioned individually. Northern sea otters in the Aleutian Islands (from Unimak Pass to Attu Island) were designated by the U.S. Fish and Wildlife Service (USFWS) as candidate species under the ESA on August 22, 2000 (65 FR 67343). On August 21, 2001, the USFWS was petitioned under the Marine Mammal Protection Act (MMPA) for the Alaska stock of sea otters to be listed as depleted. On November 2, 2001 (66 FR 55693), the USFWS determined that the current population of sea otters throughout waters adjacent to Alaska exceeds the optimum sustainable population of 60,000 animals and, therefore, does not meet the criteria to be listed as depleted under the MMPA. On February 11, 2004, the USFWS proposed to list the southwestern stock of sea otters as threatened under the ESA, based on a 56-68 percent population decline since the 1980s (69 FR 6600). The USFWS is continuing to evaluate the sea otter under both the ESA and MMPA.

Northern sea otters are not likely to interact with groundfish fisheries in the Alaska EEZ, because the areas of fishing and the types of prey preferred by otters do not overlap. Otters feed in the near shore areas primarily on invertebrates, while groundfish fisheries are conducted further offshore on groundfish species (Funk 2003). As far as interaction with the groundfish fisheries, NMFS observers monitored incidental take in the 1990–1995 groundfish trawl, longline, and pot fisheries. No mortality or serious injuries to sea otters were observed. One sea otter mortality in the trawl fishery of the BSAI was reported in 1997, but no other sea otter mortality in the groundfish fisheries in the EEZ off Alaska has been reported (Funk 2003). Alternatives 1 through 5 would have insignificant impacts on northern sea otter, because the risk of entanglement is very unlikely and would not affect the population trajectory by more than 10 percent. Alternative 5 would be more beneficial than Alternatives 1 through 4, by eliminating the fishing activities and any potential interaction with sea otters.

Spatial and Temporal Concentration of Fishery

Spatial and temporal concentration effects on all marine mammals by the groundfish fisheries have been analyzed in the PSEIS. Groundfish fisheries management has been modified to comply with ESA considerations for Steller sea lions (NMFS 2001b). The criteria for an insignificant effect determination are based on the assumptions of the Steller sea lion protection measures analysis and the Section 7 biological opinion that the groundfish fisheries, modified by Steller sea lion protection measures, reduce the impacts and prevent the likelihood of jeopardy of extinction or adverse modification or destruction of critical habitat.

The criterion in this EA also is that other protection areas (Pribilof Habitat conservation area and Walrus protection area) that may benefit marine mammals that were in place in 2004, remain unchanged. This determination applies to all ESA listed marine mammal species in the affected management areas because this action falls within the scope of the effects analyzed in the 2000 FMP BiOp. The BiOp found that only Steller sea lions were likely to be at risk of jeopardy and adverse modification of critical habitat.

The spatial and temporal management of the groundfish fisheries in 2005 and 2006, would be the same as in 2004, under Alternatives 1 through 4. Because the spatial and temporal management proposed for the 2005 and 2006 groundfish fisheries under Alternatives 1 through 4 are the same as 2004, the impacts of Alternatives 1 through 4 on the spatial and temporal concentration of the groundfish fisheries are insignificant. Under Alternative 5, TACs would be set equal to zero. This would remove the potential for temporal and spatial concentration of fishing, therefore, Alternative 5 would have significantly beneficial impacts.

Harvest Control of Prey Species

Steller sea lion protection measures require the control of overall harvest of pollock, Pacific cod, and Atka mackerel, which are considered key Steller sea lion prey species (50 CFR 679.20(d)(4)). If the spawning biomass of a prey species is predicted to fall below 20 percent of its unfished spawning biomass, directed fishing for that species would be prohibited. The harvest control rule is analyzed in the Steller sea lion protection measures SEIS (NMFS 2001b). The global harvest of pollock, Pacific cod, and Atka mackerel would be controlled by the harvest control rule for Alternatives 1 through 4, and the global harvest would be below the harvest control rule for Alternative 5. Based on the significance criteria, impacts from Alternatives 1 through 5 on the global harvest of prey species are insignificant.

<u>Gulf of Alaska Pollock</u> The GOA pollock fishery impacts on Steller sea lions may be of concern due to the magnitude of change in the pollock population in the GOA. The estimated female spawning biomass has steadily decreased in the GOA, from 385,000 mt in 1994, to 142,000 mt in 2002 (Appendix B). The model estimate of the spawning biomass of the stock in 2003, was 28 percent of the unfished spawning biomass, fairly close to the 20 percent limit specified in the harvest control rule at 50 CFR 679.20(d)(4). Draft results of the 2003 winter echo integration trawl survey of pollock were provided to the GOA Plan Team at its September 2003 meeting (Guttormsen, Wilson, and Stienessen 2003). Surveys were conducted in the Shumagin Islands, Sanak Trough, Shelikof Strait, and in the shelf breaks near Chirikof Island and Middleton Island in February and March 2003. Overall, the total GOA biomass was estimated to be similar to that in 2002, with mixed results found at the various survey locations.

Disturbance Effects

Vessel traffic, nets moving through the water column, or underwater sound production may all represent perturbations that could affect marine mammal behavior. Foraging could potentially be affected, not only by interactions between vessel and species, but also by changes in fish schooling behavior, distributions, or densities in response to harvesting activities. In other words, disturbance of the prey base may be as relevant a consideration as disturbance of the predator itself. For the purposes of this analysis, some level of prey disturbance may occur as a fisheries effect. The impact on marine mammals using those schools for prey is a function of both the amount of fishing activity and its concentration in space and time, neither of which may be extreme enough under any alternative to represent population level concerns. To the extent that fishery management measures do impose limits on fishing activities inside critical habitat, some protection may be provided from these disturbance effects.

The criterion set for insignificant impacts is a similar level of disturbance as that which was occurring in 2004. The level of disturbance is based on the locations of fishing activities and whether closed areas have been opened. Alternatives 1 through 4 would not open additional areas where disturbance may increase at particular locations, compared to 2004. Alternative 1 allows for more fishing effort than 2004, which in turn may result in more disturbance by increasing the amount of time vessels may be in contact with marine mammals. Thus, the effect under Alternatives 2 through 4 is insignificant and the effect of Alternative 1 is significantly adverse according to the criteria set for significance (Table 4.1-6). Effects on all marine mammals under Alternative 5 is likely to be significantly beneficial, because there would be no interaction between marine mammals and the groundfish fisheries.

The significance determinations for analysis performed in this EA are summarized in Table 6.0-1.

4.7 Effects on Seabirds

Impacts of fishery management on seabirds are difficult to predict due to the lack of information on many aspects of seabird ecology. A summary of known information, both general and species-specific, was presented in the PSEIS, (Section 3.7) and was followed by a description of the comparative baseline to be used for analysis (Sections 3.7.1 and 4.4). An analysis of the effects of each PSEIS alternative on seabirds is provided in sections 4.5 through 4.8, followed by an analysis of the effects of the preliminary preferred alternative in Section 4.9.7 (NMFS 2004d).

The criteria used to evaluate the environmental significance of the alternatives' seabird impacts are described in Section 4.1, and summarized in Table 4.1-7. A summary of the significance ratings for the criteria may be found in Table 6.0-1. Significance of impacts is determined by considering the context in which the action will occur and the intensity of the action. When complete information is not available to reach a strong conclusion regarding impacts, the rating of 'unknown' is used. Table 4.1-7 outlines the qualitative significance criteria or thresholds that are used for determining if an effect has the potential to create a significant impact on seabirds.

Seabird Groups and Effects to Consider

As discussed in Section 4.1, the following species or species groups are considered: (1) northern fulmar, (2) short-tailed albatross, (3) spectacled and Steller's eiders, (4) other albatrosses and shearwaters, (5) piscivorous seabird species, and (6) all other seabird species not already listed.

Given the sparse information, fishery effects on most individual bird species may not be discernable. The fishery effects that may impact seabirds are (a) direct effects of incidental take (in gear and vessel strikes), and indirect effects on (b) prey (forage fish) abundance and availability, (c) benthic habitat. See Table 4.1-7 in Section 4.1 for a list of the impacts. These are discussed at greater length below.

Incidental take

The effects of incidental take of seabirds (from fishing gear and vessel strikes) are described in Section 3.7.1 of the PSEIS (NMFS 2004d). Birds are taken incidentally in longline (hook and line), trawl, and pot gear. Estimation of seabird incidental take from longline and pot vessels is very straightforward. On trawlers, however, sample size issues confound the estimation procedure. This unfortunately creates the need to provide two estimates of total seabird takes for trawl fisheries, depending on the sample size for hauls where seabirds were not recorded. Further, while observers are able to see all gear-related mortalities from longline and pot vessels, on trawl vessels there is anecdotal evidence that seabird mortalities occur from collisions with the trawl sonar cable and main net cables. The extent of that mortality is currently unknown, as observers are fully tasked with sampling the catch. Mortality contributed by the pot fleet is small, accounting for less than one half percent annually. The trawl fleet contributes from 10.6% to 44.9% of the overall mortality, depending on which estimation methodology is used, with the actual amount likely being somewhere between these two bounds. Longline operations contribute the remainder. Due to its minimal contribution to overall seabird mortality, the pot fleet will not be considered in this analysis.

As noted in Section 3.7.1 of the PSEIS (NMFS 2004d), several factors are likely to affect the risk of seabird incidental catch. It is reasonable to assume that risk goes up or down, partly as a consequence of fishing effort (measured as total number of hooks in the longline fleet, and total haul time in the trawl fleet) each year (NMFS 2004d). In the longline fleet, if seabird avoidance measures used to prevent birds from accessing baited hooks are effective, then effort levels would probably be less of a critical factor in the probability of a bird getting hooked. Seabird bycatch avoidance measures are outlined on pages 3.7-7 through 3.7-10 of the PSEIS (NMFS 2004d). New bycatch avoidance measures have been required in the hook-and-line groundfish fisheries of the BSAI and GOA since February 12, 2004 (69 *FR* 1930). These regulations required all hook-and-line vessels over 55 feet to use paired streamer lines. Seabird incidental take in 2003 was reduced by 43% from 2001, when many freezer longliners had not yet begun voluntarily using paired streamer lines. Although the incidental take of seabirds has exhibited some large inter-annual variations, it is worth noting that this is the second year of substantive reductions in seabird incidental take when compared to earlier years. Continued collection of seabird incidental take data by groundfish observers will provide the data necessary to evaluate further changes in the rates.

In the trawl fleet, improved instructions to observers should help refine the estimates, which will in turn allow a better assessment of whether the numbers taken pose a conservation concern. At the same time, the trawl industry, the NMFS, Washington Sea Grant, and the University of Washington are collaborating on a project to reduce or eliminate mortality associated with sonar transducer and net cables.

Food abundance and availability

A description of the effects of prey abundance and availability on seabirds is in Section 3.7.1 of the PSEIS (NMFS 2004d). Detailed conclusions or predictions cannot be made regarding the effects of forage fish bycatch on seabird populations. However, the present understanding is that fisheries management measures affecting abundance and availability of forage fish or other prey species could affect seabird populations (NMFS 2004d; NMFS 2001b), although commercial fisheries do not compete directly with seabirds. There is no directed commercial fishery for those species which compose the forage fish management group and seabirds typically target juvenile stages rather than adults for those target species where there is an overlap between seabirds and commercial fisheries.

The volume of offal and processing wastes probably changes approximately in proportion to the total catch in the fishery. Whereas some bird populations may benefit from the food supply provided by offal and processing waste, the material also acts as an attractant that may lead to increased incidental take of some seabird species (NMFS 2001b). For example, there seems to be little interaction between trawl sonar cables and seabirds in the shoreside delivery fleet, which has minimal discards and offal, while the interactions are higher near catcher/processor vessels (McElderry, et al, in prep). These conclusions are based on very limited samples and should be used with caution. It is also worth noting the apparent reduction in seabird incidental take for the longline fleet described earlier. Should the use of seabird avoidance gear prove effective over time, the negative aspects of seabird attraction to vessels will be reduced. TAC levels under various alternatives could reduce the amount of processing waste and offal that is available to scavenging seabirds, particularly in some areas near major breeding colonies. This impact would need to be considered in the balance of the beneficial and detrimental impacts of the disposal actions.

Benthic habitat

The fishery effects on benthic habitat are described in Section 3.6.4 of the PSEIS (NMFS 2004d). The indirect fishery effects on benthic habitat as utilized by seabirds are described in the seabird summaries provided in each alternative (Sections 4.9.7) (NMFS 2004d).

Cormorants and alcids have diverse diets that include small schooling fishes (capelin and sand lance) and demersal fish species and crustaceans. These birds are capable of diving from 40 m to over 100 m deep and are thus able to reach the ocean floor in many areas. Some species, such as cormorants and guillemots, usually forage in coastal waters during the breeding season, but other species forage well away from land. Bottom trawl gear has the greatest potential to indirectly affect these diving seabirds via physical changes to benthic habitat but pelagic trawls (to various extents), pot gear, and longline gear also contact the ocean floor. Trawling (and to a lesser extent other fishing gear disturbance) can reduce habitat complexity and productivity. (NMFS 2004d, page 4.9-241 to 4.9-242) Gear impacts on benthic habitat would primarily be from bottom trawl gear although pelagic trawls and pot gear also make contact with the bottom and contribute to benthic disturbance. (NMFS 2004d, page 4.9-248)

Effects of Alternative 1 on Seabirds

Incidental take In as much as Alternative 1 could increase fishing effort by setting the TAC to produce a fishing rate equal to $max F_{ABC}$, it has the potential to increase interactions with those seabird species prone to incidental bycatch. The PSEIS (NMFS 2004d) noted that the data suggest that northern fulmars were the only species showing a positive linear relationship between fishing effort and numbers of birds hooked in the longline fisheries. This relationship did not exist for other bird groups and could not be established for fisheries with limited observations (trawl fishery). The short-tailed albatross, because of its small population and endangered species status, and the black-footed albatross, because of concerns of a population decline and high incidental take in the GOA, might also be affected by greater fishing effort (NMFS 2001b). These three species, the northern fulmar, short-tailed albatross, and black-footed albatross, may demonstrate significant adverse effects from incidental take resulting from this alternative. However, because there is insufficient information to document a link between population trends and incidental take of these species and other seabird species, the effect of Alternative 1 on the incidental take of all seabirds was considered likely to be adverse but rated 'unknown'. The Steller Sea Lion Protection Measures SEIS (NMFS 2001b) examines the population trends and potential for effects of groundfish fisheries on these potentially affected species.

Effort should be made to gather data and conduct the analysis and modeling necessary to make a determination in future EA on TAC alternatives on these three species. The overall effectiveness of seabird avoidance measures has not yet been evaluated, but these measures do appear to substantially reduce seabird incidental take in the longline fishery. If seabird avoidance measures are developed and implemented fleet-wide, either through voluntary action or regulation, these may substantially reduce incidental take.

<u>Food abundance and availability</u> The PSEIS concluded that under the preferred alternative, fishery influences on the abundance and availability of forage fish was considered insignificant for populations of northern fulmars and most other seabird groups (NMFS 2004d). The prey base for some piscivorous seabirds, however, could be affected by localized increases in TAC level (NMFS 2001b). Because the effect at the population level of high TAC for these seabird species is unknown, the effect on prey availability is unknown.

The northern fulmar, a species known to benefit from fishery discards in the North Atlantic, may experience a benefit from North Pacific fisheries. Given the unknown effect of incidental take on northern fulmars in the BSAI and on the Pribilof Island colonies in particular, any benefit from a supplemental feeding source could be reduced by the bycatch effects associated with the fishery. Based on this information, the availability of fishery processing wastes could have a beneficial effect on northern fulmars under Alternative 1. It is not possible at this time to determine if this effect is may change the survival or reproductive success, and thus the effect is unknown.

<u>Benthic habitat</u> Specific effects of trawling on piscivorous seabird prey species that depend on benthic habitat in the BSAI/GOA (through habitat change rather than by direct take) are poorly known. However, none of the species in this group appear to have experienced consistent or widespread population declines (USFWS 2003c) so there is no indication that the carrying capacity of the environment has been decreased through changes to benthic habitat (or any other mechanism) (NMFS 2004a). Alternative 1 allows for higher amounts of fishing effort but it is not known if this additional fishing effort is likely to impact additional benthic habitat. The impacts of bottom trawling in benthic habitat on bird species that do not directly depend on the benthic habitat are likely to be insignificant. Because the dependence of survival or reproductive success on the benthic habitat and the amount of additional impact on benthic habitat in relation to increased fishing effort are not known, the impact on piscivorous seabirds that depend on benthic habitat has been rated unknown.

Based on an analysis of the Observer Program data, there is currently no overlap occurred between spectacled eider critical habitat and the groundfish fishery under the baseline conditions. (NMFS, 2004, page 4.9-248) Since Steller's eiders forage almost exclusively in shallow waters inshore of the groundfish fisheries, their preferred winter habitats are not subject to groundfish fishing effort. During the breeding season, the overlap of bottom trawl fisheries and Steller's eider critical habitat is also very limited, involving only a few vessels in a limited area of Kuskokwim

Bay. The effects of this small bottom trawl fishery on Steller's eider critical habitat have not been investigated but considering the limited fishing effort and large area of critical habitat that is not fished, it is unlikely that the changes in benthic habitat resulting from the levels of TAC under Alternative 1 would affect Steller's eiders on a population level. The small amount of fishing in this area is limited by logistical considerations and lack of interest by the fleet. During Section 7 consultations with NOAA, USFWS concluded that the fisheries were not likely to adversely affect Steller's eider critical habitat or their food supply through bottom-contact fishing gear (USFWS 2003a; NMFS 2004a, page 4.9-248). The impact on eiders and on other seabirds not dependent on benthic habitat has been rated insignificant.

Effects of Alternative 2 on Seabirds

Incidental take TAC levels under Alternative 2 are smaller than those under Alternative 1 and similar to those in the 2004 baseline (see Tables 2.4-1 and 2.4-2 in Section 2.4 of the EA). No changes would be made to the seabird avoidance measures currently in place under this alternative. Incidental takes are expected to be similar to or less than those under the baseline because of the modest reductions in TACs described above. Incidental takes of northern fulmars, short-tailed albatross, and black-footed albatross, as discussed under Alternative 1, are not expected to change from the baseline under Alternative 2. Population level impacts on seabirds are not likely to be different from the baseline, and therefore, the effects on seabirds are insignificant.

Food abundance and availability As noted above under "Incidental take," TAC levels under Alternative 2 are smaller than those under Alternative 1, and in general similar to or smaller than those in the 2004 baseline. The PSEIS concluded that under the preferred alternative fishery influences on the abundance and availability of forage fish was considered insignificant for most seabird groups. Although some piscivorous seabirds could be affected by localized increases in TAC levels, Alternative 2 TAC levels are similar to those in the baseline. The effects of Alternative 2 on seabird food abundance are likely to be similar to those under the baseline, because the volume of forage fish removed, and the production of offal is expected to be similar. Seabird survival and reproductive success relative to food abundance and availability, are not likely to be different from the baseline, and therefore, the effects on seabirds are insignificant.

Benthic habitat As noted above under "Incidental take," TAC levels under Alternative 2 are smaller than those under Alternative 1, and in general similar to or smaller than those in the 2004 baseline. Alternative 2 allows for the same methods, locations and amounts of fishing as the baseline fishery. The survival and reproductive success of seabirds that may be dependent on the benthic habitat is likely to be similar to that under the 2004 baseline. Because the impacts on benthic habitat under Alternative 2 are likely to be the similar to those in the baseline fishery, the impacts on seabird survival and reproductive success at the population and colony level (for ESA listed species) have been rated insignificant.

Effects of Alternative 3 on Seabirds

Incidental take Compared to the Alternative 2, the overlap between longline vessels and fulmars foraging near colonies potentially would be reduced under TAC levels of Alternative 3, and could result in reduced levels of interaction and incidental take of fulmars. Given the current levels of incidental take, the existing measures in place to reduce incidental take of seabirds, and all of the above considerations (see also NMFS 2001b and NMFS 2004d), the effect on the population is difficult to determine, and Alternative 3 is considered to have an unknown effect on fulmars in the BSAI. Black-footed albatrosses could be affected in the GOA by lower encounter rates under a $F_{50\%}$., but the impact on population trends is difficult to determine. Thus, the effect of this alternative on incidental take for albatrosses is considered unknown. Other seabird species are likely to have insignificant effects because the amount of fishing effort in general is less than the baseline.

Food abundance and availability For the reasons noted in the PSEIS and summarized in NMFS 2001b, the potential indirect fishery effects on food abundance and availability of Alternative 3 are considered probably less than under the baseline fishery because of overall lower TACs. For most piscivorous seabirds and those that feed further offshore, the effects of fishing effort under this alternative would not likely be different than under current TAC levels and are therefore insignificant. Those seabirds that feed closer to shore or include benthic prey in their diets, such as guillemots, cormorants, eiders and other seaducks, might benefit from lower fishing effort under this alternative. However, the potential for effects on the seabird survival and reproductive success are unknown, and thus effects for these groups of birds is considered unknown.
The availability of fishery processing wastes could decline under Alternative 3, which could reduce supplemental food available to fulmars, which are closely associated with fishing vessels. However, the change in fishing effort is not likely to be sufficiently different from current TAC levels to affect survival and reproductive success for fulmars. Furthermore, reduced fishing could also have the effect of reducing interactions subjecting the birds to incidental take, thus the effects are considered unknown for fulmars.

Benthic habitat For the reasons discussed under Alternative 1, the Alternative 3 habitat impact on piscivorous seabirds has been rated unknown, while the impacts on other species have been rated insignificant.

Effects of Alternative 4 on Seabirds

Incidental take Under Alternative 4, fishing effort varies among target species and regions, with respect to effort under Alternatives 1-3. It is thus difficult to make a determination about the potential effects of this alternative on seabirds. In general, using the 5-year average to set TAC levels is lower than other alternatives (with the exception of Alternative 5, no take). However, important exceptions are the pollock and Pacific cod fisheries in the GOA, which under Alternative 4 are equivalent to those of Alternative 1, the $max F_{ABC}$. Given the current levels of incidental take, the existing measures in place to reduce incidental take of seabirds, and all of the above considerations, Alternative 4 is considered to have an unknown population effect on fulmars, albatrosses and shearwaters. See PSEIS for the analysis of the effect of incidental take on these species. The effects on other seabirds are considered insignificant because the level of harvest and interaction with seabirds is not likely to be substantially different from the baseline fishery.

Food abundance and availability For the reasons noted in the PSEIS, Alternative 3 above, and summarized in NMFS 2001b, the potential indirect fishery effects on food abundance and availability resulting from Alternative 4 are considered unknown on seabird survival and reproductive success for all seabirds.

This alternative has the potential of increasing offal in the GOA, and thus could affect fulmars in particular. However, the survival and reproductive success effects of TAC levels under Alternative 4 are unknown for fulmars, and are likely to be insignificant for other seabirds.

Benthic habitat For the reasons discussed under Alternative 1, the Alternative 4 habitat impact on piscivorous seabirds has been rated unknown, while the impacts on other species have been rated insignificant.

Effects of Alternative 5 on Seabirds

Incidental take The effects of Alternative 5 with respect to incidental take are expected to benefit seabirds subject to incidental take in groundfish fisheries, since it eliminates or greatly reduces fishing effort. Thus, this alternative could have a significant positive effect on populations of fulmars, albatrosses, shearwaters, and gulls. Northern fulmars have considerable overlap between longline fisheries and colony location and distribution at sea (NMFS 2003a, Appendix C). Fulmars also demonstrate a direct link between fishing effort and incidental take rates (NMFS 2004d). For these reasons, a complete absence of fishing has a high potential to have a significant beneficial effect on specific colonies. Similarly, short-tailed albatrosses and black-footed albatrosses may derive significant benefits by reduced incidental take. However, as noted under Alternative 1, insufficient information exists to link population trends and incidental take of these species. Other species would have no incidental catch but not enough information is available to determine whether the reduced catch would lead to changes in population trends. The effects on population trends are therefore, unknown.

Should the seabird new mitigation measures prove effective over time, there will be a less likely benefit to seabirds from reduced incidental take under the no fishing alternative. Differences due to trawl fishing need to be evaluated in light of refined estimates resulting from changes in observer data recording proposed for 2004.

Food abundance and availability By eliminating fishing effort there would be no incidental take of forage species, but the availability of such food to seabirds would need to be considered to determine the level of the benefit. It is not know whether the potential increase in forage species abundance would be available to seabirds and whether it would increase survival and reproductive success. The effects are unknown but likely to be positive for all seabirds. Based on the assumptions noted in NMFS 2001b, the availability of fishery processing wastes could have a significant beneficial effect on northern fulmars, thus, a complete reduction of fishing could reduce offal availability to fulmars. Similar effects might occur for albatrosses, shearwaters, and gulls. The degree to which these populations are dependent on offal are not known. The effect on survival and reproductive success is also unknown, and thus the effect is considered unknown for fulmars, albatrosses, shearwaters, and gulls.

Benthic habitat Under Alternative 5, all TACs would be set equal to zero. Because the scope of the benthic habitat contribution to the food web is not well understood, it is not possible to predict the impact on the seabird survival and reproductive success by eliminating fishing. This alternative has therefore been given an unknown rating for this impact for all seabirds but is likely to be beneficial.

4.8 Effects on Marine Benthic Habitat and Essential Fish Habitat

The effects of fishing on benthic habitat and essential fish habitat, important to Federally managed FMP species and their prey, are analyzed in this section under alternative levels of total allowable catch. A complete evaluation of effects would require detailed information on the distribution and abundance of habitat types, the life history of living habitat, habitat recovery rates, and natural disturbance regimes. Although more habitat data become available from various NOAA and ADF&G research projects each fishing year, much is still unknown about marine benthic habitat and essential fish habitat in the EEZ. Specific effects for alternate TAC levels, and the magnitude of the differences between them, are very difficult to predict, given the limitations of current data.

Both the Final PSEIS (NMFS 2004d) and the Draft EFH EIS (NMFS 2004a) discuss effects of fishing on habitat. Section 3.6 of the PSEIS discusses the role of particularly sensitive or vulnerable areas and types of EFH, referred to as Habitat Areas of Particular Concern (HAPCs) and outlines the history of fisheries management in protecting EFH. It also includes a discussion of the effects of different gear types on EFH and on different types of substrate, and has information on the patterns of trawling in the North Pacific and on the past and present effects of fishing on EFH. A habitat impacts model is presented in Section 4.1.6, and Appendix A contains tables summarizing the effects of each alternative on habitat.

The Draft EFH EIS (NMFS 2004a) contains different alternatives for identifying and mitigating effects on EFH and alternative approaches for identifying HAPC. It contains an analysis of the expected effects of each of these alternatives on EFH, as well as other environmental quality factors. Chapter 3 of the Draft EFH EIS describes the affected environment. Section 3.4.1.2 describes the groundfish fisheries, and Section 3.4.3, describes the effects of fishing activity on fish habitat. The effects of pelagic and non-pelagic trawl gear, longline gear, and pot gear, are all evaluated separately. Appendix B provides an evaluation of fishing activities that may adversely affect essential fish habitat. This appendix uses a model to incorporate issues of fishing intensity, sensitivity of habitat, and habitat recovery rates into the development of a "unified measure of the resulting effects."(NMFS, 2004a, page B-5). Appendix F contains a series of reports describing the essential fish habitat for important groundfish species.

Table 4.1-8 provides significance criteria for effects on habitat. These effects include direct and indirect effects on living habitat through direct mortality of benthic organisms, changes to benthic community structure, and geographic diversity of management and fishing effort. The reference points from which the significance of effects are determined are the current size and quality of marine benthic habitat and other essential fish habitat and the change from the current management of the groundfish fisheries.

Total Allowable Catch Specifications Alternatives 1, 2, 3, and 4

<u>Changes to Living Habitat – Direct Mortality of Benthic Organisms:</u> The direct mortality on benthic organisms from groundfish fisheries is likely to be affected by the amount of harvest that is permitted. The more harvest permitted, the more activity that is likely to happen in those areas where groundfish fishing takes place which may result in additional mortality for benthic organisms in these locations. Alternatives 2, 3, and 4 would implement harvest levels that are near or below the current management regime and would likely have impacts on the direct mortality of benthic organisms that is the same or less than impacts currently experienced in the groundfish fisheries, therefore have insignificant effects.

Alternative 1 would allow for larger amounts of harvest overall, may result in levels of fishing effort above those seen under the current management regime, and may cause mortality of benthic organisms beyond those currently experienced. For example, 2005 Alternative 1 BSAI TACs exceed Alternative 2 TACs by about 1.5 million mt.

Sixty percent of this is pollock that would be taken with mid-water trawls. This gear would have relatively small impacts on benthic habitat, although the Draft EFH EIS notes that "pelagic trawls may be fished in contact with the seafloor, and there are times and places where there may be strong incentives to do so, for example, the EBS shelf during the summer." (NMFS 2004a, page 3-162).

However, much of the additional metric tonnage would consist of species taken with longline and non-pelagic trawl gear. These species include Pacific cod (an additional 83,448 mt), yellowtail sole (an additional 23,225 mt), rock sole (an additional 86,920 mt), and others. Longline gear and non-pelagic trawls work on the bottom and can have an adverse impact on benthic habitat (see the descriptions of effects of gear on benthic habitats in Section 3.4.3.2 of the Draft EFH EIS). It is not clear to what extent increased TACs would result in increased bottom contact by these gear types. It may not be possible to market the increased quantities of many of these species (for example, increased arrowtooth flounder TACs). In other instances, incidental catch constraints for PSC species may limit the industry's ability to catch the increased TACs. Because of the increased TACs in many instances, Alternative 1 impacts on the mortality of benthic organisms are considered significantly adverse.

<u>Changes to Benthic Community Structure – Benthic Community Diversity and Geographic Diversity of Management:</u> Alternative 2, 3, and 4 would allow harvest levels near or below the current management regime. Locations of management measures for the groundfish fisheries, under each of these alternatives are the same as the current management regime. Because the levels of harvest are similar to, or less than, current management levels, and the locations of fishing management are not changed under these alternatives, the impacts on benthic community structures and the geographic diversity of management measures and fishing effort are insignificant.

Alternative 1 would allow for an increase in the overall amount of harvest beyond baseline levels. This increase in harvest may result in additional removal of organisms from the benthic community that may result in changes to the community structure, depending on the type of organisms removed and the potential rate of recovery. Information on how the additional harvest may change the community structure is not available at this time. Therefore, Alternative 1 has potentially adverse, but unknown effects on benthic community diversity. The geographic management of the groundfish fishery would not change under Alternative 1, and therefore, the impacts of Alternative 1 on the geographic diversity of management measures and fishing effort are insignificant.

Total Allowable Catch Specifications Alternative 5

Alternative 5 sets the TACs to zero. No groundfish fisheries would have an allocation, and therefore no fishing would occur.

<u>Changes to Living Habitat – Direct Mortality of Benthic Organisms</u> The level of mortality under a no fishing regime would be much less than the level of mortality currently experienced in the groundfish fisheries. Abundance increases for short-lived biota with fast recovery rates may occur relatively quickly if no fishing occurred during the 2005 and 2006 fishing years. For other species of living substrates such as long-lived corals and perhaps some sponges that have been permanently eradicated from some areas, increases over baseline levels during 2005 and 2006 may not occur or would occur very slowly. Even though the ability of the biota to recover from the impacts of the current fishing practices vary, the effects of Alternative 5 on the direct mortality of benthic organisms would be less than the current management and is therefore considered significantly beneficial.

Changes to Benthic Community Structure As discussed above for changes in living habitat, some changes in community structure may be seen in 2005 and 2006 with no fishing, but detectable, meaningful changes in community structure are expected to take longer than two years to accumulate. Shorter lived species that are capable of re-colonizing damaged areas may increase the structure in some benthic communities. There is insufficient information to determine whether the cessation of fishing for two years would result in an overall change in the benthic community structure beyond what would happen under the current management regime. The effects of Alternative 5 on benthic community structure are therefore likely to be positive, but unknown.

Distribution of Fishing Effort – Geographic Diversity of Management With no fishing occurring, the distribution of fishing effort to protect the geographic diversity of habitat would be unnecessary. The elimination of fishing would allow for widespread protection of the geographic diversity of benthic communities, resulting in significant beneficial impacts on the distribution of fishing effort and geographic diversity of management measures.

4.9 Effects on the Ecosystem

Ecosystems are populations (consisting of single species) and communities (consisting of two or more species) of interacting organisms and their physical environment that form a functional unit with a characteristic trophic structure (food web) and material cycles (movement of mass and energy among the groups).

The indicators of ecosystem function used to interpret and predict the effects of the BSAI and GOA groundfish fisheries on the ecosystem are listed in Table 4.1-9. The indicators were separated into categories relating to the three key ecosystem attributes of predator/prey relationships, energy flow/removal, and diversity. Background information specific to the North Pacific ecosystem is contained in Appendix C of this EA/FRFA ("Ecosystem Considerations for 2005"). The analysis of direct and indirect ecosystem impacts under the preferred alternative in the PSEIS may be found on pages 4.9-351 to 4.9-357 (NMFS, 2004d, Volume IV)

Predator-prey relationships

Pelagic forage availability The significance of impacts on pelagic forage availability is assessed with respect to whether or not fishery induced changes are outside the natural level of abundance or variability for a prey species relative to predator demands. (Section 4.1, Table 4.1-9) Significance is assessed primarily by evaluating population trends in pelagic forage biomass for species with age-structured population models. These include walleye pollock in the GOA, Bering Sea walleye pollock, and Aleutian Islands Atka mackerel. For other forage species (herring, squid, and the forage species group), bycatch trends are used as measures of the potential impact of the BSAI and GOA groundfish fisheries on forage availability. (NMFS, 2004d, page 4.9-352)

EBS pollock biomass was at low levels in the late 1970s, but rose to over 10 million mt a year by 1993. EBS pollock biomass has fluctuated between 10 million and 15 million mt since that time. (Appendix C, page 121) Estimates prepared with age-structured population models indicate that female spawning biomass ranged between 893,000 mt and 4.4 million mt between 1977 and 2004. The 2004 estimate was 3.9 million mt. (Appendix A, page 75). The model projects declines in biomass from current levels under all alternatives. Alternatives 1 and 2 project declines to about 2.4 million mt in 2006, and then gradual increases to stable levels of 3.0 million mt from 2010 to 2016 (the end of the projection period in the SAFE). These projections overstate the decline under Alternative 2, because they assume that harvests will be at assessment author recommended fishing rates, rather than at the lower rates imposed by the Council due to OY considerations. The assessment authors point out that at a constant harvest of 1.5 million mt (slightly above current TACs) the biomass remains above 3 million mt. (Appendix A, page 55) Alternatives 3 and 4 also involve short term harvest declines and longer term increases. Biomass in these projections never goes below 3 million mt. Alternative 5 involves increases in pollock biomass from current levels. (Appendix A, page 77) Biomass fluctuations under all scenarios stay within levels observed in the last 20 years.

Under Alternatives 1 through 4, the AI pollock fishery will be reopened in 2005, with a TAC of 19,000 mt. Alternative 5 would maintain the fishery as essentially an ICA fishery with a TAC of 1,000 mt to 2,000 mt. The impact of the new AI pollock fishery on marine mammal and seabird predators is reviewed in Section 4.12 of this EA. Impacts on predators were rated insignificant.

Pollock biomass in the GOA has declined more or less continuously since a peak of almost 4 million mt in the early 1980s. In recent years pollock biomass has been under 1 million mt, although it appears to have increased slightly between 2000 and 2003. In the late 1970s, pollock was the dominant GOA groundfish species; its position was replaced by arrowtooth flounder in 1986. (Appendix C, page 121) Age-structured population models suggest that the female spawning biomass has ranged between 749,000 mt and 142,000 mt, over the period from 1977 to 2003. As noted, biomass sizes were declining over that period. The population models indicate that all alternatives are associated with increases in the estimated spawning biomass from current levels. (Appendix B, pages 80 and 83) Section 4.6 of this EA, which examines the impact of alternatives on marine mammals, describes the GOA pollock fishery as a topic of concern due to the low levels of biomass and its potential impacts on Steller sea lions, noting that the "…model estimate of the spawning biomass of the stock in 2003 was 28 percent of the unfished spawning biomass, fairly close to the 20 percent limit specified in the harvest control rule…" for closing fishing.

Age-structured population model estimates of total biomass since 1977, indicate that AI Atka mackerel biomass has fluctuated between 260,860 mt and 771,360 mt; biomass appears to have been relatively stable since 1997, fluctuating between 414,840 mt and 459,030 mt. Female spawning biomass fluctuated between 59,000 mt and 200,000 mt over the same period. In recent years (1999-2004) female spawning biomass has fluctuated between 76,000 mt and 100,000 mt. The age structured models suggest that female spawning biomass will drop somewhat in the shortrun under either Alternatives 1 or 2, reaching a minimum of 68,000 mt in 2006, before rising to and staying at recent levels through 2016. Biomass stays at current levels under Alternative 3 and then rises to between 110,000 mt and 120,000 mt, from 2008 to 2016. Biomass drops somewhat under Alternative 4, but then rises again, staying between 90,000 mt and 100,000 mt, from 2009 to 2016. Biomass rises systematically under Alternative 5, reaching about 200,000 mt, in 2016. (Appendix A, page 749 and 752)

Under the preferred alternative in the PSEIS, the estimated pelagic forage biomass for the age-modeled populations declines from the baseline in the BSAI and increases over the baseline in the GOA. Twenty-year biomass projections show similar trends. Average biomass, however, remains within the bounds of estimated biomass that occurred historically before a target fishery emerged. Bycatch of other forage species increases in the BSAI and declines in the GOA. (NMFS, 2004d, page 4.9-352)

As noted in Section 4.4 of this EA (on forage fish species) Alternatives 1, 3 and 4 are rated unknown with respect to forage species, Alternative 2 is rated insignificant, and Alternative 5 is rated as beneficially significant. In Section 4.5 of this EA (on PSC species) all of the alternatives have been rated as insignificant with respect to impacts on herring populations. Estimates of forage biomass from food web models of the EBS indicate that levels of bycatch at recent harvest levels (represented by the baseline in the PSEIS) have probably been a small proportion of the total forage biomass, although because population-level assessments are lacking for some members of the forage species group, corresponding biomass estimates for these species are not available. (NMFS, 2004d, page 4.9-352)

Because average biomass projections for the age-modeled forage species remain within the estimated historical boundaries, and bycatch-based estimates for other forage species are small in relation to total forage biomass, specifications Alternatives 1, 2, 3, and 4 are given insignificant ratings. Alternative 5 sets all species TACs equal to zero. This alternative has been given a positively significant rating. (NMFS, 2004, page 4.9-352)

Spatial and temporal The spatial and temporal concentration of fishery impacts on forage species is assessed qualitatively by considering the potential for the alternative to concentrate fishing on forage species in regions used by predators tied to land, such as pinnipeds and breeding seabirds. Additionally, the possibility for concentrated fishing effort to result in an ESA listing or in the lack of recovery of a species that is already listed is also considered. (NMFS, 2004d, page 4.9-353)

All specifications alternatives under consideration would continue the existing closures around Steller sea lion rookeries, trawl and fixed gear closures in nearshore and critical habitat areas, the ban on directed fishing for forage fish, the seabird protection measures required since February 2004 in hook-and-line fisheries, and the spatial/temporal allocation of TAC for some BSAI and GOA species. Ecosystem Appendix C to this EA provides a map of groundfish closures in Alaska's Exclusive Economic Zone and a table summarizing groundfish trawl closures implemented since 1995. BSAI pollock fisheries have shown increasing catch in northern fur seal foraging habitat, but more research is required to evaluate whether the amounts of pollock removed are having a population-level effect on fur seals. (NMFS, 2004d, page 4.9-353)

Alternatives 2, 3, and 4 have been rated insignificant because they involve harvests similar to or less than recent harvests, and no change in spatial or temporal controls. Alternative 1 has been rated unknown, because of the large increase in BSAI pollock harvests it implies, and because of the noted potential for increased pollock catches in northern fur seal habitat. Alternative 5 has been rated significantly beneficial, because of the removal of the need for spatial and temporal controls of fishing under the no fishing regime for protection of the ecosystem.

Removal of top predators The significance criterion for removal of top level predators is whether or not catch levels are high enough to cause the biomass of one or more top level predator species to fall below minimum biologically acceptable limits. Removal of top predators, either through directed fishing or bycatch, is assessed by (1) an examination of the trophic level of the catch or bycatch, (2) the bycatch levels of sensitive top level predators, and (3) the population status of top predator species relative to acceptable limits. (Section 4.1, Table 4.1-9) The PSEIS elaborates somewhat on the ways these indicators are meant to be evaluated:

> Removal of top predators, either through directed fishing or bycatch, is assessed by evaluating the trophic level of the catch relative to the trophic level of the groundfish biomass…, bycatch levels of sensitive top predator species such as birds and sharks…, and a qualitative evaluation of the potential for catch levels to cause one or more top-level predator species to fall below biologically acceptable limits (MSST for groundfish;

for other species, ESA listing or preventing recovery of an already-listed species). (NMFS, 2004d, page 4.9-353)

The PSEIS points out that trophic level of the catch in both the BSAI and GOA have been stable. (NMFS, 2004, 4.9-353). In 1999, Livingston *et al.* "found no evidence that groundfish fisheries had caused declines in tropic guild diversity for the groups studied." Observed changes in tropic guild diversity appeared to be "related primarily to recruitment rather than to fishing." (NMFS, 2004d, page 3.10-26) More recently, as noted in this year's ecological SAFE, which may be found in Appendix C, "Stability in the trophic level of the total fish and invertebrate catches in the eastern Bering Sea, Aleutian Islands, and Gulf of Alaska…are another indication that the "fishing-down" effect is not occurring in these regions. Although there has been a general increase in the amount of catch since the late 1960's in all areas, the trophic level of the catch has been high and stable over the last 25 years." The Appendix also reports on a "Fishery in Balance Index" or FIB, which declines "when catches do not increase as expected when moving down the food web, relative to an initial baseline year. In the Alaska region, the index suggests that "…catches and tropic level of the catch in the EBS, AI, and GOA have been relatively constant and suggest an ecological balance in the catch patterns." (Appendix C, page 166) This indicator is unknown for Alternative 1, which is associated with large increases in TACs, and is rated insignificant for the other alternatives, under which TACs remain at recent levels, or are reduced.

The above indicators result in no change in the evaluation of the importance of this effect relative to the baseline. The baseline determination shows that historical whaling has resulted in low present-day abundance of whale species in the North Pacific Ocean. The PSEIS preferred alternative would not further impair the recovery of these species through direct takes. Similarly, it is not expected that levels of seabird or pinniped bycatch in groundfish fisheries would lead to an ESA listing for any of those populations or prevent any of the listed species from recovery under the ESA. (NMFS, 2004d, 4.9-353)

Bycatch levels of top-level predators are assumed to vary with catch levels, and thus with the TAC levels that constrain catches. Alternative 1 is associated with large increases in TAC and catch levels in the BSAI and GOA. This alternative is assumed to have a significantly adverse impact on this indicator. Alternatives 2, 3, and 4, are associated with harvest levels similar to or less than, those in recent years. These alternatives have been rated insignificant with respect to this indicator. Under Alternative 5, all TACs and catches would be set at zero. This alternative is rated positively significant.

Section 4.6 of the EA examined the impacts of groundfish fishery incidental takes of marine mammals and found the impact of Alternative 1 to be unknown, and of Alternatives 2, 3, 4, and 5 to be insignificant. Section 4.7 examined the impacts on incidental takes of seabirds, and found an unknown effect for at least one species for each alternative except for Alternative 2. The effect of shark bycatch on shark populations is currently unknown, and further research focusing on population assessments and establishing reliable biomass estimates for these sensitive (late maturing, low fecundity, low natural mortality) species is needed to identify potential effects from the groundfish fisheries. (NMFS, 2004d, 4.9-354)

Unknown marine mammal impacts from Alternative 1, unknown seabird impacts from some alternatives, and the unknown impacts of the fishery shark bycatch on shark populations, lead to an unknown rating for all five alternatives. While TACs are set to zero under Alternative 5, in the absence of better baseline information, it is not clear that this alternative would have a significant impact.

