

**SUPPLEMENT/ERRATA**

**FOR DRAFT**

**ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW**

**for an Amendment to the BSAI FMP and regulatory amendments  
to allow the allocation of future Aleutian Islands pollock specifications  
to the Aleut Corporation as Required by Statute**

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**Abstract:** This document contains supplemental information and replacement text or tables for an Environmental Assessment and a Regulatory Impact Review that analyze the potential impacts of an FMP amendment and regulations to allocate any future Aleutian Islands pollock specifications to the Aleut Corporation, as required by Section 803 of the 2004 Appropriations Act.



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## Description of Alternatives

Page 8, under 3.3 “Observer” alternative, the italicized text describes the “implications” of the alternatives 3.1, 3.2, and 3.3. This text should read:

*Implications of this action: The Statute allows basically two classes of vessels to participate in the Aleut Corp fishery: vessels 60 ft and smaller LOA, and AFA vessels (which are large catcher, catcher/processor, or mothership vessels). Regardless which vessel class fishes for the Aleut Corp allocation, they would have to follow current regulations for observer coverage and other monitoring and reporting requirements under the “No Action” option. The Council, however, may wish to increase or otherwise change how this fishery is monitored, and under the second alternative there are a suite of elements that would apply (in addition to status quo). These elements are a set of measures that would increase the level of monitoring currently required. These elements are not options but rather are intended to apply collectively to the action should this alternative (3.2) be selected. The first is an enforcement measure - making it easier for enforcement to know if a vessel is either fishing under AFA rules or the rules set forth for this new Aleut Corp fishery. (Note that under current regulations, listed AFA catcher-processors and motherships are under AFA rules in any groundfish fishery.) The second element would enable more accurate catch accounting and would discourage an AFA vessel from fishing for pollock in both the Bering Sea and the AI in the same trip. The third element would enhance catch composition accounting by imposing observer, sampling station, and scale requirements on all C/Ps and unlisted AFA vessels. The fourth element requires shore or stationary floating plants receiving AI pollock to operate under an approved CMCP, thereby enhancing catch accounting at the plant and would not require CMCPs for CVs. The fifth element requires the Aleut Corp to ensure that the AI pollock harvest remains within the quota prescribed; the burden of close monitoring the DFA is placed on the Aleut Corp, which would be subject to penalties if DFAs are exceeded. Alternative 3.3 imposes all elements in 3.2 plus a mandatory 100% observer requirement on all CVs.*

## Effects on Habitat

Text on page 107, under *Effects on Habitat*, first paragraph, should include the following text immediately following the sentence ending “...growth to maturity.”:

As part of the process of evaluating EFH considerations, Habitat Areas of Particular Concern, which may be particularly sensitive to the effects of fishing activities, also are being evaluated by the Council. In the AI region, sensitive areas of concern include known concentrations of sponge and coral (Figs. 4.2.2-8 and 4.2.2-9).

## Funding the AI Pollock Allocation

In Section 4.3.1, under *Implications of Alternatives* (p. 120 ff), Tables 4.3.1-1 and 4.3.1-2 contain several errors. The correct data for these tables are found on pages 204 and 205, in Tables 7.8-1 and 7.8-2, respectively.

In the same section, but under *Effects on Incidental Catch of Prohibited Species* (p. 129 ff), Tables 4.3.2-1, 4.3.2-2, and 4.3.2-3 may be better understood with some changes in column and row headings. Also, Table 4.3.2-3 should have been titled for a 50,000 mt allocation of pollock, not 25,000 mt. Therefore, replace Tables 4.3.2-1 through 4.3.2-3 with the following tables:

**Table 4.3.2-1 Estimated PSC and reductions in PSC for 8 species according to three**

**different funding mechanisms for a 25,000 mt allocation of pollock**

<b>Year</b>	<b>Prohibited species</b>	<b>Estimated bycatch</b>	<b>Estimated bycatch reduction with only EBS pollock funding (Alt 2.2)</b>	<b>Estimated bycatch reduction with all BSAI groundfish funding (Alt 2.3)</b>	<b>Estimated bycatch reduction with all BSAI groundfish except for sablefish (Alt 2.4)</b>
Low BS pollock TAC scenario (BSAI TACs equal 1999 level; pollock about 50% of OY)	Halibut (mt)	13,448	3	175	168
	Bairdi (#)	3,385,488	12	44,080	42,380
	Red King (#)	243,487	0	3,170	3,048
	Chinook (#)	33,442	446	435	419
	Other salmon (#)	58,710	1,345	765	735
	Herring (mt)	489	9	6	6
	Other tanner (#)	6,607,563	107	86,036	82,714
	Other king (#)	252,200	31	3,510	3,157
High BS pollock TAC scenario (BSAI TACs equal to 2004 level; pollock about 75% of OY)	Halibut (mt)	5,250	3	68	68
	Bairdi (#)	1,054,177	12	13,717	13,715
	Red King (#)	108,420	0	1,362	1,362
	Chinook (#)	32,302	446	409	409
	Other salmon (#)	83,412	1,345	1,046	1,046
	Herring (mt)	597	9	7	7
	Other tanner (#)	1,990,794	107	26,737	26,726
	Other king (#)	50,865	31	1,191	712

Notes: Estimated bycatches are calculated using TACs for the base year for groundfish target species and four year average bycatch rates (1999-2002) for the indicated species. Funding reductions estimates using estimated changes in target species and four year average bycatch rates. These reductions do not account for the TAC being moved to the Aleutian Islands.

**Table 4.3.2-2 Estimated PSC and reductions in PSC for 8 species according to three different funding mechanisms for a 40,000 mt allocation of pollock**

Year	Prohibited species	Estimated bycatch	Estimated bycatch reduction with only EBS pollock funding (Alt 2.2)	Estimated bycatch reduction with all BSAI groundfish funding (Alt 2.3)	Estimated bycatch reduction with all BSAI groundfish except for sablefish (Alt 2.4)
Low BS pollock TAC scenario (BSAI TACs equal 1999 level; pollock about 50% of OY)	Halibut (mt)	13,448	4	280	269
	Bairdi (#)	3,385,488	19	70,527	67,808
	Red King (#)	243,487	0	5,072	4,877
	Chinook (#)	33,442	714	697	670
	Other salmon (#)	58,710	2,153	1,223	1,176
	Herring (mt)	489	15	10	10
	Other tanner (#)	6,607,563	172	137,658	132,343
	Other king (#)	252,200	50	5,616	5,051
High BS pollock TAC scenario (BSAI TACs equal to 2004 level; pollock about 75% of OY)	Halibut (mt)	5,250	4	109	109
	Bairdi (#)	1,054,177	19	21,945	21,943
	Red King (#)	108,420	0	2,179	2,179
	Chinook (#)	32,302	714	655	655
	Other salmon (#)	83,412	2,153	1,674	1,674
	Herring (mt)	597	15	12	12
	Other tanner (#)	1,990,794	172	42,774	42,755
	Other king (#)	50,865	50	1,905	1,138
Notes: Notes: Estimated bycatches are calculated using TACs for the base year for groundfish target species and four year average bycatch rates (1999-2002) for the indicated species. Funding reductions estimates using estimated changes in target species and four year average bycatch rates. These reductions do not account for the TAC being moved to the Aleutian Islands.					

**Table 4.3.2-3 Estimated PSC and reductions in PSC for 8 species according to three different funding mechanisms for a 50,000 mt allocation of pollock**