Introduction of non-native species The introduction of non-native species through ballast water exchange and hull-fouling organism release from fishing vessels could potentially disrupt the Alaskan marine food web structure. There have been 24 non-indigenous plant and animal species documented in Alaskan marine waters, primarily in shallow-water nearshore and estuarine ecosystems, with 15 of those species recorded in PWS. It is possible that most of these introductions were from tankers or other large commercial vessels that have large volumes of ballast exchange. However, exchange via fishery vessels that take on ballast from areas where invasive species have already been established and then transit through Alaskan inshore waters has been identified as a threat in a recently developed State of Alaska Aquatic Nuisance Species Management Plan. (NMFS, 2004d, 4.9-354)

Total groundfish catch levels are used as an indicator of potential changes in the amount of these releases by groundfish fishery vessels. Catch levels in the BSAI and GOA increase substantially beyond recent levels under Alternative 1. Catch levels are similar to or less than 2004 levels under Alternatives 2, 3, and 4. Catch levels are set to zero under Alternative 5. Consequently, Alternative 1 has been rated significantly adverse, Alternatives 2, 3, and 4, have been rated insignificant, and Alternative 5 has been rated significantly beneficial. (NMFS, 2004, 4.9-354 to 4.9-355)

As noted in Section 4.12, the opening of the AI pollock fishery may increase the number of vessels operating in the AI, and the potential for the introduction of rats into islands that are currently rat-free. This could pose a threat to some bird species on those islands. That discussion indicates that the likelihood of this was small, however, and that the reopening of this fishery would have insignificant impact.

Energy flow and removal

Energy removal Fishing may alter the amount of energy in an ecosystem by removing energy through the retained harvest of fish. The indicator for energy removal is trends in total retained catch levels. (See Section 4.1, Table 4.1-9). The PSEIS notes that "The annual total catch biomass in the EBS is estimated at about one percent of the total system biomass, excluding dead organic material. There is no indication that the annual removal of this small biomass percentage alters the amount and flow of energy sufficiently to affect ecosystem stability." (NMFS, 2004d, page 3.10-24).

Total retained catch mortality is projected to increase under Alternative 1. However, given the limited potential for impacts on the ecosystem this impact has been rated insignificant. Harvests under Alternatives 2, 3, and 4 are expected to be similar to or smaller than current levels. These alternatives have been rated insignificant. Alternative 5 sets all TACs equal to zero. However, given the limited impact of removals of retained harvest, this alternative has also been rated insignificant.

Energy re-direction Fishing may alter the direction of energy flow in an ecosystem. Energy re-direction, in the form of discards, fishery offal production, or unobserved gear-related mortality, can potentially change the natural pathways of energy flow in the ecosystem. The recipients, locations, and forms of this returned biomass may differ from those in an unfished system. Three factors: (1) trends in discard and offal production, (2) scavenger population trends, and (3) bottom gear effort, were identified as formal indicators of energy redirection in Section 4.1, Table 4.1-9). Animals damaged when passing through the meshes of trawls may later die and be consumed by scavengers. Bottom trawls can expose benthic organisms and make them more vulnerable to predation. Discards and offal production can cause local enrichment and changes in species composition or water quality if discards or offal returns are concentrated in confined areas such as estuaries, bays, and lagoons. (NMFS, 2004d, 4.9-355)

Ecosystem Appendix C shows that biomass discards in BSAI and GOA groundfish fisheries dropped substantially in 1998, with the introduction of regulations prohibiting the discards of pollock and Pacific cod. The BSAI biomass discard rate in 2003, was under 6%, while the GOA rate was under 15%. The GOA rate had risen somewhat since the drop in 1998, but remained below the levels of the mid-1990s. (Appendix C, page 156). The PSEIS notes that:

> Queirolo, *et al.* (1995), working before present stricter retention requirements for pollock and cod were mandated, estimated that the total production of discarded fish and processing wastes in the BSAI and GOA ecosystems were about one percent of the unused detritus already going to the bottom. With the new retention requirements now in effect, this estimate would be substantially smaller. These authors found no changes in scavenger populations relating to changes in discard or offal production, and found the annual consumptive capacity of scavenging birds, groundfish, and crabs in the EBS to be over 10 times larger than the total production of discards and offal in the BSAI and GOA. Pathways of energy flow within the BSAI and GOA ecosystems, therefore, are apparently not redirected in any significant way by discarded fish bycatch and processing wastes that are returned to the sea. (NMFS, 2004d, page 3.10-25)

Bottom gear effort may affect benthic habitat, and its capacity to support marine fish and invertebrates that use the habitat for protection from predators. Because of this the use of bottom gear may be an indicator of the potential for this source of energy redirection. The PSEIS notes that "Present-day trends in bottom gear effort show there has been a decline in this effort over the last ten or more years." (NMFS 2004d, page 3.10-25).

Given the limited significance of the offal production and scavenging in the ecosystem, the impacts of all alternatives have been rated insignificant with respect to the first two indicators. Alternative 1 may lead to significantly increased use of bottom trawl gear. As noted in Section 4.8, this alternative was expected to have significantly adverse impacts with respect to direct mortality of benthic organisms, and unknown impacts with respect to changes in benthic community structure. For these reasons, Alternative 1 has been given a significantly adverse rating for this issue. Alternatives 2 to 4 create impacts similar to those in recent years, and have been given an insignificant rating on this indicator. Alternative 5 sets all TACs equal to zero, and has been given a positively significant rating on this indicator.

Diversity

<u>Species diversity</u> Species diversity, defined as the number of different species in an ecosystem, can be altered if fishing results in removal of one or more species from the system . An impact on species diversity is significant if catch removals are high enough to cause the biomass of one or more species (target or nontarget) to fall below or to be kept from recovering from levels below minimum biologically acceptable limits. The indicators for species diversity are: (1) population levels of target and non-target species relative to MSST or ESA listing thresholds, linked to fishing removals, (2) bycatch amounts of sensitive (low potential population turnover rates) species that lack population estimates, (3) number of ESA listed marine species, and (4) area closures. (Section 4.1, Table 4.1-9).

Population levels of target, non-specified, PSC, and forage species were addressed in Sections 4.2, 4.3, 4.4, and 4.5 of this EA. The impacts on target species were rated insignificant for

Alternatives 1 to 4 and beneficially significant for Alternative 5. The impacts on non-specified and forage fish species were unknown for Alternatives 1, 3, and 4, insignificant for Alternative 2, and beneficially significant for Alternative 5. The impacts for PSC were insignificant for all alternatives. Summarizing these results for this ecosystem indicator, Alternative 1 is rated unknown, Alternative 2 is rated insignificant, Alternatives 3 and 4 are rated unknown, and Alternative 5 is rated positively significant.

Although no fishing-related species removals have been documented under fisheries management policies in effect during the last 30 years, elasmobranches (sharks, skates, and rays) are particularly susceptible to removal, and benthic invertebrate species diversity could be affected by bottom trawling. (NMFS, 2004d, page 3.10-26) More comprehensive survey data and life history parameter determinations for skates, sharks, grenadiers, and other species groups may help to determine population status and establish additional protection measures that could minimize adverse impacts from fishing. (NMFS, 2004d, page 4.9-356). Alternative 1, under which there are large increases in TACs, has been rated adversely significant for this impact. Alternatives 2, 3, and 4, under which TACs remain close to what they were in 2004, or decline somewhat, have been rated insignificant. Alternative 5, under which TACs are set to zero, has been rated beneficially significant.

Table 6.0-2 identifies the ESA listed and candidate species that range into the BSAI or GOA groundfish management areas. As determined in previous ESA consultation BiOps (NMFS 2000, 2001a, and USFWS 2003), the alternatives under consideration in this EA are not expected to change the number of ESA marine species, or the status of existing ESA listed species. Species currently listed as candidates for ESA listing (northern sea otter and Kittlitz murrelet) have little overlap with groundfish fisheries (NMFS 2004d, NMFS 2004e, and 69 FR 24876, May 4, 2004). Harvest levels under Alternatives 1-4 are unlikely to increase the potential for these species to be listed. Alternative 5 also is not likely to result in the removal of any threatened or endangered species from the ESA listed because of the short duration of the action and the time period needed to recover a species. Alternatives 1 to 5 have been rated insignificant with respect to this impact.

Under all the alternatives, currently closed areas (50 CFR 679.22) would be maintained, and current no-trawl zones and fixed-gear restrictions would stay in place. Alternatives 1-4 have been rated insignificant with respect to this impact. Alternative 5 would close the entire EEZ to groundfish fishing and therefore would provide a significant beneficial impact to closure areas.

In summary, Alternative 1 is rated adversely significant, Alternatives 2 is rated insignificant, and Alternatives 3, and 4 are rated insignificant, and Alternative 5 is rated beneficially significant.

Functional (tropic, structural habitat) diversity Functional diversity can be altered with respect to trophic characteristics if removal or depletion of a trophic guild member occurs. Changes to distribution of biomass within a trophic guild may also result. From a structural habitat standpoint, functional diversity can be altered or damaged if benthic fishing methods such as bottom trawling remove or deplete organisms that provide structural habitat for other species (e.g., corals, sea anemones, sponges). Functional (either trophic or structural habitat) diversity can be altered through fishing if selective removal of one member of a functional guild results in increases in other guild members. A functional guild is a group of species that utilize resources within the ecosystem in similar ways. (NMFS, 2004d, 4.9-355 to 4.9-356) Significance thresholds are characterized by catch removals resulting in a change in functional diversity outside the range of natural variability observed for the system. Three indicators are used with respect to functional diversity: (1) guild diversity or size diversity changes linked to fishing removals, (2) bottom gear effort, and (3) HAPC biota bycatch. (Section 4.1, Table 4.1-9)

In 1999, Livingston *et al.* "found no evidence that groundfish fisheries had caused declines in tropic guild diversity for the groups studied." Observed changes in tropic guild diversity appeared to be "related primarily to recruitment rather than to fishing." (NMFS, 2004d, page 3.10-26) More recently, as noted in this year's ecological SAFE, which may be found in Appendix C, "Stability in the trophic level of the total fish and invertebrate catches in the eastern Bering Sea, Aleutian Islands, and Gulf of Alaska…are another indication that the "fishing-down" effect is not occurring in these regions. Although there has been a general increase in the amount of catch since the late 1960's in all areas, the trophic level of the catch has been high and stable over the last 25 years." The Appendix also reports on a "Fishery in Balance Index" or FIB, which declines "when catches do not increase as expected when moving down the food web, relative to an initial baseline year. In the Alaska region, the index suggests that "…catches and tropic level of the catch in the EBS, AI, and GOA have been relatively constant and suggest an ecological balance in the catch patterns." (Appendix C, page 166) This indicator is unknown for Alternative 1, which is associated with large increases in TACs, and is rated insignificant for the other alternatives, under which TACs remain at recent levels, or are reduced.
Bottom gear effort, which is an indicator of benthic community guild disturbance, has been decreasing in recent years. (NMFS, 2004d, page 3.10-26). This indicator has been rated significant adverse for Alternative 1, which increases harvest levels a large amount. This indicator has been rated insignificant for Alternatives 2 to 4, which leave harvests at, or below, recent levels. It has been rated significantly beneficial for Alternative 5, under which TACs, and associated bottom trawling, are set at zero levels.

Members of the HAPC biota guild serve important functional roles in providing fish and invertebrates with structural habitat and refuge from predation. The abundance level of these structural species necessary to provide protection is not known, and it may be important to retain populations of these organisms and maintain wide spatial distribution to enable them to fulfill their various functional roles. Some of these organisms have life-history traits that make them very sensitive to population-level impacts resulting from fishing. The long-lived nature of corals, in particular, makes them susceptible to permanent eradication in fished areas. Present and proposed Steller sea lion trawl closures are spread throughout the Aleutian Islands, but these closures may be further inshore than most of the coral. For this reason, the area closures proposed under the PSEIS preferred alternative may not be sufficient to provide additional protection for these sensitive organisms in all areas throughout the BSAI and GOA. (NMFS, 2004d, 4.9-356 to 4.9-357) Under these circumstances, this impact has been rated unknown for Alternatives 1 to 4, and positively significant for Alternative 5, under which no fishing would take place in 2005 and 2006.

Genetic diversity An impact on genetic diversity would be significant if catch removals were high enough to cause a loss or change in one or more genetic components of a stock that would cause the stock biomass to fall below minimum biologically acceptable limits. Indicators for this effect are: (1) degree of fishing on spawning aggregations or larger fish, and (2) older age group abundances of target groundfish stocks. Changes in these indicators are assessed qualitatively by inferences from changes in catch levels and in regulations protecting spawning aggregations and separate biomass concentrations.

If a fishery concentrates on certain spawning aggregations or on older (larger) age classes of a target species that tend to have greater genetic diversity (dating from an earlier period when fishing was less intensive), then genetic diversity will tend to decline in fishing versus unfished systems. Since genetic diversity has not been systematically surveyed, there is no baseline against which changes in genetic diversity may be measured. There are examples (i.e., North Sea cod) of fisheries in which heavy fishing, and selection for body length, over long periods of time have been found to have little impact on genetic diversity. There has been heavy exploitation of certain spawning aggregations in the past (e.g., Bogoslof pollock), but current spatial-temporal management of the groundfish fishery has tended to reduce fishing pressure on spawning aggregations. Groundfish stocks in general are protected by sub-division of ABCs and TACs among management areas smaller than the overall BSAI and GOA groupings. It is unknown if commercial fishing has altered the genetic diversity of stocks with distinct genetic components at finer spatial scales than the present groundfish management regions. (NMFS, 2004d, page 3.10-27).

Alternatives 2, 3, and 4 would establish harvest levels similar to 2004, but would not alter spatial and temporal management controls that provide existing protection for spawning stocks and for overexploitation of subdivisions of broader regional stocks. Alternative 1 would involve heavier exploitation of fish stocks and for this reason could be expected to have an adverse impact on genetic diversity. However, it is not clear whether or not this would be significant. This impact has therefore been rated unknown. Alternative 2 provides for catch levels very similar to current levels. It has been rated insignificant. Alternatives 3, 4, and 5 are associated with smaller overall levels of harvest, and may be expected to have a beneficial impact on genetic diversity. It is unknown, however, whether this impact will be significant. These alternatives have been rated unknown on this indicator.

4.10 Effects on State of Alaska Managed State Waters Seasons and Parallel Fisheries for Groundfish Fisheries

The State of Alaska manages “State water seasons” for several species of groundfish in internal waters: sablefish in Statistical Areas 649 (Prince William Sound) and 659 (Southeast Inside District), pollock in Area 649 (Prince William Sound), and Pacific cod in Areas 610 (South Peninsula District), 620, 630 (Chignik, Kodiak, and Cook Inlet Districts), and 649 (Prince William Sound).

The State also manages groundfish fisheries for which Federal TACs are established within State waters. Unless otherwise specified by the State, open and closed seasons for directed fishing within State waters are concurrent with Federal seasons. These fisheries have been referred to as “parallel fisheries” or “parallel seasons in State waters.” Harvests of groundfish in these fisheries accrue towards their respective Federal TACs.

This analysis focuses on the effects of Alternatives 1 through 5 on harvest levels in these State managed fisheries. The criterion used in estimating the effects is described in Table 4.1-10. If an alternative was deemed by NMFS to likely result in a decrease in harvest levels in these fisheries of more than 50%, it was rated significantly adverse. If the alternative was deemed likely to result in an increase in harvest levels of more than 50%, it was rated significantly beneficial. If the alternative was deemed likely to neither decrease nor increase harvest levels by more 50%, it was rated insignificant. Where insufficient information was available to make such determinations, the effect was rated as unknown. The year 2004 was used as a benchmark for comparison. The level of a 50% change in harvest levels is more a qualitative than quantitative assessment. A change of 50% in either direction was clearly a significant change and a change of less than 50% in either direction is likely insignificant as stocks of groundfish can change over the short term within this range. Individual fishing operations with greater reliance upon participation in these State fisheries may experience adverse or beneficial effects at changes in harvest levels below the 50%. Economic effects are discussed in Section 4.11 on “Social and Economic Consequences.” The effects on other State managed fisheries (salmon, herring, and crab) are discussed in Section 4.5 on “Effects on Prohibited Species.”

As noted above, guideline harvest levels for the State waters seasons for sablefish in Prince William Sound (Area 649) and the Southeast Inside District (Area 659) and for pollock in Prince William Sound (Area 649) are assessed independently from Federal assessments of these stocks in EEZ waters. NMFS does not consider pollock in Prince William Sound to constitute a distinct stock separate from the western GOA, and includes this pollock in its assessment of the combined 649, 640, 630, 620, and 610 pollock stock. The annual GHL established by the State for PWS is subtracted from the ABC for the combined stock. None of the alternatives considered would have an effect on the GHLs established by the State for these fisheries; therefore the effect on these fisheries under Alternatives 1 through 5 is rated insignificant.

Guideline harvest levels for Pacific cod in the State waters seasons are based on a fraction of the Federal ABC apportionments in the GOA (not to exceed 25%). These GHLs would proportionately change with the Federal ABCs established for Pacific cod. Alternatives which result in an ABC reduction or increase of more than 50% are rated significant. Alternative 5 would reduce Pacific cod ABCs in the GOA (and therefore the GHLs) by more than 50% and are rated significantly adverse. Alternatives 1, 2, 3, and 4 would not reduce or increase ABCs for Pacific cod in the GOA by more than 50% and are rated insignificant.

Alternatives which result in a decrease or increase in 2004 TAC levels in the BSAI and GOA from 2004 levels are assumed to have a proportionate effect on harvest levels in the State managed parallel seasons.

Alternatives 1 through 4 do not increase or decrease TACs by more than 50% from 2004 levels in the BSAI and GOA, and therefore the effect of these alternatives on harvest levels in the parallel seasons is rated insignificant. Alternative 5 (which would set TACs at zero) would be expected to decrease harvest levels in the State managed parallel seasons by more than 50% and is rated significantly adverse. These effects are summarized in Table 6.0-1.

4.11 Social and Economic Consequences

Section 4.11 describes the social and economic consequences of the alternatives. Appendix F provides a detailed discussion of the way the gross revenue estimates were prepared.

Impacts

The significance criteria used in this EA were originally derived from the economic indicators used in the Steller Sea Lion (SSL) SEIS (NMFS 2001c, page 4-342). Through time, these have been revised in modest ways.[6] The SSL SEIS indicators were relatively extensive, as the SSL SEIS attempted to describe the impact of the protection measures on all stakeholders. The significance of indicator changes is evaluated using 2004 as a baseline. The indicators are:

First Wholesale Groundfish Gross Values
Operating Cost Impacts
Net Returns to Industry

[6] These changes include the following: Indicators for "Net Returns to Industry," "Recreation" and "Community impacts" have been added. A separate indicator for "Harvest Levels and Fish Prices" has been eliminated, since this is covered under the existing "First Wholesale Groundfish Gross Values" and "Consumer Effects" indicators. Indicators for "Existence Values" and "Non-market Use Values" have been merged into an indicator for "Impacts of non-consumptive benefits from marine ecosystems." A "Non-market Use Value" indicator has been relabeled "Subsistence."

Safety and Health Impacts
Impacts on Related Fisheries
Consumer Effects
Management and Enforcement
Excess Capacity
Bycatch and Discard Considerations
Subsistence use
Recreational use
Impacts on non-consumptive benefits from marine ecosystems
Community impacts

Each of these indicators was evaluated using the criteria described in Section 4.1 of this EA.

First Wholesale Groundfish Gross Revenues

Information on gross revenue changes is summarized here. The approach used to estimate gross revenues for each alternative is discussed in detail in Appendix F. This section merely summarizes the impacts and discusses significance.

First wholesale gross revenues, under each alternative, were estimated separately for the fisheries harvesting (a) the BSAI ITAC and unspecified reserves, (b) the BSAI CDQ reserve, and (c) the GOA TACs. Gross revenues were projected for each alternative separately for 2005 and 2006, and estimated for the TACs adopted by the Council in the years 2002, 2003, and 2004. The gross revenues impacts of the alternatives and their significance are defined with respect to the change between the alternative and the year 2004 estimates. The 2002 through 2004 estimates were generated through the same estimation process used to produce the projections for the alternatives - in other words, the 2002 through 2004 gross revenues estimates were produced, treating the ABCs and TACs for those years in the same manner as the ABCs and TACs for the alternatives. All the alternatives, and the 2004 baseline gross revenues, were estimated using average 2003 prices.

The method used to prepare these first wholesale gross revenue estimates is described in detail in Appendix F. The model makes a large number of simplifying assumptions.[7] These results must be treated as a rough approximation, with a large margin of error. Note that 2002 through 2004 revenue estimates are not historical revenue estimates, but estimates developed from the model, based on the TAC levels in those years, using the same assumptions that were used for the 2005 and 2006 estimates.

The impacts of the preferred alternatives on first wholesale revenues in the BSAI and the GOA are summarized in Tables 4.11-1 through 4.11-3.

[7] An important assumption is that the first wholesale prices received for fish products do not vary as the level of output varies. Economists refer to this as the perfectly elastic demand. To the extent that prices vary inversely with output levels, and that demand is less elastic, changes in gross revenues associated with the alternatives would be reduced.

Table 4.11-1 Estimated and Projected First Wholesale Gross Revenues in the BSAI, 2002-2006.

BSAI	Estimated Earned Revenue			Projected Revenue	
	2002	2003	2004	2005 Alt. 2	2006 Alt. 2
Pollock	847,515,731	851,342,412	851,479,283	854,022,799	859,301,452
Sablefish	10,399,408	13,955,654	14,352,436	11,769,052	11,141,094
Pacific cod	202,338,709	209,926,410	218,019,959	208,408,870	197,280,241
Arrowtooth	553,813	415,359	415,359	415,359	415,359
Flathead sole	6,692,956	5,354,364	5,086,646	5,220,505	5,354,364
Rock sole	8,980,303	7,317,284	6,818,378	6,901,529	6,984,680
Turbot	7,900,430	3,950,215	3,456,438	3,456,438	3,456,438
Yellowfin	24,216,007	23,582,448	24,237,125	25,535,497	25,342,333
Flats (other)	554,592	480,646	480,646	425,187	480,646
Rockfish	7,926,692	7,603,249	6,507,437	6,532,265	6,532,265
Atka	17,679,404	21,648,250	22,730,662	22,730,662	22,730,662
Other	1,983,581	2,073,339	1,722,591	1,831,160	1,843,257
Column total	1,136,741,623	1,147,649,632	1,155,306,961	1,147,249,326	1,140,862,793

Table 4.11-2 Estimated and Projected First Wholesale Gross Revenues for BSAI CDQ groups, 2002-2006.

BSAI CDQ	Estimated Earned Revenue			Projected Revenue	
	2002	2003	2004	2005 Alt. 2	2006 Alt. 2
Pollock	94,460,213	94,886,717	94,901,972	95,185,461	95,773,795
Sablefish	1,156,685	1,532,275	1,532,275	1,292,336	1,223,369
Pacific cod	15,341,596	15,916,906	16,530,570	15,801,844	14,958,056
Arrowtooth	53,807	40,355	40,355	40,355	40,355
Flathead sole	192,744	154,195	146,485	150,340	154,195
Rock sole	128,099	104,377	97,260	98,446	99,632
Turbot	241,629	120,815	105,713	105,713	105,713
Yellowfin	776,810	756,487	777,488	819,137	812,941
Flats (other)	30,863	26,748	26,748	23,662	26,748
Rockfish	492,317	472,228	404,169	405,711	405,711
Atka	1,397,850	1,711,653	1,797,236	1,797,236	1,797,236
Other	142,341	148,782	123,612	131,403	132,271
Column total	114,414,953	115,871,537	116,483,883	115,851,644	115,530,022

Estimated BSAI gross revenues by species group are shown in Table 4.11-1. Between 2002 and 2004, model projections of overall revenue trended upward. A decrease of about $8 million is projected between 2004 and 2005, and a decrease of about $15 million projected between 2004 and 2006.

Table 4.11-2 provides similar revenue estimates for the BSAI CDQ groups over the years 2002 through 2006. From 2002 through 2004, an increasing trend in model projections of overall revenue is evident. The projected 2005 CDQ allocation of TAC is estimated to result in a slight decrease in overall revenue when compared to 2004, and an additional slight decrease is projected for 2006.[8]

Table 4.11- 3 Estimated and Projected First Wholesale Gross Revenues in the GOA, 2002-2006.

GOA	Estimated Earned Revenue			Projected Revenue	
	2002	2003	2004	2005 Alt. 2	2006 Alt. 2
Pollock	38,945,969	36,338,428	47,644,460	61,317,337	61,451,057
Sablefish	67,703,889	78,635,796	87,402,446	84,180,966	79,771,236
Pacific cod	49,458,431	45,332,236	53,710,984	49,685,428	43,699,649
Arrowtooth	2,633,453	2,633,453	2,633,453	2,633,453	2,633,453
Flathead sole	1,084,469	1,302,999	1,271,447	1,214,185	1,193,384
Rex sole	6,517,492	6,517,492	8,706,047	8,706,047	8,706,047
Flat (deep)	526,476	526,476	654,858	735,771	735,771
Flat (shallow)	3,707,248	3,925,108	3,765,344	3,765,344	3,765,344
Rockfish	14,484,820	15,026,545	13,699,066	14,175,480	13,789,691
Atka	131,545	131,545	131,545	131,545	131,545
Skates	0	0	4,696,689	5,470,404	5,469,732
Other	372,391	370,090	413,870	455,908	444,536
Column total	185,566,184	190,740,169	224,730,209	232,471,868	221,791,445

Notes: The skate fishery was in transition during this period. A targeted fishery emerged in 2003, and skates were moved from the "other fisheries" to the "target" category by FMP amendment in 2004. The model is believed to understate skate revenues in 2003 and overstate them in 2004, 2005, and 2006.

Table 4.11-3 provides estimates of first wholesale gross revenues in the GOA, by species group, from 2002 through 2006. Note, that skates were allocated a separate TAC for the first time in 2004 due to an emerging target fishery. However, compared to 2004, projected GOA TACs result in estimated overall model revenue projection increases of approximately $8 million in 2005 and a decrease of approximately $3 million in 2006.

The results of this analysis are summarized graphically in Figures 4.11-1, 4.11-2, and 4.11-3. Each of these figures shows the difference between 2004 first wholesale revenue estimates, and the first wholesale revenue estimates for each of the alternatives in 2005 and 2006. If the revenues associated with the alternative are greater than the 2004 estimated revenues, the appropriate bar in the figure is positive, if they are less than the 2004 estimated revenues, the bar is negative.

The 2002-2003 estimates from the model projections can be compared to the estimates for those years from the annual Economic SAFE. The total estimated 2002 first

[8] It is important to note that this figure reports the first wholesale value of the CDQ reserves, not the receipts received by the CDQ groups. These receipts will be considerably lower than the first wholesale value, since CDQ groups lease out large parts of their allotments in return for royalty payments. For example, pollock royalties were estimated at about $43 million in 2003, while the model projections suggest that the CDQ pollock allocations had a first wholesale value of about $95 million. (http://www.commerce.state.ak.us/bsc/CDQ/pub/CDQa_pollock.pdf accessed on Jan 4, 2004 and Table 4.11-2 above)

wholesale revenues from Tables 4.11-1 to 4.11-2 were about $1.437 billion; the total from the SAFE was $1.483 billion. The estimates in this EA were thus about 3% less than the estimate in the SAFE. The total estimated 2003 first wholesale revenues were $1.454 billion; the total from the SAFE was $1.519 billion. The 2003 estimates in this EA were thus about 4% less than those in the SAFE. (SAFE estimates from the 2004 Economic SAFE, Table 36 on pages 86-87).

Figure 4.11-1 Model projections of BSAI First Wholesale Value of the ITAC and Unspecified Reserves: Difference Between Estimated 2004 First Wholesale Value and Estimated First Wholesale Value of Each Alternative for 2005 and 2006 (in millions of dollars)

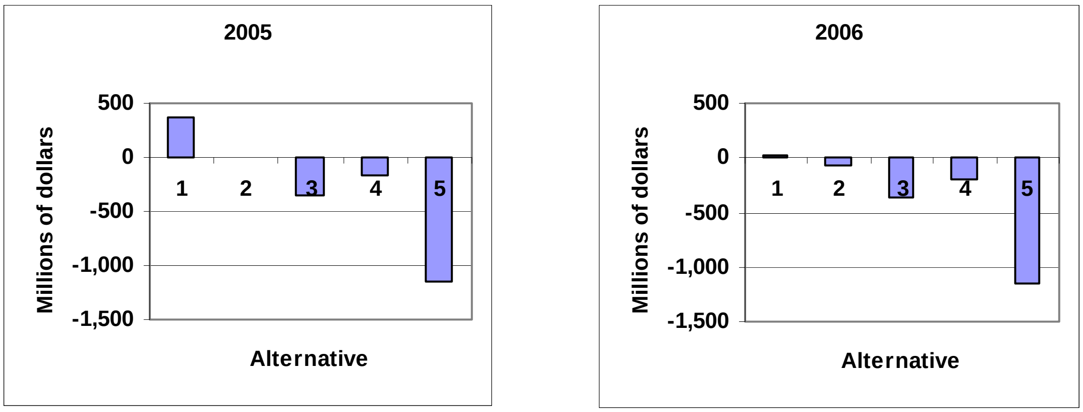


Figure 4.11-2 Model projections of BSAI First Wholesale Value Estimates for CDQ reserve: Difference Between Estimated 2004 First Wholesale Value and Estimated First Wholesale Value of Each Alternative for 2005 and 2006 (in millions of dollars

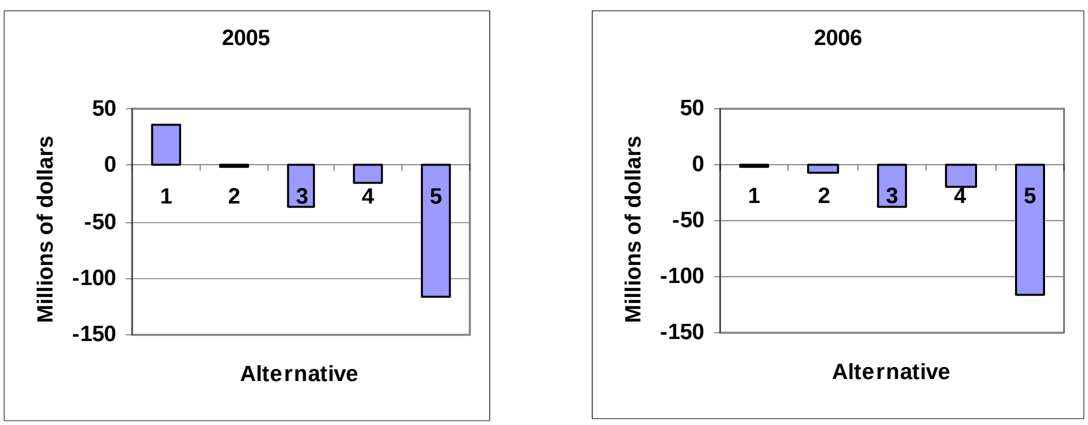
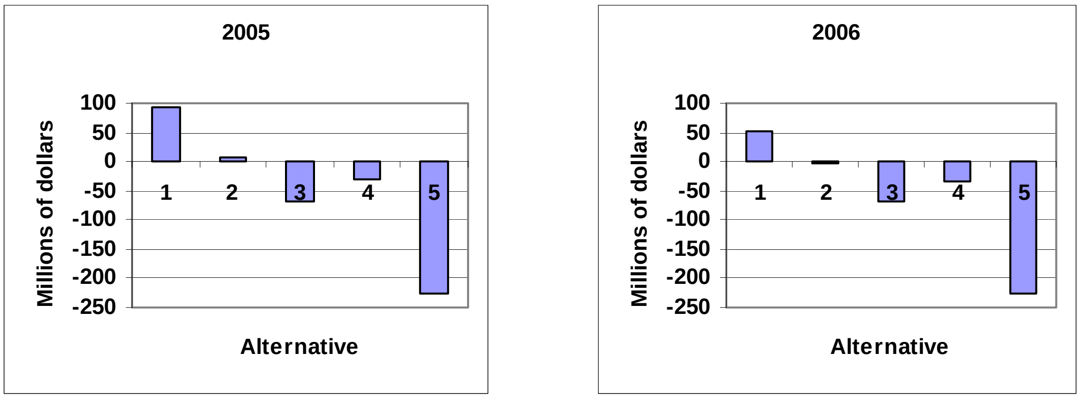


Figure 4.11-3 Model projections of GOA Gross Revenue Estimates: Difference Between Estimated 2004 First Wholesale Value and Estimated First Wholesale Value of Alternatives for 2005 and 2006 (millions of dollars)



For this analysis of effects, a 20% threshold was adopted to determine significance. In other words, only a change in gross revenues of 20% from 2004 levels will be described as significant. Table 4.11-4 provides the projected changes in estimated gross revenue by alternative and year for the BSAI, CDQ groups, and the GOA. Estimated BSAI ITAC 2004 revenues were about $1.16 billion, BSAI CDQ revenues were about $116 million, and GOA revenues were about $225 million. The corresponding significance thresholds are changes of $231 million, $23 million, and $45 million, respectively. Any changes that exceed these thresholds (in absolute value) are bolded for clarity.

Table 4.11-4 Model Projections of Change in Revenue by Alternative (millions of dollars)

Threshold	Year	Alternative				
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
BSAI	2005	**378**	-8	**-348**	-165	**-1,155**
231	2006	19	-15	**-363**	-204	**-1,155**
CDQ	2005	**36**	-1	**-36**	-16	**-116**
23	2006	-1	-1	**-37**	-20	**-117**
GOA	2005	**92**	8	**-69**	-32	**-225**
45	2006	**53**	-3	**-67**	-34	**-225**

Alternative 1 sets TAC's to produce fishing mortality rates, *F*, that are equal to $maxF_{ABC}$, where $maxF_{ABC}$ refers to the maximum permissible value of F_{ABC} under Amendment 56. Historically, TAC has been constrained by ABC, so this alternative provides a likely upper limit for setting TAC within the limits established by the fishery management plan. It is important to note that Alternative 1 results in total TAC that significantly exceeds the 2 million metric ton OY limit, established in law, for the BSAI groundfish resource.

Table 4.11-4 shows that the total of first wholesale revenues under Alternative 1, in 2005, exceeds the threshold positively in each case. Therefore, the significance ratings for the gross revenues under Alternatives 1 for 2005, are "positively significant." In contrast, the estimates of first wholesale revenues under Alternative 1 in 2006 are only "positively significant" in the GOA, while the BSAI and CDQ values are "insignificant." However, this assessment should be qualified by the observation that potential price declines associated with higher catches are not taken into account. The revenue projection may thus overstate the likely increase. Overall, the effect of Alternative 1 on gross revenue is positively significant in 2005, and insignificant in 2006.

Alternative 2 shows "insignificant" changes in both 2005 and 2006, in all cases. This would be expected given the small changes between these years and 2004. In both 2005 and 2006, Alternative 5, which sets all ABCs to zero, eliminates all revenues from the fishery. This alternative has been rated "negatively significant" in both year for the BSAI, CDQ, and GOA cases.

Alternatives 3 and 4 tend to have a more negative impact on gross revenues. The gross revenue estimates in this analysis may have an upward bias (for the reasons discussed in Appendix F), and they have a large, and unknown, error. Alternative 3 triggered the threshold in both 2005 and 2006 in all cases. Thus, Alternative 3 has been rated "negatively significant" in all cases as well as overall. Alternative 4 did not trigger the thresholds in any case. Thus, Alternative 4 has been rated "insignificant" in all cases as well as overall.

Operating Cost Impacts

There is very little information on operating and capital costs in the BSAI and GOA groundfish fisheries. Models that would predict behavioral changes associated with changes in these TAC specifications, and that would generate estimates of cost impacts associated with these behavioral changes, are not available. It is therefore impossible to provide numerical estimates of the operating cost impacts associated with the proposed alternatives. The classification of costs into variable and fixed costs is not exact, but is instead dependent on the time frame considered. It is important to recognize that fishermen may incur loans to pay for capital goods over extended periods, and that the associated costs may not be avoidable over the length of the loan. Similarly, operators may incur maintenance costs for fishing and processing gear, even if that gear is unemployed in a particular year.

However, even absent empirical data, it is clear that harvesting, delivering, and processing of larger volumes of fish would increase the variable costs of fishing and fish processing. Conversely, reductions in production imposed by reduced specifications would decrease variable costs. Thus, Alternative 1, which increased TACs to theoretical upper bounds has been given a "negatively significant" rating in 2005, due to the likelihood of increased costs with significant increases in harvest, and an "insignificant" rating for 2006, in keeping with the "insignificant" rating for gross revenue effects of Alternative 1 in that year. Since the Alternative 2 specifications are similar to the 2004 specifications, suggesting that there may be little change in variable costs, this alternative has been given a cost impact significance rating of "insignificant." TACs are generally smaller under Alternatives 3 and 4. Thus, variable costs are expected to be smaller, ignoring potential economies of scale. As discussed previously, Alternative 3 would reduce gross revenues enough to exceed the 20 percent of gross revenues threshold in all cases, while Alternative 4 has insignificant effects on gross revenue in all cases. Alternative 3 was consequently rated as "significantly positive" effects on operating costs in 2005 and 2006, while Alternative 4 was rated as "insignificant" in both years.

Under Alternative 5, no groundfish fishing would be allowed during 2005 and 2006. In these circumstances, there would be a large reduction in variable costs incurred for active fishing operations. As noted above, however, firms would continue to have expenditures for fixed costs such as loans and maintenance of existing vessels and plant. Fishermen would experience transitional expenses as they move into their next best alternative employment. However, on balance, fishing costs would be expected to decline. For this reason, Alternative 5, again when examined in isolation, has been given a rating of "positively significant" for this indicator, in both 2005 and 2006.

Net Returns to Industry

Although it has been possible to make crude estimates of gross first wholesale revenues under the alternatives, without cost information, it is not possible to make corresponding estimates of net returns to industry. NMFS has little information on the value of capital investments or the operating costs in Alaska's groundfish fisheries. Voluntary surveys have been tried, but response rates have been very poor. Therefore, treatment of net revenues will, by default, be qualitative.

In general, net returns should be larger in parts of the fishery that have been subject to rationalization. This may be the case in the BSAI pollock fisheries, where the American Fisheries Act (AFA) allowed fishing operations to rationalize through the medium of fishing cooperatives. Likewise, it may be the case in the portions of BSAI fisheries conducted under the auspices of the Community Development Quotas, and it may be the case in the sablefish fisheries which operate under an IFQ program. Each of these programs would allow fishermen to operate with greater efficiency. In general, however, the groundfish fisheries in the GOA and the BSAI are conducted in an essentially managed open-access environment. While a limited entry program has been adopted, the numbers of permits provide little constraint on fishing effort. Theory suggests that economic costs and benefits would be closely balanced in these fisheries, and that in equilibrium net revenues would be only large enough to cover the opportunity costs of labor and capital.

Specifications associated with gross revenues that are larger than current levels of production would relax constraints on fishermen and fish processors and would almost certainly be associated with higher levels of net revenues (i.e., profits); specifications associated with lower gross revenues would increase the constraints on fishermen and would likely result in lower profits.

Alternative 1, which is projected to have positively significant impacts on gross revenue in 2005, is assumed to have positively significant impacts on net returns in that year, but "insignificant" effects on net returns in 2006. Alternative 2, which had insignificant impacts on gross revenues and costs, is assumed to have insignificant impacts on net returns. Alternative 3 was rated as having significant impacts on revenues and costs in 2005 and 2006 and has thus been given a "significantly negative" rating for net returns in 2005 and 2006, while the rating for Alternative 4 is "insignificant in both years. Alternative 5 eliminates all revenues and variable costs, but fishermen would be left with fixed costs. This alternative has been rated "negatively significant" in terms of this net effects criterion for both 2005 and 2006.[9]

[9] The Council SSC minutes for December 2004 note that "…because the Alternatives are likely to result in different costs and different revenues, it is not possible to determine whether net returns will increase or decrease without additional information on the structure of the cost and revenue functions." (Council, 2004c, page 26). The discussion here is clearly qualitative, based on the assumption that fixed costs do not vary across alternatives, and that variable costs vary proportionately with gross revenues. Without more

Safety and Health Impacts

Groundfish fishing off Alaska is a dangerous occupation. However, little is known about the connection between fisheries management measures and accident, injury, or fatality rates. Moreover, little is known about risk aversion among fishermen, or the values they place on increases or decreases in different risks. There is no way to connect changes in the harvests expected under these alternatives with changes in different risks, and the costs or benefits of these changes to fishermen.

Increases in TACs may improve fishing profitability and lead to greater investments in fishing vessel safety and greater care by skippers. This may reduce the fatality rate (although this is conjecture). Conversely, increases in TACs may increase the number of operations, the average crew size per operation, and the average time at sea. These may increase the potential population at risk, and the length of time individuals may be exposed to the risks. The net impact of changes in TACs on accident rates and accident severity are thus difficult to determine. Shoreside stress and related health problems are probably associated with large negative changes in production and fishery revenues. The extent of stress related health problems associated with decreases in revenues is unknown.

Alternative 1 increases TACs, thereby likely increasing fishing/processing activity and time at sea. This would be expected to affect safety and health negatively. However, if increased TACs lead to greater net returns (as argued above), then safety and health may be positively affected. Thus, it is not possible to unequivocally state what net effect Alternative 1 would be expected to have on safety and health, and this has resulted in an "unknown" ranking. Alternative 2 has essentially the same projected TACs as 2004.[10] Because of this, Alternative 2 has been given an "insignificant" safety and health rating. Alternatives 3 and 4 generally involve cuts in 2004 gross revenues. In some instances, there are large percentage reductions in harvests from important stocks. Because there is no clear relationship between changes in fish production, and safety and health, the impacts of these changes are rated "unknown."

Alternative 5 stops all fishing for groundfish. Under these conditions, there would be no groundfish vessels at sea, and fatalities, injuries, and property damage to this sector would drop to zero. However, Alternative 5, by closing the fisheries for a year, and by eliminating this source of yearly income for thousands of fishermen and their families, would introduce new sources of stress, and stress-related health problems, for those connected with the affected fishing, processing, and support businesses. While the fishery closure would reduce at-sea accidents, increased stress associated with income loss would have an offsetting effect of unknown magnitude. This alternative has thus been given a significance rating of "unknown."

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detailed information on groundfish fishing costs, these assumptions cannot be empirically tested, and quantitative estimates of profit changes cannot be made.

[10] The TACs in this EA are based on ABC recommendations made by the Council Plan Teams at their September 2004 meeting. These TACs take account of fishery optimum yields, and past Council decisions - particularly those incorporated in the 2004 specifications. For more details on the methods used to make the TAC projections incorporated here see Chapter 2.

Impacts on Related Fisheries[11]

Many of the operations active in groundfish fishing are diversified operations, participating in other fisheries. Groundfish fishing may provide a way for fishermen to supplement their income from other fisheries and to reduce fishing business risk by diversifying their fishery "portfolios." Moreover, Pacific cod pot fishermen often fish for crab as well, and Pacific cod harvests provide them with low cost, high quality bait. Changes in specifications, and consequent changes in groundfish availability, could lead to more or less activity by groundfish fishermen in other fisheries, affecting competition in those other fisheries.

In general, reductions in groundfish availability would be expected to have a negative affect on related fisheries, as fishermen move out of groundfish fishing and into those activities, or crab fishermen find bait costs rising. Conversely, increases in groundfish availability should have a positive impact on those fisheries. However, little is known about how these processes would take place and what their quantitative impacts would be.

CDQ groups use revenues from their CDQ operations to invest in new fishery related activities. Many of these investments take place in fisheries other than groundfish fisheries. For example, the Coastal Villages Region Fund operates seasonal halibut buying stations, and has invested in a custom salmon processing plant in Quinhagak. (ADCED 2001, page 54). The impact of a reduction in groundfish revenue is difficult to predict. CDQ groups may have smaller revenues to invest in other fishing related activities. However, they may also accelerate their diversification into other non-groundfish fishing activities, in order to offset the risks associated with lower groundfish harvests.

Changes in Alaska groundfish TACs may also affect other fisheries through market impacts. Alaska groundfish products are substitutes for groundfish products produced elsewhere. For example, Pacific cod has a relatively close substitute in Atlantic cod. Reductions in Pacific cod harvests, and consequent price increases for Pacific cod, may shift demand curves for substitute species out, and lead to price increases for those species. Price increases and associated profit increases may lead to increased fishing effort in the fisheries for those species.

Groundfish fisheries may affect other fisheries harvesting PSC species such as halibut, herring, crab, and salmon. As noted in the discussion of PSC species, chinook and "other" (mainly chum) salmon bycatches have risen in the Bering Sea pollock trawl fishery in recent years. Greater fishing activity in 2005 or 2006 may be associated with larger PSC harvests.

The projected TACs under Alternative 2 are similar to those in place in 2004. The impact of these alternatives on related fisheries has been rated, "insignificant." Alternative 1 significantly increases the TAC for several species, while Alternatives 3 and 4 produce reductions in fish harvests. Given the uncertainties associated with projecting impacts on other fisheries, these alternatives have been given a rating of "unknown".

Alternative 5 sets all TACs equal to zero. This alternative would clearly create strong incentives for fishermen to explore other fisheries (although most fisheries in the U. S. EEZ are fully subscribed and entry into many is strictly limited), would make it harder for CDQ programs to

[11] The impact of bycatches in the groundfish fisheries on fisheries targeting PSC species is discussed under another heading in this section.

develop additional local fishery resources (even if it would increase the incentive for them to do so), and would increase prices and incentives to use more effort in fisheries that can be used as substitutes in markets. For these reasons, this alternative has been given a "negatively significant" rating.

Consumer Effects

Consumer effects of changes in production are measured by changes in the consumers' surplus. The consumers' surplus is a measure of what consumers would be willing to pay to be able to buy a given amount of a product or service at a given price. A decrease in quantity supplied, and an associated increase in price will reduce consumer welfare as measured by consumers' surplus. An increase in quantity supplied and a consequent decrease in price will increase consumer welfare as measured by consumers' surplus.[12] A decrease in consumers' surplus is not a total loss to society, since some of that loss is usually transferred to producers in the form of higher prices and an accompanying increase in producers' surplus. However, this transfer is still a loss to consumers.

The effect of changes in production of pollock, Pacific cod, and Atka mackerel products on domestic consumers might be fairly modest, because pollock surimi and roe, and Atka mackerel are principally sold overseas. Pacific cod and pollock fillets are, by in large, sold into domestic markets in which there are many relatively close substitutes. Under these circumstances, consumers would be unlikely to gain or lose much from modest changes in supply.[13]

Alternative 1 would significantly increase TAC's for some species in 2005 with more modest increases projected for 2006. As a result, this alternative would tend to decrease market prices, leading to increased consumer surplus, all else equal, and has been rated "significantly positive" in 2005 and "insignificant" in 2006. TACs projected under Alternative 2 are not expected to change much from those in 2004. This alternative has therefore been given a consumer impact significance rating of "insignificant." Alternatives 3 and 4 lead to some reductions in a number of TACs. The overall effect of Alternatives 3 on United States consumers rates as "significantly negative," however, the overall effect of the more modest reduction of Alternative 4 are rated as "insignificant" primarily due to the importance of overseas markets for groundfish products.

Alternative 5 would close Federal groundfish fisheries off Alaska in 2005 and 2006, creating large reductions in supplies to U.S. consumers (as well as, severe disruptions of world seafood markets). This alternative would eliminate the consumers' surplus from consumption of groundfish from the EEZ off Alaska and lead to price increases in markets for substitute species. As a result, this alternative has been given a "significantly negative" rating.

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[12] As a technical matter, in the standard diagram of supply and demand curves, the amount of the consumers' surplus is approximated by the area under the demand curve and above the horizontal line used to indicate the market clearing price of the good.

[13] Note that the assumption of a change in consumers's surplus requires inelasticity in the demand curve. The gross revenue analysis used a perfectly elastic demand curve as a simplifying assumption. If that assumption is correct, it would imply that there would be no change in consumers' surplus.

Management and Enforcement Costs

Enforcement expenses are related to TAC sizes in complicated ways. Larger TACs may mean that more offloads would have to be monitored and that each offload would take longer. Both these factors might increase the enforcement expenses to obtain any given level of compliance. Conversely, smaller TACs may lead to increased enforcement costs as it becomes necessary to monitor more openings and closures and to prevent poaching.[14]

In-season management expenses are believed to be more closely related to the nature and complexity of the regulations governing the fishery (for example, on the number of separate quota categories that must be monitored and closed on time) than to TAC sizes. Over a wide range of possible specifications, in-season management expenses are largely fixed. For example, increases in TACs from 50% above 2004 levels, to 50% below 2002 levels could probably be handled with existing in-season management resources[15] (Tromble, pers. comm.[16]).

Alternative 1 increases TACs more than 50 % above 2004 levels for several species and is therefore rated as "negatively significant" for management and enforcement costs. Alternative 2 does not change TACs to a great extent. Therefore, the management and enforcement cost impacts of this alternative have been rated "insignificant." Alternatives 3 and 4 impose larger reductions in TACs, but, in light of the considerations described above, the impacts of these have also been rated "insignificant."

Under Alternative 5, in which there would be no groundfish fishing in 2005 and 2006, management and enforcement costs would be reduced, but not eliminated. Prohibitions on fishing activity would still need to be enforced to prevent poaching; however, enforcement expenses would be reduced because it would be immediately clear, in any instance, that a vessel found using groundfish gear in the Federal waters would be in violation. In-season management expenses and activities would be eliminated if there were no fishing in 2005 and 2006, however, management and research efforts devoted to the longer term would still continue. Because of the expected reduction in groundfish management and enforcement costs under Alternative 5, it has been given a significance rating of "positively significant."

Excess Capacity

The groundfish fisheries off of Alaska have considerable excess capacity. A recent study tried to estimate the difference between the maximum amount of fish that could be caught and would be caught by fishermen, given existing technological and economic constraints, if the limitations imposed by TACs were removed, as compared to the amounts of fish harvested in 2001. This study used two methodologies to address this question. The results of the more conservative

[14] Jeff Passer. (2001). NOAA Enforcement. "Personal Communication." NMFS Alaska Region, P.O. Box 21668, Juneau, Alaska 99802. November 19, 2001.

[15] Although at low levels of TACs (but above a zero level) in-season management costs might increase due to the difficulties in managing numerous small quotas (Tromble, pers. comm.).

[16] Galen Tromble. (2002). National Marine Fisheries Service. Silver Spring, Maryland. "Personal Communication." November 21, 2002.

method are summarized here. The study estimated that, conservatively, there was about 17% excess capacity (as described above) in the Atka mackerel fleet, about 26% for flatfish, 35% for Pacific cod, 39% for pollock, 21% for rockfish, 24% for sablefish, and 30% for other groundfish. (Hiatt, *et al.* 2002, page 111). These estimates apply to the catcher vessel and catcher-processor components of the fleet. Excess capacity for pollock may have been reduced since 2001, as fishing operations have taken advantage of cooperative fishing arrangements under the American Fisheries Act (AFA). Corresponding data are not available for on-shore processors.

Alternative 1 increases TACs significantly for several species in 2005, while providing more modest increases in 2006. Significantly greater TACs may be expected to improve capacity utilization in limited entry fisheries. Alternative 1 is rated as “positively significant” in 2005, and insignificant in 2006. TACs projected under Alternative 2 are not expected to change much from those in 2004. The overall effect of the significant TAC reductions of alternative 3 has resulted in a rating of “significantly negative” on operational aspects of the fleet. The insignificant TAC reductions of Alternative 4 have resulted in a rating of “insignificant” on operational aspects of the fleet. Under Alternative 5, no groundfish fishing would occur in 2005 and 2006, thus increasing “excess capacity” in 2005 and 2006, by an even greater amount. These three alternatives have been rated “negatively significant.”

Bycatch and Discards

Halibut, salmon, king crab, Tanner crab, and herring are important species in other directed subsistence, commercial, and recreational fisheries. These species have been designated “prohibited species” in the BSAI and GOA groundfish fisheries. Groundfish fishing operations are required to operate so as to minimize their incidental harvests of prohibited species, and, under most circumstances, to discard prohibited species if they are taken.

In the BSAI, prohibited species are protected by harvest limits and/or the closure of areas to directed groundfish fishing, if high concentrations of the prohibited species are present. Because of the limits or other protection measures, changes in the harvests in the directed groundfish fisheries, associated with the different specifications alternatives, should have little impact on catches of prohibited species. Chinook and “other” salmon (primarily chums) may be an exception; as noted in Section 4.5, incidental catches of these species have been high in the BSAI pollock fishery in recent years. Salmon bycatches may be affected by increased or decreased pollock TACs under the different alternatives. Alternative 5, which, in shutting down the groundfish fisheries, clearly would reduce associated prohibited species catches to zero.

In the GOA, bycatch rates are typically low. The only average bycatch amounts that are meaningful in terms of numbers or weight in the GOA are Pacific halibut in the Pacific cod fishery, chinook salmon in the pollock fishery, “other” salmon (primarily chums) in the pollock fishery, and small amounts of *C. bairdi* crab in the Pacific cod fishery. Halibut is the only prohibited species managed under a limit in the Gulf.

The impacts of the alternatives on the bycatch and discard of prohibited species are discussed in EA Section 4.5. The results of that analysis are summarized in Table 6.0-1. This table indicates that all alternatives have “insignificant” ratings, with the exception of Alternative 5, which has a positively significant rating for bycatch levels of prohibited species in directed groundfish fisheries, and Alternative 1 which has an adversely significant/insignificant rating. These ratings have been adopted for this criterion (i.e., Alternatives 2 through 4 have been rated “insignificant,” while Alternative 5 has been rated “positively significant”, and Alternative 1 has been rated “adversely significant”).

Subsistence

The commercial groundfish fisheries can affect subsistence fisheries in several ways. Commercial fisheries may target stocks also targeted by subsistence fishermen. Examples of jointly targeted stocks include sablefish and demersal shelf rockfish in the GOA. Commercial groundfish fisheries may take species harvested by subsistence fishermen as incidental catches. This may include species such as salmon and halibut. Commercial groundfish fisheries may harvest species, such as pollock, that are prey for species taken in subsistence harvests, such as Steller sea lion. Commercial fisheries may alter habitat used by important subsistence species, or they may affect species interactions by harvesting species used as prey by, that predate on, or that compete ecologically with, important subsistence species. Commercial fishing often provides employment and income needed to support the purchase of inputs used in the pursuit of subsistence activities. Alternatives that affect employment and wages in the commercial fishery can be expected to have indirect impacts on subsistence activities. Finally, commercial fishing operations may directly impact subsistence fishermen by creating congestion, or by damaging subsistence gear.

While some persons use small amounts of groundfish for subsistence purposes, groundfish are not one of the more important subsistence products (NMFS 2001b, page F3-109). Since the Federal groundfish fisheries take place outside of State waters, the potential for overlap and direct conflict with subsistence activities is limited.

The mechanisms relating changes in the harvest of groundfish prey to changes in populations of animals used for subsistence purposes, and the mechanisms relating changes in populations of animals to changes in subsistence use are poorly understood. In addition, as noted earlier in this section, prohibited species bycatch is limited by bycatch caps and area closures. These measures limit groundfish harvests, if necessary, to protect prohibited species. It seems unlikely that Alternatives 1 through 4 would affect subsistence harvests by changing bycatch. Alternative 5, which completely shuts down the groundfish fisheries, would reduce bycatch to zero; however, even under these conditions, it is not clear how much of the bycatch that had been eliminated would flow to subsistence fishermen, how much to commercial or recreational fishermen targeting bycaught species, and how much would be lost to natural mortality.

TACs projected under Alternative 2 are not expected to change much from those in 2004. This alternative has, therefore, been given a significance rating of “insignificant”. Alternatives 3, 4, and 5 all reduce groundfish harvests to a greater or lesser extent, while Alternative 1 significantly increases groundfish TACs. However, since the impact of this on subsistence activity is hard to gauge, Alternatives 1, 3, 4, and 5 have been rated “unknown” on this criterion.

Recreation

The commercial groundfish fisheries can affect recreational fisheries in several ways. Commercial fisheries may target stocks also targeted by recreational fishermen. Examples of jointly targeted stocks include sablefish and demersal shelf rockfish in the GOA. Commercial groundfish fisheries may take species harvested by recreational fishermen as incidental catches. This may include species such as salmon and halibut. Commercial fisheries may alter habitat used by recreationally important species, or they may affect species interactions by harvesting species used as prey by, that predate on, or that compete ecologically with, recreational species. Finally, commercial fishing operations may directly impact recreational fishermen by creating congestion, or by damaging recreational gear.

In general, alternatives that reduce groundfish TACs available to commercial harvest will tend to decrease negative effects on recreation, while alternatives that increase TACs available for commercial harvest will tend to increase negative effects on recreation. However, the extent to which these effects accrue is unknown. Thus, Alternative 2, which maintains TACs at levels similar to the recent past, is expected to have insignificant effects on recreation as compared to the baseline. Alternative 1 is expected to have negative effects on recreation, while Alternatives 3, 4, and 5 are expected to have positive effects on recreation. However, the magnitude of such effects is unknown. Thus, the significance rating for Alternatives 1, 3, 4, and 5 are "unknown".

Non-consumptive benefits from ecosystems

A person need never actually use, nor even intend to use, a resource in order to derive value from it.[17] That is, people enjoy a benefit (which can be measured in economic terms) from simply knowing that an aspect of the natural environment exists in a certain state. Survey research suggests that these values can be significant, in at least some contexts. Estimation of these values is difficult, technically complex, and often very costly. In the present context, it is not possible to derive empirical estimates of values attributable to the suite of alternatives under review. Nonetheless, these considerations are appropriately included in the comparative assessment of these competing alternatives, albeit in a qualitative manner.

Non-consumptive values pertain to the continued existence of resources. A clearly delineated class of resources in the GOA and BSAI, whose existence has been identified as at risk, include those that have been formally "listed" as endangered, under the U.S. Endangered Species Act. Under the Act, an endangered species is one that is "...in danger of extinction throughout all or a significant portion of its range..." and not one of certain insects designated as 'pests."(16 U.S.C. §1532(6).) As such, society is committed to incur all necessary costs to ensure that these listed species are not in jeopardy of extinction, and that adverse modifications are not made in their critical habitat. Implicitly, the benefits of protection for these resources always exceed the cost.

Non-consumptive benefits may also flow from certain uses of the resource. Eco-tourism, to the extent that it is unobtrusive and doesn't disturb animals and habitat, may be a non-consumptive use of a resource.

Changes in groundfish harvests in the GOA and the BSAI may impact non-consumptive use values by affecting the availability, or probability of continued existence or recovery of a listed species. At present, four endangered species or classes of endangered or threatened species range into the GOA and BSAI management areas: (a) Steller sea lions; (b) seven species of Great Whales; (c) Pacific Northwest salmon; and (d) three species of sea birds (Table 6.0-2 lists the affected species).

Section 4.5 of the EA described the effects of the alternatives on prohibited species. Section 4.6 described the effects on Marine Mammals (including ESA listed marine mammals). Section 4.7 described the effects on seabirds. The significance ratings for these impacts are summarized in Table 6.0-1 in Section 6.0 ("Conclusions").

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[17] People are said to have an "existence value" for a resource if they place a value on its mere existence, whether or not they ever expect to interact with it.

Alternative 1 has been rated significant adverse with respect to marine mammals. All alternatives have been rated unknown with respect to at least one potential impact on marine mammals and/or seabirds. This impact is concerned with the impact of fishing activity on human passive use values, rather than with the impact on the resources themselves (impacts on the resources are treated in other sections). Given the uncertainty with respect to the environmental impacts, and the uncertainty about how a given impact would affect passive use values, all alternatives have been rated unknown for this criterion.

Communities

Changes in groundfish fishery revenues may impact fishery dependent communities. In general, specifications associated with gross revenues that are larger than current levels of production would "likely" relax constraints on fishermen and fish processors and could be associated with higher levels of profits, leading to improvements in the economic conditions in communities that are dependent on fishing activities. In contrast, and under the same set of caveats, specifications associated with lower gross revenues would increase the constraints on fishermen and would likely result in lower profits and may have negative effects on the economies of communities that are dependent on fishing activities.

As described previously for gross revenue effects, the overall effect of Alternative 1 on gross revenue is "positively significant" in 2005, and "insignificant" in 2006. Thus, the effect on communities is given the same ratings.

Alternative 2, which is similar to the 2004 baseline, shows "insignificant" changes in gross revenues in both 2005 and 2006, in all cases. Thus, the effects on communities of Alternative 2 are given the same rating. Alternative 5, which sets all ABCs to zero, eliminates all revenues from the fishery. This alternative has been given a significance rating of "negatively significant" in both years and all cases for gross revenue effects, as well as for effects on communities.

Alternative 3 triggered the gross revenue significance thresholds in both 2005 and 2006 in all cases. Thus, Alternative 3 has been given a significance rating of "negatively significant" in all cases and overall. Alternative 4 did not triggered the threshold and has been given a significance rating of "insignificant" in all cases and overall. These ratings have also been adopted for community effects.

Summary of the significance analysis

The significance ratings for the different indicators, discussed in this section, are summarized in the following table.

Table 4.11-5 Summary of effects of Alternatives 1 through 5 on Economic Impacts

Economic Indicators	Year	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
First wholesale gross revenues	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Operating cost impacts	2005	S-	I	S+	I	S+
	2006	I	I	S+	I	S+
Net returns to industry	2005	S+	I	S-	I	S-

	2006	S+	I	S-	I	S-
Safety and health impacts	2005	U	I	U	U	U
	2006	U	I	U	U	U
Impacts on related fisheries	2005	U	I	U	U	S-
	2006	U	I	U	U	S-
Consumer effects	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Management and enforcement costs	2005	S-	I	I	I	S+
	2006	S-	I	I	I	S+
Excess capacity	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Bycatch and discards	2005	S-/I	I	I	I	S+
	2006	S-/I	I	I	I	S+
Non-consumptive use values	2005	U	U	U	U	U
	2006	U	U	U	U	U
Subsistence	2005	U	I	U	U	U
	2006	U	I	U	U	U
Recreation	2005	U	I	U	U	U
	2006	U	I	U	U	U
Communities	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
S = Significant, I = Insignificant, U = Unknown, + = positive, - = negative						

4.12 Aleutian Islands pollock

The Consolidated Appropriations Act of 2004 (Public Law (Pub. L.)108-199), was signed into law on January 23, 2004. Section 803 of this law allocates the AI directed pollock fishery to the Aleut Corporation for economic development of Adak, Alaska. The statute permits the Aleut Corporation to authorize one or more agents for activities necessary for conducting the AI directed pollock fishery.

In June 2004, the Council adopted Amendment 82, by a 10 to 1 vote. If approved by the Secretary of Commerce, Amendment 82 would revise the FMP to establish the management framework for the AI directed pollock fishery. In October 2004 the Council clarified its intent with respect to treatment of CDQ groups. Amendment 82, and associated regulatory amendments, would implement the following management provisions for the AI directed pollock fishery:

- Restrictions on the harvest specifications for the AI directed pollock fishery, including: limitations on the size of the annual AI pollock total allowable catch

(TAC), limits on the A season harvest of ABC, allocation requirement for vessels 60 feet (18.3 m) LOA or less, rollover provisions for unharvested amounts of the AI directed pollock fishery allocation, CDQ groups allocated 10% of the AI pollock TAC and 10% of the BSAI pollock TAC;

- Provisions for fishery monitoring, including: the Aleut Corporation's selection and NMFS's approval of vessels and processors participating in the AI directed pollock fishery, restrictions on having pollock from the AI and either the Bering Sea subarea (BS) or the GOA on a vessel at one time, observer and scale requirements, catch monitoring control plans for shoreside and stationary floating processors, and Aleut Corporation's and participants' responsibility for ensuring the harvest does not exceed the AI directed pollock fishery allocation;
- A requirement that the Aleut Corporation report to the Council on the use of the allocation for economic development at Adak; and
- A new AI chinook salmon prohibited species catch limit that, when reached, would close the existing chinook salmon savings areas in the AI.

In October 2004, the Council clarified its intent that the Aleut Corporation contribute to the CDQ group allocations in the BSAI from its own allocation of AI pollock.

The Council's June action, as clarified in October, is analyzed in an EA/RIR prepared for Amendment 82. Amendment 82 creates the structure within which an allocation may be made to the Aleut Corporation. An actual AI pollock DPF itself would be created in the course of the annual specifications process.

This section provides a special review of the AI TAC alternatives. The purpose is to provide a heightened level of scrutiny for this portion of the specifications. Although the potentials for significance of the different alternatives are discussed in this section, the significance analysis itself is subsumed in the general analysis of the specifications, the results of which may be found in Table 6.0-1.

The Alternatives

The Council's final motion in June 2004 stated:

Starting in 2005:

1 Annual TAC

   (a) When the AI ABC is equal to or more than 19,000 mt, the AI TAC shall equal 19,000 mt.
   (b) When the AI ABC is less than 19,000 mt, the AI TAC shall be no more than the ABC.

2. The AI pollock CDQ directed fishing allowance shall be established as 10 percent of the AI TAC. The remaining amount will be termed the initial TAC (ITAC)[18]

[18] The CDQ pollock directed fishing allowance is seasonally apportioned 40/60 between the A/B seasons, respectively, under 50 CFR 679.23(e)(2).

3. The ICA shall be deducted from the annual ITAC

4. Seasonal Apportionments

The A season apportionment of the DPF shall be the lesser of

(a) no more than 40% of the ABC or
(b) the annual ITAC after subtraction of the ICA

The total harvest in the A season (DPF, CDQ, and ICA) shall not exceed 40% of the ABC.

The B season apportionment will be equal to the annual ITAC minus the ICA and minus A season DPF. The B season apportionment may be further adjusted by rollover of unharvested A season pollock.

Section 206(a) of the American Fisheries Act (AFA) requires that "10 percent of the total allowable catch of pollock in the BSAI management area be allocated as a directed fishing allowance" to the CDQ program. Pub. L. 108-199 prohibits the AFA directed pollock fishery in the AI, but it does not prohibit CDQ groups from harvesting a portion of their directed fishing allowance in the AI. In October 2004, the Council clarified its intent that the CDQ groups receive 10% of the AI pollock TAC.

For the interim and final harvest specifications in 2005, NMFS will prohibit the AI directed pollock fishery, until the management provisions for the AI directed pollock fishery become effective under Amendment 82. Any AI pollock TAC recommended by the Council under the provisions of proposed Amendment 82 will be included in the interim and final harvest specifications to allow the Regional Administrator to open the AI directed pollock fishery if and when the regulations for Amendment 82 are effective. This prohibition is authorized by the Pub. L. 108-199 and the associated draft proposed rule, which requires that only those who are selected by the Aleut Corporation and approved by NMFS may participate in the AI directed pollock fishery.

The TAC is equal to 19,000 mt or the ABC, whichever is less. The CDQ allocation is equal to 10% of the TAC. The CDQ "A" season allocation is equal to 40% of the CDQ allocation, and the "B" season allocation is equal to 60% of the allocation. The ICA is given by incidental catch needs estimated for non-pollock directed fisheries. In the following calculations, these have been assumed to be 2,000 mt. It was assumed that 60% of this would be required in the "A" season, and 40% in the "B" season. The DPF is equal to the TAC, minus the CDQ and ICA requirements. The "A" season DPF is equal to 19,000 mt, or 40% of the ABC (whichever is less), minus the "A" season CDQ and ICA. The "B" season DPF, is equal to the DPF minus the "A" season DPF.

Table 4.12-1 calculates the AI pollock specifications for the ABC alternatives in 2005 and 2006. These tables are identical.

Table 4.12-1 2005 and 2006 Specifications for the AI pollock fishery (metric tons)

Alt	ABC	TAC	CDQ	CDQA	CDQB	ICA	ICAA	ICAB	DPF	DPFA	DPFB
1	29,400	19,000	1,900	760	1,140	2,000	1,200	800	15,100	9,800	5,300
2	29,400	19,000	1,900	760	1,140	2,000	1,200	800	15,100	9,800	5,300
3	29,400	19,000	1,900	760	1,140	2,000	1,200	800	15,100	9,800	5,300
4	29,400	900	90	36	54	810	600	400	0	0	0
5	29,400	0	0	0	0	0	0	0	0	0	0

These estimates are contingent on the assumption that the spawning biomass in the AI is above 20% of the projected unfished spawning biomass. Federal regulations promulgated as part of the measures implemented to protect the SSL require that, if a biological assessment of the pollock stock in the AI is equal to or below 20% of the projected unfished spawning biomass during a fishing year, the Regional Administrator will prohibit the directed fishery, and that the fishery will remain closed until a subsequent biological assessment projects that the spawning biomass for the species in the area will exceed 20% of the projected unfished spawning biomass (679.20(d)(4)). This condition would be met, given the 43,200 mt ABC in 2004.

The CDQ and DPF fisheries may not be able to harvest the available pollock. A large proportion of the historical domestic fish production (in the 1990s) came from waters that are now closed to pollock fishing, because of Steller sea lion protection measures. If the Aleut Corporation and its associated fishermen are unable to fully harvest the DPF, the Council's recommendation would require a roll back of the unused portion of the pollock allocation to the EBS pollock ITAC. Following the October 2004 Council meeting, the CDQ groups indicated, in a joint letter to the Alaska Region Regional Administrator, that they did not expect to be able to harvest their CDQ allocations in the AI. Because AI SSL critical habitat is closed to pollock fishing, the CDQ groups indicated concerns that pollock would not be found in "economically viable harvestable amounts outside critical habitat," and that operating costs outside of critical habitat would be "extremely high." For these reasons the CDQ groups requested a rollover or reallocation of their entire AI pollock allocations to the EBS (Cotter, 2004).

Effects on Pollock

The criteria for the evaluation of target species are described in Section 4.1, and summarized in Table 4.1-2. Target species affected include: (1) AI pollock, (2) species taken as bycatch in AI pollock (flatfish, rockfish, Pacific cod, and Atka mackerel), and (3) EBS pollock (as the funding source). This section deals with AI pollock; incidental catches of other species, and impacts on EBS pollock are addressed in following sections.

This alternative requires that any AI pollock TAC be less than or equal to the ABC level; no TAC may exceed ABC. For ABCs under 19,000 mt, this alternative gives the Council complete discretion to set the TAC at any level between zero and the ABC in any given year. For ABCs equal to or above 19,000 mt, the alternative mandates a TAC of 19,000 mt. As noted above, this means that TACs will be at least 24% less than the lowest estimated ABC in the AI, since 1991. For ABCs just above 19,000 mt, the rule will mandate that the Council choose a TAC of 19,000 mt. Thus, for ABCs in this range, which are fairly low compared to historical ABCs, the rule requires that the Council choose a TAC that is equal to (if the ABC=19,000 mt), or fairly close to but not in excess of, the ABC. As noted above, these considerations are contingent on a spawning pollock biomass in the AI that is above 20% of the projected unfished spawning biomass. For a biomass below this level, the DPF and CDQ would have to equal zero, and only incidental catches would be allowed.

In 2005 and 2006, the ABC is projected to be 29,400 mt. This would be associated with a maximum TAC of 19,000 mt. The ICA has been 1,000 mt in recent years, and may be increased in 2005 (because it has been exceeded in recent years). Thus, Alternatives 1, 2, and 3 for this action would be associated with TACs of 19,000 mt. This is less than half of the ABC. Alternative 4 would be associated with a TAC equal to just over recent ICA levels, while Alternative 5 would be associated with a TAC of zero.

At this time, it is not clear if the Aleut Corporation and its partners, and the CDQ groups, will be able to fully harvest their allocations. During the domestic fishery, most pollock were harvested inside what is now designated as SSL critical habitat. SSL critical habitat will be closed to pollock fishing in any future pollock fishery. It is not clear if pollock can be found in economically viable amounts outside of critical habitat. As noted earlier, in October 2004, the CDQ groups requested a rollover or reallocation of their AI pollock allocations to the EBS. The groups asserted that they would not be able to harvest the AI allocations. (Cotter, 2004).

The 2003 SAFE document noted that the fish to the east of 174° W and the fish west of 174° W may belong to two different stocks. In the 2003 assessment proposal, the Aleutian Islands region was divided into areas where discontinuities in pollock distribution were apparent (see Appendix A). These breaks separate the northern "Basin" area from the Aleutian Islands chain and split the eastern-most portion of the Aleutian Islands region from the Aleutian Islands. Two regional partitions were developed, one called NRA (for Near, Rat, and Andreanof Island groups) extending to 170° E., and another that excludes the eastern portion between 174° W. and 170° W. This partitioning was based primarily on fishery distribution data. More information is available for the portion of the pollock stock located to the west of 174° W. longitude, so that it may be assessed as a tier 3 stock. Less stock information for the portion of the pollock stock east of 174° W. longitude is available, leading the assessment of that portion to be recommended under tier 5. The Plan Team and the SSC will need to decide if there is sufficient information to establish separate management stocks for AI pollock, or if AI pollock may be managed subarea wide. Also, the potential stock divisions are more consistent with the area covered by summer bottom-trawl surveys. The stock assessment authors have recommended that additional information be collected in the winter, through a scientific research permit to better understand the AI pollock stock structure.

The 2004 AI ABC was calculated by adding separate Tier 5 ABC estimates for these two areas. The ABC for the western area was 27,400 mt, while the ABC for the eastern area was 12,000 mt. These totaled the AI pollock ABC of 39,400 mt. (SAFE, page 852) If an entire AI pollock DPF of 18,000 mt were harvested from the area between 170° W. and 174° W., the catch in that area would exceed the ABC, at current ABC levels.

If this is a concern, the Council may choose, during the annual specifications process, to allocate the AI pollock TAC among the different management areas defined for the region. For illustrative purposes, it could impose a 12,000 mt TAC in the easternmost management area, Area 541, and could impose a separate 27,400 mt TAC in the central and western Aleutians management areas (Areas 542 and 543).

Area 541 includes waters that fall outside the 170° W. and 174° W. range, identified in the SAFE document as the waters within which the eastern AI pollock stock is located. This smaller area itself, however, could not be assigned a separate TAC until regulatory action was taken to create an appropriate management area. Given such a regulatory action, however, it would be possible to more finely tune the areas to the fish stocks.

The 2003 SAFE document noted that "given uncertainty in the status of the pollock in the NRA area east of 170° **W., it may be prudent to declare this area, along with the Bogoslof area, a protected transition zone between the Aleutian Islands, the Eastern Bering Sea, Central Bering Sea, and the GOA pollock stocks**. [emphasis in the original] This would provide some measure of insurance over stock structure uncertainty and better justify current regional management stocks (since they will no longer be contiguous). We expect that this will also enhance the current conservation measures in place for the Bogoslof region related to the Central Bering Sea and Aleutian Basin pollock..." (Appendix A, page 852) Should the Council close the areas east of 174° W., to protect weaker elements of the overall AI pollock stock, the ABC recommendations for the remaining fishable areas in the AI region west of 174° W. might be lower, reflecting only the NRA biomass.

AI TACs of 19,000 mt, or less, associated with the alternative actions, are small compared to the ABC of 43,200 metric tons, and are not expected to jeopardize the capacity of the pollock stock to produce MSY on a continuing basis, to alter the genetic structure, to change reproductive success, to change prey availability, or to affect habitat so as to jeopardize the ability of the stock to sustain itself at or above MSST.[19] This impact has thus been rated "not significant."

Effects on Target Species and Fisheries

The bycatch of species targeted in other fisheries by an AI pollock fishery could reduce the quantity of fish available for harvest in these other fisheries, causing some economic effects. Quotas for other target fisheries might be affected if this incidental harvest becomes large. Mortality to non-target species could affect potential yield from these stocks or affect the spatial or temporal distribution of these species. Harvest of pollock also may reduce the yield from the AI pollock population, possibly reducing production of juvenile pollock that are important prey for fish species harvested in other directed fisheries.

None of the five alternatives under consideration in this action would create a pollock TAC greater than 19,000 mt in 2005 or 2006. At least 1,000 mt are needed to maintain existing incidental catch limits. This means that the increase in directed CDQ and DPF harvests would be less than or equal to 18,000 mt. At an AI pollock CDQ and DPF of 18,000 mt, the effects on other target fisheries are likely to be small. The four other target species that appear in non-trivial amounts in pollock bycatch during the domestic fishery of the 1990s (from 1991 to 1998) were Atka mackerel, flatfish (primarily Greenland turbot), rockfish (primarily Pacific Ocean perch), and Pacific cod.

The average bycatch rate for Atka mackerel during this period was 0.0005 mt of Atka mackerel for each ton of pollock. The low yearly rate was zero, while the high yearly rate was .0058. At the average rate, the incidental Atka mackerel catch associated with 18,000 mt of pollock harvest would be 10 mt. At the low rate it would be zero and at the high rate it would be 104 mt. (NMFS

[19] The assessment authors use the size of the female spawning biomass with respect to the B_{35} biomass level for MSST determinations in the NRA stock. They do not have a similar threshold for the stock east of 174° W.

AKR blend) The Atka mackerel biomass estimate from the most recent (2002) survey was about 773,000 mt (2003 SAFE, page 720).

The average bycatch rate for flatfish during this period was 0.0011 mt of flatfish for each ton of pollock. The low yearly rate was 0.0001, while the high yearly rate was 0.0074. At the average rate, the incidental flatfish catch associated with 18,000 mt of pollock harvest would be 19 mt. At the low rate it would be 2 and at the high rate it would be 133 mt. (NMFS AKR blend)

The average bycatch rate for Pacific cod during this period was 0.0085 mt of cod for each ton of pollock. The low yearly rate was 0.0011, while the high yearly rate was 0.0085. At the average rate, the incidental Pacific cod catch associated with 18,000 mt of pollock harvest would be 20 mt. At the low rate it would be 1 mt and at the high rate it would be 154 mt. (NMFS AKR blend)

The average bycatch rate for rockfish during this period was 0.00085 mt of rockfish for each ton of pollock. The low yearly rate was 0.000125, while the high yearly rate was .0035. At the average rate, the incidental rockfish catch associated with 18,000 mt of pollock harvest would be 15 mt. At the low rate it would be 2 mt, and at the high rate it would be 63 mt. (NMFS AKR blend) The rockfish harvest is almost entirely Pacific Ocean perch (NMFS, AKR Blend). The Aleutian Islands Pacific Ocean perch biomass, based on the 2002 survey, is about 452,000 mt. (2003 SAFE, page 596).

These bycatches would count against the rockfish TACs in the AI, reducing the TAC available for targeted harvests, and buffering any impact these small amounts might have on the total harvest of rockfish in the AI. Because these bycatches would come at the expense of other groups fishing in the BSAI, they would impose an economic cost on these groups. This cost is addressed under the economic and social criteria.

Up to 50% of the allowance in a future AI pollock fishery will, it is proposed, be prosecuted with smaller vessels than in previous years, and perhaps more intensively in some geographic areas (because of SSL closures). The trawl nets used, the horsepower of participating vessels, and fishing strategies used may all be quite different than prior to 1998, resulting in bycatch rates and patterns quite different from historic patterns. These differences may create problems with the extrapolation of future bycatch rates in the AI pollock fishery.

An AI pollock fishery would be prosecuted with pelagic trawls, and would not likely affect habitat for such non-target species as Pacific cod, Atka mackerel, sablefish, flatfish, or rockfish since these species are more demersal or benthic oriented, are often associated with benthic structure and relief, and pollock fishing would be targeting schools of pollock that would likely be more bathypelagic or midwater oriented.

Higher removals of pollock may be associated with incidental catches of juvenile pollock, and may reduce the biomass of pollock, thereby reducing the production of juvenile pollock. Juvenile pollock are preyed upon by other pollock, Pacific cod, and other species of fish. Juvenile pollock are important components of the diet of other fishes, with pollock being the number one consumer of juvenile pollock, followed by Pacific cod and arrowtooth flounder as numbers two and three, respectively (Lang, et al. 2003). But the levels of reduced yield are very small and are judged to be insignificant given the very large biomass of pollock in the AI region. Thus, this alternative is not likely to impact prey items for fish species harvested in other target fisheries in the AI.

The pollock TAC in the EBS would have to be reduced by 18,000 mt to fund an AI CDQ and DPF under Alternatives 1, 2, or 3. The reduction would be smaller for Alternative 4, and zero for Alternative 5. Historical and current pollock ABCs and TACs in the EBS are very high. An 18,000 mt reduction in the EBS TAC is a change of about 1% in the 2003 harvests. Moreover, a reduction in removals in the EBS will not have adverse impacts on species taken incidentally there. These alternatives are not expected to jeopardize the capacity of the EBS pollock stocks to produce MSY on a continuing basis, and would not be expected to alter the genetic structure, change reproductive success, change prey availability, or affect habitat, so as to jeopardize the ability of this stock to sustain its self at or above MSST.[20]

The Council's proposal provides for the rollover of unused AI pollock DPF and CDQ to the ITAC and CDQ fisheries in the EBS, if the Aleut Corporation or CDQ groups are unable to harvest them in the AI. It is possible that was much as 17,000 mt to 18,000 mt (depending on the size of the ICA) might be rolled over. Such a reallocation would provide for harvest of pollock in the EBS above the annual TAC amount established for the EBS. This will not lead to a significant adverse impact on the EBS pollock stock. The maximum amount in question would be about 1.3% of the 2005 proposed EBS pollock TAC (1,474,450 mt). The TAC, plus any rollover, would be far below the recommended 2005 EBS ABC of 2,363,000 mt. Implications of potential rollovers for SSL protection measures are discussed in the marine mammals part of this section.

Historic evidence indicates that pelagic pollock fisheries will only catch small amounts of these other target species incidentally. There appears to be limited potential for overlap between pollock and fixed gear fishing areas. None of the five specifications alternatives are expected to jeopardize the capacity of the other target stocks, including EBS pollock, to produce MSY on a continuing basis, or to alter the genetic structure, change reproductive success, change prey availability, or affect habitat, so as to jeopardize the ability of these stocks to sustain themselves at or above MSST. For these reasons, the impacts of this alternative on other target species have been rated "insignificant."

Effects on Incidental Catch of Other and Non-specified Species

The "other species" category includes: sculpins, skates, sharks, and octopus. This category also includes squid, which in the BSAI are separately assessed, annually, by the Plan Team. Information on these species is generally limited when compared with other species upon which directed fisheries are prosecuted. However, these species have some current or potential economic value, are an integral part of the marine ecosystem, and thus are monitored by NMFS. Catch levels are small when compared with target species, but levels of catch are increasing (NPFMC 2003b).

Non-specified species are marine organisms which have little or no economic value and are generally discarded and certainly not targeted; non-specified species catch levels presumably track the catches of the target species in various fisheries. Since target fishermen realize adverse effects (i.e., costs) from harvest of species not targeted, efforts are generally made to minimize catch of these species to reduce the time it takes to sort or otherwise deal with unwanted catch. Thus, levels of catch of other or non-specified species are generally low.

[20] The assessment authors use the size of the female spawning biomass with respect to the B_{35} biomass level for MSST determinations in the NRA stock. They do not have a similar threshold for the stock east of 174 degrees W.

Between 1999 and 2003, groundfish fishermen have taken between 98,000 mt and 120,000 mt of groundfish from the Aleutian Islands each year. (AKR Blend and Catch Accounting System) The proposed FMP and regulatory amendments would structure an AI pollock fishery that might add a maximum of 18,000 mt to that (1,000 mt are already taken as incidental catch), if the entire TAC can be harvested. Assuming that other and non-specified species harvests would increase or decrease in proportion to the total volume of groundfish harvested in the AI, the increase in pollock harvest would not change the incidental catches of these species by more than 50% (See Table 4.1-2 in Section 4.1 for the relevant significance criteria). This impact is therefore classified as “insignificant.”

Effects on Incidental Catch of Forage Fish Species

Forage species are taken incidentally in many groundfish fisheries, and prior to 1998, directed fisheries for these species were primarily targeting capelin and eulachon. After 1998, no commercial fishery on forage species has been allowed (BSAI FMP Amendment 36). At the present time, the incidental catch of forage species likely would be very small to negligible. Current regulations permit maximum retainable forage species catch of 2 percent of total catch.

As previously reported, between 1999 and 2003, groundfish fishermen have taken between 98,000 mt and 120,000 mt of groundfish from the Aleutian Islands each year. The proposed FMP and regulatory amendments could structure an AI pollock fishery that might add a maximum of 18,000 mt to that (1,000 mt are already taken as incidental catch), if the entire TAC can be harvested. Assuming that forage fish harvests would increase or decrease in proportion to the total volume of groundfish harvested in the AI, the increase in pollock harvest would not change the incidental catches of these species by more than 50% (See Table 4.1-3 in Section 4.1 for the relevant significance criteria). This impact is therefore classified as “insignificant.”

Effects on Incidental Catch of Prohibited Species

The average bycatch mortality rate for halibut during this period was 0.00002 mt of halibut for each ton of pollock.[21] The lowest yearly rate was zero, while the highest yearly rate was .00011. At the average rate, the incidental halibut catch associated with 18,000 mt of pollock harvest would be 0.4 mt. At the low rate it would be zero and at the high rate it would be 2 mt (NMFS AKR blend). This compares to BSAI groundfish fisheries halibut bycatch mortality of 3,790 mt in 2003.

Note that bycatches of crab (and salmon) are measured in “numbers of animals”, not metric tons. The average bycatch rate for bairdi Tanner crab during this period was 0.00315 crab for each ton of pollock. The lowest yearly rate was zero, while the highest yearly rate was .01968. At the average rate, the incidental bairdi catch associated with 18,000 mt of pollock harvest would be 57 crab. At the lowest rate it would be zero and at the highest rate it would be 354 crab (NMFS AKR blend). This compares to BSAI groundfish fisheries bairdi bycatch of about 897,000 crab in 2003.

The average bycatch rate for red king crab during this period was almost zero for each ton of pollock. The lowest yearly rate was zero, while the highest yearly rate was .00002. At the

[21] Note that crab PSC amounts are measured in “numbers of animals”, not mt, as are most other PSCs. Salmon PSC catches are also tabulated in “numbers of fish”, rather than mt.

average rate, the incidental red king crab catch associated with 18,000 mt of pollock harvest would be, effectively, zero crabs. At the lowest rate it would be zero and at the highest rate it would be far less than one crab (NMFS AKR blend). This compares to BSAI groundfish fisheries red king crab bycatch of 73,378 crab in 2003.

The average bycatch rate for chinook salmon during this period was 0.02389 salmon for each ton of pollock. The lowest yearly rate was 0.00365, while the highest yearly rate was .04326. At the average rate, the incidental chinook salmon catch associated with 18,000 mt of pollock harvest would be 430 salmon. At the low rate it would be about 66 salmon, and at the high rate it would be 779 salmon (NMFS AKR blend). This compares to chinook salmon bycatch of 44,706 salmon in 2003.

The average bycatch rate for "other" salmon (mainly chums) during this period was 0.01658 salmon for each ton of pollock. The lowest yearly rate was 0.00167, while the highest yearly rate was 0.15724. At the average rate, the incidental "other" salmon catch associated with 18,000 mt of pollock harvest would be 299 salmon. At the lowest rate it would be about 30 salmon and at the highest rate it would be 2,830 salmon (NMFS AKR blend). This compares to a BSAI "other" salmon bycatch of 187,323 salmon in 2003.

There are limited data on the origins of chinook salmon taken as bycatch in the BSAI. Witherell, et al. (2002) found that the most recent information is scale pattern analysis data from 1979-1982. These are data from the early years of the U.S. managed foreign and joint venture harvests in the EEZ. These data suggest that the chinook harvested in the BSAI came from Western Alaska, Southcentral Alaska, Asia, Southeast Alaska, and Canada. Somewhat over half of the salmon came from Western Alaska. The Groundfish PSEIS notes that "Chinook stocks from southeastern Alaskan/British Columbia, as well as those from Washington, Oregon, and California, are rare in the Bering Sea and western North Pacific." (NMFS, 2004d, page 3.5-186). Witherall et al. (2002) point to more recent scale pattern and genetic data for chum salmon from the mid-1990s. Chum salmon also originated in many places around the North Pacific. Somewhat smaller proportions of the chum catch (on the order of 20% to 25% appear to have originated in Western Alaska (Witherell et al., 2002, pages 59-60).