Year	Prohibited species	Estimated bycatch	Estimated bycatch reduction with only EBS pollock funding (Alt 2.2)	Estimated bycatch reduction with all BSAI groundfish funding (Alt 2.3)	Estimated bycatch reduction with all BSAI groundfish except for sablefish (Alt 2.4)
Low BS pollock TAC scenario (BSAI TACs equal 1999 level; pollock about 50% of OY)	Halibut (mt)	13,448	5	350	351
	Bairdi (#)	3,385,488	23	88,159	88,284
	Red King (#)	243,487	1	6,340	6,349
	Chinook (#)	33,442	892	871	872
	Other salmon (#)	58,710	2,691	1,529	1,531
	Herring (mt)	489	19	13	13
	Other tanner (#)	6,607,563	215	172,072	172,307
	Other king (#)	252,200	62	7,020	6,577
High BS pollock TAC scenario (BSAI TACs equal to 2004 level; pollock about 75% of OY)	Halibut (mt)	5,250	5	136	136
	Bairdi (#)	1,054,177	23	27,429	27,427
	Red King (#)	108,420	1	2,724	2,724
	Chinook (#)	32,302	892	819	819
	Other salmon (#)	83,412	2,691	2,093	2,092
	Herring (mt)	597	19	15	15
	Other tanner (#)	1,990,794	215	53,461	53,437
	Other king (#)	50,865	62	2,381	1,423
Notes: Notes: Estimated bycatches are calculated using TACs for the base year for groundfish target species and four year average bycatch rates (1999-2002) for the indicated species. Funding reductions estimates using estimated changes in target species and four year average bycatch rates. These reductions do not account for the TAC being moved to the Aleutian Islands.					

## **Purpose and Need and Monitoring Vessel Activity Options**

The following description of the alternative meanings of “fishery endorsement” should be added to Chapter 4, **Monitoring Vessel Activity Options**, in Section 4.4.1, page 144, following the four bullets mid-page.

Section 803(b) does not define the meaning of the word “endorsement.” Senator Stevens’ floor language does not elaborate on the meaning. Thus, it appears the Council may have the scope to, and may want to, clarify the meaning in the administrative record for this action. The term endorsement may have several meanings:

- The term "fishery endorsement" may refer to an endorsement provided by the U.S. Maritime Administration to a vessel documented by the U.S. Coast Guard. The endorsement is a function of its documentation and allows that vessel to be deployed in any U.S. fishery. In testimony before the Council in February, members of the public familiar with the legislative process indicated that it was their understanding that this had been the Congressional intent.
- The term might refer to a vessel with a Federal Fisheries Permit (FFP) for groundfish for which pollock species is indicated on the application.<sup>1</sup> FFP Atka mackerel, Pacific cod, and pollock endorsements are made freely available to vessel owners on request.
- The term “endorsement” is also used in the groundfish License Limitation Program (LLP).<sup>2</sup> The term could be interpreted to mean a vessel with an LLP with endorsements to fish with trawl gear in the Aleutian Islands area. However, no vessels less than or equal to 60 feet LOA possess LLPs with these endorsements. Thus, this interpretation appears to defeat the intent of Congress.

## **The Aleut Corporation and the Aleut Enterprise Corporation**

On page 30 under the above heading, the third sentence contains a reference to 1.572 million acres of subsurface estate. This should read “...1.572 million acres of surface estate.”

## **Significance Analysis and Criteria**

In Section 4.1, a set of significance criteria are presented (see p. 64 ff). These criteria were used by the analysts in judging the level of effect of the various alternatives on several features of the environment. There are several clarifications or changes to the language in this section that need to be made, none of which affects the conclusions reached in this EA/RIR. However, to be more accurate in the presentation of the criteria used in the analyses, and to simplify the process of making text changes in this section of the document, the following text can be substituted for Section 4.1 in its entirety:

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

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<sup>1</sup>Provided for in 679.4(b)

<sup>2</sup>679.4(k)

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 proposed action are analyzed for each of the following resource categories:

- Pollock stock
- Other target species and fisheries
- Incidental catch of other and non-specified species
- Incidental catch of forage fish species
- Incidental catch of prohibited species
- Steller sea lions
- Other marine mammals
- 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 proposed action. Each of these categories also 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.

Four 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 judgement 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 judgement 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 judgement 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.

This chapter is organized into six sections. In addition to this section, which describes the significance criteria, there is one section for each of the decisions the Council identified in its February 2004 motion. As described in Chapter 2, these are:

- AI pollock allocation level

- Funding the AI pollock allocation
- Monitoring and enforcement measures
- Delay of small vessel use
- Economic development reporting

Each of these sections is divided into two parts. The first describes the alternatives available to the Council and the issues associated with their implementation. The second evaluates the environmental significance of these alternatives should they be incorporated into the FMP.

The following sub-sections of 4.1 describe the significance criteria used in evaluation of the proposed alternatives. Significance criteria are provided for each of the resource categories listed above.

#### *Effects on pollock stock*

Alternatives are evaluated with respect to five potential impacts on pollock stocks in the Aleutian Islands:

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?
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 ratings utilize a qualitative assessment of the relative impact of each alternative on the mortality to pollock or the degree to which the action might affect the spatial and temporal distribution of pollock harvest. The ratings also employ a qualitative assessment of how the alternative may affect prey items that are important to pollock harvests, and how the alternative may affect the pollock habitat. The significance criteria used to evaluate the impacts of the alternatives on pollock are provided in Table 4.1-1.

**Table 4.1-1 Criteria used to estimate the significance of effects on the pollock stocks in the Aleutian Islands**

<b>Intensity of the Effects</b>				
<b>Direct Effects</b>	<b>Significant Adverse</b>	<b>Unknown</b>	<b>Insignificant Impact</b>	<b>Significant Beneficial</b>
Fishing mortality	Reasonably expected to jeopardize the capacity of the stock to yield fishable biomass on a continuing basis.	Unknown fishing mortality rate.	Reasonably expected to not jeopardize the capacity of the stock to yield fishable biomass on a continuing basis.	Action allows the stock to return to its unfished biomass.
Spatial or temporal distribution	Reasonably expected to adversely affect the distribution of species harvested either spatially or temporally.	No information on how the action might affect the distribution of species harvested either spatially or temporally.	Unlikely to adversely impact the distribution of species harvested either spatially or temporally.	Reasonably expected to positively affect the species harvested through spatial or temporal increases in abundance.
Change in prey availability	Evidence that the action may lead to a change prey availability such that it jeopardizes the ability of the stock to sustain itself.	No information that the action may lead to a change in prey availability such that it enhances <i>or</i> jeopardizes the ability of the stock to sustain itself.	Evidence that the action will not lead to a change in prey availability such that it jeopardizes the ability of the stock to sustain itself.	Evidence that the action may result in a change in prey availability such that it enhances the ability of the stock to sustain itself.
Habitat: Change in suitability of spawning, nursery, or settlement habitat, etc. due to fishing	Evidence that the action may lead to a decrease in spawning or rearing success such that it jeopardizes the ability of the stock to sustain itself.	No information that the action may lead to a detectable change in spawning or rearing success such that it enhances <i>or</i> jeopardizes the ability of the stock to sustain itself.	Evidence that the action may lead to a detectable change in spawning or rearing success such that it has no effect on the ability of the stock to sustain itself.	Evidence that the action may lead to an increase in spawning or rearing success such that it enhances the ability of the stock to sustain itself.

### *Effects on Other Target Species and Fisheries*

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. 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). Impacts on pollock fisheries in the Aleutians are discussed under the previous resource category.

Alternatives are evaluated with respect to five potential impacts on other directed fisheries or the species harvested in other directed fisheries:

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?
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?
5. How much effect does the alternative have on gear use by other target fishers or the fishing grounds important to other target fisheries?

The ratings utilize a qualitative assessment of the relative impact of each alternative on the mortality to fish species harvested in non-target fisheries or the degree to which the action might affect the spatial and temporal distribution of species harvested in other directed fisheries. The ratings also employ a qualitative assessment of how the alternative may affect prey items that are important to fish harvested in other target fisheries, and how the alternative may affect the habitat used by non-target fish species. The issue of gear conflicts or fishing grounds preemption is addressed in these ratings also. The significance criteria used to evaluate the proposed action on other directed fisheries or fish stocks are provided in Table 4.1-2.