Witherall et al. also point out that BSAI groundfish fisheries can take salmon as bycatch one or two years before they return to their natal streams. Given normal mortality some proportion of the salmon harvested as bycatch would not have lived to return to their natal streams, even if they had not been caught. They use the concept of "adult equivalents" to refer to the reduction in fish returning to their streams as adults for any given bycatch of salmon. For example, a bycatch of 18,000 chinook, translates into a reduction in returning salmon of 14,581 adult equivalents (Witherell et al., 2002, page 61). The calculations are rough, and are only provided here to illustrate the general concept, and provide a sense of the possible difference between bycatch and adult equivalent returns. A full economic analysis would have to address issues of weight gain by Chinook in their last years at sea, and of the reproductive potential of returning salmon. (Queirolo, 1988).

Figure 4.2.2-7a in the Amendment 82 EA/RIR showed locations of salmon bycatch in pollock fisheries in the Aleutian Islands. A relatively large part of historical AI bycatch of chinook salmon occurred outside of Steller sea lion critical habitat on the eastern border of Area 541, and north of Atka Island, so additional pollock trawling there could lead to additional chinook salmon bycatch in the Aleutian Islands. A relatively large part of historical AI bycatch of "other" (primarily chum) salmon occurred between the Rat Islands and the Near Islands, in waters outside of SSL critical habitat, and also in the waters just north of Atka, some of which are outside Steller sea lion critical habitat. Additional pollock trawling in these waters could also lead to additional salmon bycatch.

The average bycatch rate for herring during this period was 0.00033 mt of herring for each ton of pollock. The lowest yearly rate was zero, while the highest yearly rate was 0.00248. At the average rate, the incidental herring catch associated with 18,000 mt of pollock harvest would be 6 mt. At the lowest rate, it would be about zero mt and at the highest rate it would be 45 mt (NMFS AKR blend). This compares to a BSAI herring bycatch of 1,099 mt in 2003 (almost all in the EBS pollock fishery).

The average bycatch rate for other Tanner crab during this period was 0.00275 crab for each ton of pollock. The lowest yearly rate was zero, while the highest yearly rate was 0.02049. At the average rate, the incidental herring catch associated with 18,000 mt of pollock harvest would be 50 crab. At the lowest rate, it would be about zero mt and at the highest rate it would be 369 (NMFS AKR blend). This compares to a BSAI other tanner crab bycatch of about 615,000 crab in 2003.

The average bycatch rate for other king crab during this period was 0.00022 crab for each ton of pollock. The lowest yearly rate was zero, while the highest yearly rate was 0.00088. At the average rate, the incidental other king crab catch associated with 18,000 mt of pollock harvest would be 4 crab. At the lowest rate, it would be effectively zero and at the highest rate it would be 16 crab (NMFS AKR blend).

The AI pollock fishery may be prosecuted with smaller vessels than in previous years, and perhaps more intensively in some geographic areas (because of SSL closures). The trawl nets used, the horsepower of participating vessels, and fishing strategies used may all be quite different than prior to 1998, resulting in bycatch rates and patterns that differ from historical experience. Thus, there are concerns about extrapolation or inferring the future bycatch rates in the AI pollock fishery.

In 2003 and 2004, NMFS stock assessment biologists reevaluated the stock structure of pollock in the AI region, given uncertainty over stock composition. Future AI pollock ABCs may be changed in amount, and geographic boundary, in future stock assessments. A change in pollock stock structure, with possible changes in where pollock may be fished, and at what levels, may result in a change in the overall PSC bycatch scenario, placing some uncertainty in predicting future effects of these alternatives on PSC bycatch.

If the fishery develops as envisioned in the legislation and supporting regulations, not all vessels in the AI pollock fishery will be observed. In the absence of observer coverage, NMFS cannot be certain that vessels are accurately reporting PSC bycatch. Catcher vessels under 60 feet are not normally required to carry observers, and catcher vessels from 60 to 120 feet are only required to carry observers 30% of the time. Under the provisions of the Council’s final action establishing the AI pollock fishery, vessels under 60 feet are required to carry a NMFS Cadre observer if one is provided by NMFS. However, the number of Cadre observers is limited, and the program was established for an entirely different purpose. It is not clear that the Cadre requirement will generate sufficient, useful observer data. Pollock vessels tend to sort their catch at sea somewhat less than other fishing operations, and deliveries to authorized processors will be monitored under this program. Moreover, in 2005-2006, the use of catcher vessels under 60 feet in this fishery may be limited. Program rules prohibit more than 25% of the harvest from being taken by vessels of this class in these years. It is also likely that the main focus of the Aleut Corporation in these years will be harvests by larger vessels, with the smaller trawlers perhaps used experimentally.

The Council has committed to a review of the observer issue at its June 2006 meeting.

The Aleutian Islands pollock ABC for 2005, is 39,400 mt. The TAC associated with this ABC is 19,000 mt, implying that 18,000 mt would be available for the CDQ and DPF, if the ICA is 1,000 mt. As noted earlier, using low and high bycatch rates from 1991 to 1998, this implies chinook bycatches between 66 and 779 salmon. Using the average bycatch rate over the period, the bycatch would be 430 salmon. Similar estimates for "other" salmon range between 30 and 2,830 salmon (mostly chums), with a mean of 299. At the high ends, this is about 1.7% of the 2003 BSAI chinook salmon bycatch, and 3% of BSAI "other" salmon bycatch. At the mean bycatch rates from 1999 to 1998, these are 1% and 0.33%, respectively.

Considering the modest levels of expected bycatch, the evidence of the dispersed origins of the salmon taken as bycatch in the BSAI groundfish fisheries, the relationship between bycatch and salmon adult equivalent returns, and the fact that increased bycatches associated with increased pollock fishing in the AI may be offset to some extent by reduced bycatches associated with corresponding reductions in pollock fishing in the EBS, PSC bycatch amounts are not expected to be large enough to jeopardize the capacity of the PSC stocks to maintain benchmark population levels, produce 20% decreases in harvest levels in directed fisheries, or increase BSAI harvests of prohibited species by more than 50%. Bycatch of other species are relatively small. For these reasons, the PSC impacts are rated "not significant" for these alternatives.

Effects on Marine Mammals

The Aleutian Islands would be open to a directed pollock fishery with the TAC set as previously described (see Table 4.4-1) and apportioned to A and B seasons. The current regulations (and ESA consultations) provide for an Aleutian Islands subarea pollock fishery that is strictly outside of Steller sea lion designated critical habitat, with TAC apportioned 40%/60% to the "A" and "B" seasons, respectively, and based upon an ABC value which conforms to the harvest control rule and is based on the annual pollock stock assessment, which appropriately evaluates the stock being harvested. Possible adverse effects of an offshore (i.e., outside of critical habitat) fishery for pollock were fully considered in the 2001 Biological Opinion and those adverse effects were accounted for under the incidental take statement, provided by that consultation. An AI pollock fishery would fall within the terms of that previous consultation and would not be considered an adverse impact on Steller sea lions. An informal consultation, dated August 19, 2004, between the NMFS Sustainable Fisheries Division and the Protected Resources Division found that Amendment 82 and its proposed regulations were not likely to adversely affect Steller sea lions or their critical habitat beyond those effects already identified in previous consultations.

The Aleutian Islands area previously has been open to a directed pollock fishery. Prior to 1999, this fishery's TAC was as high as 100,000 mt. In recent years, the TAC has been much lower (since 1999, basically only an ICA apportionment), and the BSAI Plan Team's reevaluation of the AI pollock structure may lead to recommended closure to fishing east of 174 degrees W. and perhaps lowered ABCs for the remainder of the AI region. The impacts of a reopened fishery on marine mammals would likely be substantially smaller than impacts realized in this fishery in prior years. This is so for several reasons. First, SSL protection measures, in place in the AI, significantly reduce the potential for adverse interactions between marine mammals and the pollock fishery. Second, the proposed AI pollock fishery is limited to a total of 19,000 mt, a much smaller amount than harvested in any fishery prior to the 1999 closure. Third, there is a very much heightened awareness on the part of all concerned parties (e.g., fishermen, observers, enforcement, conservation groups, and the general public) of the serious implications of adverse interactions with marine mammals. It is, therefore, reasonable to assume that much greater care will be exercised, by all concerned, to minimize the potential for adverse interactions.

Historically, impacts of the pollock fishery on marine mammals were reviewed periodically as the fishery was prosecuted, and the prevailing levels of harvest were not judged to be adversely impacting marine mammals. Where issues of concern arose, as in the instance of Steller sea lion rookeries and haulouts, the Council established appropriate measures to mitigate these concerns. However, a reopened fishery will occur in areas outside of Steller sea lion protection areas and these protection areas will remain closed to all pollock trawling. This may displace the Aleut Corporation pollock fishing activities into areas perhaps not fished as intensely before.

The proposed pollock fishery would be prosecuted in compliance with existing SSL protection measures. Several potential direct and indirect effects on Steller sea lions are considered in this analysis. Annual levels of fishery-related incidental mortality to Steller sea lions are estimated by comparing the ratio of observed incidental take of animals to observed groundfish catch (stratified by area and gear type). Incidental take frequencies also reflect locations where fishing effort is highest. In the Aleutian Islands and GOA, incidental takes are often within Steller sea lion critical habitat. In the Bering Sea, takes are farther off shore and along the continental shelf. Otherwise there seems to be no apparent "hot spot" of incidental take, disproportionate with fishing effort. Given that critical habitat is closed to directed fishing for pollock in the Aleutian Islands, an AI pollock fishery apportionment would not likely result in an increase in the incidental take of Steller sea lions. Use of areas beyond critical habitat by sea lions is very limited in the Aleutian Islands subarea (2001 BiOp). Also, it is unlikely that the allocation regime chosen for the offshore fishery would result in additional adverse impacts. Therefore, incidental take would be insignificant under this alternative.

The spatial and temporal effects on Steller sea lion prey by the Aleutian Islands directed pollock fishery previously has been analyzed and the fishery modified to comply with the Endangered Species Act (ESA)(2001 BiOp and August 19, 2004 informal consultation memorandum). The fishery as prosecuted under the alternatives would be conducted according to these protection measures and no impacts are expected beyond those already analyzed. The specifics of the fishery seasonal apportionments and fishery location were described above. Telemetry data suggest that most Steller sea lions forage relatively close to haulouts and rookeries, generally within 10 nm and most within 20 nm, although in winter they may forage further offshore. The Steller sea lion protection measures provide a buffer around haulouts and rookeries to provide an area protected from fishery removals of fish species important in Steller sea lion diets. In parts of the AI region, especially the western Aleutians, Steller sea lions continue to decline, and there is heightened concern over these animals in this particular area. Aerial surveys of Steller sea lions conducted in 2004, will provide valuable data on population levels in this region.

There could be some effect of an AI pollock fishery if spatial concentration of fishing activity occurs. This could result from larger AFA vessels fishing a relatively small TAC, concentrating their efforts in an area or areas that yield good CPUEs. The vessels could be expected to remain in such areas to attain their TAC quotas as quickly and efficiently as possible. Also, when small vessels enter this fishery, as is provided for in the enabling legislation, conceivably these vessels also could concentrate in areas that are closest to ports and/or areas of refuge from stormy weather. In either case, some local depletion of marine mammal prey items could occur, but the volumes of potential harvest are small compared with available biomass. These impacts on marine mammals would be in proportion to the amount of TAC apportioned to this fishery. The projected TACs for Alternatives 1, 2, 3, and 4 allow for harvest well below the ABCs, reducing the likelihood of adverse impacts due to the quantity of harvest. Moreover, all fishing would be subject to the area restrictions associated with Steller sea lion protection areas.

Steller sea lion protection measures require the control of overall harvest of pollock, Pacific cod, and Atka mackerel, which are considered key Steller sea lion prey species (50 CFR 679.20(d)(4)). If the spawning biomass of a prey species is predicted to fall below 20 percent of its unfished spawning biomass, directed fishing for that species would be prohibited. The analysis of the harvest control rule is in the Steller sea lion protection measures SEIS (NMFS 2001). All alternatives preclude directed fishing for pollock if the spawning biomass fell below 20% of the unfished spawning biomass, and therefore would have insignificant impacts on the global availability of pollock in the Aleutian Islands subarea. Further, the resumption of a fishery in the Aleutian Islands subarea would not cause the 2 million metric ton cap for the BSAI to be exceeded. Overall, with the current Steller sea lion protection measures in place, Alternatives 1 through 4 would have insignificant effects on spatial and temporal concentration of harvest and on global harvest of prey species for marine mammals. Alternative 5 would likely have a significant beneficial affect on the spatial and temporal harvest of prey species, due to no groundfish fishing and insignificant effects on the global harvest of prey species.

Vessel traffic, nets moving through the water column, or underwater sound production may all represent perturbations that could affect Steller sea lion behavior. An increase in fishing activity in the AI region could result in increased discard or accidental loss of fishing materials, such as nets, package bands, lines, etc., that could increase the incidence of entanglement with Steller sea lions. Foraging could potentially be affected not only by interactions between vessel and species, but also by changes in fish schooling behavior, distributions, or densities in response to harvesting activities. In other words, disturbance to the prey base may be as relevant a consideration as disturbance to the predator itself. For the purposes of this analysis, we recognize that some level of prey disturbance may occur as a fisheries effect. The impact on marine mammals using those schools for prey is a function of both the amount of fishing activity and its concentration in space and time. The criterion set for insignificant impacts is a similar level of disturbance as that which was occurring in 2001. In 2001, the total pollock catch in the Aleutian Islands was only 824 mt (Table 3.2-1); thus a fishery up to 19,000 mt would be a substantial increase in the amount of catch, compared to 2001. However, the test for significance is whether there would be more disturbance to the Steller sea lion population. Given that all of sea lion critical habitat is closed in the Aleutian Islands, and the effects of a fishery up to the ABC was considered in the 2001 BiOp and the Steller sea lion protection measures SEIS (NMFS 2001), no substantial disturbance effects are likely given the vast area beyond 20 n mi from land and the very limited use of this area by sea lions in the Aleutian Islands, due to the bathymetry (i.e., deep water off the continental shelf). Thus, the indirect effects under Alternatives 1 through 4 are "insignificant" according to the criteria set for significance. The effects of Alternative 5 could be "significantly beneficial" because the groundfish fisheries would not be authorized and the disturbance would be eliminated.

In October 2004, the Council clarified its intent regarding the allocation of TAC in the AI and EBS subareas to the directed pollock fisheries. A separate TAC will be established for each subarea with 10 percent of each TAC allocated to the CDQ program in each subarea. In June 2004, the Council recommended that any TAC that is not likely to be harvested in the AI directed pollock fishery be reallocated to the EBS subarea directed pollock fishery. The CDQ groups also may request a reallocation of unharvested AI CDQ pollock to the EBS subarea CDQ pollock directed fishing allowance due to logistical difficulties in harvesting pollock in the AI subarea. Reallocation of unharvested AI pollock to the EBS AFA and CDQ directed pollock fisheries would provide for harvest of pollock in the BS, above the annual TAC amount established for the BS.

The Steller sea lion protection measures require harvest of pollock to be within the annual TAC amounts to ensure harvest is appropriate to the amount of available pollock biomass and other considerations. Because of the current condition of the EBS pollock stock, and the 2 million mt optimum yield cap for the BSAI, the EBS pollock TAC is set well below theEBSpollock ABC. The maximum amount of reallocation that could occur from the AI subarea to theEBSsubarea is 19,000 mt, approximately 1.3 percent of the 2005 proposed pollock TAC (1,474,450 mt). The proposed acceptable biological catch (ABC) for pollock in the EBS subarea is 2,363,000 mt. Thus, 19,000 mt is 2 percent of the difference between the EBS pollock TAC and ABC. Even with a reallocation of 19,000 mt from the AI subarea, the amount of pollock available for harvest in the EBS (1,493,450 mt) would be well below the ABC.

The reallocation of any unharvested AI pollock TAC likely would be substantially less than 19,000 mt, and likely would occur in the later part of the A season or in the B season. Based on the 19,000 mt annual TAC limit for AI pollock and on the current biomass size of the EBS pollock stock, the reallocation of unharvested AI pollock TAC is not likely to result in harvest in the EBS that is excessive, in relation to available pollock biomass. As long as the gap between the EBS pollock ABC and the EBS pollock TAC is wide, the reallocation of unharvested pollock from the AI to the EBS is not likely to adversely affect Steller sea lions or their critical habitat. If the biomass of the EBS pollock stock declines substantially in the future, so that the gap between the ABC and the TAC is substantially reduced and potential reallocated amounts would exceed TAC by more than 2 percent, the potential reallocation of unharvested AI pollock would need to be analyzed by informal consultation before commencing an inseason action for the reallocation. The current condition of the EBS stock and the amount of AI pollock reallocation would need to be considered at that time to determine the likelihood of an adverse effect on Steller sea lions or their critical habitat. No reallocation would occur if the action was likely to adversely affect Steller sea lions or their critical habitat.

The northern fur seal population has declined over the past decade, and recent counts in the Bering Sea region suggest the decline is continuing. Fur seals breed and pup on the Pribilof Islands, and on a few other islands in the Bering Sea region. Lactating females forage at sea to maintain a nutritional status sufficient to successfully nurse pups during the summer months. These foraging areas are primarily in the Bering Sea, and thus an AI pollock fishery would not likely overlap this foraging habitat. However, most of the Bering Sea fur seal population migrates through Aleutian Island passes en route to/from summer habitat and winter habitat. The fur seal is pelagic during the winter months in the north Pacific, although some remain in the Bering Sea region in winter. Migrations through the AI region could be affected by an AI pollock fishery through disturbance or direct take. Fur seals are susceptible to entanglement with derelict fishing gear because of their seasonal pelagic activity, and often entangle with lost nets and line around rookery areas. Efforts to remove derelict gear, nets, lines, and other debris from beaches on the Pribilof Islands have met with some success. Fur seals feed on pollock, although primarily juvenile fish. A pollock fishery could remove prey items used by fur seals; however, given the difference in size between fishery-targeted pollock and pollock consumed by fur seals, this overlap may be of less concern. Also, the AI pollock fishery is very distant from the main Bering Sea fur seal foraging areas, and would be unlikely to affect foraging fur seals. There still could be some impact on fur seals as they move through Aleutian Island passes, but the AI pollock fishery has operated there in the past, and many other fisheries continue to operate there, and the addition of the AI pollock fishery to the 2005 and 2006 harvest specifications does not rise to a level of concern and thus is considered to be “insignificant”.

Similarly, some cetaceans migrate through the AI region, and special concern has been expressed over the extremely small population of North Pacific right whales that seasonally occupies habitat in the Bering Sea. This highly endangered whale may be sensitive to encounters with fishing activity; as is currently understood, this whale is susceptible to vessel strikes because of its low profile when at the water surface, making it difficult to see. Members of the right whale group (including the Atlantic stock) may entangle with lines from floating buoys, damaging baleen plates and impairing feeding. However, very little is known about the North Pacific right whale's habitat, movement patterns, or other vital activities in the north Pacific region.

Other cetaceans also may be susceptible to gear entanglement. Some mortality to humpback whales has been reported for trawl fisheries in the Bering Sea (Angliss and Lodge 2002), and mortality to fin whales also has been reported from BSAI groundfish trawl fisheries. Most baleen whales do not target food species that would be harvested in an AI pollock fishery (although some baleen plates in larger whales may sieve large quantities of larval or small juvenile pollock, among other fish species). The AI pollock fishery will be prosecuted with pelagic nets, which, because of rough bottom conditions in the AI, are not expected to be brought in contact with the bottom to any great degree and thus are less susceptible to loss from this cause (2004a, page 3-98). As a result, gear loss and subsequent entanglement with whales is considered to likely be very rare. Overall, the potential for encounters between AI pollock fishing operations and cetaceans is low. There will be few vessels participating, and fishing operations will be primarily during the A season, which will be before the main migration of those whales that migrate seasonally through the AI passes en route to summer feeding grounds in the Bering Sea. Given the very small incremental increase in vessel activities, the low likelihood of gear loss, very little concern over prey removal, and a low level of spatial and temporal overlap with cetacean habitat, the potential for adverse effects from an AI pollock fishery is very small. Thus, this is considered "insignificant" for Alternatives 1, 2, 3, and 4 and "significantly beneficial" for Alternative 5's impact on spatial and temporal concentration of prey removal and disturbance.

The Bering Sea stock of northern harbor seal experiences mortality from BSAI trawl fisheries of 2 or more individuals annually (Angliss and Lodge 2002). However, this level of mortality likely comes from a variety of groundfish fishery activities, and at these levels is not considered a threat to this population. Increased fishing in the AI by trawl vessels will likely be a small fraction of any future injury or mortality to harbor seals, primarily because these fisheries will be prosecuted distant from shore where harbor seals tend to concentrate throughout the year. Some heightened concern may remain, however, as the Alaskan populations of harbor seals (their stock structure is still not understood and is the subject of ongoing genetic and other research) have declined in some areas. Managers are seeking to understand reasons for this decline, so that mitigative actions might be taken in the future.

The southwest Alaska stock (Distinct Population Segment or DPS) of the northern sea otter is a candidate for listing as threatened under the Endangered Species Act (65 *FR* 67343; 11/9/00). This DPS of sea otter (see Figure 4.2.2-7b) is under a heightened level of concern, because of the significant population decline in the Aleutian Islands in the past several years. It is unlikely that the AI pollock fishery would have any appreciable effect on sea otters, because this species is very coastally oriented, does not migrate from area to area, and feeds on prey items not targeted by the fishery. Fuel spills and loss of nets and lines could result in direct contact and mortality to sea otters. However, the AI pollock fishery would be prosecuted well offshore and not in contact or proximity to sea otters, and thus would not likely have measurable effects on the sea otter population. Future impacts on this DPS may depend on action taken by Congress and the U.S. Fish & Wildlife Service on defining critical habitat. It is possible that some features of critical habitat may be susceptible to impact from groundfish fishing activities, although it again appears unlikely that an AI pollock fishery will overlap with sea otter critical habitat to any extent such that significant concern results.

The overall combination of effects described above seem to indicate a small impact on marine mammals of an AI pollock fishery with a maximum CDQ and DFA of 18,000 mt apportioned to A and B seasons, as previously described (see Table 4.4-1). Some species are known to have potential interactions with groundfish fisheries (some whales, northern fur seals), and in some cases the effects of the proposed action in the context of this interaction are unknown. For some marine mammals, pollock are a component of their diet (harbor seals, Steller sea lions, northern fur seals), and some localized prey depletion might be a concern, depending on how the fishery is actually prosecuted. In the past, groundfish fishery effects on prey availability was one reason SSL protection measures were put in place, limiting prey removals within 3, 10, or 20 nm from SSL haulouts and/or rookeries. Thus, setting a TAC that could result in prey removals is of some concern. In some other cases, insufficient information is available on the distribution, abundance, or habitat use patterns by many marine mammal species, making it impossible to predict impacts, although from past history with the AI pollock fishery no significant concerns were raised. Some marine mammals that likely use the AI region for seasonal habitat, or migrate through the AI passes en route to or from seasonal habitat in the Bering Sea, are endangered, heightening the level of concern over any fishery prosecuted in their habitat. Some are in continued decline (e.g. northern fur seals) or have declined such that their population condition is uncertain (northern harbor seals, North Pacific right whale). Given the potential for some overlap of this fishery with pelagic fur seals, movement corridors for North Pacific right whales en route to/from summering areas in the Bering Sea, and movement corridors for some other cetaceans, the impacts of this alternative could be of concern, but the fact that this fishery has occurred in the region before without adversely impacting these marine mammals suggests that it will not have adverse impacts in the future. Also, this will be a small incremental addition to fishing activity in the region. Plus many other marine activities occur in the area, and this small pollock fishery is considered insignificant in light of the larger picture. Overall, then, an "insignificant" rating is assigned to this issue.

Effects on Seabirds

The Aleutian Islands would be open to a directed pollock fishery with the TAC set as previously described (see Table 4.4-1) and apportioned to A and B seasons. The proposed pollock fishery would be prosecuted in compliance with existing seabird protection measures. Several potential direct and indirect effects on seabirds are considered in this analysis. In the Aleutian Islands and GOA, overlap between seabirds and trawl fishing effort is most likely to occur near shore or in the relatively narrow band of the continental shelf. In the Bering Sea, trawling overlaps with birds along the continental shelf and mid shelf regions, thus extending farther from land masses than in the GOA (see GOA and BSAI SAFE documents).

The most frequent incidental take in trawl fisheries is of the northern fulmar (about 75% of trawl seabird bycatch), and over 500,000 northern fulmars nest on the Aleutian Islands. The next most common, shearwaters and Laysan albatross, do not nest in Alaska. Birds which utilize bottom fish and crustaceans, such as some alcids and cormorants (< 2% of total bycatch), may be taken in trawls or have their foraging affected. Between 5 - 7 % of birds taken in trawls are not identified, which may mean that alcids comprise a larger proportion of incidental take than previously recognized. The species most commonly subject to vessel strike mortality (especially in dark, stormy conditions or where lights are used) include five species of small auklets; auklets comprise about 32% of the colonial birds that nest on these islands. Annual levels of fishery-related incidental mortality to seabirds are estimated by comparing the ratio of observed incidental take of dead birds to observed groundfish catch (stratified by area and gear type). Incidental take frequencies also reflect locations where fishing effort is highest.

In the Aleutian Islands (Unimak Pass to Attu), the Beringian Seabird Colony Catalog (USFWS 2004) lists approximately 10.5 million seabirds nesting at 274 colony sites. The colonies would usually be occupied by nesting birds from May through September, although some species, notably fulmars, may be raising chicks through October. Thus, primarily the "B" pollock season would substantially overlap temporally with colonially nesting birds, although the same species listed below are likely to be in the Aleutian area, further offshore, during their non-breeding season. These colonially nesting birds consist of 29 species, with the most abundant being fork-tailed storm-petrel (22% of total), Leach's storm-petrel (24%), least auklet (22%) and tufted puffin (12%).

In terms of bird distribution at sea, the North Pacific Pelagic Seabird Database (NPPSD) (See SAFE 2002 report for figures) indicates that northern fulmars overlap with trawl fisheries in the Aleutians near the major passes and around the eastern Aleutian Islands. Shearwaters also occur primarily around Unimak Pass and the central to eastern Aleutians. Laysan albatrosses are most likely to overlap in the western Aleutians, whereas black-footed albatrosses are relatively rare in the Aleutians. In the Aleutians, short-tailed albatrosses have been observed most frequently near the central Aleutians and on the GOA side of the eastern Aleutians.

Because of the 20 n mi closure around SSL critical habitat, and the consequent closure of these areas to any pollock trawl fishery, many of the nearshore feeding birds, such as guillemots, cormorants, and sea ducks, should not experience significant increase in incidental take from the proposed trawl fishery in the AI. Species that may experience a shift in location of incidental take in the Aleutians include albatrosses and shearwaters, although the global take should not increase significantly. An exception may be the Laysan albatross, which occurs primarily in the central and western Aleutians, and thus could experience an increase in total incidental take. The short-tailed albatross has only been observed to be taken in long-line fisheries, and the spectacled and Steller's eiders have not been recorded as incidental take in groundfish fisheries. The impact of third-wire interactions with albatrosses is not well defined, and is being addressed through on-going studies.

Piscivorous seabirds utilize a wide variety of forage fish, as well as the juvenile stages of some commercial species such as pollock and Pacific cod. Forage fish are not commercially fished, and although their bycatch in trawl fisheries is not well defined, they do not appear to be a large proportion of fish bycatch (SAFE Ecosystem Considerations chapter, Forage fish, 2004). The AI pollock fishery will target large adult pollock, and will not harvest to any appreciable extent fish species consumed by seabirds. Thus this is considered an insignificant concern. [22]
Vessel traffic, nets moving through the water column, or underwater sound production may all represent perturbations that could affect seabird behavior. Foraging could potentially be affected not only by interactions between vessel and species, but also by changes in fish schooling behavior, distributions, or densities in response to harvesting activities that disturb the prey base. Some level of prey disturbance may occur as a fisheries effect. The impact on seabirds using those schools for prey is a function of both the amount of fishing activity and its concentration in space and time. The AI pollock fishery will be prosecuted by a small number of vessels, outside Steller sea lion closed areas, and thus will likely not impact schooling or other behavior of fish species consumed by seabirds; this issue is not considered significant.

[22] As noted in the ecosystem section, at the June 2004 Council meeting, the SSC recommended that advantage be taken of any new AI pollock fishery to study the effects on upper trophic level predators, such as piscivorous seabirds, of fishing for pollock. A more detailed summary of the SSC's proposal may be found in the ecosystem analysis in this section.

Some seabirds dive to the ocean bottom to obtain food, particularly eiders and scoters as well as guillemots and cormorants. Adverse impacts could accrue if there is major damage to their feeding areas. These would be a particular concern with respect to the threatened Steller's eider, which winters throughout the AI region's coastal areas. However, the AI pollock fishery will be prosecuted by pelagic trawl gear that, because of rough bottom conditions in the AI, is not expected to be brought into contact with the sea floor. Thus the potential for disturbance or damage to important seabird food resources on the sea floor is considered to be insignificant.

Offal may be produced during the AI pollock fishing operations. Offal may attract seabirds to vessels and birds may be subject to incidental mortality through vessel superstructure collisions (primarily at night when disoriented by bright deck lights), encounters with cables and warps, or capture in nets. On the other hand, offal production also may be an important seasonal food source for some seabirds, and thus may be considered a positive effect of some fishing operations. The AI pollock fishery will involve very few vessels. Issues around offal production will therefore be very minor. Thus the impact of offal production on subsequent fishery interactions with seabirds is considered to be insignificant.[23]

Fishing vessels may carry rats, although to an unknown extent. Vessel sinkings or visits to islands may introduce rats to those islands. The introduction of rats to a previously rat-free island can have adverse impacts on local bird populations, because rats may eat birds, bird eggs, and chicks. Bird species that nest in burrows such as storm petrels, puffins, and auklets, may be at risk to a greater extent than other species. Local populations may be reduced, and potentially driven to extinction. This issue was discussed at more length in the 2004 EA/RIR for Amendment 82. There is already vessel traffic in the region from military, cargo shipment, other target fisheries, tendering, subsistence, and recreational activity. The incremental addition of a small number of vessels fishing the AI pollock resource would likely have a small probability of contributing rats to an uninfested island that harbors a significant population of burrow-nesting seabirds. These AI pollock vessels would be required to fish outside of SSL critical habitat, generally keeping them well offshore while engaged in fishing, and further reducing the likelihood of the introduction of rats. Given available information, it is unlikely that the proposed action would lead to an incident that accidentally brought rats to an uninfested island, and thus is judged to be an "insignificant" impact.

None of the alternatives under consideration for this action would result in an AI pollock TAC greater than 19,000 mt. The test for significance is whether there would be sufficient take, prey removal, production of offal, or damage to important benthic habitat that it would cause impacts at the colony or population level. Because sea lion critical habitat is closed in the Aleutian Islands, no substantial disturbance effects are likely within the 20 nm zone around those islands. This closure would continue to provide "protection" of food resources for guillemots, cormorants, and eiders near the protected rookeries and haulouts. Many species of birds forage extensively beyond this zone, however, and may also be attracted to fishing activity. Also some effects may occur with respect to birds nesting during the "B" pollock season; the "B" season overlaps with seabird occupation of nesting areas from May to September. This would also be the period when obtaining sufficient prey is critical to building reserves for egg laying, and for supplying food to newly hatched chicks. However, the level of fishing activity with a 19,000 mt TAC would be small; as noted in Table 4.4-1, at the 39,400 mt ABC level, about 4,780 mt of this would be

[23] Although the overall effect is considered insignificant, it may still be beneficial to mitigate or minimize offal, especially when albatrosses are around, because of the potential for third wire interactions, which are not yet well quantified or understood.

taken in the “B” season (more could be taken in the “B” season if the “A” season allocation is not fully harvested, however the primary commercial interest in this fishery is in the roe season) , and part of that, (assumed to be 400 mt here) of that is estimated “B” season ICA harvest that would be taken whether or not directed pollock fishing were allowed.   These levels of fishing activity are not expected to result in an appreciably increased level of incidental mortality from vessel strikes, third wire encounters, or other fishery-related take or mortality. Also, the fishery will focus almost exclusively on adult pollock, and this coupled with the small level of vessel activity, should not result in any appreciable impact on prey availability for seabirds. Trawling will be by pelagic gear, reducing the likelihood of damage to benthic habitat important to diving birds, and offal production will likely be limited in offshore areas where seabird encounters may occur. Finally, while there are also concerns over rats gaining access to non-infested islands, and having subsequent adverse impacts on nesting seabirds, the potential for such an event is considered small. Thus, the overall impacts on seabirds from the AI pollock fishery are expected to be insignificant.

Effects on Habitat

The primary habitat concerns in the AI region are the potential adverse effects of an AI pollock fishery on the coral and sponge assemblages that are evident throughout the region; while the precise locations of these habitats are unknown, the locations are suggested by information on bycatch of these organisms in previous trawl hauls over the past several decades. These distributions are shown in Figures 4.2.2-8 and 4.2.2-9 of the Amendment 82 EA/RIR.

Pollock in the BSAI are targeted exclusively by pelagic trawls. Non-pelagic trawling for pollock is prohibited (679.24(b)(4)). Bottom contact is discouraged on sea floors that are rough by prohibiting the use of chafe protection gear to protect pelagic trawl footropes (679.2).

In the Aleutian Islands pollock fishery no intentional sea floor contact is expected, because the rough bottom conditions would result in torn or lost midwater trawls (NMFS, 2004a, page 3-98). Pelagic gear is large and fairly delicate compared to more traditional non-pelagic gear. While larger pelagic gear is usually fished near softer substrates, such as the mud and sand of Bering Sea, rougher substrates easily damage pelagic gear. Fishing areas in the Aleutian Islands are typically rougher in bottom type and more vertical in slope. The roughness of the bottom and the fragile pelagic pollock net configuration discourage even accidental contact of the net and bottom. The high cost of repairing a pelagic net damaged by contact with the bottom provides a built-in protection for habitat from fishing effort in the directed pollock fishery. When pelagic trawling, such as for pollock, the trawls are fished with doors that do not contact the sea floor, so any door effects are eliminated. Because the pelagic trawl’s unprotected footrope effectively precludes the use of trawl nets on rough or hard substrates, pelagic trawls do not generally affect the more rare, fragile, and complex habitats that occur on these rougher substrates. Moreover, in the BSAI, vessels fishing for pollock are also limited by a performance standard that states that if more than twenty crabs are on board this is an indication of bottom trawling.

Under all these alternatives, the Aleutian Islands Steller sea lion Critical Habitat, and significant parts of the AI shelf, remain closed to directed fishing for pollock. Critical Habitat includes 20 nautical mile buffers around the rookeries and haulouts and also includes the Seguam Pass foraging area.   For the following analysis the 0-1000-meter bathymetry lines in the Aleutian Islands represent the continental shelf and the habitats at risk.[24]

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[24]Bathymetry is based on ETOPO2. This is bathymetric data based on NOAA vessel soundings

- Steller sea lion Critical Habitat removes approximately 65% of the Aleutian Islands shelf available to a pollock fishery. This leaves only 35% of the entire Aleutian Islands shelf potentially susceptible to benthic disturbance from a directed pollock fishery.

- Within 100 nautical miles of Adak, only 9% of the remaining open shelf is available to a directed pollock fishery. The open areas include a small area approximately five nautical miles below Tanaga Island and a larger area to the north and south of the western wing of Atka Island.

- Within 200 nautical miles of Adak, only 44% of the remaining open shelf is open to a directed fishery for pollock. The open areas includes a small area to the east of Seguam pass, to the north and south of the western wing of Atka Islands, a small area five miles to the south of Tanaga Island, a section of shelf crossing Amchitka Pass, most of Petrel Banks, and the southern half of Bowers Ridge.

The distribution of fishing effort likely would be proportional to the quota set for pollock in the AI. Because of the current spatial restrictions of Steller sea lion critical habitat out to 20nm from shore, it would be necessary for the fleet to travel at least twenty miles from shore or travel to the nearest open coastline (outside 3 n mi). Much of the early pollock fishery was inside Critical Habitat. After Steller sea lion restrictions increased, some of this effort moved offshore to deep water near the west of the Bogoslof foraging area and east and north of Seguam Pass. Historically these new areas where effort may move were not high pollock catch areas, but under the proposed action these areas likely will be fished, leading to some more intensified fishing effort. Comparing these areas with Figures 4.2.2-8 and 4.2.2-9 in the Amendment 82 EA/RIR, there is some potential overlap with known sponge and coral assemblages, but not in areas where sponge or coral are considered to be heavily concentrated.

Occurrences of bottom contact by pelagic pollock gear may occur in areas not currently fished. It is possible that these could impact benthic community structure. The more trawl hauls that occur, the greater the potential area of bottom contact, and thus, the greater the intensity of impact. This could result in damage to, or removals of, some larger coral and sponges. Large pelagic trawl nets full of target species catch may touch the sea floor in some situations. Such light contact could have a potentially greater impact on fragile AI habitats, such as hard corals and larger sponges, than in the less structured, softer substrates of the EBS.

However, given the nature of pelagic fishing gear, the potential costs to operators of fishing too close to the rugged bottoms in the AI, the limited amount of AI shelf area open to pollock fishing, and the relatively small size of the AI TAC, a directed pollock fishery is expected to have limited contact with bottom habitat. Thus, the introduction of a pelagic pollock fishery in the AI is expected to produce levels of mortality and damage to living habitat, changes to benthic community structure, and changes in the distribution of fishing effort and geographic diversity of management measures that are similar to baseline levels. The action has been rated “non significant” with respect to these criteria.

and satellite altimetry. Source: NOAA\NEMA. Boulder, CO.

Table 4.12-2 Ecosystem Effects

Issue	Effect	Discussion	Significance
Predator-prey relationships	Pelagic forage availability	Atka mackerel and pollock are important prey items for marine mammals and other species in the AI marine ecosystem. Over the period 1977-2003, point estimates of Atka mackerel biomass age 1+ ranged between 260,860 mt and 771,360 mt. In recent years (1997-2003) modeled biomass estimates ranged from about 415,000 to about 459,000 mt (2004 SAFE page 749). Pollock biomass from AI groundfish survey estimates has ranged between 77,000 mt and 175,000 mt since 1991. In recent years (since 1997), Atka mackerel catches have ranged from about 46,000 mt to about 66,000 mt. Pollock catches have been very low (less than 1,000 mt), as only pollock bycatch in other target fisheries was allowed. The 2004 pollock ABC in the AI was 39,400 mt. The TAC cap of 19,000 mt means that any pollock harvest will be far below ABC. The Aleut Corporation likely will be primarily interested in the pollock roe fishery, and any pollock fishery in the A season is subject to the 40% Steller sea lion protection measure limit. Thus, actual harvest, especially in the early years of this program, may be significantly less than the TAC. Also, as noted previously, fishermen will have to direct their attention to new waters. Considering Atka mackerel and pollock as indicators of forage species abundance in this area, the effects of a 19,000 mt TAC for an AI pollock fishery would not likely adversely affect forage availability given the large amounts of forage biomass in the AI region.	Not significant under all five alternatives.
	Spatial and temporal concentration of fishery impact on forage	No more than 40% of the ABC may be harvested in the “A” season. Thus, although the TAC is 19,000 mt in 2005, given an ABC of 39,400 mt, no more than 14,220 mt may be taken in the “A” season. The balance, 4,780 mt, must be taken in the “B” season (see Table 4.12-1). While ICA harvests may be taken within 20 miles of shore in critical habitat in connection with other target fisheries, such as that for Pacific cod, Steller sea lion protection measures will prevent CDQ or DPF harvests from taking place within 20 miles of these shore areas. These measures will limit spatial and temporal concentration of the fishery on forage fish.	Not significant under all five alternatives.

Issue	Effect	Discussion	Significance
	Removal of top predators	As discussed earlier, the impacts on marine mammals were designated as "not significant." Sharks did not appear often in historical bycatch. This action is not expected to have a significant impact on removals of marine mammals or seabirds (see the relevant sections in this EA). In accordance with the NRC's recommendation for examining the ecosystem effects of fishery removals on SSL, the SSC proposed, in June 2004, that when the pollock fishery in the Aleutian Islands reopens, a research program be established to test hypotheses concerning the effects on upper trophic level predators of fishing for pollock. This fishery provides an opportunity to determine how changing the rate of pollock removals will influence the local distribution and abundance of adult pollock (local depletion hypothesis), the abundance, pupping rate and foraging distribution of SSL (prey depletion hypothesis), the reproductive success of seabirds (indices of forage fish abundance and availability, prey quality hypothesis) and the distribution and abundance of forage fish, including age-0 and age-1 pollock. These objectives can be achieved by conducting appropriately timed and thorough surveys of seabird colonies and sea lion rookeries and haulouts, as well as quantitative acoustic surveys of fish distribution and abundance. To account for bottom-up effects that could affect pollock and forage fish distribution and abundance, the SSC recommends measuring physical processes, nutrient availability, and standing stocks of phytoplankton and zooplankton. The program should be a closely integrated, interdisciplinary study that is closely focused on the region to be fished or potentially fished, including inshore waters. The duration of the study should be a minimum of five years to allow observations under the variety of conditions reflecting interannual variation in climate patterns.	Not significant under all five alternatives.

Issue	Effect	Discussion	Significance
	Introduction of non-native species	These could include non-native species introduced in ballast water of vessels as they move from one region to another, or rats introduced into rat-free islands through vessel visits or sinkings. Rats are a concern because of the threat they pose to burrowing bird species. There is already significant fishing activity in the AI for Pacific cod, Atka mackerel, halibut and sablefish, flatfish, crab and other species. This action represents a modest change in overall harvest activity in the BSAI area. Some vessels that may be active in the pollock fishery may already be active locally (for example, the Aleut Corporation may use the pollock allocation to provide additional targets for vessels already fishing for Pacific cod in the AI). Some vessels will likely change their operating patterns within the BSAI or between the BSAI and GOA. This action is not expected to attract significant numbers of new vessels from the continental U.S. Any that may come will almost certainly come from the Pacific Northwest, which has been the situation for many years. While the introduction of rats is a concern, the increased likelihood of this because of fishing in 2005 is likely to be low since the fishery will probably involve a relatively small number of vessels in 2004, many of the vessels (small trawlers) may already be involved in AI fisheries, and the fishery will be conducted outside of critical habitat, which generally provides a 20 mile buffer between fishing activity and shore.	Not significant under all five alternatives.
Energy flow and balance	Energy redirection	The reduction in Bering Sea pollock quota to fund the AI fishery and the use of C/Ps to harvest the AI pollock quota and the likely shift in deliveries of harvested pollock to Adak should shift some offal production from the Bering Sea to the AI. Limits on offal production associated with the 40%/60% “A”/”B” season split, and the early emphasis of interest in fishing primarily the “A” season, may shift energy into certain areas and seasons. If the fishery concentrates only in the ”A” season, and the ”B” season apportionment is not harvested, it is possible that larger proportions of the TAC will not be harvested in AI in this situation, but will be rolled over back to the Bering Sea. The AI fishery will be pursued with pelagic trawl gear, and thus any impacts on benthos should be relatively minor. Certainly some fraction of any discards or offal from C/Ps or catcher vessels will settle through the water column, providing an energy source for pelagic or benthic organisms. The total TAC of 19,000 mt is fairly small, which will also limit energy redirection.	Not significant under all five alternatives.
	Energy removal	An increase in pollock removals in the AI may be partially offset by a reduction in pollock and other species removals in the Bering Sea. Concentration of removals of pollock biomass would be limited by the required A/B season split and the 20 n mi SSL closure zones. If a relatively minor interest in fishing the “B” season materializes, this may mean that the full AI TACs won’t be harvested, and that some part of the TAC will be rolled over to the Bering Sea. The total AI TAC of 19,000 mt represents a relatively modest amount compared to overall AI groundfish biomass.	Not significant under all five alternatives.

Issue	Effect	Discussion	Significance
Diversity	Species diversity	Pelagic pollock trawling is a relatively clean fishery with limited bycatch. This fishery will not harvest a diverse assemblage of other marine species. Pollock removals will be capped by a 19,000 mt TAC, and will be well below the ABC of 39,400 mt. A CDQ and DPF as large as 18,000 mt is not expected to affect the diversity of species in the AI.	Not significant under all five alternatives.
	Functional (tropic, structural habitat) diversity	The fishery would be almost purely pollock, with some bycatch of Pacific cod, Atka mackerel, sablefish, flatfish, and rockfish, but at very low levels. Thus there likely would be little change in the trophic level of the catch and the trophic level of the remaining groundfish community. The fishery would be prosecuted only with pelagic gear; and fishing would be prohibited within 20 n mi of most AI shoreline; these factors would limit the potential for impacts on structural habitat diversity.	Not significant under all five alternatives.
	Genetic diversity	While the fishery would likely focus on roe-bearing pollock, in 2005 the pollock stock would be protected from over harvest because the 19,000 mt TAC will be set well below the ABC of 39,400 mt. The 40/60 A/B season split would spread out the harvest somewhat, reducing the chance for over harvest of pollock. A re-evaluation of the pollock stock structure is currently being conducted by the BSAI Plan Team. TACs set for this fishery in future years may be impacted by the results of this analysis should a different stock structure emerge; in this case, the Plan Team likely would recommend an appropriate ABC or ABCs for the apparent stock(s) in the AI region. The results of this effort would be to enhance protection and conservation of the genetic stock structure of pollock in the overall BSAI system. New information on stock structure or other characteristics of pollock in the AI region might add data that are useful in this re-evaluation of the AI pollock stock. Impacts on other species would be small since the pelagic pollock fishery has relatively small bycatches.	Not significant under all five alternatives.

Effects on State-managed and Parallel Fisheries

A Federal AI pollock fishery could trigger the creation of a new State managed pollock fishery inside State waters, which would require action by the BOF. However, under the State of Alaska Constitution, the ADF&G and BOF cannot create an exclusive fishery, restricting participants to Aleut Corporation-approved entities. If a pollock fishery were to open inside State waters, it would be subject to Board of Fisheries regulations, but would not be limited to participants of any specific group. The State would likely adopt most Federal requirements including Steller sea lion protection measures, pollock quotas, and seasonal fishing restrictions. Any AI pollock fishery proposed for areas inside State waters that are currently within closed areas under SSL protection measures would trigger reinitiation of formal consultation under the ESA.

About 95% of State waters in the Aleutian Islands are in areas that are closed to pollock fishing by Steller sea lion protection measures. The only State waters in NMFS areas 541, 542, and 543 that are not inside critical habitat are waters south of Atka Island from Vasilief Bay to Sergief Bay, and waters immediately north of Atka Island. There does not appear to have been any significant historical catch of pollock in these areas. ADF&G regional staff communication, and review of observer and fish ticket catch data, indicate that this area has been subject to only minimal fishing effort for any species. For these reasons, it is likely that this action will be "insignificant" for AI pollock TACs up to the 19,000 mt cap.

The specifications criterion for significance was a 50% change in harvest levels in State waters. This criterion implicitly incorporates an assumption that there is an existing fishery in place; however, when there is no existing fishery and a zero harvest, the 50% change harvest is not defined. A qualitative analysis has been substituted here. Because (a) only a small part of the AI State waters (about 5%) would be available for fishing, (b) because it appears that these areas have not been important pollock (or other species) target areas in the past, (c) because opening additional State waters to pollock fishing would trigger a formal consultation, and (d) because the action would only have a small (about 1%) impact on EBS pollock TAC at current EBS TAC levels, this impact has been given a "not significant" rating.

Table 4.12-3 Economic and socio-economic significance analysis

Issue	Discussion	Significance analysis
Gross revenues	At historical ICA levels, these alternatives would create an AI CDQ and DPF of a maximum of 18,000 mt. Valuing this at an “A” season EBS first wholesale price of $959/mt, this would be associated with about $17.3 million. This is only a rough approximation. For example, it is not clear that the fishery will be able to fully harvest the CDQ and DPF; there is some hope that larger roe bearing fish in this fishery will bring a higher royalty rate, but it is also likely that some harvest will take place at lower prices in the “B” season.	Not significant under any of the alternatives.
Operating costs	Operating costs are not known. Aggregate BSAI pollock costs are likely to rise somewhat since it may cost more to harvest pollock in the AI than in the EBS. Efforts to increase the proportion of the harvest taken with small trawlers (under 60 feet) may also increase operating costs. Furthermore, requirements that all fishing take place outside of SSL protection areas (e.g. 20 nm) may reduce CPUE substantially, perhaps below economically sustainable levels. (Cotter, 2004).	Not significant under any of the alternatives.
Net returns	At historical ICA levels, this action could create an AI CDQ and DPF of as much as 18,000 mt. Valuing this at an “A” season EBS royalty rate of $304/mt, this would be associated with about $5.5 million. This is only a rough approximation. For example, it is not clear that the fishery will be able to fully harvest the DPF; there is some hope that larger roe bearing fish in this fishery will bring a higher royalty rate.	Not significant under any of the alternatives.
Safety and health	The weather can be very poor in the AI in winter. The requirement that the fishery occur 20 nm from shore, in most areas of the AI, may result in extremely dangerous fishing conditions, particularly for pelagic fishing trawlers under 60 feet. Serious concerns have been expressed about the potential for the loss of a small trawler and its crew. It is difficult to estimate the likelihood that this will happen. To some extent it will depend on decisions made by the Aleut Corporation about the numbers of small trawlers to involve in the program.	Unknown
Related fisheries	Pelagic pollock fishing is relatively clean, with relatively small amounts of bycatch of other species. Four other groundfish target species appeared in non-trivial amounts in the AI pollock fisheries of the 1990s: Atka mackerel, Pacific cod, flatfish (mainly Greenland turbot), and rockfish (almost entirely Pacific Ocean perch). The discussion of impacts on other fisheries, earlier in this section, indicated that pollock fishery bycatch of these species, based on lowest and highest annual bycatch rates between 1991 and 1998, could range between zero and 104 mt of Atka mackerel, 2 mt and 133 mt of flatfish, 1 mt and 154 mt of Pacific cod, and 2 mt and 63 mt of rockfish. Chinook and “other” salmon (primarily chum) bycatch could affect commercial and subsistence salmon fisheries in western Alaska. While the bycatch has some potential for adverse impacts, these were rated “not significant” in the discussion of PSC impacts earlier in this section. Under the Council’s motion, AI chinook PSC don’t count against the BSAI chinook PSC limit, and will not contribute to closure of the chinook salmon savings area in the EBS. The EA/RIR for Amendment 82 examined the potential for gear conflicts and fishery overlap between pollock fishing and fishing for other targets, and found little potential for problems.	Not significant under any of the alternatives.
Consumer effects	This action is not expected to have noticeable effects on U.S. consumers. Pollock quota is being shifted from the EBS to the AI. To the extent that the AI fishery is not economically viable, some of this quota may not be caught, although provisions will be in place to reapportion unused TAC amounts back to the EBS users at the earliest possible time, thus reducing this likelihood. Much of it is destined for foreign markets and consumers.	Not significant under any of the alternatives.
Management and enforcement	No significant change in management and enforcement efforts are expected.	Not significant under any of the alternatives
Excess capacity	This action will reduce EBS pollock TACs by a small amount (about 1%) and will re-establish a fishery in the AI. Some of the AFA operations, which will have lost TAC in the EBS, will be able to fish in the AI. Moreover, the AI fishery may create fishing opportunities for small vessels, including vessels already fishing for other species in the Aleutians, or, perhaps, for vessels fishing out of Sand Point or King Cove. Overall creation or utilization of excess capacity will be very small.	Not significant under any of the alternatives.
Bycatch and	By catch of other target species, non-specified species, forage species, and PSC species were described in	Not significant under any of the

Issue	Discussion	Significance analysis
discards	earlier sections, and found not to be significant in the AI. Moreover, since the action represents a shifting of pollock harvest from the EBS to the AI, to some extent increased bycatch in the AI will be offset at the BSAI scale by reduced bycatch in the EBS. Pelagic pollock fishing is relatively clean, with smaller levels of bycatch than other trawl fisheries for other species.	alternatives.
Subsistence use	Pollock are not an important subsistence resource. Primary subsistence impacts would probably be through potential impacts on BSAI salmon PSC incidental catch. As noted in the discussion of PSC, earlier in this section, based on incidental bycatch rates from the 1990s, AI incidental salmon bycatches associated with the high end of potential pollock harvests, were estimated to range between 66 and 779 chinook and between 20, and 2,830 "other" (mostly chum) salmon. To some extent, these incidental bycatches are expected to be offset by reductions in EBS incidental salmon bycatches. These compare to chinook and "other" salmon incidental bycatches of 45,000 and 187,000 salmon in 2003. While these could have adverse impacts on subsistence fisheries, these are not expected to be significant under the criteria used here.	Not significant under any of the alternatives.
Recreational use	Pollock are not the object of an important recreational fishery. Primary recreational impact would probably be through potential impacts on BSAI salmon PSC incidental catches. The issues discussed for subsistence are applicable here.	Not significant under any of the alternatives.
Impacts on benefits from marine ecosystems	As noted in the discussions of habitat and ecosystems, this action is not expected to have significant impacts on these elements of the human environment. Thus, this action is not expected to have significant impacts on benefits received from the environment (other than the commercial benefits described in other sections of this table).	Not significant under any of the alternatives.
Community impacts	The Aleut Corporation will be able to use the allocation in different ways to promote economic development in Adak. Royalty value could be in excess of $5 million, annually. This will be accompanied by a reduction in deliveries to other Alaskan ports; 9,000 mt of the DPF could have been expected to be delivered by CV to Dutch Harbor if this program had not been initiated (this is compared to an overall shoreside CV allocation of almost 700,000 mt in 2003). Benefits may accrue to Sand Point and King Cove if their under 60 foot vessel fishermen enter the AI pollock fishery. In general, benefits accruing to one community appear to offset costs to others. Overall impacts appear small compared to BSAI pollock production.	Not significant under any of the scenarios.

5.0 Cumulative Effects

5.1 Cumulative effects and the PSEIS

NEPA requires that environmental assessments analyze the potential cumulative effects of a proposed action and its alternatives. An environmental assessment or environmental impact statement must consider cumulative effects when determining whether an action significantly affects environmental quality. The CEQ regulations for implementing NEPA define cumulative effects as:

> the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR 1508.7)

Cumulative effects of the groundfish fisheries are thoroughly analyzed in the final PSEIS in Chapter 4.0 (NMFS 2004d). Section 4.1.4 describes the methodology used in the cumulative effects analyses, and in section 4.9 and the accompanying tables in Appendix A, groundfish management under the Preferred Alternative is analyzed for effects on the environment, including cumulative effects for each component of the environment. See section 4.9 of the PSEIS for further details on the cumulative effects of the Preferred Alternative. The PSEIS evaluates the direct, indirect, and cumulative effects of the groundfish fisheries through the period 2001-2002 (NMFS, 2004d, Volume I, page 3.1-3).

In 2005, three years will have passed since the latest period on which the PSEIS analysis was based. The most current scientific information is contained in the 2004 SAFE reports (appendix A and B) which present much of the same types of data on BSAI and GOA groundfish fisheries as the PSEIS. Although the timeframe of the PSEIS's includes up to 2002 only, the models used in developing the data for that baseline allowed fisheries biologists to make projections of ABCs, OFLs, and TACs for 2003 and 2004, and these projections for the GOA and BSAI target fisheries are given in PSEIS Tables 3.5-2 and 3.5-28, respectively. The current SAFE reports, while they incorporate new information, such as from the 2004 trawl and longline surveys, present projected ABCs and OFLs that derive from many of the same modeling efforts and correspond closely (and, in most cases, exactly) to the data published in the PSEIS baseline tables.

The cumulative effects analysis takes the latest period analyzed in the PSEIS, 2001-2002, as its baseline, and examines effects of events and actions that have taken place since that time, and of future events and actions, which are currently reasonably foreseeable. Past actions are actions or events that occurred or were finalized, after the 2002 PSEIS analysis, such as final regulatory amendments or bycatch harvest amounts. Future actions are those that are in process either by proposed rule making, or are currently being developed through research activities or Council committees and have been addresses by the Council during one or more meetings.

5.2 Actions and events since the PSEIS baseline

Groundfish Harvests since the PSEIS baseline

Up-to-date information on groundfish harvests may be found in the annual catch statistics from the NMFS/Alaska Region's catch accounting system and published on the NMFS/Alaska Region website at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm. The catch statistics are categorized by individual species, and those discrete statistics may be viewed at NMFS/Alaska Region website. For brevity's sake, presented in Table 5.2-1 are the statistics for total harvests and quotas only; the complete catch statistics tables may be found at:

http://www.fakr.noaa.gov/2004/car110_bsai.pdf
http://www.fakr.noaa.gov/2004/car110_goa.pdf
http://www.fakr.noaa.gov/2003/car110_bsai.pdf
http://www.fakr.noaa.gov/2003/car110_goa.pdf
http://www.fakr.noaa.gov/2002/bsa02b.txt
http://www.fakr.noaa.gov/2002/goa02b.txt

Table 5.2-1 Total groundfish harvest in the GOA and BSAI in 2002 through 2004

Year and Area	Total TAC in mt	Harvest in mt	Total harvest as Percent of TAC
2002 GOA	237,123	165,664	70
2003 GOA	236,440	176,433	75
2004 GOA*	271,776	168,294	62
2002 BSAI	1,980,464	1,934,957	98
2003 BSAI	1,994,403	1,970,817	99
2004 BSAI*	1,988,404	1,974,433	99

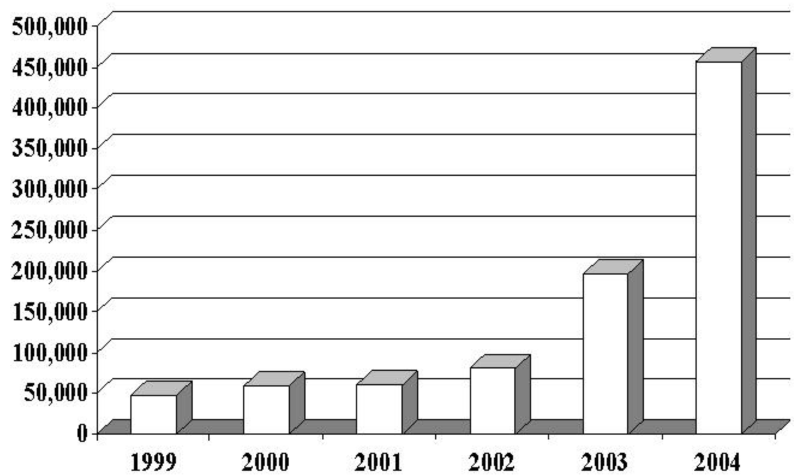
**NMFS Inseason catch data through December 4, 2004. Source: Annual specifications for relevant years, NMFS AKR blend data (2002), and catch accounting system (2003 and 2004).*

As of November 27, 2004, catch of all target and other species in the GOA groundfish fisheries totals 168,294 mt, slightly more than 62% of the total groundfish quota of 271,776, with one month left to fish. Most fishing effort in the BSAI is completed at this time. The total quotas and harvests from these years show relatively small incremental changes and suggest that overall harvests are in line with or below the amounts anticipated in the PSEIS. Total harvests and quotas for target and other groundfish species from these years do not suggest that there have been significant changes in overall fisheries TAC levels or, consequently, in their environmental impacts from the baseline previously analyzed in the PSEIS. The data presented in the GOA and BSAI catch statistics suggest that the fisheries are being prosecuted in the same spatial and temporal patterns as in the past. Because the ratios of harvest to the total TAC in each area have remained fairly constant since the baseline 2002, no additional cumulative effects from past harvests are likely beyond effects already anticipated and analyzed in the PSEIS.

Salmon bycatch in the BSAI groundfish fishery

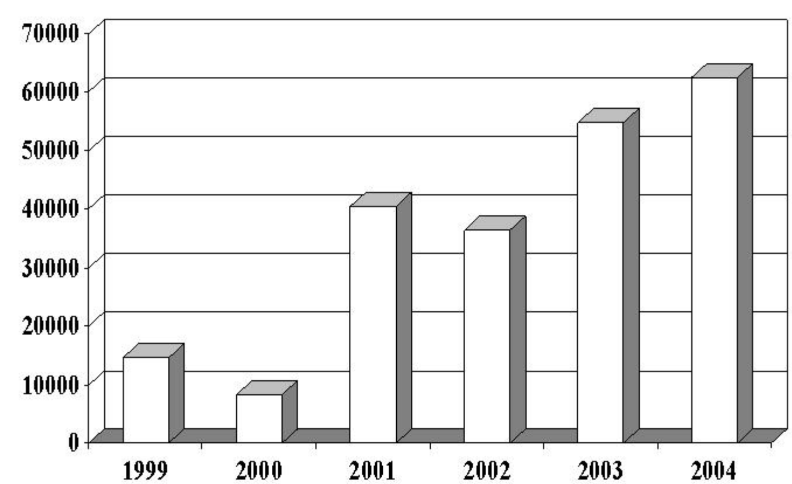
Figures 5.2-1 and 5.2-2 show the incidental catch of other salmon and chinook salmon in the BSAI groundfish fisheries. Incidental takes of chinook salmon and "other" (mainly chum) salmon in the BSAI groundfish fisheries, and primarily in the pollock mid-water trawl fisheries, have grown considerably since the 2002 PSEIS baseline. Incidental chinook takes were about 36,000 salmon in 2002, and about 62,000 in 2004; incidental "other salmon" takes (which are primarily chum salmon) were about 81,000 in 2002, and about 457,000 in 2004. (AKR blend, catch accounting system, and CDQ catch reports). It is not currently possible to predict salmon incidental harvests in 2005-2006.

Figure 5.2-1 Other Salmon BSAI PSC take (number of salmon)



Source: NMFS Sustainable Fisheries, Alaska Region. Summary on 11-15-04.

Figure 5.2-2 Chinook salmon BSAI PSC take (number of salmon)



Source: NMFS Sustainable Fisheries, Alaska Region. Summary on 11-15-04.

In 2003, NMFS implemented a new catch accounting system for the groundfish fisheries. The new system replaced the Blend system that had been used for quota accounting for about 10 years. The improved accounting is not likely to explain all of the increase, and the evidence of industry concern at 2003 and 2004 Council meetings regarding salmon bycatch suggests that it does not.

The pollock trawl industry experiences the majority of the salmon incidental take. Working with the fishing industry to reduce the amount of salmon incidentally taken, NMFS has issued an exempted fishing permit in 2003 and 2004 to support the development of a salmon excluder device for pollock trawl gear (NMFS 2003b, EFP Permit # 03-01). The device was developed in 2003 and has been tested in 2004 with some success. Additional testing is needed to develop a commercially viable excluder device. Additional testing likely may occur under one or more exempted fishing permits. Several trawl vessels have used the prototype salmon excluder device in 2004 with mixed success, but the industry continues to be very interested in the development and use of a commercially viable salmon excluder device and is investing considerable resources towards that goal[25].

Changes in regulations since the PSEIS baseline

A number of final rules have been implemented by NMFS since the January 2002 baseline for analysis in the PSEIS. Each action was analyzed under NEPA for its impacts on the human environment. Copies of all final rules and the associated analyses are available on the NMFS Alaska Region website at www.fakr.noaa.gov. Two important actions were finalized after January 2002, but implemented by emergency rule in 2001 and 2002: the Steller sea lion protection measures (68 FR 204, January 2, 2003) and the American Fisheries Act program (67 FR 79692, December 30, 2002). Because these were implemented by emergency rule in 2001 and 2002, their impacts were included in the PSEIS analysis and are part of the baseline for the PSEIS. Many of the final rules since January, 2002, implement administrative changes, observer program changes, recordkeeping and reporting changes, or corrections and have no effect on the harvest specifications. A few of these actions have affected the harvest specification or other management aspects of the groundfish fisheries in ways that were not analyzed in the cumulative effects analysis of the PSEIS and may need to be further considered in this EA. These are listed in Table 5.2-2 below.

Table 5.2-2 Regulatory and FMP Amendments completed since the PSEIS

Action	Federal Register Citation	Effective Date
CDQ Other Species Management	68 FR 69974, December 16, 2003	January 15, 2004
2004 List of Fisheries for Marine Mammal Protection	69 FR 48407, August 10, 2004	September 9, 2004
Seabird Longline Avoidance Measures	69 FR 1930; January 13, 2004	February 12, 2004
Amendment 63, GOA skates as target species	69 FR 26313, May 12, 2004	June 11, 2004
Amendment 48/48 to GOA and BSAI harvest specifications process	69 FR 64683, November 8, 2004	December 8, 2004
Amendment 81/74, ecosystem management policy	Record of Decision August 26, 2004	August 26, 2004
Demersal Shelf Rockfish Retention in GOA	69 FR 68095, November 23, 2004	December 23, 2004

[25] John Gauvin, Principal Investigator, Personal communication, November 24, 2004, United Catcher Boats Association, 4005 20th Ave. W. Ste. 116, Seattle, WA 98199.

CDQ program other species management

In December 2003, NMFS issued a final rule to modify the management of the ‘‘other species’’ Community Development Quota (CDQ) reserve by eliminating specific allocations of ‘‘other species’’ CDQ to individual CDQ managing organizations (CDQ groups) and, instead, allowing NMFS to manage the ‘‘other species’’ CDQ reserve with the general limitations used to manage the catch of non-CDQ groundfish in the BSAI. This action also eliminated the CDQ non-specific reserve and made other changes to improve the clarity and consistency of CDQ Program regulations.

This action was necessary to improve NMFS's ability to effectively administer the CDQ Program, allowing for more complete harvest of target species that had been constrained by individual allocations of "other species" quota. This action modifies the impact of the harvest specifications by facilitating the full harvest of the target species quota in the CDQ program and by changing the way the "other species" TAC as a whole (CDQ plus non-CDQ catch) is managed in the annual harvest specifications. The impacts from the alternatives in this analysis are based on the assumption of fully harvesting the quotas, and, therefore, the CDQ "other species" final rule action is not likely to have any additional effects that need to be considered in this EA.

List of Fisheries

In August 2004, NMFS published a final List of Fisheries (LOF) for 2004, as required by the Marine Mammal Protection Act (MMPA), reflecting new information on interactions between commercial fisheries and marine mammals. In this LOF, NMFS categorizes each commercial fishery into one of three categories under the MMPA, based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. The categorization of a fishery in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take-reduction plan requirements.

The listing of the Alaska groundfish fisheries was changed in 2004, to be specific to a target species, rather than combining all fisheries in one gear type in an area. Through 2004, all groundfish fisheries are Category III fisheries, based on the annual marine mammal mortality in each fishery, which mortality is expected to be less than or equal to one percent of the potential biological removal level for each marine mammal species.

NMFS has published a proposed rule under which selected groundfish fisheries would be assigned to Category II. This proposal is discussed below, under reasonably foreseeable future actions.

Longline seabird avoidance measures

On January 13, 2004, NMFS issued a final rule requiring seabird avoidance measures in the BSAI and GOA hook-and-line groundfish fisheries and in the Pacific halibut fishery in U.S. Convention waters off Alaska (69 FR 1930; January 13, 2004; effective February 12, 2004). This action is intended to improve the current requirements and further mitigate interactions with the shorttailed albatross (Phoebastria albatrus), an ESA listed endangered species, and with other seabird species in hook-and-line fisheries off Alaska. Details on the 6-fold decrease in seabird bycatch in the BSAI and GOA fisheries due to the avoidance measures is in Appendix C, page 204.

Skates as a target species in the GOA

In 2003, a directed fishery for certain skate species developed in the GOA. In May 2004, NMFS issued a final rule implementing Amendment 63 to the GOA FMP, which moved skates from the ‘‘other species’’ list to the ‘‘target species’’ category in the FMP (69 FR 26313, May 12, 2004), and announced 2004 harvest specifications for skates (69 FR 26320, May 12, 2004) to manage the newly developed skate fishery in the GOA.

This change has affected not only the skate fishery management, but also the “other species” management in the GOA harvest specification. The “other species” category has fewer species groups listed, but the TAC available for these species is larger. These changes need to be considered in this analysis and are discussed in the GOA SAFE report. The current GOA SAFE report presents all available information on skates, pertinent to management, including suggestions for incorporating additional survey information for skate stock assessment in the future.

The shifting of skates (along with sharks) to the “target species” category was a reasonably foreseeable future effect analyzed as a cumulative effect in the PSEIS (NMFS 2004d, page 4.9-189). The cumulative effects analysis in the EA prepared for Amendment 63 is incorporated by reference. (NMFS 2004g, page 99). The analysis in the EA for Amendment 63 found that the skate fishery was likely to have socioeconomic cumulative impacts on the participants in the directed skate fishery, and in other fisheries where the targeted species will be taken as incidental catch in a directed skate fishery. Also affected are fisheries that will rely on the same halibut PSC limits as the directed skate fishery. No information is available to predict potential impacts. The biological impacts are limited by the groundfish management and PSC management strategies currently in place. Amendment 63 has foreseeable future impacts in the development of a directed fishery for skates but not enough information is available to determine the significance of effects, therefore the cumulative impact of Amendment 63 is unknown.

GOA and BSAI FMP Amendments 48/48

NMFS has published a final rule to implement Amendments 48/48 to the groundfish FMPs and, thus, revise the harvest specifications process. The goals in revising the harvest specifications process are to: (1) manage fisheries based on the best scientific information available, (2) provide for adequate prior public review and comment to the Secretary on Council recommendations, (3) provide for additional opportunity for Secretarial review, (4) minimize unnecessary disruption to fisheries and public confusion, and (5) promote administrative efficiency. This final rule has no major changes to fishing practices nor to total allowable harvest amounts and management measures, only administrative changes to the process of setting harvest specifications.

Ecosystem Management Policy

In August 2004, Amendments 81/74 for the groundfish FMPs were approved. These FMP amendments revise the management policies, goals, and objectives for the groundfish fisheries. The goals and objectives provide for a new ecosystem-based management framework that serves as the management policy for the groundfish fisheries into the future. These amendments were based on the preferred alternative in the PSEIS.

Demersal Shelf Rockfish Retention requirements

This final rule published in November 2004 requires an operator of a Federally-permitted catcher vessel using hook-and-line or jig gear in the Southeast Outside District (SEO) to retain and land all demersal shelf rockfish (DSR) caught while fishing for groundfish or for Pacific halibut under the Individual Fishing Quota (IFQ) program in the SEO (69 FR 68095). Because this action requires full retention of DSR, the final rule also eliminates current maximum retainable amounts (MRAs) for DSR in the SEO for catcher vessels. MRAs would remain in place for catcher/processors in the SEO. This action is necessary to improve estimates of fishing mortality of DSR. Under existing Federal and State of Alaska (State) regulations, all landed fish must be weighed and reported on State tickets or, in the case of fish landed in a port outside of Alaska, on equivalent Federal or State documents. The final rule limits the sale of retained DSR to prevent excess amounts of DSR entering commerce.

5.3 Reasonably foreseeable future actions

The following is a list of reasonably foreseeable future actions that have become known since the PSEIS. These actions are either in the final rulemaking stages or are in development and have been recognized as necessary by either NMFS or the Council. For items currently under development, it may be possible to only determine the nature of the potential effect, either positive or negative on an environmental component because there is not enough information at this time to determine significance. Table 5.3-1 contains substantial actions and proposals scheduled for review by the Council or for proposed or final action by NMFS in the near future.

Table 5.3-1 Reasonably Forseeable Future Actions

Action	Expected Date of Implementation
Subsequent harvest specifications	Annually into the future
BSAI Amendment 82 for the AI pollock fishery	Effective March 2005
GOA Groundfish Rationalization	Within the next 5 years
Essential Fish Habitat and HAPC Management Amendments 78/73	Effective by August 13, 2006 by court order
Salmon bycatch control measures	Excluder device development in 2005, closure area measures revision in 2006, salmon DNA study 2005 and 2006
Potential ESA listing for northern sea otters	Decision scheduled for February 2005
Fur seal management	EIS for subsistence harvest scheduled for 2005 Conservation Plan draft scheduled for early 2005
Trawl seabird avoidance measures	Post 2006
List of Fish Category II proposal	2005

Subsequent annual specifications

The current action, specifying TACs for 2005 and 2006, will be followed next year and in subsequent years by actions specifying TACs for future years. While the cumulative effects of small incremental changes in annual TACs are not discernable on a year to year basis, NMFS expects that over time any cumulative effects may become apparent through the annual cumulative effects analysis for the harvest specifications.

BSAI FMP Amendment 82

In June 2004, the Council adopted Amendment 82, which, if approved by NMFS, would establish a framework for management of the Aleutian Islands (AI) directed pollock fishery. The Consolidated Appropriations Act of 2004 (Pub. L. No. 108-199, Sec. 803) requires the AI directed pollock fishery to be allocated to the Aleut Corporation for economic development of Adak, Alaska. A notice of availability for Amendment 82 was published on November 16, 2004 (69 FR 67107), and the proposed rule for associated regulatory changes was published on December 7, 2004 (69 FR 70589). This proposed rule would establish the regulatory structure for allocating the directed pollock fishery to the Aleut Corporation and would implement the management provisions for this fishery.

The Council's action created an AI pollock total allowable catch (TAC) of 19,000 mt if the acceptable biological catch (ABC) were equal to or greater than 19,000 mt, and a TAC less than or equal to the ABC if the ABC were less than 19,000 mt. The TAC is to provide for an Aleut Corporation directed pollock fishery, and for an incidental catch allowance (ICA) of pollock for other target fisheries that take pollock incidentally in their operations and for the CDQ allocation.

The directed pollock fishery in the AI (Statistical Areas 541, 542, and 543) has been closed since 1999. The only pollock harvested legally since 1999 in the AI has been taken as incidental catch in fisheries for other species, principally the Pacific cod fishery, the Pacific ocean perch (POP) fishery, and the Atka mackerel fishery. In recent years the Council has recommended, and the Secretary has adopted, ICAs of 1,000 mt of pollock which will be increased to 2,000 mt in 2005 and 2006 to ensure adequate pollock is available for other groundfish fisheries bycatch needs. The impacts of Amendment 82 and regulatory changes were analyzed in an EA/RIR (NMFS 2004c). Impacts of the 2005 and 2006 harvest specifications for the new directed fishery for pollock in the AI are analyzed in section 4.12 above, where no significance impacts on environmental resources were found from this action.

Rationalization of the GOA Groundfish Fisheries

At the request of the GOA groundfish industry, the Council is considering recommending management measures that would rationalize fisheries managed under the GOA groundfish FMP. Rationalization may improve economic stability for the fisheries' various participants, including harvesters, processors, and residents of fishing communities. Industry has raised concerns about changing market opportunities and stock abundance, the long-term economic health of fishing dependent communities, and the limited ability of the fishing industry to respond to environmental concerns under the existing management regime.

At the current stage of the rationalization process, the Council is uncertain of the measures it will recommend. The Council may consider rationalizing the fishery through individual fishing quotas, allocations to communities or processors, or cooperatives. Alternatively, the Council may choose to modify the License Limitation Program or maintain the existing management system.

The Council and NMFS will prepare an SEIS to examine the potential scope, alternatives, and effects of this proposed action. NMFS accepted written comment on this proposed action through November 15, 2002 and held a series of public scoping meetings to gather additional information.

Additional information on the SEIS and public participation is available through the scoping guides and the Council website www.fakr.noaa.gov/npfmc.

Rationalization of the Non-AFA Trawl Catcher Processor sector

The Council is considering recommending management measures, under BSAI FMP Amendment 80, that would establish a cooperative system among the non-AFA trawl catcher-processing operations in the BSAI. The Council's intent in developing these measures is "reducing bycatch, minimizing waste, and improving utilization of fish resources to the extent practicable in order to provide the maximum benefit to present generations of fishermen, associated fishing industry sectors, communities, and the nation as a whole, while at the same time continuing to look for ways to further rationalize the fisheries." The Amendment 80 proposals are viewed as "an initial step towards rationalization of the BSAI groundfish fisheries. " (Problem statement in the Council's Final December 2004 Motion on Amendment 80)

At its December meeting the Council continued to clarify and modify the elements for consideration in a rationalization program. The December 2004 motion identified cooperatives as its mechanism of choice for bycatch control and rationalization purposes. Council staff are currently preparing an EA/RIR/IRFA for this action. This should be available for Council review in April or June 2005. (Council December newsletter, McCracken,[26] pres. comm.).

Essential Fish Habitat and Habitat Areas of Particular Concern

The Council is currently in the process of amending the FMPs to identify essential fish habitat (EFH) and habitat areas of particular concern (HAPCs) and to identify measures to protect habitat generally and allow a more focused application of protection measures to those habitat areas most sensitive to impact.

In January 2004, NMFS published a draft EIS evaluating alternatives for three actions: (1) describing EFH for fisheries managed by the Council; (2) adopting an approach for the Council to identify HAPCs within EFH; and (3) minimizing to the extent practicable the adverse effects of Council-managed fishing on EFH (NMFS 2004a). The draft EFH EIS discusses the effects of these actions and their alternatives on habitat, target species, the economic and socioeconomic aspects of Federally managed fisheries, other fisheries and fishery resources, protected species, ecosystems and biodiversity, and non-fishing activities.

A draft EA/RIR/IRFA for defining HAPCs was reviewed by the Council in October 2004, and the Council has tentatively scheduled taking final action on both the EFH EIS and the HAPC EA in February 2005 (NPFMC 2004c).

Salmon Bycatch controls in the BSAI groundfish fisheries

Possible future actions to control salmon bycatch include the development of a salmon excluder device for pollock trawl gear and Council initiatives to review and improve current salmon bycatch control measures.

Over the past several years, concern has existed regarding the effectiveness of the current chum and chinook salmon savings areas closures. In October 2003, representatives from the Bering Sea

[26] Jon McCracken. Council staff. Personal communication 12-30-04. North Pacific Fishery Management Council. 605 W 4th St., Suite 306, Anchorage, Alaska 99501-2252.

pollock trawl fleet testified to the Council that the closure of the Chum Salmon Savings Area in August had forced the fleet to fish in areas with higher chum salmon bycatch rates. Consequently, chum salmon bycatch had increased dramatically in 2003. They requested that the Council initiate a discussion paper to evaluate the regulatory salmon bycatch closures and consider the hotspot avoidance program initiated by the trawl fleet to avoid areas of high salmon bycatch. The Council decided to put the issue on the tasking list, and discuss it further and prioritize analytical tasking in December (Witheralll, personal communication).

In December 2003, representatives from the BSAI pollock fishery co-ops testified about the fleet's use of salmon bycatch monitoring. At that meeting, Council member John Bundy made a motion to immediately initiate an analysis of BSAI salmon bycatch controls (the motion included a draft problem statement and alternatives), but a substitute motion to postpone the decision and discuss the issue in February passed. In February 2004, the Council decided to keep the salmon bycatch issue on the tasking list, but put a hold on developing a problem statement and alternatives pending other workload priorities. (Witherall, personal communication)

In October 2004, a representative for the pollock fishery co-ops testified to the Council about the adverse effects of the salmon closure regulations on bycatch rates, and the resulting high levels of salmon bycatch again observed in 2004. Recent bycatch rates appear to be higher outside of the closure areas than within the closure areas (K. Haflinger presentation to Council, October 2004). In October, the Council directed staff to prepare an issues paper for the December 2004 meeting, and placed the issue on the December agenda.[27] It is likely that the recent high rates of salmon bycatch, the completion of development of the salmon excluder device, and the completion of large high priority tasks such as crab rationalization, will allow the Council to shift focus to improve salmon bycatch controls in 2005.

In December, Council staff presented a discussion paper to the Council (NPFMC, 2004d). The Council adopted a problem statement and a preliminary set of five alternatives, and initiated a staff analysis. Staff were requested to bring a preliminary discussion paper and action plan "to address the analytical components and timelines associated with the various alternatives" to the February 2005 Council meeting. (Council, December 2004 newsletter, page 3)

Pending funding for analysis, NMFS will be conducting a genetics study on salmon taken as bycatch in the observed fisheries[28]. Funding will be needed to support DNA analysis in 2006 of fin clippings collected by observers in 2005. The information will provide the origin of the salmon specific to streams rather than the larger geographic scale, which is currently available in origin studies (Myers, et al. 2004). The new genetics information will provide better understanding of the origin of salmon bycatch in the groundfish fisheries and of the impact of the fisheries on specific salmon stock in Alaska, the Pacific Northwest, and Asia.

Potential ESA Sea otter listing

The southwest Alaska Distinct Population Segment (DPS or "stock") of northern sea otters has been proposed by the USFWS for listing as threatened under the ESA. The USFWS, the agency responsible for sea otter management, has observed a steady decline in abundance of this stock. The reasons for the decline are unknown, but population studies suggest that adult mortality

[27] Witherell, David. Deputy Director North Pacific Fishery Management Council. Personal communication, November 23, 2004.

[28] Wilmot, Richard. Research Genetist, Personal Communication December 9, 2004. Stock Identification Section, NMFS Auk Bay Laboratory, Juneau AK

appears to be the major source. The USFWS published a Proposed Rule on February 11, 2004 (69 FR6600) to list the sea otter stock as threatened under the ESA. The statutory decision date is one year from the proposal date, February 2005.

Listing of the sea otter would require NMFS to ensure that actions it authorizes (e.g., commercial groundfish fisheries) are not likely to jeopardize the existence or adversely modify or destroy any listed critical habitat. The Alaska Department of Fish and Game also would be required to determine if an incidental take permit would be necessary for conducting the State fisheries under section 10 of the ESA. The incidental take permit would likely include a habitat conservation plan which may include fishery restrictions to protect sea otters.

Fur seal management

The northern fur seal inhabits the North Pacific Ocean and occupies the Pribilof Islands and Bogoslof Island during the summer/fall breeding season. Fur seals are harvested by subsistence hunters of the Aleut communities of St. Paul and St. George Islands, and this subsistence harvest is managed cooperatively by NMFS and the Tribal Governments of St. Paul and St. George. The northern fur seal population in the Pribilofs has been declining, with pup production between 2002 and 2004 down 15.7 percent on St. Paul and 4.1 percent on St. George.

In June 2003 the Council appointed a Fur Seal Committee to monitor preparation of the draft EIS for subsistence harvest and to make recommendations for further Council action. The draft EIS may be viewed at www.fakr.noaa.gov. The draft EIS has identified conditional significantly adverse cumulative effects from the groundfish fisheries based on the significance criteria use in the EIS. Continued concern for fur seals and potential interaction with the groundfish fisheries may result in protection measures implemented for the groundfish fisheries.

Seabirds

In the trawl fisheries, research is currently underway to address seabird interactions with trawl fisheries. A September 2003 Biological Opinion issued by the USFWS identifies this issue as needing additional study and requires NMFS to develop a means to assess these interactions and recommends the developments of methods to minimize seabird collisions with trawl wires. Appendix C has more details on trawl fisheries seabird bycatch. A pilot project for electronic monitoring of seabird interactions with the third-wire cable was completed in 2002, analyzing an additional method of collecting bird interaction information besides the use of observers. (McElderry, et al. 2004). A collaborative project with industry, AFSC, USFWS, and the University of Washington will test mitigation measures to reduce seabird interactions with trawl sonar transducer cables (NPFMC 2004e). Protection measures based on the results of the research are not likely to be implemented until after 2005.

2005 List of Fisheries

The proposed rule for the 2005 List of Fisheries (LOF) for purposes of marine mammal protection was published December 2, 2004 (69 FR 70094). NMFS has completed an analysis of past incidental mortality and serious injury for each of the Federal fisheries specified in the 2004 LOF.

Based on these analyses, NMFS proposes that five of the Federal fisheries be reclassified as Category II fisheries and the remainder of the fisheries are Category III. The fisheries proposed to be reclassified from Category III to Category II are: Bering Sea Aleutian Islands flatfish trawl, Bering Sea Aleutian Islands Pollock trawl, Bering Sea Aleutian Islands Greenland Turbot longline, Bering Sea Aleutian Islands Pacific Cod longline, and Bering Sea Sablefish pot.

Fisheries in Category II are required to register with NMFS, take a marine mammal observer if asked, and must comply with any take reduction plan if one exists. The final rule for the LOF will likely be completed in mid 2005. If the proposed reclassifications are made final, the Category II fisheries will be subject to additional scrutiny regarding marine mammal interactions compared to Category III fisheries.

5.4 Cumulative effects analysis

Cumulative effects analysis requires assessment of additive impact of past effects that have a continuing and additive impact, direct and indirect effects of the proposed action, and reasonably foreseeable future effects. The Groundfish PSEIS provides an extensive review and analysis of past effects of groundfish fisheries up to the year 2002. Additional past effects from Federal groundfish management that may have accumulated in the recent past between 2002 and the present and reasonable foreseeable future actions in this analysis remain to be analyzed.

Direct and indirect impacts of the action on ten resource categories were analyzed in Chapter 4. The resource categories included target species, non-specified species, forage fish species, PSC species, marine mammals, seabirds, habitat, ecosystem impacts, State waters groundfish fisheries, and social and economic effects. This section reviews the resource categories identified in Chapter 4 for such past and future effects, applies the significance criteria for each environmental component, and limits the analysis to the cumulative effects added to the direct and indirect effects from the preferred alternative (alternative 2). Table 5.4-1 below shows the past and foreseeable future actions and the environmental components that may be affected. The following discussion explores the significance of the potential effects.

Table 5.4-1 Past actions and type of effect on environmental components.

	Target	Non-specified	Forage	PSC	Marine mammals	Seabirds	Habitat	Ecosystem	State waters	Social and Economic
Changes in amount of total directed groundfish harvest compared to annual TAC total since 2002	Amount of harvest consistently at or below the amount planned for including adjustments each year for past harvest. No Effect	Consistency in past harvests at or below planned levels provides no additional effect.	Consistency in past harvests at or below planned levels provides no additional effect.	Consistency in past harvests at or below planned levels provides no additional effect.	Consistency in past harvests at or below planned levels provides no additional effect.	Consistency in past harvests at or below planned levels provides no additional effect.	Consistency in past harvests at or below planned levels provides no additional effect.	Consistency in past harvests at or below planned levels provides no additional effect.	Consistency in past harvests at or below planned levels provides no additional effect.	No effect in BSAI, may have effect for GOA fisheries that are consistently below total TAC.
Longline seabird measures	No effect	No effect	No effect	No effect	No effect	Positive effect by reducing longline bycatch of seabirds	No effect	Positive effect by reducing longline catch of top level predator	No effect	Increased costs of using streamers, success may prevent exceeding Short Tailed Albatross ITS and additional restrictions
Skates as a target species	Improved management capability for skates in GOA; Increased TACs for GOA other species.	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect	System of OFLs, ABCs, and TACs may constrain skate harvests in short run, but facilitate long run health of fishery
48/48	No effect because administrative process	No effect because administrative process	No effect because administrative process	No effect because administrative process	No effect because administrative process	No effect because administrative process	No effect because administrative process	No effect because administrative process	No effect because administrative process	Improves public review and administrative process
Past salmon bycatch	No effect	No effect	No effect	BSAI past salmon bycatch exceeds 50% incidental catch change significance criteria since 2002, beneficial effects of	No effect	No effect	No effect	No effect	No effect	Growth in bycatch may have adverse impacts for directed salmon fisheries and groundfish fisheries where they are taken as bycatch

	Target	Non-specified	Forage	PSC	Marine mammals	Seabirds	Habitat	Ecosystem	State waters	Social and Economic
				salmon excluder development						
Amend 81/74, Ecosystem policy	Improved management by applying ecosystem principals	Improved management by applying ecosystem principals	Improved management by applying ecosystem principals	Improved management by applying ecosystem principals	Improved management by applying ecosystem principals	Improved management by applying ecosystem principals	Improved management by applying ecosystem principals	Improved management by applying ecosystem principals	No effect	Increased costs due to research needs to support ecosystem decision making, likely result in improve management of resource
Other species CDQ reserve	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect	Improvement to profit position for CDQ groups.
LOF	No effect	No effect	No effect	No effect	Better marine mammal protection	No effect	No effect	Better marine mammal protection	No effect	No effect
Demersal Shelf Rockfish Retention	Improved management of DSR	No effect	No effect	No effect	No effect	No effect	No effect	No effect		

Table 5.4-2 Reasonably foreseeable future actions and type of effect on environmental components.

	Target	Non-specified	Forage	PSC	Marine mammals	Seabirds	Habitat	Ecosystem	State waters	Social and Economic
Future Harvest Specifications	BSAI OY now in statute, no growth expected in overall sum of TACs; GOA sum of TACs may increase or decrease. All TACs would be limited by ABC and OFL considerations, ensuring continuing MSY for the stocks.	Continued bycatch within scope of Amendments 81/74	Continued bycatch within scope of Amendments 81/74	Continued bycatch within scope of Amendments 81/74	Potential for incidental take, competition for prey, disturbance, within scope of Amendments 81/74	Potential for take, competition for prey, impacts to benthic habitat, within scope of Amendments 81/74	Potential adverse effect for long-lived slow growing species and changes in benthic community structure	Potential for range of impacts described in Section 4.9, within scope of Amendments 81/74	Certain State managed and parallel groundfish fisheries in State waters depend on continuing TACs.	Likely beneficial effect by providing source of revenue
Amend 82 for the AI pollock fishery	Fishing mortality is constrained at high levels of ABC which may be beneficial to AI pollock stock	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect	IF AI pollock fishery reopens, A82 allows non-CDQ and non-ICA portion to be harvested by the Aleut Corp only
GOA rationalization	No effect	No effect	No effect	Depending on nature of program, rationalization could provide opportunities for better bycatch control	No effect	No effect	No effect	No effect	No effect	Will reduce the cost of harvest, increase profitability, may produce changes in communities
BSAI Non-AFA Trawl Catcher-Processor rationalization (Amendment 80)	No effect	No effect	No effect	Depending on nature of program, rationalization could provide opportunities for better bycatch control	No effect	No effect	No effect	No effect	No effect	Will reduce the cost of harvest, increase profitability, may produce changes in communities

	Target	Non-specified	Forage	PSC	Marine mammals	Seabirds	Habitat	Ecosystem	State waters	Social and Economic
EFH/HAPC	May be beneficial to target stocks by protecting EFH	May be beneficial if also protect areas used by non specified species	May be beneficial if also protect areas used by forage species	May be beneficial if also protect areas used by prohibited species	May result in improved foraging	May result in improved foraging	Better protection for habitat features	Better protection for functional diversity	No effect	May be associated with limitations on where, when, and how people may fish. These limits will impose costs.
Salmon bycatch controls	No effect	No effect	No effect	Better protection for salmon populations may benefit users targeting salmon; may be associated with reduced incidental take in groundfish fisheries	No effect	No effect	No effect	No effect	No effect	May be associated with increased costs to directed groundfish fishery, and increased economic value of these salmon resources (e.g., commercial, sport, subsistence, escapement)
Sea Otter ESA candidate	No effect	No effect	No effect	No effect	Improved protection if listed	No effect	No effect	May protect top level predator if listed	May result in fishery restrictions in conservation management plan for ITS if listed	May result in higher State fishery costs, but improve non consumptive uses if listed.
Fur Seal Management	No effect	No effect	No effect	No effect	Improved protection	No effect	No effect	May protect top level predator	No effect	May result in additional cost if fishery restrictions required.
Trawl Seabird Avoidance	No effect	No effect	No effect	No effect	No effect	Reduction in incidental take	No effect	May protect top level predators	No effect	May increase costs to fisheries but improve nonconsumptive uses if required.
LOF Category proposal	No effect	No effect	No effect	No effect	Improve protection by additional oversight and information collection, may result in take reduction plan	No effect	No effect	May provide additional protection to top level predators and additional ecosystem information	No effect	May increase costs if observer required or if restrictions are part of take reduction plan

Target species

The direct and indirect effects of the action on target species were evaluated in Section 4.2. TACs and the associated limits on fishery mortality have generally changed by small amounts since the 2002 baseline used for this analysis. As shown in section 5.2 above, the groundfish fisheries over the last two years have continued in similar spatial and temporal patterns as in the past; total harvests remain under established quotas and continue to provide for maximum sustainable yield as mandated by the MSA; and all target species at present are above their MSSTs, and none is in imminent danger of being overfished. The portions of harvest in relation to allowable TAC and the location of groundfish harvest have remained fairly constant so that prey availability and habitat suitability are not likely to have been affected. When combining the effects of the past harvest of groundfish since 2002 with the direct effects, the cumulative effects are not expected to jeopardize the capacity of the stock to produce MSY on a continuing basis or to maintain at or above MSST, and therefore, the cumulative effects on target species from past harvests are insignificant.

The past action of implementation of Amendment 63 for skate target species has improved the management of skate species, reducing the potential for overfishing under the previous management regime. Any cumulative effect from Amendment 63 would be on fishing mortality for skate species because the fishing practices that may affect the spatial and temporal harvest, prey availability and habitat suitability are not changed. As of December 4, 2004, only 13 percent of the "other species" TAC was harvested. The increase in the "other species" TAC has very little or no effect on the "other species" because of the low amount of harvest for "other species" which are usually not targeted. Because the effect of Amendment 63 in combination with effects from the 2005 and 2006 harvest specifications will not jeopardize the capacity of the stock to produce MSY, the cumulative effect of Amendment 63 is insignificant for "other species." It is likely to be beneficial but insignificant for skates because the skate stocks are unlikely to return to their unfished biomass.

The past action of implementation of Amendment 48/48 primarily affects the administrative process to set harvest specifications and has not effect on the significance criteria in this analysis, and no cumulative impact on target species is expected.

The past action of Amendments 81/74 for the implementation of ecosystems policy will likely be beneficial to target stocks by improving overall management of the ocean ecosystem. It is unlikely that fishing mortality may change to allow the stock to return to unfished biomass and therefore the affects on fishing mortality would be insignificant. Because the specific action that will be taken to implement an ecosystem policy for fisheries management are unknown at this time, the significance of cumulative effects of ecosystem policy implementation on spatial and temporal distribution of the fisheries, changes in prey availability and changes in habitat suitability cannot be determined at this time. However, these effects are likely to be beneficial and may enhance the ability of stocks to sustain themselves at or above MSST.

Implementation of the demersal shelf rockfish retention regulations will improve the management of demersal shelf rockfish species by affecting fishing mortality. It is unlikely that such an effect would allow a return of the stock to the unfished biomass, and therefore, any direct and past effects on demersal shelf rockfish fishing mortality is likely insignificant.

Future harvest specifications will primarily affect fishing mortality as the other significance criteria for target species (temporal and spatial harvest, prey availability, and habitat suitability) are primarily controlled through regulations in 50 CFR 679. The setting of harvest levels each year is controlled to ensure the stock can produced MSY on a continuing basis. Each year's setting of harvest specifications include the consideration of past harvests and future harvests based on available biomass estimates. Because of the controls on fishing mortality in setting harvest specifications ensure the stocks are able to produce MSY on a continuing basis, the cumulative effects of the 2005 and 2006 harvest specifications in combination with future harvest specifications are likely to be insignificant.

The future action of implementation of Amendment 82 is considered in the analysis of target species under sections 4.2 and 4.12 and in the SAFE report. The action is primarily managing the allocation of pollock in the Aleutian Islands. The AI pollock TACs will be developed in the same manner as other groundfish species and would be limited by regulation resulting in more conservative management then may be seen for other groundfish fisheries. Any future cumulative effect is limited to fishing mortality for pollock because the fishing practices that may affect the spatial and temporal harvest, prey availability and habitat suitability would not be changed. Because the effect of this action will not jeopardize the capacity of the stock to produce MSY on a continuing basis and would not allow a return to the unfished biomass, the effects of the 2005 and 2006 harvest specifications in combination with Amendment 82 on target species are insignificant.

GOA rationalization would have large changes on the way the GOA fisheries are managed and primarily would affect the allocation of harvest amounts. It is unlikely to add future effects on target species because the setting of TACs that control the impacts of the fisheries on fishing mortality and the harvesting practices that would affect the other significance criteria for target species is not expected to change.   Therefore the 2005 and 2006 harvest specifications in combination with GOA rationalizations have no cumulative effect on target species.

The future action to identify essential fish habitat and HAPC may improve the capacity of the target stocks to produce MSY on a continuing basis by eventually resulting in protection measures for these areas. The future impact of EFH/HAPC management on fishing mortality would be insignificant because any changed in fishing mortality is unlikely to allow the stocks to return to their unfished biomass. Future effects on prey availability, habitat suitability, and spatial and temporal management measures are likely to be beneficial, but it is unknown if the direct effects of 2005 and 2006 harvest specification in addition to the future effects of EFH/HAPC identification may result in enhancing the ability of the stock to sustain itself at or above MSST.

Non-specified and forage species

The cumulative effects on two of the impact categories, non-specified species and forage species, are analyzed together in this section.

Virtually no data exist that would allow quantitative assessments of cumulative effects on biomass, seasonal distributions, and natural mortality of non-specified and forage species. Qualitative estimates of the direction of change in non-specified and forage species harvests are made assuming that non-specified and forage harvests are roughly proportional to target species harvests. The preferred alternative has been rated "insignificant" due to the relatively modest harvest changes since 2002.   The sum of TACs in the BSAI has not changed from 2 million mt over this period. The sum of TACs in the GOA rises from about 238,000 mt in 2002 to about 294,000 mt in 2005 (about 56,000 mt or a 24% increase). The past and future actions identified are not likely to change the harvest of non-specified and forage species by more than 50 percent when added to the direct and indirect effects of the 2005 and 2006 harvest specifications, and therefore the cumulative effects are insignificant.

The past action of establishing ecosystem policy to fisheries management and the future action of identifying EFH and HAPC may be beneficial to non-specified and forage species. Both of these actions may result in protection of the habitats used by these species and in the structure of the ecosystem that supports these species. Not enough information exists to allow for an analysis or to specify criteria for such effects.

PSC species

PSC species overall may be beneficially impacted by the future implementation of GOA groundfish and BSAI non-AFA trawl catcher-processor rationalization and the identification of EFH and HAPC. GOA rationalization may allow for better bycatch controls in the groundfish fisheries. The protection of EFH and HAPC may also result in improved protection for PSC species. Because the details of these action are unknown at this time, the future effects in combination with the 2005 and 2006 harvest specifications on the PSC species are unknown.

Salmon is the only PSC species potentially affected by the past and future actions previously identified. The criteria used to evaluate the significance of PSC impacts are described in Section 4.1. As noted in Section 4.5, these levels of chinook and "other" (mainly chum) salmon harvests are not expected to jeopardize the capacity of chinook or chum stocks to maintain benchmark population levels, or, despite potential adverse impacts to subsistence and commercial fishermen, to lead to significant decreases in harvest levels in directed fisheries targeting salmon. However, these levels of chinook and "other" incidental takes exceed the direct/indirect significance threshold for PSC bycatch of +-50% of a baseline incidental catch by directed groundfish fishing operations (see Table 4.1-6). The 2004 chinook take is 72% greater than the 2002 take, while the 2004 "other salmon" take is about 464% larger. This past effect would be considered significantly adverse alone, but when considered with the past and future actions described below, the net effect is unknown.

The improvement of the Catch Accounting System has made it possible for NMFS to maintain more timely and accurate information regarding salmon bycatch. This information can be used by NMFS and the industry to reduce salmon bycatch by tracking when and where salmon bycatch is occurring and react quickly to reduce the potential for additional bycatch. Pending funding for analysis, starting in mid-2005, the North Pacific Groundfish Observer Program and Auke Bay Lab collection and analysis of salmon tissue samples will help identify the natal streams of origin from salmon bycatch, and help clarify the dimensions of the environmental impact.

Additionally, the current development and future use of a salmon excluder device for pollock trawl vessels may result in large decreases of chinook and possibly chum salmon bycatch. The initial reports of the prototype excluder resulted in 43 percent escapement of chinook and 9 percent for Chum salmon (Gauvin personal communication 11/24/04). Improvements in the excluder in 2005 may increase the amount of escapement, providing a beneficial impact that may reach the 50 percent significance threshold (especially for chinook salmon).

The Council is also in the process of evaluating improvements to the salmon bycatch controls currently used which will likely result in reductions in the amount of salmon bycatch. Because the Council and the industry has demonstrated motivation and committed resources to the reducing salmon bycatch, it is likely that the overall past and future effects combined with the 2005 and 2006 harvest specification effects will result in insignificant impacts. Because the timing of implementation of measures to reduce salmon bycatch is currently unknown, the amount and duration of these future impacts in combination with the 2005 and 2006 harvest specifications on salmon bycatch cannot be determined, and the overall cumulative effects are unknown.

Marine Mammals

Past actions that may have beneficial impacts on marine mammals are Amendments 81/74 for the ecosystem policy for fisheries management and the 2004 List of Fisheries. The use of ecosystem principals in fisheries management is likely to lead to more consideration for the impact of the groundfish fisheries on marine mammals and more efforts to ensure the ecosystem structure that marine mammals depend upon is maintained. The changes in the List of Fisheries to separate the specific fisheries for purposes of marine mammal take reduction will lead to better collection of information and more appropriate development of take reduction measures. This may ultimately lead to less incidental take and interaction with the groundfish fisheries. Because the specific actions resulting from ecosystems considerations in groundfish management and the potential changes in fishing practices that may result from take reductions plans are unknown, the effects of the 2005 and 2006 harvest specifications in combination with these past actions are unknown.

The future impact of identifying EFH and HAPC may result in improved foraging for marine mammals if their prey species are benefited by this future action. The proposed change of several groundfish fisheries to Category II in the LOF may be beneficial to marine mammals by increasing the potential for observers collecting marine mammals and groundfish fisheries interaction information and by any take reduction plans that may be implemented.

The potential ESA listing of sea otters may be beneficial. Alaska groundfish fisheries currently are not known to adversely interact with or impact sea otters stock either through spatial or temporal overlap with sea otter distribution or through harvest of fish or shellfish species important to sea otter diet. In 1992, some sea otters were taken in the AI sablefish pot fishery, and one sea otter was reportedly taken in a trawl in 1997 in the BSAI, but no takes have been reported in the groundfish fisheries since then, according to the latest sea otter stock assessment (USFWS 2002). The listing of sea otters as a threatened species is likely to improve the protection of sea otters. It is unlikely that protection measures would be developed for the Alaska groundfish fisheries conducted in the EEZ and impacts from the groundfish fisheries on sea otters after listing are likely to remain unchanged. Therefore, the 2005 and 2006 harvest specifications and the future listing of sea otters would be insignificant.

In the SSL SEIS (NMFS 2004a) and the draft EIS for fur seal subsistence hunting (NMFS 2004f), the cumulative effects from the indirect impacts of the groundfish fisheries were described as conditionally adversely significant. The significance criteria used in the draft EIS for fur seal harvest for the indirect effect from the groundfish fisheries on fur seals is not specified. The significance of direct effects on fur seals was determined by comparing the number of animals harvested to the potential biological removal, with less than 10 percent being insignificant, and the impact on the population growth. For purposes of the analysis for marine mammal in this EA, the significance criteria for marine mammals are described in Table 4.1-6 and is based on potential changes in population trajectory from incidental catch and changes in indirect effects beyond the 2004 baseline. Future actions for improved management of fur seals will likely result from the increased concern that has been demonstrated by the Council in the formation of the Fur Seal Committee and the continued development of information regarding groundfish fishery interactions and fur seals. The timing and nature of potential protection measures for fur seals are unknown, but any action is likely to result to be beneficial. Therefore, the effects of the 2005 and

2006 harvest specifications with the effects of future protection measures for fur seals is unknown.

Seabirds

A past action that may have beneficial impacts on seabirds is Amendments 81/74 for the ecosystem policy for fisheries management. The use of ecosystem principals in fisheries management is likely to lead to more consideration for the impact of the groundfish fisheries on seabirds and more efforts to ensure the ecosystem structure that seabirds depend upon is maintained. Because the specific actions resulting from ecosystems considerations in groundfish management are unknown, the effects of the 2005 and 2006 harvest specifications in combination with this past action are unknown.

The future impact of identifying EFH and HAPC may result in improved foraging for seabirds if their prey species are benefited by this future action. Not enough information exists to determine the significance of this potential effect.

The implementation of the seabird avoidance measures and the potential development of avoidance measures for the trawl fisheries may affect seabirds. The potential effect is limited to the incidental take in the groundfish fisheries. The implementation of the seabird avoidance measures for the hook-and-line fisheries has resulted in decreases in the incidental take of seabirds since 2002 (Appendix C). No data is available to determine if the reduction in take is likely to have population level effects in 2004. Because the seabird avoidance measures for hook-and-line fisheries will be in effect during the 2005 and 2006 fisheries, the amount of incidental take is likely to be the same. Therefore the effects of the past action of seabird avoidance measures for the hook-and-line fisheries with the 2005 and 2006 harvest specifications is likely to have similar effects to the 2004 baseline fishery and are therefore insignificant.

The future adoption of seabird avoidance measures for the trawl fishery will likely result in reduction in the incidental take of seabirds. The amount of benefit is unknown because the effectiveness of such measures cannot be determined until implementation and data collection and population effects are uncertain (Appendix C). It is likely that the combined effect of the 2005 and 2006 harvest specifications and the future trawl seabird avoidance measures will result in less incidental take than experienced in the baseline fishery but whether that decrease could be considered “substantial” as defined in the significance criteria cannot be determined at this time. The future cumulative effect is therefore unknown but likely beneficial.

Habitat

The past action that may have effects on habitat is Amendments 81/74 for the ecosystem policy for fisheries management. Habitat is one component of the ecosystem which includes the groundfish fisheries. Fisheries management measures will be developed with consideration of the entire ecosystem, including habitat. The level of mortality to habitat will likely decrease, benthic community structure will likely increase and the distribution of fishing effort based on geographic diversity of management measures will likely increase to improve protection to habitat. The implementation of Amendments 81/74 in combination with the 2005 and 2006 harvest specifications will likely result in significant beneficial effects, but these effects cannot be known until management measures are developed and implemented. Therefore, the past effect with the current action is unknown but likely to be beneficial.

One future action that may have impacts on habitat is the future harvest specifications. Understanding that portions of habitat are impacted each year by fishing activities and some of those habitats may require exceptionally long periods to recover from fishing impact (i.e., slow growing, long lived corals) (NMFS 2004a), cumulative impact of the 2005 and 2006 harvest specifications in combination with future harvest specifications may have lasting effects on habitat. As the slow growing, long-lived components of the habitat are impacted by cumulative years of fishing, there is likely to be cumulative mortality and damage to living habitat and changes to the benthic community structure. Species that are able to recover faster from fishing impacts may displace the longer-lived, slower growing species, changing the structure and diversityof the benthic community. It is unknown if these potential effects may be irreversible, or if the impact is likely to be substantial as specified in the significance criteria. This depends on the concurrent implementation of habitat protection measures. Therefore, the significance of future harvest specifications impacts in combination with 2005 and 2006 harvest specifications is unknown.

The other future action that may have cumulative effects on habitat and may offset the potential cumulative adverse effects from future harvest specifications is description of EFH and HAPC and the possible implementation of precautionary measures, such as gear modifications, closure areas, and gear restrictions. As with Amendments 81/744, any such measures are likely to result in the decrease in mortality and damage to marine habitat, the increase in benthic community structure and changes in the distribution of fishing effort. All of these effects are likely to be beneficial, but because the description of EFH and HAPC and the nature of the measures are currently unknown, the cumulative effects are unknown but likely to be beneficial.

Ecosystem

Indicators of ecosystem function used to assess the effects of the BSAI and GOA groundfish fisheries on the ecosystem are listed in Table 4.1-9. The past action of Amendments 81/74 will incorporate ecosystem considerations into the management of the Alaska groundfish fisheries. All of the significance criteria for ecosystems would be considered in the development of management measure which would likely result in beneficial effects. Because the specific actions are not known at this time, it is not possible to determine the significance of the current action with the effect of having an ecosystems policy for fisheries management. Therefore the cumulative effect of 2005 and 2006 harvest specifications and Amendments 81/74 is unknown but likely beneficial.

The other past actions that may have effects on the ecosystem are the 2004 LOF and the seabird avoidance measures for hook-and-line fisheries. The LOF and seabird avoidance measures may provide additional protection to marine mammals and seabirds, which are considered top level predators. The removal of top level predators is an important consideration for predator-prey relationships in the ecosystem. Implementation of the LOF and the seabird avoidance measures would likely result in the catch level not being high enough to cause the biomass of the one or more top level predator species to fall below minimum biologically acceptable limits and therefore the significance criteria is not likely to be exceeded. The effects of the 2005 and 2006 harvest specifications in combination with the past effects of the 2004 LOF and seabird avoidance measures for hook-and-line fisheries are likely to have cumulatively beneficial impacts that are insignificant.

The future identification of EFH and HAPC will likely have effects on the ecosystem. Resulting protection measures for EFH and HAPC would provide protection for structural diversity that may result in improved function of the habitat and ultimately the ecosystem. Any protection measures are likely to prevent removals that would be high enough to cause a change in the functional diversity outside of the range of natural variability and would therefore not exceed the significance criteria. The effects of the 2005 and 2006 harvest specifications in combination with the future identification of EFH and HAPC are likely to have cumulatively beneficial impacts that are insignificant.

The other future actions that may have effects on the ecosystem are the proposed LOF, the potential ESA listing of sea otters, fur seal management, and seabird avoidance measures for the trawl fisheries. These actions may provide additional protection to marine mammals and seabirds, which are considered top level predators. The removal of top level predators is an important consideration for predator-prey relationships in the ecosystem. Implementation of these actions would likely result in the catch level not being high enough to cause the biomass of the one or more top level predator species to fall below minimum biologically acceptable limits and therefore the significance criteria is not likely to be exceeded. The effects of the 2005 and 2006 harvest specifications in combination with these future actions' effects are likely to have cumulatively beneficial impacts that are insignificant.

State Waters

Of the past and future action, the DSR rule and the potential listing of sea otters are the only actions that may affect State waters fisheries. The DSR rule provides for improved management of the State DSR fishery which will likely lead to beneficial effects. It is unlikely that the 2005 and 2006 harvest specifications in combination with the DSR rule would change the harvest of DSR by more than 50 percent in the State fisheries and therefore, the cumulative effect is considered insignificant.

The potential ESA listing of sea otters may have an adverse effect on State waters fisheries. Sea otters are found in the same locations as State fisheries and have rarely been taken in State fisheries (Funk 2003). If the sea otter is listed, it is possible that the State would be required to obtain an incidental take permit after developing a habitat conservation plan to offset harmful effects of the State fisheries. Protection measures may be necessary if the sea otter is listed, but it is unlikely that the harvest levels of groundfish or salmon in the State fisheries would be reduced by 50 percent as a result of the protection measures. Because it is unknown at this time if the sea otter would be listed and what protection measure may be necessary in either the Federal or State fisheries, the cumulative effect for this action is unknown but likely insignificant.

Social and Economic issues

The direct and indirect effects analysis in Section 4.11 of the EA reviewed 13 impact areas for social and economic effects. The impact areas are:

- Gross revenues
- Operating costs
- Net returns
- Safety and health
- Related fisheries
- Consumer effects
- Management and enforcement
- Excess capacity
- Bycatch and discards

- Subsistence use
- Recreation
- Benefits from marine ecosystem
- Community impacts

The direct and indirect effects for twelve of these were rated "insignificant" when compared to the 2004 baseline (see Table 6.0-1). The impact on benefits from marine ecosystems (referring to non-use and non-consumptive uses, such as existence value, or eco-tourism services) was rated unknown, reflecting unknown ratings for certain ecosystem impacts.

Gross revenues There have been two specifications actions since the 2002 baseline; TACs were implemented in 2003 and 2004. In both cases, the Council recommended specifications on the basis of Plan Team and SSC OFL and ABC recommendations. The Council's TAC recommendations in each year were generally similar to those in the year before, although there were some changes. TACs in the BSAI have been capped by the 2 million mt OY in each year. The Council's specifications recommendations for 2005-2006 follow the same pattern, and are generally similar to those in the earlier years. Changes in the spatial, temporal, and gear distribution of fishing effort are expected to remain similar to those in 2002. The 2005-2006 specifications contain provisions for reopening the AI pollock fishery. As noted in Section 4.12, the relatively small TAC (limited to 19,000 mt) is not expected to have significant impacts.

Gross revenue estimates for the period 2002-2006 are in Tables 4.11-1 to 4.11-3. The estimates in all years are made using a common set of values (2003 first wholesale values); therefore changes in gross revenues reflect species composition of the catch, rather than price changes.[29] For BSAI non-CDQ catches, 2002 revenues were estimated to be $1.1 billion. The 2005 and 2006 revenues under the preferred alternative are also estimated to be about $1.1 billion in each year. For BSAI CDQ catches, 2002 first wholesale revenues are estimated at $114 million. In contrast, 2005 and 2006 first wholesale revenues are estimated at $116 million in each year.

Changes in the GOA since 2002 have been proportionately larger. In the GOA, 2002 revenues were estimated to be $186 million. In contrast, 2005 revenues are estimated to be $232 million, and 2006 revenues are estimated to be $222 million. These values represent an increase of more than 20% between 2002 and 2005, and an increase of about 20% between 2002 and 2006. The significance threshold described in Section 4.1 was a 20% increase in gross revenues. The increases in the GOA are caused by increased TACs for pollock, Pacific cod, and sablefish, since 2002.

Past TAC specifications do not appear to have had a significant impact on the capacity of fish stocks to contribute to ongoing production and gross revenues.[30]

Future TAC specifications constitute important reasonably foreseeable future actions affecting gross revenues. TAC specifications actions will be taken annually, for the foreseeable future.

[29] The use of this constant set of prices abstracts from the potential price effects of changes in fish product production. In general, these effects would be expected to moderate the impact of harvest fluctuations; the impact of reductions in harvest could be offset by price increases, while the impact of increases in harvest could be offset by price reductions.

[30] From one point of view, a fish stock is one of society's capital assets. The annual income from the asset (the amount that could be harvested while maintining the productive capacity of the stock) may be consumed as a TAC, or left unharvested as an investment in the in future production from the stock. The investment is productive if, as a result, growth and reproduction exceed natural mortality.

SAFE documents for Tier 1 to 3 species (for which population models are available) project TACs over different periods ranging between 2009 and 2017, depending on the species.

Tables 5.4-3 and 5.4-4 below compare the 10 year (2015) catch projections under Alternative 2 with the 2005 and 2006 TACs. In some instances, where later projections were unavailable, projections out to 2009 have been substituted. The 10 year catch projections under Alternative 2 may be conservative for some species, particularly in the BSAI, because earlier year catch projections may be greater than the TACs likely to be set by the Council. Larger earlier year catch estimates reduce estimated biomass in later years, and reduce catches associated with the later year biomass projections. In general, the comparisons indicate that anticipated specifications actions over the next ten years will not constrain the Council's ability to provide TACs that would support current levels of gross revenues. In certain respects, especially for pollock and Pacific cod in the GOA, the specifications may provide for increased TACs and gross revenues (depending on price impacts).

Table 5.4-3 BSAI 2005-2006 TACs for groundfish species in Tiers 1-3 compared to projected 2015 Catches under Scenario 2 (set F equal to a constant fraction of ${}_{max}F_{ABC}$) Comparisons only provided when Scenario 2 projections were made in 2004.

Species	2005 TAC	2006 TAC	2015 Catch	BSAI SAFE Source
Pollock (EBS)	1,478,500	1,487,756	1,638,000	p 76
Pollock (AI)	19,000	19,000	28,400/42,900*	P 161-162
Pacific cod	206,000	195,000	228,000	p 254
Yellowfin sole	90,686	90,000	87,782	p 402
Greenland turbot	3,500	3,500	4,346	p. 444
Arrowtooth flounder	12,000	12,000	40,418	p. 484
Rock sole	41,500	42,000	85,112	p. 528
Flathead sole	19,500	20,000	32,215	p. 584
Alaska plaice	8,000	10,000	62,966	p. 640
Pacific ocean perch	12,600	12,600	15,814	p. 707
Northern rockfish	5,000	5,000	6,755	p. 777
Atka mackerel	63,000	63,000	69,949	p. 900
Source: 2005-2006 TACs from Tables 2.3-1 and 2.3-2; 2015 catches from 2004 SAFE *The Assessment author recommended a model with a 2015 catch of 28.4 thousand mt, the Plan Team recommended a model with 42.9 thousand mt. (Appendix A, page 11)				

Table 5.4-4 GOA 2005-2006 TACs for groundfish species in Tiers 1-3, and BSAI-GOA sablefish, compared to projected 2015 Catches under Scenario 2 (set F equal to a constant fraction of $_{max}F_{ABC}$) Comparisons only provided when Scenario 2 projections were made in 2004.

Species	2005 TAC	2006 TAC	2015 Catch	GOA SAFE Source
Pollock	91,710	91,910	153,580	p. 84
Pacific cod	44,433	39,080	63,300	p. 190
Deep water flats	6,820	6,820		
Dover sole			5,538	(2009) P 319
Rex sole	12,650	12,650	7,643	(2009) p 349
Arrowtooth flounder	38,000	38,000	177,946	(2009) P 379
Flathead sole	10,390	10,212	22,500	(2008) p. 383
BSAI/GOA sablefish	21,000	19,895	23,500	P 276
Source: 2005-2006 TACs from Tables 2.4-1 and 2.4-2; 2015 catches from 2004 SAFE Notes that deep water flatfish are primarily Dover sole				

Other listed past and reasonably foreseeable future actions may also affect gross revenues. The modification to “other species” management under the CDQ program is expected to facilitate more complete harvest of CDQ group allocations, and should increase revenues. The rationalization programs being developed for the BSAI non-AFA trawl catcher-processor fleet, and for the GOA groundfish fisheries, may facilitate marketing, leading to increased wholesale prices. Steps to control salmon incidental catches in the BSAI, or to protect fur seals or EFH/HAPC may impose constraints on fishing activity that may interfere with the ability to fully harvest resources.

The most important determinant of gross revenues is likely to remain the level of TAC specifications. These are at OY in the BSAI. The projections summarized in Table 5.4-4 suggest that TAC increases may be possible in the GOA for some important species over the next 10 years. While these would be beneficial to operations in the GOA, they are not likely to be large enough to change groundfish revenues from Federal waters off Alaska by more than 20% given the large proportion of revenues from the BSAI. Although in some instances particular species and areas (and the GOA as a whole) have experienced changes greater than 20%, overall gross revenues from Federal groundfish fisheries off Alaska have changed by less than 20% since 2002. For these reasons, this impact is rated “insignificant.”

<u>Operating costs</u> Several past, or reasonably foreseeable future actions, may increase operating costs for fishing operations for any given level of TAC specifications.

- The longline seabird protection measures that became effective in February 2004 impose increased operational requirements on longline fishing operations and will increase their operating costs to some extent. Current investigations into third wire bird interactions in trawl fisheries may lead to new protective measures in trawl fisheries. These may also lead to increased fishing costs.
- The assignment of certain groundfish fisheries to Category II status under a final rule implementing the MMPA LOF requirement could lead to increased costs in those fisheries.
- GOA groundfish or BSAI non-AFA trawl catcher-processor rationalization could lead to reductions in operating costs, and removal of some excess capacity, within the affected groundfish fisheries.

- Designation of EFH/HAPC may increase operating costs, if these rules limit access by fishermen to preferred fishing grounds.
- The revision of salmon bycatch controls may actually reduce costs for pollock fishing operations in the BSAI. Current rules are more restrictive than some of those under consideration.
- ESA listing of sea otters may lead to increased costs for fishing operations in State waters if reasonable and prudent alternatives adopted to prevent jeopardy or adverse modification of critical habitat restrict the freedom of action for fishing operations. Protective measures for fur seals may also lead to increased costs in the BSAI.

The net impact of these various actions on fishery operating costs (whether adverse or beneficial) is unknown. The specific content of many of these actions (for example, the GOA rationalization) is not known. Some of these actions would reduce costs and others would increase them. The significance of these cost impacts has been rated unknown.

<u>Net returns</u> To the extent that these actions change gross revenues or fishing costs, they may change net returns. Because the impact and magnitude of the gross revenue and cost changes are unknown, the impact on net returns is also unknown. Note however, that the impacts on net returns in the long term may depend on the choice of the appropriate "counterfactual." What would happen if some of these measures were not taken? This is unknown, but in the instances of actions that prevent the need to list species under the ESA, or that mitigate actions so as to avoid jeopardy or prevent adverse modification of listed habitat, actions that increase costs may protect continued fishing activity, and could well have a beneficial impact on net returns. The direction and significance of this impact are unknown.

<u>Safety and health</u> Fishing is a dangerous occupation with high levels of occupational mortality, injury and property loss. (Lincoln and Conway, p 692).[31] Little scientific information is available on the factors that cause fishing accidents in the GOA and BSAI. However, regulations that affect fishing conditions may affect accident rates.

Several of the reasonably foreseeable future actions under consideration may affect accident rates for any given level of TAC. Amendment 82, which opens the Aleutians to pollock fishing, may encourage small vessel activity in this region during the dangerous winter months. Actions which limit fishing areas available to fishermen may force them to fish further from port, or in more dangerous waters than they might otherwise have done. Several potential actions may limit fishing areas, including EFH/HAPC designation, sea otter protection measures, and fur seal protection measures. While these actions appear to have adverse implications for safety, their specific content, and their significance, are unknown. Other actions may have positive impacts for safety. GOA and BSAI non-AFA trawl catcher-processor rationalization, may reduce competitive pressures to race for fish, and lead to safer fishing operations. The specific content and impact of these actions are also unknown at this time. The net impact of all actions, whether adverse or beneficial, and the joint significance of these actions, are unknown.

<u>Related fisheries</u> The increase in chinook and "other"salmon bycatch in the BSAI pollock trawl fisheries since 2002, the actions taken by the Council in December 2004, and the reasonably foreseeable prospect of further action by the Council, may have an impact on Alaska fisheries for chinook and chum salmon. This is a special concern for subsistence, sport, and commercial fisheries in Western Alaska. The net direction and significance of this impact are unknown.

[31] Lincoln and Conway estimate that the occupational mortality rate in Alaska commercial fisheries was for the period 1991-1998 was 26 times the national average. Lincoln and Conway, page 692.

These actions are expected to have an insignificant impact on ESA listed stocks of chinook salmon in the Pacific Northwest. EFH and HAPC designation may have an indirect impact on species dependent on newly protected habitat. Amendments 71/84, which implement ecosystem principles in the FMPs may have an impact on related fisheries. This impact may be direct, if ecosystem principles provide more protection for fisheries with targeted harvests, or indirect, to the extent that indirect ecosystem impacts affect other fisheries indirectly. The EFH/HAPC and Amendment 71/84 impacts are expected to be beneficial. GOA groundfish and BSAI non-AFA trawl catcher-processor rationalization may reduce fishing effort in their respective fisheries, displacing some effort into other fisheries. The specific form these programs will take is currently unknown, thus the potential size of the impacts are unknown as well. The overall significance of impacts on related fisheries is rated "unknown."

Consumer effects The key indicator for changes in consumer welfare is the change in consumers' surplus (the amount consumers' would be willing to pay for fish, over and above what they do have to pay). Changes in TACs may affect the overall supply of products; increases in TACs may be expected to be associated with increases in surplus, decreases with decreases. As noted in Table 5.4-1, there is no expected growth in the sum of the BSAI TACs, while the direction of change in the GOA TACs is uncertain. As noted above, some actions may affect the costs of supplying fish products. Actions that increase costs could reduce supplies and consumers' surplus, while actions that reduce costs may increase supplies and surplus. As noted above, however, the overall direction of cost movements is unknown. GOA groundfish, and BSAI non-AFA trawl catcher-processor, rationalization may make it possible for fishing operations to improve product quality. This could increase consumers' surplus. The overall impacts on consumers are expected to be more closely related to changes in TACs than to other factors. As discussed above under "gross revenues", (1) substantial portions of the groundfish production coming from the BSAI and GOA are destined for export markets, wherein "gains" or "losses" in non-domestic consumers' surplus are not relevant within the scope of this impact assessment, and (2) TAC changes are not expected to be large in relation to overall production off of Alaska. Therefore, this impact category has been rated "insignificant."

Management and enforcement As discussed in Section 4.11, management and enforcement expenses are not believed to change much with changes in TAC levels. Among the other measures considered, some will tend to increase management and enforcement expenses, and others will tend to decrease them. New measures requiring additional enforcement efforts will increase these expenses. These actions may include longline seabird measures, GOA Amendment 63, which created new, area-specific TACs for skates, rules governing the DSR retention in the GOA, Amendment 82, which reopened the AI pollock fishery, and EFH/HAPC rules and potential sea otter and fur seal protection measures to the extent that they create closed fishing areas. GOA groundfish and BSAI Non-AFA Trawl Catcher-processor rationalization may increase some management and enforcement costs (such as those for restricted access management) and tend to reduce others (fewer operations to monitor, cooperatives may be able to implement some management measures through private contracting more cost effectively than government can through regulation). Many of these measures will tend to increase management and enforcement costs somewhat, however the overall direction and significance are unknown.

Excess capacity GOA groundfish and BSAI non-AFA trawl catcher-processor rationalization may reduce excess capacity in the GOA groundfish fisheries, and have a beneficial impact on excess capacity in the fisheries that are rationalized. Although this is considered to be a beneficial impact, because the specific elements of the rationalization programs are unknown, the significance has been rated "unknown."

Bycatch and discards   The new longline seabird protection measures should contribute to a reduction in the incidental take of seabirds for any given level of groundfish TAC. Ongoing research into trawl third wire seabird interactions may also lead to measures helping to reduce seabird incidental catch even further. These would be beneficial impacts, but their significance is unknown.

Salmon bycatch in the directed BSAI pollock fishery has risen considerably since 2002. The reasons for this are unclear; many are concerned that changes in the chinook and "other" (mostly chum) salmon stocks, and the evolution of fisheries management, has made the savings area approach to salmon protection counterproductive in some years. If this is the case, average annual chinook and "other" (mostly chum) takes may be higher for given TACs. The Council has initiated a process to review and, if necessary, revise the existing salmon protection measures. The net cumulative effect of these past and reasonably foreseeable future actions is unknown.

Subsistence use   The increase in chinook and "other" (mostly chum) salmon bycatch in the BSAI pollock trawl fisheries since 2002, and the actions taken by the Council, and the reasonably foreseeable prospect of further action by the Council may have an impact on Alaskan subsistence fisheries for chinook and "other" (mostly chum) salmon. This is a special concern for fisheries in Western Alaska. For reasons discussed above, the significance of this impact is unknown.

Recreation use   The increase in chinook and "other" (mostly chum) salmon bycatch in the BSAI pollock trawl fisheries since 2002, and the actions taken by the Council, and the reasonably foreseeable prospect of further action by the Council may have an impact on Alaskan recreational fisheries for salmon. The significance of this impact is unknown. The requirement for increased retention of DSR under GOA Amendment 63 may improve information on DSR bycatch, and lead to improved management of the DSR fishery in Southeast Alaska. In general, however, the impacts of the measures on recreational fisheries are expected to be insignificant.

Benefits from marine ecosystem   As discussed in Section 4.1, this category includes other benefits from marine ecosystems. Some of these benefits involve actual use of the resource (such as ecotourism) and some do not (such as valuing the continued existence of the resource in a given state). Many of the measures taken, or under consideration, require managers to take account of other ecosystem impacts in their management of target species. These include:

- Longline seabird measures, and investigation of trawl third wire impacts
- Amendments 81/74, which implement an ecosystem policy
- The MMPA LOF categorization of fisheries
- The Demersal shelf rockfish retention requirements (DSR are the object of a recreational fishery in SE Alaska)
- EFH/HAPC designation
- Investigation of salmon bycatch controls
- Sea otter ESA candidature
- Fur Seal EIS

These actions appear to have a net beneficial impact of unknown significance. The increase in salmon PSC bycatch in the BSAI pollock fisheries since 2002 is not believed to threaten the stocks of these fish. Impacts on commercial, subsistence, and recreational fisheries are described elsewhere. This overall impact has thus been rated beneficial, but with unknown significance.

Community impacts   Alaskan groundfish fishermen come from communities in Alaska and elsewhere, especially Washington and Oregon. (NMFS 2004d 3.9-56) Changes in income shares from fishing may have impacts on communities in which groundfish fishermen are concentrated. As noted above, past and future specifications do not appear likely to limit the ability of fishermen to maintain current levels of harvest into the future. Salmon bycatch concerns in the BSAI may have potentially adverse impacts on communities in Western Alaska; the reasonably foreseeable modifications in bycatch controls should provide protections for these communities. GOA rationalization may reduce the numbers of jobs available in GOA groundfish fisheries, but the remaining jobs may be more stable and profitable. The specific content of the GOA rationalization program is still unknown. The fur seal EIS should contribute to the protection of the resource, and to subsistence users of the resource. Considering the uncertainties associated with many of the measures under consideration, the significance of this impact has been rated "unknown."

5.5 Summary

The cumulative effects of this action, in combination with past actions, and reasonably foreseeable future actions are either insignificant or unknown. Except for (a) the impact of the potential ESA listing of sea otters on State of Alaska fisheries, (b) the impacts of future harvest specifications on habitat, and (c) impacts associated with cumulative change in incidental BSAI salmon catches, all of the unknown effects on the natural environment are likely to be beneficial. Some socio-economic unknown effects may be adverse. For example cost increases associated with various management measures. No significant socio-economic impacts, either beneficial or adverse, were identified. Under Council of Environmental Quality regulations, significant socio-economic impacts would not have affected FONSI (40 CFR 1508.14). The environmental components with unknown effects are summarized in Table 5.5-1.

The specifications were determined following a process that has been fully analyzed in the PSEIS. Moreover, this action in and of itself is of short duration, and its effects will be measurable only on a very fine scale. At the population level, the effects of a single year's specifications may be impossible to detect. The agency will attempt to more fully assess cumulative effects in future editions of the PSEIS when sufficient time has passed for analysts to be able to evaluate more clearly the cumulative environmental consequences of the annual BSAI and GOA specifications.

Table 5.5-1 Nature of Unknown Cumulative Effects from Past and Future Actions for Environmental Components

Environmental Component	Unknown Effect and Action
Target Species	U+ for Amend 81/74 and EFH/HAPC
Non-Specified and Forage Species	U+ for EFH/HAPC
PSC Species	U+ for GOA rationalization and EFH/HAPC and for salmon U+ based on research and mitigation planned
Marine Mammals	U+ for Amend 81/74 and 2004 LOF, EFH/HAPC, 2005 LOF, fur seals management
Seabirds	U+ for Amend 81/74, EFH/HAPC, trawl avoidance measures
Habitat	U+ for Amend 81/74, EFH/HAPC, U- for future harvest specifications but may be offset by concurrent actions from Amend 81/74 and EFH/HAPC measures.
Ecosystem	U+ for Amend 81/74
State Waters	U for sea otter ESA listing but likely insignificant.
Social and Economics	U for impacts on costs, net returns, safety and health, related fisheries, management and enforcement, excess capacity, bycatch and discards, subsistence, recreational, non-consumptive benefits, and community impacts. Many actions considered have cross-cutting impacts, for example seabird protection measures that protect valued seabirds, but increase operating costs.

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6.0 Environmental Analysis Conclusions

As stated in section 4.0 of this EA, the intent of TAC setting deliberations is to balance the harvest of fish during the 2005 and 2006 fishing years with established total optimum yield amounts and ecosystem needs. The alternatives must be evaluated for all direct, indirect and cumulative effects on resources, species, and issues within the action area as a result of specified TAC levels. The impacts of alternative TAC levels are assessed in Chapters 4 and 5 of this EA.

In addition to the PSEIS and other NEPA analyses for the groundfish fisheries, the significance of impacts of the actions analyzed in this EA were determined through consideration of the following information, as required by NEPA and 40 CFR 1508.27.

Context

For the 2005 and 2006 harvest specifications action, the setting of the proposed action is the groundfish fisheries of the BSAI and GOA. Any effects of this action are limited to these areas. The effects of the 2005 and 2006 harvest specifications on society within these areas, are on individuals directly and indirectly participating in the groundfish fisheries and on those who use the ocean resources. Because this action continues groundfish fisheries in BSAI and GOA into the future, this action may have impacts on society as a whole or regionally.

Intensity

Listings of considerations to determine intensity of the impacts are in 40 CFR 1508.27(b) and in the NOAA Administrative Order 216-6, Section 6. Each consideration is addressed below in order as it appears in the regulations.

Adverse or beneficial impact determinations for marine resources, **including sustainability of target and nontarget species, damage to ocean or coastal habitat or essential fish habitat, effects on biodiversity and ecosystems**, **and marine mammals** Adverse or beneficial impact determinations for marine resources accruing from establishment of year 2005 and 2006 Federal groundfish fisheries harvest specifications are summarized in Table 6.0-1.

<u>Alternative 1</u> Alternative 1 had significant adverse and unknown impacts identified for PSC salmon species, marine mammals, marine benthic habitat, and the ecosystem. Some significant beneficial socioeconomic effects may result from Alternative 1.

<u>Alternative 2 (preferred alternative)</u> No significant adverse impacts were identified for the preferred alternative (Alternative 2) for the harvest specifications. Unknown direct and indirect effects were identified for the PSC salmon and ecosystem under Alternative 2. The PSC salmon effects were limited to the ESA listed chinook salmon for which a bench mark for population is unknown. The effect is likely to be insignificant based on the rarity of surrogate ESA listed species being taken in the BSAI groundfish fishery. For ecosystems, the population status for many top predator seabird, marine mammals, and sharks are unknown so that it is not possible to determine the impacts of fishing under Alternative 2 on these population trends. Unknown effects on HAPC biota were also identified based on the unknown abundance levels needed by structural HAPC species for a functional HAPC biota guild. It is likely that the mitigation measures in place and the application of the ecosystems management policy adopted with Amendments 81 and 74 to the groundfish FMPs will reduce the potential for significantly adverse effects on the top predator populations and on HAPC biota. Also, this action of annual harvest

specifications is for a short duration and at a similar level of harvest in relation to biomass experienced in the groundfish fisheries in the past, reducing the potential for adverse population trend effects for top predator species and adverse effects on HAPC biota. Unknown cumulative effects for nearly all environmental components were detailed in Chapter 5.0 of this EA. These effects were likely to be beneficial or likely to be mitigated by past and future actions so that none of the cumulative effects were likely to be significant.

Alternatives 3 and 4 The effects of alternatives 3 and 4 for the environmental components were nearly identical. All effects were either unknown or insignificant. Unknown effects were similar to Alternative 2 with a few exceptions. See Table 6.0-1 for more details.

Alternative 5 Under Alternative 5, there would be no groundfish fisheries in 2005 and 2006. Alternative 5 had significantly beneficial impacts for target, non-specified, forage, and PSC species, marine mammals, benthic habitat, and ecosystems components and for social and economic factors of operating costs, management and enforcement costs, and bycatch and discards. It had significantly adverse impacts on social and economic factors of gross revenues, returns to the industry, impacts on related fisheries, consumer impacts, excess capacity, and communities. See Table 6.0-1 for more details.

Public health and safety will not be affected in any way not evaluated under previous actions or disproportionally for Alternatives 1-4. The harvest specifications will not change fishing methods, timing of fishing or quota assignments to gear groups which are based on previously established seasons and allocation formulas in regulations. Alternative 5 affects on safety and health are unknown. It is likely that no fishing would result in a reduction in fishery related injuries and mortality, but the lack of income may result in adverse effects on public health.

Cultural resources and ecologically critical areas: These actions take place in the geographic areas of the Bering Sea, Aleutian Islands, and GOA, generally from 3 nm to 200 nm offshore. The land adjacent to these areas contain cultural resources and ecologically critical areas. The marine waters where the fisheries occur contain ecologically critical area. Effects on the unique characteristics of these areas are not anticipated to occur with these actions and mitigation measures such as a bottom trawling ban in the Bering Sea are part of fisheries management measures.

Controversiality: These actions deal with management of the groundfish fisheries. Differences of opinion exist among various industry, environmental, management, and scientific groups on the appropriate levels of TAC to set for various target species and in particular fishery management areas. Alternative 2 is less likely to be controversial compared to the other alternatives analyzed because it continues to apply similar scientific and public processes used for harvest specifications as in the past for the groundfish fisheries. Alternatives 1 and 5 would be more likely to be controversial because of the large increase and decrease in harvest, respectively. Alternatives 3 and 4 also would be more likely than Alternative 2 to be controversial because they do not apply the scientific or public processes for harvest specifications development.

Risks to the human environment, **including social and economic effects:** Risks to the human environment by setting harvest specifications in the BSAI and GOA groundfish fisheries are described in detail in the PSEIS (NMFS 2004d) and in this EA. Because of the mitigation measures implemented with every past action, it is anticipated that there will be minimal or no risk to the human environment beyond that disclosed in the PSEIS (NMFS 2004d) or the Steller Sea Lion Protection Measures SEIS (NMFS 2001b). No significant adverse impacts were identified for the preferred alternative (Alternative 2) for the harvest specifications, including socioeconomic effects. Unknown impacts were identified for marine mammals, HAPC, and ecosystems under this alternative, but current management practices and the action duration likely prevent significant adverse impacts. Additionally, unknown socioeconomic impacts were identified for Alternative 2 regarding nonconsumptive uses of marine resources.

Future actions related to this action may result in impacts and are addressed in Chapter 5.0 of this EA. NMFS is required to establish fishing harvest levels for up to two years for the BSAI and GOA groundfish fisheries. Changes may occur in the environment or in fishing practices that may result in significant impacts. Additional information regarding marine species may make it necessary to change management measures. All of the future impacts identified in section 5.3 are not likely to result in significant impacts on the environment because of mitigating management measures in place or likely to occur (e.g. Amendments 81/74 and EFH/HAPC management). Pursuant to NEPA, appropriate environmental analysis documents will be prepared to inform the decision makers of potential impacts of future actions on the human environment, and mitigation measures are likely to be implemented to avoid significantly adverse impacts.

Cumulatively significant effects, including those on target and nontarget species
Cumulative impacts of the preferred alternative are analyzed in Chapter 5.0. The cumulative effects of this action, in combination with past actions, and reasonably foreseeable future actions are either insignificant or unknown. Except for (a) the impact of the potential ESA listing of sea otters on State of Alaska fisheries, (b) the impact of future harvest specifications on habitat, and (c) impacts associated with cumulative change in incidental BSAI salmon catches, all of the unknown effects on the natural environment are likely to be beneficial. Some socio-economic unknown effects may be adverse. For example cost increases may be associated with various management measures used to reduce adverse effects on the environment. No significant socio-economic impacts, either beneficial or adverse, were identified. Under Council of Environmental Quality regulations, significant socio-economic impacts would not have affected FONSI (40 CFR 1508.14). The environmental components with unknown effects are summarized in Table 5.5-1.

The specifications were determined following a process that has been fully analyzed in the PSEIS. Moreover, this action in and of itself is of short duration, and its effects will be measurable only on a very fine scale. At the population level, the effects of up to two years of harvest specifications may be impossible to detect. The agency will attempt to more fully assess cumulative effects in future editions of the PSEIS when sufficient time has passed for analysts to be able to evaluate more clearly the cumulative environmental consequences of the annual BSAI and GOA specifications.

Districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places: This action will have no effect on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places, nor cause loss or destruction of significant scientific, cultural, or historical resources. This consideration is not applicable to this action.

Impact on ESA listed species and their critical habitat: ESA listed species that range into the fishery management areas are listed in Table 6.0-2. An FMP level Section 7 consultation BiOp was completed for the groundfish fisheries in November 2000 (NMFS 2000). The FMP level BiOp is limited to those species under NMFS jurisdiction and covers most of the endangered and threatened species occurring in the action area, including marine mammals, turtles, and Pacific salmon.

Under NMFS' FMP level BiOp (NMFS 2000), the western distinct population segment of Steller sea lions was the only ESA listed species identified as likely to be adversely affected by the groundfish fisheries. A subsequent biological opinion on the Steller sea lion protection measures was issued in 2001 (NMFS 2001b, appendix A). The 2001 BiOp found that the groundfish fisheries conducted in accordance with the Steller sea lion protection measures were unlikely to cause jeopardy of extinction or adverse modification or destruction of critical habitat for Steller sea lions.

The effects of the groundfish fisheries on ESA listed salmon are discussed in section 4.5. The incidental take statement of 55,000 chinook salmon from the 1999 BiOp (NMFS 1999) was exceeded in the 2004 groundfish fishery. NMFS Alaska Region is currently consulting with NMFS NW Region to determine if the exceedence of the ITS is likely to adversely affect ESA listed salmon. Given that chinook salmon take in the BSAI groundfish fishery has been under 55,000 animals for 5 of the last 6 years, we believe that the 2005 fishery is likely to take fewer than 55,000 chinook salmon.

Listed seabirds are under the jurisdiction of the USFWS which has completed an FMP level (USFWS 2003a) and project level BiOp (USFWS 2003b) for the groundfish fisheries. Both USFWS BiOps concluded that the groundfish fisheries and the annual setting of harvest specifications were unlikely to cause the jeopardy of extinction or adverse modification or destruction of critical habitat for ESA listed birds.

No consultations are required for the 2005 and 2006 harvest specification because the proposed actions will not modify the actions already analyzed in previous BiOps, are not likely to adversely affect ESA listed species beyond the effects already analyzed, and the incidental take statements of ESA species are not expected to be exceeded. Therefore the triggers to reinitiate consultation were not met. Summaries of the ESA consultations on individual listed species are located in the section 3.0 and accompanying tables of the PSEIS under each ESA listed species' management overview (NMFS 2004d).

This action poses **no known violation of Federal, State, or local laws or requirements for the protection of the environment**. Implementation of the harvest specifications would be conducted in a manner consistent, to the maximum extent practicable, with the enforceable provisions of the Alaska Coastal Management Program within the meaning of section 30(c)(1) of the Coastal Zone Management Act of 1972 and its implementing regulations.

Alternatives 2-4 pose **insignificant effects on the introduction or spread of nonindigenous species** into the BSAI and GOA because they do not change fishing, processing or shipping practices that may lead to the introduction of nonindigenous species. Alternative 1 poses a significant adverse effect by increasing fishing effort leading to increases in activities that may introduce nonindigenous species beyond those potentials impacts under other alternatives. Alternative 5 would have a significant beneficial impact by eliminating activities that may spread nonindigenous species.

Comparison of Alternatives and Selection of a Preferred Alternative

Alternative 1 would set TACs in the BSAI above the upper limit of 2,000,000 mt for OY and has more potential for significantly adverse effects on a number of environmental components compared to Alternatives 2-5. Alternative 5 has the most significantly beneficial impact on environmental components, but setting TACs to zero in both the BSAI and GOA would result in severe socioeconomic impacts. Neither Alternative 3 nor 4 uses the best and most recent scientific information on status of groundfish stocks nor takes into account socioeconomic benefits to the nation.

Alternative 2 is the preferred alternative because: 1) it takes into account the best and most recent information available regarding the status of the groundfish stocks, public testimony, and socio-economic concerns; 2) it sets all TACs at levels equal to or below ABC levels; 3) it falls within the specified range of OY for both the BSAI and GOA, and 4) it is consistent with the ESA and the National Standards and other requirements of the Magunson Stevens Fishery Conservation and Management Act. Unknown effects on the environment are likely to be insignificant effects. Unknown impacts were identified under the socioeconomic effects. Council of Environmental Quality regulations at 40 CFR 1508.14 described the human environment as including socioeconomic concerns, but those social or economic effects alone are not intended to trigger the need for an EIS.

Table 6.0-1 Summary of significant determinations with respect to direct and indirect impacts.

Coding: I = Insignificant, S = Significant, + = beneficial, - = adverse, U = Unknown					
Issue	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Target Fish Species (Section 4.2)					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	S+
Change in prey availability	I	I	I	I	S+
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	S+
Other and non-specified species (Section 4.3)					
Incidental catch of other species and non-specified species	U	I	U	U	S+
Forage species (Section 4.4)					
Incidental catch of other species and non-specified species	U	I	U	U	S+
Prohibited Species Management (Section 4.5)					
Benchmark Stock Levels of PSC species	U/I	U/I	U/I	U/I	U/I
Harvest levels in directed fisheries targeting prohibited species	I	I	I	I	I

Coding: I = Insignificant, S = Significant, + = beneficial, - = adverse, U = Unknown					
Issue	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Bycatch levels of prohibited species in directed groundfish fisheries	S-/I	I	I	I	S+
Marine Mammals (Section 4.6)					
Incidental take/entanglement in marine debris	U	I	I	I	I
Spatial/temporal concentration of fishery	I	I	I	I	S+
Global Harvest of prey species	I	I	I	I	I
Disturbance	S-	I	I	I	S+
Northern Fulmar (Section 4.7)					
Incidental take–BSAI	U	I	U	U	U
Incidental take–GOA	U	I	I	U	U
Prey availability	I/U	I	U/I	U/I	U
Benthic habitat	I	I	I	I	U
Short-tailed Albatross (Section 4.7)					
Incidental take	U	I	U	U	U
Prey Availability	I	I	I	I	U
Benthic Habitat	I	I	I	I	U
Other Albatrosses & Shearwaters (Section 4.7)					
Incidental Take	U	I	U	U	U
Prey Availability	I	I	I	I	U
Benthic Habitat	I	I	I	I	U
Piscivorous Seabirds (Also Breeding in Alaska) (Section 4.7)					

Incidental Take		U	I	I	I	U
Prey Availability		U	I	I	I	U
Benthic Habitat		I/U	I	U	U	U
Eiders (Spectacled and Stellers) (Section 4.7)						
Incidental Take		U	I	I	I	U
Prey Availability		I	I	U/I	U/I	U
Benthic Habitat		I	I	I	I	U
Other Seabird Species (Section 4.7)						
Incidental Take		U	I	I	I	U
Prey Availability		I	I	U/I	U/I	U
Benthic Habitat		I	I	I	I	U
Marine Benthic Habitat (Section 4.8)						
Level of mortality and damage to living habitat		S-	I	I	I	S+
Modification of Benthic Community Structure		U	I	I	I	U
Changes in Distribution of Fishing Effort		I	I	I	I	S+
Ecosystem Considerations (Section 4.9)						
Predator-prey relationships						
Pelagic forage availability		I	I	I	I	S+
Spatial and temporal concentration of fishery impact on forage		U	I	I	I	S+
Removal of top level predators	Trophic level of catch	U	I	I	I	I
	Top predator bycatch levels	S-	I	I	I	S+
	Pop status of top predators	U	U	U	U	U

Introduction of nonnative species		S-	I	I	I	S+
Energy flow and balance						
Energy flow and balance	Trends in offal and discard production levels	I	I	I	I	I
	Scavenger population trends	I	I	I	I	I
	Bottom gear effort	S-	I	I	I	S+
Energy removal		I	I	I	I	I
Diversity						
Species diversity	Population levels of target and nontarget relative to MSST or ESA listing thresholds	U	I	U	U	S+
	Bycatch amounts of sensitive species lacking pop. estimates	S-	I	I	I	S+
	Number of ESA listed marine species	I	I	I	I	I
	Area closures	I	I		I	S+
Functional diversity	Guild diversity or size diversity changes linked to fishing	U	I	I	I	I
	Bottom gear effort	S-	I	I	I	S+
	HAPC biota bycatch	U	U	U	U	S+
Genetic diversity	Degree of fishing on spawning aggregations or larger fish	U	I	U	U	U
	Older age group abundances of target groundfish stocks	U	I	U	U	U

State waters seasons (Section 4.10)					
Harvest levels of groundfish in State waters seasons and parallel seasons	I	I	I	I	S-

Economic Indicators (Section 4.11)	Year	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
First wholesale gross revenues	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Operating cost impacts	2005	S-	I	S+	I	S+
	2006	I	I	S+	I	S+
Net returns to industry	2005	S+	I	S-	I	S-
	2006	S+	I	S-	I	S-
Safety and health impacts	2005	U	I	U	U	U
	2006	U	I	U	U	U
Impacts on related fisheries	2005	U	I	U	U	S-
	2006	U	I	U	U	S-
Consumer effects	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Management and enforcement costs	2005	S-	I	I	I	S+
	2006	S-	I	I	I	S+
Excess capacity	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-
Bycatch and discards	2005	S-/I	I	I	I	S+
	2006	S-/I	I	I	I	S+
Subsistence	2005	U	I	U	U	U
	2006	U	I	U	U	U
Recreation	2005	U	I	U	U	U
	2006	U	I	U	U	U
Non-consumptive use values	2005	U	U	U	U	U
	2006	U	U	U	U	U
Communities	2005	S+	I	S-	I	S-
	2006	I	I	S-	I	S-

Table 6.0-2 ESA listed and candidate species that range into the BSAI or GOA groundfish management areas.

Common Name	Scientific Name	ESA Status
Blue Whale	*Balaenoptera musculus*	Endangered
Bowhead Whale	*Balaena mysticetus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Right Whale	*Balaena glacialis*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Steller Sea Lion (WesternPopulation)	*Eumetopias jubatus*	Endangered
Steller Sea Lion (Eastern Population)	*Eumetopias jubatus*	Threatened
Chinook Salmon (Puget Sound)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Lower Columbia R.)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Upper Columbia R. Spring)	*Oncorhynchus tshawytscha*	Endangered
Chinook Salmon (Upper Willamette .)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Snake River Spring/Summer)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Snake River Fall)	*Oncorhynchus tshawytscha*	Threatened
Sockeye Salmon (Snake River)	*Oncorhynchus nerka*	Endangered
Steelhead (Upper Columbia River)	*Onchorynchus mykiss*	Endangered
Steelhead (Middle Columbia River)	*Onchorynchus mykiss*	Threatened
Steelhead (Lower Columbia River)	*Onchorynchus mykiss*	Threatened
Steelhead (Upper Willamette River)	*Onchorynchus mykiss*	Threatened
Steelhead (Snake River Basin)	*Onchorynchus mykiss*	Threatened
Steller's Eider [1]	*Polysticta stelleri*	Threatened
Short-tailed Albatross [1]	*Phoebaotria albatrus*	Endangered
Spectacled Eider[1]	*Somateria fishcheri*	Threatened
Kittlitz Murrelet[1]	*Brachyramphus brevirostris*	Candidate
Northern Sea Otter[1]	*Enhydra lutris*	Candidate

[1]The Steller's eider, short-tailed albatross, spectacled eider, and Northern sea otter are species under the jurisdiction of the U.S. Fish and Wildlife Service. For the bird species, critical habitat has been established for the Steller's eider (66 FR 8850, February 2, 2001) and for the spectacled eider (66 FR 9146, February 6, 2001). The northern sea otter has been proposed by USFWS as a candidate species (November 9, 2000; 65 FR 67343). The Kittlitz murrelet has been proposed as a candidate species by the USFWS (69 FR 24875, May 4, 2004)

7.0 Final Regulatory Flexibility Analysis

7.1 Introduction

This Final Regulatory Flexibility Analysis (FRFA) evaluates the impacts of the 2005-2006 proposed harvest level specifications for the groundfish fisheries in the Bering Sea and Aleutian Islands, and the Gulf of Alaska, on small entities.

The proposed rule for the BSAI specifications was published in the Federal Register on December 8, 2004 (69 FR 70974). A correction was published on December 22, 2004 (69 *FR* 76682). The proposed rule for the GOA specifications was published in the *Federal Register* on December 7, 2004 (69 *FR* 70605). An Initial Regulatory Flexibility Analysis (IRFA) was prepared for the proposed rules, and described in the classifications sections of the preambles to the rules. The public comment period ended on January 6, 2005, for the GOA rule, and on January 7, 2005, for the BSAI rule. No comments were received on the IRFA.

This FRFA addresses the statutory requirements of the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 (5 U.S.C. 601-612). It specifically addresses the requirements at section 604(a).

7.2 The purpose of a FRFA

The Regulatory Flexibility Act (RFA), first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a Federal regulation. Major goals of the RFA are: (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require that agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and on the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action.

On March 29, 1996, President Clinton signed the Small Business Regulatory Enforcement Fairness Act. Among other things, the new law amended the RFA to allow judicial review of an agency's compliance with the RFA. The 1996 amendments also updated the requirements for a final regulatory flexibility analysis, including a description of the steps an agency must take to minimize the significant economic impact on small entities. Finally, the 1996 amendments expanded the authority of the Chief Counsel for Advocacy of the Small Business Administration (SBA) to file amicus briefs in court proceedings involving an agency's violation of the RFA.

In determining the scope, or 'universe', of the entities to be considered in a FRFA, NMFS generally includes only those entities that can reasonably be expected to be directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis. NMFS interprets the intent of the RFA to address negative economic impacts, not beneficial impacts, and thus such a focus exists in analyses that are designed to address RFA compliance.

Data on cost structure, affiliation, and operational procedures and strategies in the fishing sectors subject to the proposed regulatory action are insufficient, at present, to permit preparation of a “factual basis” upon which to certify that the preferred alternative does not have the potential to result in “significant adverse impacts on a substantial number of small entities” (as those terms are defined under RFA).

Because, based on all available information, it is not possible to ‘certify’ this outcome, should the proposed action be adopted, a formal FRFA has been prepared and is included in this package for Secretarial review.

7.3 What is required in a FRFA?

Under 5 U.S.C., Section 604(a) of the RFA, each FRFA is required to contain:

(1) a succinct statement of the need for, and objectives of, the rule;

(2) a summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;

(3) a description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;

(4) a description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and

(5) a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

Where are the FRFA requirements of the RFA addressed?

Need for the action	Section 7.5
Objectives of action	Section 7.6
Public comments	Section 7.7
Description of small entities	Section 7.8
Impacts on regulated small entities	Section 7.9
Description of reporting requirements	Section 7.10
Significant alternatives	Section 7.11

7.4 What is a small entity?

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a 'small business' as having the same meaning as 'small business concern', which is defined under Section 3 of the Small Business Act. 'Small business' or 'small business concern' includes any firm that is independently owned and operated and not dominant in its field of operation. The SBA has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor… A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the firm is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the United States, including fish harvesting and fish processing businesses. A business involved in fish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of $3.5 million for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business involved in both the harvesting and processing of seafood products is a small business if it meets the $3.5 million criterion for fish harvesting operations. Finally, a wholesale business servicing the fishing industry is a small business if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established "principles of affiliation" to determine whether a business concern is "independently owned and operated." In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern's size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when, (1) a person is an affiliate of a concern if the person owns or controls, or has the power to control 50 percent or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) if two or more persons each owns, controls or has the power to control less than 50 percent of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors, or general partners, controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint venturers if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small organizations. The RFA defines "small organizations" as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

7.5 Reason for considering the action

Each year the North Pacific Fishery Management Council (Council) recommends, and the Secretary of Commerce publishes, harvest specifications for the Bering Sea and Aleutian Islands (BSAI) and the Gulf of Alaska (GOA) groundfish fisheries. Harvest specifications establish specific limits on the commercial harvest of groundfish and are used to manage the groundfish fisheries. Harvest specifications include the setting of overfishing levels (OFLs), acceptable biological catches (ABCs), total allowable catches (TACs), and prohibited species catches (PSC). Specifications also include the setting of seasonal apportionments and allocations of TACs and PSCs. The purpose of this action is to establish the 2005-06 harvest specifications for the groundfish fisheries in the BSAI and GOA.

In September 2004, the BSAI and GOA Plan Teams met and recommended 2005-2006 OFL and ABC levels to the Council. In October 2004, the Council met and recommended proposed 2005-2006 OFL, ABC, and TAC levels to the Secretary of Commerce. The Council met again in December 2004, and made final OFL, ABC, and TAC recommendations to the Secretary.[32] This EA/FRFA is a Secretarial review draft, prepared to analyze the Council's December 2004 proposed specifications, prior to a Secretarial decision to publish final specifications in the *Federal Register*.

The 2005-06 harvest specifications are necessary for the management of the groundfish fisheries and the conservation of marine resources, as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and as described in the management policy, goals, and objectives in the groundfish Fishery Management Plans.

Detailed descriptions of each alternative analyzed in this EA/FRFA can be found in Section 2.0, in Tables 2.3-1, 2.3-1, 2.4-1, and 2.4-2.

[32] A detailed discussion of the specifications and the process by which they are adopted may be found in Chapter 1 of the EA.

7.6 Objectives of, and legal basis for, the proposed action

The objectives of the proposed action (publication of specifications) are to (1) allow commercial fishing for the groundfish stocks in the BSAI and GOA, (2) while protecting the long run health of the fish stocks and the social and ecological values that those fish stocks provide.

Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the United States has exclusive fishery management authority over all living marine resources, except for marine mammals and birds, found within the exclusive economic zone (EEZ) between 3 and 200 nautical miles from the baseline used to measure the territorial sea. The management of these marine resources is vested in the Secretary of Commerce and in Regional Fishery Management Councils. In the Alaska region, the North Pacific Fishery Management Council has the responsibility to prepare fishery management plans (FMPs) for the marine resources it finds require conservation and management. The National Marine Fisheries Service (NMFS) is charged with carrying out the Federal mandates of the Department of Commerce with regard to marine fish. The Alaska Regional Office of NMFS, and Alaska Fisheries Science Center (AFSC), research, draft, and support the management actions recommended by the Council.

The Magnuson-Stevens Act requires that the FMPs must specify the optimum yield from each fishery to provide the greatest benefit to the Nation, and must state how much of that optimum yield may be harvested in U.S. waters. The FMPs must also specify the level of fishing that would constitute overfishing. Using the framework of the FMPs and current information about the marine ecosystem (stock status, natural mortality rates, and oceanographic conditions), the Council annually recommends to the Secretary total allowable catch (TAC) specifications and prohibited species catch (PSC) limits and/or fishery bycatch allowances based on biological and economic information provided by NMFS. The information includes determinations of acceptable biological catch (ABC) and overfishing level (OFL) amounts for each of the FMP established target species or species groups.

7.7 Public Comments

The proposed rule for the BSAI specifications was published in the Federal Register on December 8, 2004 (69 FR 70974). A correction was published on December 22, 2004 (69 *FR* 76682). The proposed rule for the GOA specifications was published in the *Federal Register* on December 7, 2004 (69 *FR* 70605). An Initial Regulatory Flexibility Analysis (IRFA) was prepared for the proposed rules, and described in the classifications sections of the preambles to the rules. The public comment period ended on January 6, 2005, for the GOA rule, and on January 7, 2005, for the BSAI rule. No comments were received on the IRFA.

7.8 Number and description of small entities regulated by the proposed action

The entities directly regulated by this action are those entities that harvest groundfish in the EEZ of the BSAI and/or GOA. These entities include the groundfish catcher vessels and groundfish catcher/processor vessels active in these areas. It also includes organizations to which direct allocations of groundfish are made. In the BSAI, this includes the CDQ groups and the AFA fishing sectors (i.e., at-sea, inshore).

Table 7.7-1 shows the estimated numbers of small and large entities in the BSAI and GOA groundfish fisheries. The reasoning behind these estimates is summarized in the paragraphs, which follow the table.

Table 7.8-1 Estimated numbers of regulated entities in the BSAI and GOA groundfish fisheries

Fleet segment	Number small entities	Number large entities	Total number of entities
Catcher vessels	758	< 98	< 856
Catcher processors	24	< 60	< 84
Motherships	0	3	3
CDQ groups	6	0	6
Shoreside Processors	<= 65	> 8	73

Notes: Numbers of small CVs and CPs are calculated as described in the paragraphs below. The numbers of large CPs and CVs are estimates of vessel numbers and are upper bound estimates of entities. Actual numbers of large entities in these categories are considerably smaller, as many of these vessels are affiliated with AFA cooperatives and should not be independently counted as entities. Catcher vessel and catcher/processor estimates prepared from fishtickets, weekly processor reports, product price files, and intent-to-operate listing. The methodology used may overstates the numbers of small entities. Shoreside processors include all Alaska processors that reported processing of groundfish to NOAA Fisheries in 2002. The number of small processing entities cannot be determined at this time due to insufficient ownership and affiliation information. All CDQ groups are non-profits and are therefore treated as small.

Fishing vessels, both catcher vessels and catcher/processors, are small if their annual total gross receipts, from all their economic activities combined, as well as those of any and all their affiliates anywhere in the world, (including fishing in Federally managed non-groundfish fisheries, and in Alaska managed fisheries), are less than $3.5 million in a year. An estimated 940 vessels fished for groundfish in the Federal waters off of Alaska in 2003. [33]

Small entities were identified as vessels that did not have AFA permits in 2003, and that grossed less than $3.5 million dollars in 2003. The same criterion was used for catcher-vessels and catcher processors. This criterion led to an estimate of 758 small catcher-vessels and 24 small catcher processors.

These estimates may actually be high because they do not take into account affiliations between entities, other than those associated with membership in an AFA cooperative. There is not a strict one-to-one correspondence between vessels and entities; many persons and firms are known to have ownership interests in more than one vessel, and many vessels with different ownership, are otherwise affiliated with each other. Moreover, these estimates only include fishery revenues earned from fishing activity in the Federal waters off of Alaska and from fishing within Alaskan waters. Because of data limitations, they do not include revenues from fishing activity off of the West Coast of the U.S., or revenues from other sources.

[33] The description of the small vessels operating in the Federal fisheries of the EEZ off of Alaska is based on data supplied by the Alaska Fisheries Information Network in December 2004. AKFIN used somewhat different selection criteria than those used by the Alaska Fisheries Science Center to prepare its annual Economic SAFE document. AKFIN reports 940 small vessels off of Alaska in 2003, while the economic SAFE reports 1,037 vessels (Tables 26.1 and 26.2, pages 61-62)

The 758 small catcher vessels had total gross revenues, from all Alaskan fishing sources, of $292 million dollars. Mean gross revenues were about $384,000, and median gross earnings were about $223,000. Groundfish revenues accounted for about 39% of total revenues for these operations. Halibut and crab were also important species, accounting for 35% and 20% of total gross revenues respectively. Salmon accounted for about 5% of gross revenues. Groundfish revenues were mainly from sablefish (60% of groundfish revenues) and Pacific cod (30% of groundfish revenues). [Estimates derived from data supplied by the Alaska Fisheries Information Network (AKFIN)].[34]

The 24 small catcher-processors had total gross revenues, from all Alaskan region fishing sources, of $50 million. Mean gross revenues were about $2.1 million, and median gross earnings were about $2.4 million. Groundfish accounted for about 95% of total revenues for these operations. Halibut and crab accounted for 3.5% and 1.9% of total gross revenues respectively. Groundfish revenues for catcher-processors were overwhelmingly first wholesale revenues from Pacific cod (82% of groundfish revenues). Wholesale revenues from pollock accounted for 2.4% of groundfish revenues, sablefish accounted for 6.1%, and other groundfish species accounted for 6.1% (Estimates derived from data supplied by AKFIN).

The estimates of the number of shoreside processors, in Table 7.7-1, include all Alaska processors that reported processing groundfish to NOAA Fisheries in 2002. It is not possible, at this time, to determine how many of the 73 shoreside processors qualify as small entities, due to insufficient employment, ownership, and affiliation information. At least eight, i.e., those affiliated with AFA cooperatives, would be considered large, based on SBA criteria. (a list of the inshore processors affiliated with the AFA cooperatives may be found here: http://www.fakr.noaa.gov/ram/daily/afa_ip.htm accessed on November 9, 2004) However, while shoreside processors are potentially affected by this action, because the specifications will affect deliveries by catcher vessels, they are not directly regulated by it.

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[34] The AKFIN data set is compiled from three data sources:

- NMFS Catch Accounting – Source for catcher/processor groundfish
- NMFS CDQ Catch Report – Additional source for catcher/processor groundfish
- Fish Ticket Data Compiled by the CFEC – Source for catcher/vessel groundfish and all entities non-groundfish data

Only retained groundfish data for catcher/processors were included from the NMFS sources by querying the primary reported and CDQ catch report tables. Vessels selected for the diversification include all catcher/processors reporting in the Catch Accounting data source. Wholesale revenues were determined by applying wholesale prices as received from NMFS. The CFEC source is filtered to include only commercial, retained harvest so that the following is reported or removed from the source:

- Commercial harvest, as determined by the CFEC, is included
- Non-retained catch such as discard-at-sea, landed/discarded, and deadloss was removed from report data
- Ancillary product was removed from report data
- By-catch harvest removed by including only the primary species grouping from each fish ticket fishery

Vessels selected for this diversification include all vessels reporting in the CFEC fish ticket data source harvesting commercial groundfish in Federal waters. Ex-vessel revenues, determined by the CFEC gross earnings values, were used for all species except halibut; halibut was priced at $2.165 per round pound.

The three motherships are believed to be large entities, based upon SBA criteria.

Through the Community Development Quota (CDQ) program, the North Pacific Fishery Management Council and NMFS allocate a portion of the BSAI groundfish, prohibited species, halibut, and crab TAC limits to 65 eligible Western Alaska communities. These communities work through six non-profit CDQ Groups to use the proceeds from the CDQ allocations to start or support commercial fishing activities that will result in ongoing, regionally based, commercial fishery or related businesses. Because they are non-profit entities, the CDQ groups are considered small, for RFA purposes.

The CDQ program began in 1992, with the allocation of 7.5 percent of the BSAI pollock TAC. The fixed gear halibut and sablefish CDQ allocations began in 1995, as part of the halibut and sablefish Individual Fishing Quota Program. In 1998, allocations of 7.5 percent of the remaining groundfish TACs, 7.5 percent of the prohibited species catch limits, and 7.5 percent of the crab guideline harvest levels were added to the CDQ program. At this time, the CDQ share of the pollock TAC was increased to 10 percent. The CDQ groups may, and do, both lease their quota to third parties, on a royalty-basis, or fish the quota directly, themselves.

In 2003, the CDQ groups are reported to have had gross revenues of about $89 million. Almost half of these came from pollock royalties ($43 million). Total royalty payments were $52 million. (Alaska Department of Community and Economic Development web site, http://www.commerce.state.ak.us/bsc/CDQ/cdqstats.htm accessed 1-3-04).

7.9 Impacts on regulated small entities

The impacts of the preferred alternatives on first wholesale revenues in the BSAI and the GOA are summarized in Tables 7.9-1 through 7.9-3.

Table 7.9-1 Estimated and Projected First Wholesale Gross Revenues in the BSAI Groundfish Fisheries, 2002-2006.

BSAI	Estimated Earned Revenue			Projected Revenue	
	2002	2003	2004	2005 Alt. 2	2006 Alt. 2
Pollock	847,515,731	851,342,412	851,479,283	854,022,799	859,301,452
Sablefish	10,399,408	13,955,654	14,352,436	11,769,052	11,141,094
Pacific cod	202,338,709	209,926,410	218,019,959	208,408,870	197,280,241
Arrowtooth	553,813	415,359	415,359	415,359	415,359
Flathead sole	6,692,956	5,354,364	5,086,646	5,220,505	5,354,364
Rock sole	8,980,303	7,317,284	6,818,378	6,901,529	6,984,680
Turbot	7,900,430	3,950,215	3,456,438	3,456,438	3,456,438
Yellowfin	24,216,007	23,582,448	24,237,125	25,535,497	25,342,333
Flats (other)	554,592	480,646	480,646	425,187	480,646
Rockfish	7,926,692	7,603,249	6,507,437	6,532,265	6,532,265
Atka	17,679,404	21,648,250	22,730,662	22,730,662	22,730,662
Other	1,983,581	2,073,339	1,722,591	1,831,160	1,843,257
Column total	1,136,741,623	1,147,649,632	1,155,306,961	1,147,249,326	1,140,862,793

Estimated BSAI non-CDQ fishing operation gross revenues, by species group, are shown in Table 7.9-1. Between 2002 and 2004, overall revenue trended upward. A decrease of about $8 million is projected for 2005, and a decrease of about $15 million is projected for 2006.

Table 7.9-2 Estimated and Projected First Wholesale Gross Revenues for BSAI CDQ groups, 2002-2006.

BSAI CDQ	Estimated Earned Revenue			Projected Revenue	
	2002	2003	2004	2005 Alt. 2	2006 Alt. 2
Pollock	94,460,213	94,886,717	94,901,972	95,185,461	95,773,795
Sablefish	1,156,685	1,532,275	1,532,275	1,292,336	1,223,369
Pacific cod	15,341,596	15,916,906	16,530,570	15,801,844	14,958,056
Arrowtooth	53,807	40,355	40,355	40,355	40,355
Flathead sole	192,744	154,195	146,485	150,340	154,195
Rock sole	128,099	104,377	97,260	98,446	99,632
Turbot	241,629	120,815	105,713	105,713	105,713
Yellowfin	776,810	756,487	777,488	819,137	812,941
Flats (other)	30,863	26,748	26,748	23,662	26,748
Rockfish	492,317	472,228	404,169	405,711	405,711
Atka	1,397,850	1,711,653	1,797,236	1,797,236	1,797,236
Other	142,341	148,782	123,612	131,403	132,271
Column total	114,414,953	115,871,537	116,483,883	115,851,644	115,530,022

Table 7.9-2 provides similar revenue estimates for the BSAI CDQ groups, which are considered to be small entities, over the years 2002 through 2006. From 2002 through 2004, an increasing trend in overall revenue is evident. The projected 2005 CDQ allocation of TAC is estimated to result in a slight decrease in overall revenue, when compared to 2004, and an additional slight decrease is projected for 2006.

Table 7.9-3 Estimated and Projected First Wholesale Gross Revenues in the GOA Groundfish Fisheries, 2002-2006.

GOA	Estimated Earned Revenue			Projected Revenue	
	2002	2003	2004	2005 Alt. 2	2006 Alt. 2
Pollock	38,945,969	36,338,428	47,644,460	61,317,337	61,451,057
Sablefish	67,703,889	78,635,796	87,402,446	84,180,966	79,771,236
Pacific cod	49,458,431	45,332,236	53,710,984	49,685,428	43,699,649
Arrowtooth	2,633,453	2,633,453	2,633,453	2,633,453	2,633,453
Flathead sole	1,084,469	1,302,999	1,271,447	1,214,185	1,193,384
Rex sole	6,517,492	6,517,492	8,706,047	8,706,047	8,706,047
Flat (deep)	526,476	526,476	654,858	735,771	735,771
Flat (shallow)	3,707,248	3,925,108	3,765,344	3,765,344	3,765,344
Rockfish	14,484,820	15,026,545	13,699,066	14,175,480	13,789,691
Atka	131,545	131,545	131,545	131,545	131,545
Skates	0	0	4,696,689	5,470,404	5,469,732
Other	372,391	370,090	413,870	455,908	444,536
Column total	185,566,184	190,740,169	224,730,209	232,471,868	221,791,445

Notes: The skate fishery was in transition during this period. A targeted fishery emerged in 2003, and skates were moved from the "other species" to the "target" category by FMP amendment in 2004. The model is believed to understate skate revenues in 2003 and overstate them in 2004, 2005, and 2006.

Table 7.9-3 provides estimates of first wholesale gross revenues in the GOA, by species group, from 2002 through 2006. Note that skates were first allocated a separate TAC in 2004, due to an emerging target fishery. Overall, GOA first wholesale revenues are estimated to have increased from 2002 through 2004. However, compared to 2004, projected GOA TACs result in estimated overall revenue increases of approximately $8 million in 2005 and a decrease of approximately $3 million in 2006. The increase in 2005 estimates result largely from increased pollock TAC, while the decrease in 2006 is largely attributable to decreased Pacific cod TAC.

The gross revenue model results described above have been used to identify directly regulated fishing sectors in the BSAI and GOA, which may be adversely impacted by the proposed specifications. Sectors were chosen if projected gross revenues appear to decline by more than 1% between 2004 and either 2005 or 2006. Sectors are defined by BSAI/GOA status, and target species. These criteria indicated that six directly regulated sectors would be adversely impacted:

- BSAI Pacific cod (Table 7.8-1)
- BSAI sablefish (Table 7.8-1)
- BSAI other flatfish (Table 7.8-1)
- BSAI CDQ groups (Table 7.8-2)
- GOA sablefish (Table 7.8-3)
- GOA Pacific cod (Table 7.8-3)
- Flathead sole (Table 7.8-3)

The analysis that follows draws on data on vessel revenues prepared under the auspices of the Alaska Fisheries Information Network. A detailed description of the AKFIN data set is provided in a footnote earlier in this section. The AKFIN data sets provide a relatively complete view of revenues from fishing in State and Federal waters off of Alaska. Deliveries of unprocessed groundfish are valued using ex-vessel prices, while deliveries of processed groundfish products are valued using first wholesale gross revenues. Because a large proportion of production is valued using ex-vessel prices, the gross revenues are not fully comparable to those in Tables 7.9-1 to 7.9-2, which value all processed product at the first wholesale level. The AKFIN data sets include data on non-groundfish production, as well; all non-groundfish production is valued at the ex-vessel level. Vessels with fewer than 1,000 pounds of production of the species were excluded from the analysis.

In the paragraphs below, the impacts on the different sectors are estimated in the following way. First, the change in small entity gross revenues for the fishery of concern from 2004 to 2005 or 2006 (whichever comparison produces the greater change) is estimated. Then this change is evaluated as a percentage of 2003 small entity gross revenues from all sources. It is necessary to make the comparison with 2003 gross revenues, because individual operational gross revenues are not yet available for 2004; because of this, entity-specific gross revenue projections for 2004 are unavailable. The gross revenues model does not produce these estimates.

<u>BSAI other flatfish, and GOA flathead sole</u> The BSAI "other flatfish," and GOA flathead sole sectors are special cases that do not require detailed analysis. The BSAI "other flatfish" category in the gross revenue model is made up of two TAC classifications: Alaska plaice and "other flatfish." The "other flatfish" TAC does not decrease during this period. It is actually higher in

2005, than in 2004. Alaska plaice are generally discarded. In 2002, of 12,176 mt caught, only 370 mt were retained. The apparent gross revenue decline for this category reflects limitations of the gross revenue model. In the GOA, the flathead sole revenues are more than 1% lower in 2005, and in 2006, than they are in 2004. The TAC changes that underlie this estimate may be found in Table 2.4-2 in Section 2.4 of the EA ("Council's October 2004 recommendations"). However, as shown in Table 2.4-2, this fleet does not come close to harvesting the full TAC of this species. This gross revenue estimate, because of limitations in the gross revenue model, overstates the decline in gross revenues expected from this action. Therefore, the apparent gross revenue declines for BSAI "other flatfish" and GOA flathead sole are not expected to impact small entities, and these sectors have not been subjected to more detailed review.

BSAI sablefish   Seventy-nine vessels each retained over 1,000 pounds of sablefish in the BSAI fishery in 2003. Fifty-three of these were judged to be small entities. These 53 small entities had total gross revenues of about $58.9 million from all sources. Mean gross revenues of $1.1 million from all sources. Median gross revenues were also about $1.1 million. The 79 small and large vessels grossed an estimated $8.8 million from BSAI sablefish. Most of this, about 78%, was received by small entities. Table 7.8-1 indicates that BSAI sablefish revenues are expected to decline by 23% between 2004 and 2005. If small entities absorb 78% of this reduction, their aggregate gross revenues will decline by about $1.6 million. A reduction in revenues of this magnitude would have accounted for about 2.7% of total 2003 gross revenues from all sources for these small entities.

BSAI Pacific cod   Two hundred and seventy-seven vessels each retained over 1,000 pounds of Pacific cod in the BSAI fishery in 2003. One hundred and twenty of these were judged to be small entities. These 120 small entities had total gross revenues of about $124 million from all sources. Mean gross revenues of $1.0 million from all sources. Median gross revenues were about $842,000. The 277 small and large vessels, taken together, grossed an estimated $58.7 million from BSAI Pacific cod. About 30% of this was received by small entities. Table 7.8-1 indicates that BSAI Pacific cod revenues are expected to decline by 9.5%, between 2004 and 2006. If small entities absorb 30% of this reduction, their aggregate gross revenues will decline by about $1.7 million. A reduction in revenues of this magnitude would have accounted for about 1.3% of total 2003 gross revenues from all sources for these small entities combined.

BSAI CDQ Groups   Table 7.9-3 indicates that the value of the first wholesale revenues received for the fish allocations made to the CDQ groups will decline by abut $1.2 million, between 2004 and 2006. This is less than 1% of the gross revenues for these allocations in 2004.

GOA sablefish   Four hundred and fifteen vessels each retained over 1,000 pounds of sablefish in the GOA fishery in 2003. Three hundred and eighty-two of these were judged to be small entities. These 382 small entities had aggregate total gross revenues of about $188 million from all sources. Mean gross revenues were $491,000 from all sources. Median gross revenues were also about $335,000. The 415 small and large vessels, taken together, grossed an estimated $74.4 million from GOA sablefish. Most of this, about 88% was received by small entities. Table 7.8-3 indicates that BSAI sablefish revenues are expected to decline by 8.7%, between 2004 and 2006. If small entities absorb 88% of this reduction, their aggregate gross revenues will decline by about $5.7 million. A reduction in revenues of this magnitude would have accounted for about 3.0% of total 2003 gross revenues from all sources for these small entities combined.

GOA Pacific cod   Two hundred and fifty-three vessels each retained over 1,000 pounds of Pacific cod in the GOA fishery in 2003. Two hundred and seven of these were judged to be small entities. These 207 small entities had aggregate total gross revenues of about $118 million from all sources. Mean gross revenues were $570,672 from all sources. Median gross revenues were about $400,000. The 253 small and large vessels, taken together, grossed an estimated $29 million from GOA Pacific cod in 2003. Most of this, about 70%, was received by small entities. Table 7.8-3 indicates that BSAI Pacific cod revenues are expected to decline by 19% between 2004 and 2006. If small entities absorb 70% of this reduction, their aggregate gross revenues will decline by about $3.9 million. A reduction in revenues of this magnitude would have accounted for about 3.2% of total 2003 gross revenues from all sources for these small entities combined.

7.10 Recordkeeping and reporting requirements

The FRFA should include "a description of the projected reporting, record keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record..."

This regulation does not impose new recordkeeping or reporting requirements on the regulated small entities.

7.11 Description of significant alternatives

A FRFA should include "a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected. "

Four alternatives were evaluated, in addition to the preferred alternative. Alternative 1 set TACs equal to the ${}_{max}F_{ABC}$ fishing rate. Alternative 1 was associated with high TACs, high revenues, and TACs that exceeded the statutory BSAI OY. Alternative 2, the preferred alternative, set TACs to produce the fishing rates recommended by the Council on the basis of Plan Team and SSC recommendations. Alternative 3 set TACs to produce fishing rates equal to half the maxFABC, and Alternative 4 set TACs to produce fishing rates equal to the last five years' average fishing rate. Alternative 5 set TACs equal to zero.

There are no significant alternatives to the proposed rule that accomplish the stated objectives, are consistent with applicable statutes, and that would minimize the economic impact of the proposed rule on small entities.

Appendix Tables F-4a and F-4b indicate that BSAI Pacific cod fishermen and CDQ groups would have been better off under one other alternative, Alternative 1, than under the preferred alternative. BSAI sablefish fishermen would not have been better off under any other alternative. While Pacific cod fishermen and CDQ groups would have been better off under Alternative 1, total BSAI TACs would have been greater than the two million metric ton BSAI OY mandated by statute, under that alternative. An increase in the TAC for Pacific cod would have had to come at the expense of TACs provided to other operations. Moreover, and most importantly, as shown in Table 2.2-1, both the the Pacific cod and sablefish TACs set under the preferred alternative were set equal to the ABCs recommended by the Council's BSAI Plan Team and its SSC. Higher TACs would not be consistent with prudent biological management of the fishery; TACs have been set as high as possible while still protecting the biological health of the stock.

Appendix Tables F-6a and F-6b indicate that GOA Pacific cod fishermen would have been better off under two other alternatives, Alternatives 1 and 4, than under the preferred alternative. GOA sablefish fishermen would not have been better off under any alternative. As shown in Table 2.2-2, the sablefish TACs are set equal to the recommended ABC. The ABCs are recommended by the Council on the basis of the biological recommendations made to it by its Plan Teams and its SSC. Higher TACs would not be consistent with prudent biological management of the fishery. The situation is very similar for Pacific cod. Although the Pacific cod TACs under the preferred alternative are lower than the ABC, these lower TACs reflect guideline harvest levels for Pacific cod set by the State of Alaska for its own waters. To protect the resource, the sum of the State's GHL and the Federal TAC are not allowed to exceed the ABC. Thus, this TAC also has been set as high as possible while still protecting the biological health of the stock. The Pacific cod Federal TACs and State GHLs under Alternatives 1 and 4 would have exceeded the ABCs.

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Appendix A: BSAI Stock Assessment and Fishery Evaluation (SAFE) Reports

This document is included by reference. The 2004 versions for each species or species group may be found here: http://www.afsc.noaa.gov/refm/stocks/assessments.htm

Appendix B: GOA Stock Assessment and Fishery Evaluation (SAFE) Reports

This document is included by reference. The 2004 versions for each species or species group may be found here: http://www.afsc.noaa.gov/refm/stocks/assessments.htm

Appendix C: Ecosystem Considerations

This document is included by reference. The 2004 version may be found here: http://www.afsc.noaa.gov/refm/docs/2003/APPENDIX%20C%20Ecosystem%20Considerations%20Chapter.pdf

Appendix D: Economic Status Report

This document is included by reference. The 2004 version may be found here: http://www.afsc.noaa.gov/refm/docs/2003/Economic.pdf

Appendix E: Projected 2004 Fishing Mortality

By James Ianelli, Tom Pearson, and Mary Furuness, NMFS

Introduction

The NMFS and Council continue to evaluate revising the harvest specification process (TAC setting process). The main motivation for this stems from a need to provide for adequate time for the rulemaking process and to accommodate the mandatory public comment periods (on the TACs). In the interim (prior to the approval and implementation of any changes to the process), preliminary 2005 TACs need to be implemented. The first step in setting a TAC is to provide reasonable estimates of ABC. Rather than simply rolling over the 2004 ABC values as was done in the past, projections of 2005 ABCs based on estimates from the 2003 SAFE are provided. This will be an improvement over the earlier practice as the proposed values will be based on better estimates of the actual 2004 catch levels. This in turn provides a better approximation of the 2005 ABC level and thus enhances the public review and comment process. Only species in Tiers 1-3 (age structured assessments) have projections, ABC levels for the other species will be the same as the 2003 values.

At the September 2002 NPFMC Plan Team meetings preliminary TACs for 2003 were presented for TAC setting purposes. The SSC subsequently requested that further documentation on the rationale and methods used for projecting the anticipated catch for the latter third of 2002 (based on assessments conducted in 2001). The purpose of this document is to detail the rationale and method for doing these projections. As before (incremented by one year), these projections are based on age-structured stock assessments published in 2003 and estimated catches expected for 2004 to provide preliminary ABC projections for 2005.

Methods

This analysis is a simple update of the methods used in each assessment chapter of the SAFE for EA specifications and MSST determinations. The age-structured projection model (requiring inputs on 2004 estimates of numbers at age, a time series of recruitment estimates (since 1978) and age-specific schedules of average weight, maturity, natural mortality, and selectivity) is used with the following modification: the catch for 2004 is based on the estimates (presented below) rather than expected based on harvest control rules as specified in the SAFE.

2004 catch projection of BSAI groundfish as of May 22, 2004

In 2003, a catch projection for the 2003 fishing year was made in mid August to assist in the preparation of the 2003 SAFE report. This year, the 2004 catch projection was made in late May to facilitate the preparation of the EA for the proposed 2005 harvest specification. Clearly, these estimates of projected catch for 2004 are preliminary and will be revised as actual data are collected and normal editing procedures take place.

This catch projection estimate is based on the year-to-date catch of groundfish through May 22, 2004 plus the average catch for the years 2001, 2002, 2003 from late May to December 31 (week ending dates 5/24/03, 5/25/02, and 5/26/01 through 12/31). At this time many of the fisheries have not yet concluded for the year but the TACs for these fisheries are fully utilized, so the entire TAC amount was used as a logical upper limit for the catch. This adds some conservative elements to the estimates for next years OFLs and ABCs. This was done for pollock, Pacific cod, Pacific Ocean perch, and Atka mackerel. For some species the projection is more than the 2004 TAC and in these cases the 2004 TAC is used (Alaska plaice, arrowtooth flounder, Greenland turbot, "other flatfish," "other species," rock sole, squid, and yellowfin sole).

During 2001 through 2003, a large amount of the shortraker and rougheye rockfish catch was reported using a combined species code. The amounts of shortraker and rougheye in Table 13.1 of the 2003 SAFE report are used to calculate the separate catch amounts of shortraker and rougheye for 2001 through 2003.

Data used to make these projections came from the NMFS blend reports for 2001 and 2002, from the NMFS catch accounting system for 2003 and 2004. Catch estimates for the BSAI region are presented in Table 1.

2004 catch projection of GOA groundfish as of May 22, 2004

In 2003 a catch projection for the 2003 fishing year was made in mid August to assist in the preparation of the 2003 SAFE report. As with the approach detailed for the BSAI region, these catch projection estimates were made in late May to facilitate the preparation of the EA for the proposed 2005 harvest specification. These estimates will be updated when more harvest information becomes available later in the year.

This catch projection is based on the year to date harvest of groundfish through May 22, 2004 plus the average harvest for the years 2001, 2002, 2003 from late May to December 31 (week ending dates 5/24/03, 5/25/02, and 5/26/01 through 12/31). At this time many of the fisheries have not yet concluded for the year and so the entire TAC (or ABC in the case of P cod) amount was used as a logical upper limit for the catch. This adds some conservative elements to the estimates for next years OFLs and ABCs. This was done for pollock and Pacific cod in the Western and Central GOA, for all rockfish targets gulfwide except for POP and pelagic shelf rockfish in the SEO District, for sablefish gulfwide, and for big and longnose skates in the Central GOA. Projections were made for all flatfish targets, other skates, Atka mackerel, and other species gulfwide. These species are predominately harvested by trawl gear that is usually limited by halibut PSC limitations rather than TAC amounts. The annual amount of halibut in the PSC allowance (2,000 mt in the GOA) has not changed in recent years.

Information on the pollock harvest in State waters fishery in Prince William Sound is also available and the stock assessment authors may wish to use it since it has not been demonstrated that the pollock in PWS constitutes a stock separate from the W/C/WYK stock. In all other cases the catch of groundfish in Areas 649 and 659 has been omitted (unlike last year). This was done because NMFS believes these State waters lie outside the area surveyed by NMFS and the harvest of groundfish in these areas is no longer subtracted from the Federal TACs.

Very little information is available on the previous catch of big and longnose skates in the Central GOA in the blend catch reports prepared by NMFS. In 2001 they were largely reported as other species (species reporting code 100), in 2002 and 2003 they were largely reported as skates (species reporting code 700). Information on incidental catch in previous years is also extremely limited. To be conservative this projection assumes the entire TAC will be harvested. Projections for other skates and other species used this year's catch to date plus average catch after mid May for the years 2002 and 2003 only.

Data used to make these projections came from the NMFS blend reports for 2001 and 2002, from the NMFS catch accounting system for 2003 and 2004, and from the 1999 and 2003 SAFE reports for the GOA. Catch estimates for the GOA are presented in Table 2.

These values were then submitted to the 2003 configuration of the projection model and the fishing mortality rate for the 2004 catches (as estimated below) were used to determine projected numbers at age in 2004 for subsequent ABC estimates. These projections were computed for the Plan Team during the September 2003 meeting and presented in their report to the Council.

Tables

Table 1. Estimated 2004 GOA catch projections year-to-date though 5/22/04 + 2000-2003 average catch after 5/22/2004*.

Area	WGOA	CGOA		EGOA		Gulfwide	
Target	610	620	630	WYK**	SEO***		PWS
Pollock****	22,930	26,490	14,040	136	0	64,652	1,056
Pacific cod	22,610	35,800		154		58,564	
Deep-water flatfish	22	748		55	4	829	
Rex sole	567	1,253				1,820	
Flathead sole	1,023	1,724		0	0	2,747	
Shallow-water flatfish	205	4,930		1	1	5,137	
Arrowtooth flounder	5,434	16,806		112	84	22,436	
Sablefish	2,930	7,300		2,500	3,770	16,500	
Pacific Ocean perch	2,520	8,390		830	0	11,740	
SR/RE	254	656		408		1,318	
Other slope rockfish	40	300		130	200	670	
Northern rockfish	770	4,100		0		4,870	
Pelagic shelf rockfish	370	3,010		210	10	3,600	
Thornyhead	410	1,010		540		1,960	
Demersal shelf rockfish					450	450	
Big & longnose skates		3,284				3,284	
Other skates						1,379	
Atka mackerel						230	
Other species						1,667	

* PWS pollock - In previous years the GHL established by the State for PWS has been deducted from the W/C/WYK ABC. This year's harvest comes from both a commercial fishery and a test fishery conducted by ADF&G. The 2005 GHL for PWS is 923 mt.

** P cod - ABCs were used rather than TACs to include removals from the State managed fisheries in the Western and Central GOA.

*** Northern Rockfish E GOA - In the E GOA northern rockfish are included in the other rockfish assemblage. Annual harvests are on the order of 10 mt.

Table 2. Estimated 2004 BSAI catch projections year-to-date though 8/9/03 + 2000-2004 average catch after 5/31/2004.

	TAC	YTD Catch	CDQ catch	Remaining TAC	Average Catch (May-Dec)**	Projected Catch*
Bering Sea						
Other Rockfish	460	136	1	323	246	383
Pacific Ocean perch	1,408	54	1	1,353	700	755
Sablefish	2,900	228	82	2,590	719	1,029
Greenland Turbot	2,700	164	7	2,529	2,596	2,700
Pollock	1,492,000	545,993	59,738	886,269	870,530	1,492,000
Pollock, Bogoslof***	50	0		50	22	22
Aleutian Islands						
Other Rockfish	634	142	2	490	341	485
Pacific Ocean perch (E)	3,059	202	94	2,763	2,660	3,059
Pacific Ocean perch (C)	2,926	271	0	2,655	2,732	2,926
Pacific Ocean perch (W)	5,187	188	0	4,999	4,781	5,187
Pacific Ocean perch (all AI)	*11,172*	*661*	*94*	*10,417*	*10,173*	*11,172*
Atka mackerel (E)	11,240	4,341	388	6,511	3,953	11,240
Atka mackerel (C)	31,100	13,918	70	17,112	14,024	31,100
Atka mackerel (W)	20,660	3,543	0	17,117	11,459	20,660
Atka mackerel (All AI)	*63,000*	*21,802*	*458*	*40,740*	*29,436*	*63,000*
Sablefish	3,100	500	0	2,600	759	1,259
Greenland Turbot	800	221	0	579	677	800
Pollock, ICA***	1,000	620	0	380	538	1,000
Bering Sea Aleutian Islands						
Alaska Plaice	10,000	6,971	1	3,028	3,839	10,000
Arrowtooth Flounder	12,000	4,762	52	7,186	7,948	12,000
Flathead Sole	19,000	7,991	190	10,819	9,381	17,562
Other Flatfish	3,000	2,498	9	493	2,049	3,000
Other Species	27,205	13,140	1,821	12,244	14,883	27,205
Pacific Cod	215,500	126,329	8,374	80,797	74,155	215,500
Rock Sole	41,000	41,243	312	-555	9,427	41,000
Squid	1,275	202		1,073	1,223	1,275
Yellowfin Sole	86,075	57,369	45	28,661	42,969	86,075
Northern Rockfish	5,000	1,473	5	3,522	3,431	4,909
Rougheye Rockfish	195	21	2	172	289	195
Shortraker Rockfish	526	77	4	445	168	249
Total	2,000,000	832,597	71,198	1,096,205	1,086,499	1,993,575

*Projected catch is either:

** 2001 5/26 - 12/31, 2002 5/25 - 12/31, 2000 5/24 - 12/31 source NMFS Blend Estimates and Catch Accounting System

1. 2004 TAC amount-highlighted. TAC amounts are used for these species because they are fully utilized or the 2004 projection exceeds the TAC.

*** Pollock ICA CDQ is included in open access pollock ICA

2. 2004 open access/CDQ catch through 5/22/04 plus 2001-2003 average catch from May 23 - December 31 (includes CDQ).

Appendix F: Detailed Analysis of 2004 Gross Value Impacts

The gross value analysis provides estimates of gross revenues received for products at the first wholesale level ("first wholesale gross revenues"). First wholesale gross revenues are used as a measure of gross value for two reasons. First, they provide the first market transaction common to two major sectors of the industry: (1) the "inshore sector," comprised of catcher vessels that harvest fish and deliver them for processing to shoreside or at-sea processors, and these same processors; and (2) catcher/processor vessels that process their own harvest. Ex-vessel revenues for catcher vessels would not be comparable to the revenues received in the first commercial transaction of a catcher/processor, because the latter transaction involves a value added product, while the former involves raw catch. The second reason first wholesale gross revenues were used, was to capture impacts on the combined fishing and fish processing sectors.

How first wholesale revenues were estimated

The volumes of fish harvested under the different alternatives were estimated as follows: (a) Alternative 1, 3, 4, and 5 TACs for each species in Tiers 1, 2, and 3 were estimated from AFSC population models calibrated to produce catches generating the catch rates associated with the alternatives; Alternative 1, 3, 4, and 5 TACs for other species were rolled over from 2004; Alternative 2 TACs were those recommended by the Council in December 2004; (b) BSAI TACs were divided into the CDQ reserve and the ITAC plus unspecified reserves using formulas from the regulations; (c) an estimate of the proportion of the projected TAC for the species group taken on average in the years 1998-2003, was used to estimate total catch (separate proportions were used in the BSAI and GOA, and for CDQ and other fishing in the BSAI); (d) an estimate of the average proportion of the total catch that was discarded in 1998 to 2003, was used to estimate the proportions of catch that were discarded and retained.[35]

The first wholesale value of the harvest under each alternative was estimated using the first wholesale price per metric ton of retained weight and the estimated retained harvests. Prior to this calculation, the species were aggregated into larger groupings corresponding to the several groups for which first wholesale prices were available. Values were estimated for each species grouping, and then summed across groupings.

The prices are defined as "first wholesale price per metric ton of retained catch." First wholesale prices are necessary for calculating gross revenues at the first wholesale level. Prices are measured in dollars per metric ton of retained catch by the fishermen. Retained catch differs from total catch because fishermen often discard parts of their total catch.

Price projections are not available for 2004. The most recent year for which relatively complete price data are available is 2003. The first wholesale price per metric ton of retained catch was calculated by dividing an estimate of gross first wholesale revenues by an estimate of retained catch for twelve BSAI species groupings and eleven GOA species groupings. In the BSAI, these groupings (and their prices) were pollock ($649), sablefish ($6,132), Pacific cod ($1,126), arrowtooth ($530), flathead sole ($843), rock sole ($687), turbot ($1,779), yellowfin sole ($531), other flatfish ($1,348), rockfish ($687), Atka mackerel ($507), and "other" species ($583). In the

[35] The proportions of available harvest actually taken were obtained from the NOAA Fisheries Alaska Region web site. BSAI and GOA percentages caught were averaged over 1999-2003; CDQ percentages were averaged over 1999-2003. Separate discard rates for the GOA and BSAI were obtained from Economic SAFEs for various years; rates were averaged over the period 1999-2003.

GOA, these groupings (and their prices) were pollock ($788), sablefish ($5,849), Pacific cod ($1,240), arrowtooth ($341), flathead sole ($772), rex sole ($2,094), deepwater flatfish ($672), shallow water flatfish ($762), rockfish ($802), Atka mackerel ($815), and other species ($485) are used. The prices estimates are region specific and are based on data used to prepare the 2004 Economic SAFE.[36]

In the BSAI, the TACs were divided into two categories. The fish available in the CDQ reserves, and the fish available for use by fishermen harvesting the ITAC and the unspecified reserves. The CDQ reserve was assigned 10% percent of the pollock TAC, 20% of the sablefish allocated to hook-and-line and pot fishermen, 7.5% of the sablefish allocated to trawl fishermen, and 7.5% of all other groundfish species.

Estimates of gross revenues for actual TACs from 2002-2004 were also prepared using similar procedures. In each year, the actual TACs were adjusted by the average percentage of the TAC caught, and by the discard rate, and monetized with 2003 prices (just as the alternatives were). Thus, these revenue estimates are based on estimated, rather than actual, harvests in those years and incorporate 2003 prices. The 2004 estimates were prepared using assumed constant prices (using the 2002 prices as the base year) to provide a benchmark against which to compare the revenue estimates produced for the five alternatives.

The 2002-2003 estimates can be compared to the estimates for those years from the annual Economic SAFE. The total estimated 2002 first wholesale revenues from Tables 4.11-1 to 4.11-2 were about $1,437 million; the total from the SAFE was $1,483 million. The estimates in this EA were thus about 3% less than the estimate in the SAFE. The total estimated 2003 first wholesale revenues were $1,454 million; the total from the SAFE was $1,519 million. The 2003 estimates in this EA were thus about 4% less than those in the SAFE. (SAFE estimates from the 2004 Economic SAFE, Table 36 on pages 86-87).

There are several important conceptual problems with this approach. First, changes in the quantity of fish produced, might be expected to lead to changes in the price paid. However, in this analysis, a constant price, by species and product form, was used to value the different quantities that would be produced under the different alternatives. Since, all else equal, an increase in quantity should reduce price, while a decrease in quantity should increase price, leaving price changes out of the calculation may lead to an exaggeration of actual gross revenue changes across alternatives. The magnitude of this exaggeration is unknown. This is probably not a serious issue for Alternative 2, because TAC changes are relatively small. However, Alternative 1 increases TACs significantly, so the absence of a price effect may overstate revenue increases because prices would be expected to decline. In contrast, the method may cause the revenue reductions for Alternatives 3 and 4, which have moderate reductions in TACs of highly valued species, to be overstated, since the declines in TACs might be offset to some extent by increases in prices. It is not an issue for Alternative 5, since with no harvests, prices are undefined.

Second, many of the groundfish fisheries become limited by PSC catch constraints, rather than attainment of TAC. PSC constraints are not proportional to groundfish specifications and are

[36] Retained catch was calculated using Tables 4 and 5 which contains information on catch and discards. Total first wholesale revenues were estimated from Table 36. The species groupings used were determined by the groupings used in the 2003 Economic SAFE.

likely to bind sooner, or impose greater costs on groundfish fishermen, given higher levels of TAC specifications. This suggests that gross revenues for alternatives with generally higher levels of TAC specifications will be biased upward. This may not be an issue for most alternatives in this instance, since TACs generally are the same as or lower than TACs in 2004. The exception could be Alternative 1, which increases TACs significantly.

Other assumptions incorporated into the model may affect the results in ways that are difficult to determine. For example: (1) the use of first wholesale prices per metric ton of retained weight, implies that proportions of output of different products made with a species at the wholesale level remain constant at 2003 levels as the retained catch of the species changes; (2) the use of broad species categories in the analysis implies that changes in specifications would result in proportional changes in the harvest by all the gear groups harvesting a species; (3) the lumping of species together in categories implies that changes in specifications would result in proportional changes in the harvest of all the species included in the category.

Estimates of first wholesale gross revenues

Estimates of the projected TACs for each alternative, by species group, are summarized for both the BSAI and for the GOA in Tables F-1a and F1-b for 2005 and 2006 respectively.

Estimates of the percentage changes between 2004 BSAI TACs and the 2005 and 2006 projected TACs for the alternatives are summarized in Tables F-2a and F-2b. Similar percentage changes for the GOA are summarized in Table F-3a and F-3b.

Estimates of the 2005 and 2006 values for each alternative for the BSAI ITAC and unspecified reserves are summarized in Table F-4a and F-4b.   Estimates for the BSAI CDQ groups are in F-5a and F-5b, and estimates for the GOA are in F-6a and F-6b.

Table F-1a 2005 TACs in metric tons

Species	A1	A2	A3	A4	A5	2004
BSAI						
Pollock	1,990,700	1,497,510	1,047,850	1,301,207	0	1,493,050
Sablefish	5,060	5,060	2,602	4,000	0	6,000
Pacific cod	227,000	206,000	119,000	179,000	0	215,500
Arrowtooth	108,000	12,000	56,836	8,444	0	12,000
Flathead sole	58,500	19,500	30,480	10,660	0	19,000
Rock sole	132,000	41,500	68,224	25,057	0	41,000
Turbot	15,547	3,500	8,283	3,928	0	3,500
Yellowfin	124,000	90,686	63,761	39,559	0	86,075
Flats (other)	210,400	11,500	119,077	14,043	0	13,000
Rockfish	25,079	19,469	12,676	18,225	0	19,395
Atka	124,000	63,000	67,721	74,883	0	63,000
Other	70,740	30,275	35,390	27,685	0	28,480
Total	3,091,026	2,000,000	1,631,900	1,706,691	0	2,000,000
GOA						
Pollock	131,320	91,710	68,800	86,884	0	71,260
Sablefish	15,940	15,940	6,558	10,080	0	16,550
Pacific cod	73,800	44,433	38,800	56,800	0	48,033
Arrowtooth	216,900	38,000	100,136	15,810	0	38,000
Flathead sole	45,100	10,390	23,520	2,048	0	10,880
Rex sole	12,650	12,650	6,325	3,055	0	12,650
Flats deep	6,820	6,820	3,419	902	0	6,070
Flats shallow	52,070	20,740	26,035	5,290	0	20,740
Rockfish	31,333	27,999	17,083	21,075	0	27,058
Atka	4,700	600	2,350	232	0	600
Skates	8,144	8,145	4,072	3,524	0	6,993
Other	29,939	13,871	14,855	10,284	0	12,592
Totals	628,716	291,298	311,953	215,984	0	271,426

Notes: TACs are actual TACs as adopted by the NPFMC at its December 2004 meeting. BSAI TACs have been constrained to meet the two million metric ton optimum yield constraint for Alternatives 2-4 but not for Alternative 1.

Table F-1b 2006 TACs in metric tons

Species	A1	A2	A3	A4	A5	2004
BSAI						
Pollock	1,450,700	1,506,766	1,025,850	1,251,207	0	1,493,050
Sablefish	4,790	4,790	2,675	3,952	0	6,000
Pacific cod	207,000	195,000	125,000	174,000	0	215,500
Arrowthooth	88,400	12,000	51,923	8,466	0	12,000
Flathead sole	48,400	20,000	27,353	10,108	0	19,000
Rock sole	111,000	42,000	61,241	23,469	0	41,000
Turbot	10,124	3,500	6,803	3,662	0	3,500
Yellowfin	114,000	90,000	61,703	39,559	0	86,075
Flats (other)	130,400	13,000	91,712	13,655	0	13,000
Rockfish	24,859	19,469	12,997	18,344	0	19,395
Atka	89,200	63,000	58,014	62,817	0	63,000
Other	70,740	30,475	35,370	27,685	0	28,480
Total	2,349,613	2,000,000	1,560,640	1,636,924	0	2,000,000
GOA						
Pollock	100,860	91,910	63,840	77,854	0	71,260
Sablefish	15,105	15,105	8,425	12,448	0	16,550
Pacific cod	60,800	39,080	36,000	50,100	0	48,033
Arrowtooth	230,740	38,000	101,106	16,539	0	38,000
Flathead sole	42,850	10,212	20,323	2,030	0	10,880
Rex sole	12,650	12,650	6,325	3,055	0	12,650
Flats deep	6,820	6,820	3,279	901	0	6,070
Flats shallow	52,070	20,740	26,035	5,270	0	20,740
Rockfish	30,571	27,237	15,987	21,793	0	27,058
Atka	4,700	600	2,350	232	0	600
Skates	8,144	8,144	4,072	1,983	0	6,993
Other	28,266	13,525	14,387	9,610	0	12,592
Totals	593,576	284,023	302,129	201,815	0	271,426

Notes: TACs are actual TACs as adopted by the NPFMC at its December 2004 meeting. BSAI TACs have been constrained to meet the two million metric ton optimum yield constraint for Alternatives 2-4 but not for Alternative 1.

Table F-2a: Percent differences between 2005 BSAI TACs for the Alternatives, and 2004 BSAI TACs

Species	2004 mt	Alt. 1 %	Alt. 2 %	Alt. 3 %	Alt. 4 %
Pollock	1,493,050	33%	0%	-30%	-13%
Sablefish	6,000	-16%	-16%	-57%	-33%
Pacific cod	215,500	5%	-4%	-45%	-17%
Arrowtooth	12,000	800%	0%	374%	-30%
Flathead sole	19,000	208%	3%	60%	-44%
Rock sole	41,000	222%	1%	66%	-39%
Turbot	3,500	344%	0%	137%	12%
Yellowfin	86,075	44%	5%	-26%	-54%
Flats (other)	13,000	1518%	-12%	816%	8%
Rockfish	19,395	29%	0%	-35%	-6%
Atka	63,000	97%	0%	7%	19%
Other	28,480	148%	6%	24%	-3%

Table F-2b: Percent differences between 2006 BSAI TACs for the Alternatives, and 2004 BSAI TACs

Species	2004 mt	Alt. 1 %	Alt. 2 %	Alt. 3 %	Alt. 4 %
Pollock	1,493,050	-2.84%	0.92%	-31.29%	-16.20%
Sablefish	6,000	-20.17%	-20.17%	-55.42%	-34.14%
Pacific cod	215,500	-3.94%	-9.51%	-42.00%	-19.26%
Arrowtooth	12,000	636.67%	0.00%	332.69%	-29.45%
Flathead sole	19,000	154.74%	5.26%	43.96%	-46.80%
Rock sole	41,000	170.73%	2.44%	49.37%	-42.76%
Turbot	3,500	189.26%	0.00%	94.37%	4.63%
Yellowfin	86,075	32.44%	4.56%	-28.31%	-54.04%
Flats (other)	13,000	903.08%	0.00%	605.48%	5.04%
Rockfish	19,395	28.17%	0.38%	-32.99%	-5.42%
Atka	63,000	41.59%	0.00%	-7.91%	-0.29%
Other	28,480	148.38%	7.00%	24.19%	-2.79%

Table F-3a Percent differences between 2005 GOA TACs for Alternatives, and 2004 GOA TACs

Species	2004 mt	Alt. 1 %	Alt. 2 %	Alt. 3 %	Alt. 4 %
Pollock	71,260	84%	29%	-3%	22%
Sablefish	16,550	-4%	-4%	-60%	-39%
Pacific cod	48,033	54%	-7%	-19%	18%
Arrowtooth	38,000	471%	0%	164%	-58%
Flathead sole	10,880	315%	-5%	116%	-81%
Rex sole	12,650	0%	0%	-50%	-76%
Flats deep	6,070	12%	12%	-44%	-85%
Flats shallow	20,740	151%	0%	26%	-74%
Rockfish	27,058	16%	3%	-37%	-22%
Atka	600	683%	0%	292%	-61%
Skates	6,993	16%	16%	-42%	-50%
Other	12,592	138%	10%	18%	-18%

Table F-3b **Percent differences between 2006 GOA TACs for Alternatives, and 2004 GOA TACs**

Species	2004 mt	Alt. 1 %	Alt. 2 %	Alt. 3 %	Alt. 4 %
Pollock	71,260	42%	29%	-10%	9%
Sablefish	16,550	-9%	-9%	-49%	-25%
Pacific cod	48,033	27%	-19%	-25%	4%
Arrowtooth	38,000	507%	0%	166%	-56%
Flathead sole	10,880	294%	-6%	87%	-81%
Rex sole	12,650	0%	0%	-50%	-76%
Flats deep	6,070	12%	12%	-46%	-85%
Flats shallow	20,740	151%	0%	26%	-75%
Rockfish	27,058	13%	1%	-41%	-19%
Atka	600	683%	0%	292%	-61%
Skates	6,993	16%	16%	-42%	-72%
Other	12,592	124%	7%	14%	-24%

Table F-4a **Estimates of First Wholesale Value of 2005 ITAC and Unspecified Reserves in the BSAI (millions of dollars)**

Species Group	First Wholesale Value by Alternative (millions of dollars)				
	A1	A2	A3	A4	A5
Pollock	1,135	854	598	742	0
Sablefish	12	12	6	9	0
Pacific cod	230	208	120	181	0
Flatfish	99	42	52	23	0
Rockfish	8	7	4	6	0
Atka mackerel	45	23	24	27	0
Other	4	2	2	2	0
Total	1,534	1,147	807	990	0

Notes: All estimates have been rounded to the nearest million dollars. This causes some cells to read "0" when actual value is non-zero. Cells may not sum to totals due to rounding.

Table F-4b **Estimates of First Wholesale Value of 2006 ITAC and Unspecified Reserves in the BSAI (millions of dollars)**

Species Group	First Wholesale Value by Alternative (millions of dollars)				
	A1	A2	A3	A4	A5
Pollock	827	859	585	714	0
Sablefish	11	11	6	9	0
Pacific cod	209	197	126	176	0
Flatfish	81	42	47	22	0
Rockfish	8	7	4	6	0
Atka mackerel	32	23	21	23	0
Other	4	2	2	2	0
Total	1,174	1,141	792	951	0

Notes: All estimates have been rounded to the nearest million dollars. This causes some cells to read "0" when actual value is non-zero. Cells may not sum to totals due to rounding.

Table F-5a Estimates of First Wholesale Value of 2005 CDQ Reserve in the BSAI (millions of dollars)

Species Group	First Wholesale Value by Alternative (millions of dollars)				
	A1	A2	A3	A4	A5
Pollock	127	95	67	83	0
Sablefish	1	1	1	1	0
Pacific cod	17	16	9	14	0
Flatfish	3	1	2	1	0
Rockfish	1	0	0	0	0
Atka mackerel	4	2	2	2	0
Other	0	0	0	0	0
Total	153	116	80	101	0

Notes: All estimates have been rounded to the nearest million dollars. This causes some cells to read “0" when actual value is non-zero. Cells may not sum to totals due to rounding.

Table F-5b Estimates of First Wholesale Value of 2006 CDQ Reserve in the BSAI (millions of dollars)

Species Group	First Wholesale Value by Alternative (millions of dollars)				
	A1	A2	A3	A4	A5
Pollock	92	96	65	80	0
Sablefish	1	1	1	1	0
Pacific cod	16	15	10	13	0
Flatfish	3	1	1	1	0
Rockfish	1	0	0	0	0
Atka mackerel	3	2	2	2	0
Other	0	0	0	0	0
Total	115	116	79	97	0

Notes: All estimates have been rounded to the nearest million dollars. This causes some cells to read “0" when actual value is non-zero. Cells may not sum to totals due to rounding.

Table F-6a Estimates of 2005 First Wholesale Value in the GOA

Species Group	First Wholesale Value by Alternative (millions of dollars)				
	A1	A2	A3	A4	A5
Pollock	88	61	46	58	0
Sablefish	84	84	35	53	0
Pacific cod	83	50	43	64	0
Flatfish	39	17	19	4	0
Rockfish	16	14	9	11	0
Atka mackerel	1	0	1	0	0
Other	6	6	3	3	0
Total	317	232	156	193	0

Notes: All estimates have been rounded to the nearest million dollars. This causes some cells to read “0" when actual value is non-zero. Cells may not sum to totals due to rounding.

Table F-6b Estimates of 2006 First Wholesale Value in the GOA

Species Group	First Wholesale Value by Alternative (millions of dollars)				
	A1	A2	A3	A4	A5
Pollock	67	61	43	52	0
Sablefish	80	80	44	66	0
Pacific cod	68	44	40	56	0
Flatfish	40	17	19	5	0
Rockfish	15	14	8	11	0
Atka mackerel	1	0	1	0	0
Other	6	6	3	2	0
Total	278	222	158	191	0

Notes: All estimates have been rounded to the nearest million dollars. This causes some cells to read "0" when actual value is non-zero. Cells may not sum to totals due to rounding.

Appendix G: Text of PSEIS Amendments 81 to BSAI FMP and 74 to GOA FMP

The policy, goals and objective texts for Amendments 81 and 74 are identical. Therefore, the text for Amendment 81 only is shown below.

AMENDMENT 81to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area

In Section 2.0, Executive Summary, revise the first heading and following text to read as follows:

Management Goal to be Attained

The fishery management goal is to provide sound conservation of the living marine resources; provide socially and economically viable fisheries and fishing communities; minimize human-caused threats to protected species; maintain a healthy marine resource habitat; and incorporate ecosystem-based considerations into management decisions.

Ecological, Economic and Social Impacts

(continue as written)

Revise Section 3.2 to read as follows:

3.2 Goals and Objectives for Management Plan

The productivity of the North Pacific ecosystem is acknowledged to be among the highest in the world. For the past 25 years, the Council's management approach has incorporated forward looking conservation measures that address differing levels of uncertainty. This management approach has, in recent years, been labeled the precautionary approach. The Council's precautionary approach applies judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future and current generations. Recognizing that potential changes in productivity may be caused by fluctuations in natural oceanographic conditions, fisheries, and other non-fishing activities, the Council intends to continue to take appropriate measures to insure the continued sustainability of the managed species. It will carry out this objective by considering reasonable, adaptive management measures, as described in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and in conformance with the National Standards, the Endangered Species Act, the National Environmental Policy Act, and other applicable law. This management approach takes into account the National Academy of Science's recommendations on Sustainable Fisheries Policy.

As part of its policy, the Council intends to consider and adopt, as appropriate, measures that accelerate the Council's precautionary, adaptive management approach through community or rights-based management, ecosystem-based management principles that protect managed species from overfishing, and where appropriate and practicable, increase habitat protection and bycatch constraints. All management measures will be based on the best scientific information available. Given this intent, the fishery management goal is to provide sound conservation of the living marine resources; provide socially and economically viable fisheries and fishing communities; minimize human-caused threats to protected species; maintain a healthy marine resource habitat; and incorporate ecosystem-based considerations into management decisions.

This management approach recognizes the need to balance many competing uses of marine resources and different social and economic goals for sustainable fishery management, including protection of the long-term health of the resource and the optimization of yield. This policy will utilize and improve upon the Council's existing open and transparent process to involve the public in decision-making.

Adaptive management requires regular and periodic review. Objectives identified in this policy statement will be reviewed annually by the Council. The Council will also review, modify, eliminate, or consider new issues, as appropriate to best carry out the goals and objectives of this management policy.

To meet the goals of this overall management approach, the Council and NMFS will use the PSEIS as a planning document. To help focus its consideration of potential management measures, it will use the following objectives as guideposts to be re-evaluated, as amendments to the FMP are considered over the life of the PSEIS.

Prevent Overfishing:

1. Adopt conservative harvest levels for multi-species and single species fisheries and specify optimum yield.
2. Continue to use the existing optimum yield cap for the BSAI (as stated in current law) groundfish fisheries.
3. Provide for adaptive management by continuing to specify optimum yield as a range.
4. Initiate a scientific review of the adequacy of F_{40} and adopt improvements, as appropriate.
5. Continue to improve the management of species through species categories.

Promote Sustainable Fisheries and Communities:

6. Promote conservation while providing for optimum yield in terms of providing the greatest overall benefit to the nation with particular reference to food production, and sustainable opportunities for recreational, subsistence, and commercial fishing participants and fishing communities.
7. Promote management measures that, while meeting conservation objectives, are also designed to avoid significant disruption of existing social and economic structures.
8. Promote fair and equitable allocation of identified available resources in a manner such that no particular sector, group or entity acquires an excessive share of the privileges.
9. Promote increased safety at sea.

Preserve Food Web:

10. Develop indices of ecosystem health as targets for management.
11. Improve the procedure to adjust ABCs as necessary to account for uncertainty and ecosystem factors.
12. Continue to protect the integrity of the food web through limits on harvest of forage species.
13. Incorporate ecosystem-based considerations into fishery management decisions, as appropriate.

Manage Incidental Catch and Reduce Bycatch and Waste:

14. Continue and improve current incidental catch and bycatch management program.
15. Develop incentive programs for bycatch reduction including the development of mechanisms to facilitate the formation of bycatch pools, vessel bycatch allowances, or other bycatch incentive systems.

16. Encourage research programs to evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available.
17. Continue program to reduce discards by developing management measures that encourage the use of gear and fishing techniques that reduce bycatch which includes economic discards.
18. Continue to manage incidental catch and bycatch through seasonal distribution of TAC and geographical gear restrictions.
19. Continue to account for bycatch mortality in TAC accounting and improve the accuracy of mortality assessments for target, PSC bycatch, and non-commercial species.
20. Control the bycatch of prohibited species through PSC limits or other appropriate measures.
21. Reduce waste to biologically and socially acceptable levels.

Avoid Impacts to Seabirds and Marine Mammals:

22. Continue to cooperate with USFWS to protect ESA-listed seabird species, and if appropriate and practicable, other seabird species.
23. Maintain or adjust current protection measures as appropriate to avoid jeopardy of extinction or adverse modification to critical habitat for ESA-listed Steller sea lions.
24. Encourage programs to review status of endangered or threatened marine mammal stocks and fishing interactions and develop fishery management measures as appropriate.
25. Continue to cooperate with NMFS and USFWS to protect ESA-listed marine mammal species, and if appropriate and practicable, other marine mammal species.

Reduce and Avoid Impacts to Habitat:

26. Review and evaluate efficacy of existing habitat protection measures for managed species.
27. Identify and designate EFH and HAPC pursuant to Magnuson-Stevens Act rules, and mitigate fishery impacts as necessary and practicable to continue the sustainability of managed species.
28. Develop a Marine Protected Area policy in coordination with national and state policies.
29. Encourage development of a research program to identify regional baseline habitat information and mapping, subject to funding and staff availability.
30. Develop goals, objectives and criteria to evaluate the efficacy and suitable design of marine protected areas and no-take marine reserves as tools to maintain abundance, diversity, and productivity. Implement marine protected areas if and where appropriate.

Promote Equitable and Efficient Use of Fishery Resources:

31. Provide economic and community stability to harvesting and processing sectors through fair allocation of fishery resources.
32. Maintain LLP program and modify as necessary, and further decrease excess fishing capacity and overcapitalization by eliminating latent licences and extending programs such as community or rights-based management to some or all groundfish fisheries.
33. Provide for adaptive management by periodically evaluating the effectiveness of rationalization programs and the allocation of access rights based on performance.
34. Develop management measures that, when practicable, consider the efficient use of fishery resources taking into account the interest of harvesters, processors, and communities.

Increase Alaska Native Consultation:

35. Continue to incorporate local and traditional knowledge in fishery management.
36. Consider ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge in fishery management where appropriate.
37. Increase Alaska Native participation and consultation in fishery management.

Improve Data Quality, Monitoring and Enforcement:

38. Increase the utility of groundfish fishery observer data for the conservation and management of living marine resources.
39. Improve the North Pacific Groundfish Observer Program, and consider ways to address the disproportionate costs associated with the current funding mechanism.
40. Improve community and regional economic impact costs and benefits through increased data reporting requirements.
41. Increase the quality of monitoring and enforcement data through improved technological means.
42. Encourage a coordinated, long-term ecosystem monitoring program to collect baseline information and compile existing information from a variety of ongoing research initiatives, subject to funding and staff availability.
43. Cooperate with research institutions such as the North Pacific Research Board (NPRB) in identifying research needs to address pressing fishery issues.
44. Promote enhanced enforceability.
45. Continue to cooperate and coordinate management and enforcement programs with the Alaska Board of Fish, Department of Fish and Game, and Alaska Fish and Wildlife Protection, the U.S. Coast Guard, NMFS Enforcement, IPHC, Federal agencies, and other organizations to meet conservation requirements; promote economically healthy and sustainable fisheries and fishing communities; and maximize efficiencies in management and enforcement programs through continued consultation, coordination, and cooperation.

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Current Version	Which version is this?	What is the new information on ABCs and TACs?	What is the decision?
	September EA/IRFA	$_{Max}F_{ABC}$ and TACs for different F rates updated by rerunning models based on projected 2004 and 2005 harvests, or by rolling over 2004 ABCs and TACs for species for which this was not possible.	October AP, SSC, and Council deliberations on recommendations for proposed harvest specifications. (Proposed specifications are used for interim specifications.)
	October EA/IRFA	Council October recommendations on ABCs and TACs for Alternative 2.	Secretarial decision on interim specifications.
	November EA/IRFA	SAFE reports finalized; November Plan Team recommendations.	December AP, SSC, and Council deliberations on recommended specifications.
X	January EA/FRFA	Council December recommendations. Public comment on proposed specifications and IRFA.	Secretarial decision on final specifications.

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Edits through 1-26-05, including response to regional economist comments bmuse
Edit 2-8-05 in response to GC comment bmuse