**Table 4.1-2 Criteria used to estimate the significance of effects on other directed fisheries or the fish stocks targeted in other directed groundfish fisheries in the Aleutian Islands**

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 yield fishable biomass on a continuing basis.	Unknown fishing mortality rate.	Reasonably expected to not jeopardize the capacity of the stock to yield fishable biomass on a continuing basis.	Action allows the stock to return to its unfished biomass.
Spatial or temporal distribution	Reasonably expected to adversely affect the distribution of species harvested in other target fisheries either spatially or temporally.	No information on how the action might affect the distribution of species harvested in other target fisheries either spatially or temporally.	Unlikely to adversely impact the distribution of species harvested in other target fisheries either spatially or temporally.	Reasonably expected to positively affect the species harvested in other target fisheries through spatial or temporal increases in abundance.
Change in prey availability	Evidence that the action may lead to a change prey availability such that it jeopardizes the ability of the stock to sustain itself.	No information that the action may lead to a change in prey availability such that it enhances <i>or</i> jeopardizes the ability of the stock to sustain itself.	Evidence that the action will not lead to a change in prey availability such that it jeopardizes the ability of the stock to sustain itself.	Evidence that the action may result in a change in prey availability such that it enhances the ability of the stock to sustain itself.
Habitat: Change in suitability of spawning, nursery, or settlement habitat, etc. due to fishing	Evidence that the action may lead to a decrease in spawning or rearing success such that it jeopardizes the ability of the stock to sustain itself.	No information that the action may lead to a detectable change in spawning or rearing success such that it enhances <i>or</i> jeopardizes the ability of the stock to sustain itself.	Evidence that the action may lead to a detectable change in spawning or rearing success such that it has no effect on the ability of the stock to sustain itself.	Evidence that the action may lead to an increase in spawning or rearing success such that it enhances the ability of the stock to sustain itself.

<b>Intensity of the Effects</b>				
<b>Direct Effects</b>	<b>Significant Adverse</b>	<b>Unknown</b>	<b>Insignificant Impact</b>	<b>Significant Beneficial</b>
Gear conflicts or fishing grounds preemption	Evidence that non-target fisheries will experience gear loss and/or will be displaced from important fishing grounds.	Unable to determine if the action will cause gear loss or grounds preemption.	Evidence that non-target fisheries will not experience gear loss and/or displacement from important fishing grounds.	Evidence that the action will result in reductions in gear loss in non-target fisheries and/or improved access to fishing grounds important to non-target fishers.

*Effects on Incidental Catch of Other Species and Non-specified Species*

The “other species” category in the BSAI are marine organisms that are important ecologically and also have some economic value. The Council sets an aggregate total TAC for the other species category to limit catch to within levels that are considered sustainable for these species. Some of the other species organisms are harvested incidentally in other fisheries, including sculpins, skates, sharks, and octopus. Information on the distribution, stock structure, and life history characteristics of these species is limited. Available information on sculpins, skates, sharks, and octopus is provided in the SAFE for 2004 (NPFMC 2003).

Table 4.1-3 provides estimates of incidental non-specified and other species in sampled hauls in the AI from 1989 to 2003. These are not estimates of total harvests of these species in directed pollock fisheries during these years. A very large number of species are included in the totals. Squid and grenadiers were the species that appeared in significant levels most consistently during these years.

**Table 4.1-3 Most frequently appearing non specified and other species in AI pollock incidental catches, 1991-1998 (from observer reports)**

	50 metric tons or more in sampled hauls									
	90	91	92	93	94	95	96	97	98	
Grenadier	X		X	X	X	X		X	X	
Unidentified invertebrates	X									
Irish lord	X									
Lumpsucker	X	X	X	X	X	X		X		
Ragfish	X	X			X					
Sculpin	X	X								
Skate	X	X								
Sponge	X									
Squid	X	X	X	X	X	X	X	X	X	
	100 metric tons or more in sampled hauls									
	90	91	92	93	94	95	96	97	98	
Grenadier	X		X	X	X	X		X		
Irish lord	X									
Lumpsucker				X						
Sculpin	X	X								
Skate	X	X								
Sponge	X									
Squid	X	X	X	X	X	X	X	X	X	

Non-specified species are other marine organisms harvested incidentally in other groundfish fisheries but are not of major economic value and are not specifically apportioned TAC in the specifications process. Information on incidental harvest of non-specified species is very limited. Presumably the incidental harvest of these organisms would track closely the harvest levels of certain target species, particularly when the target species is harvested by gear that also catches non-specified species. Non-specified species include such organisms as eelpouts, grenadiers, sea urchins, starfish, sponges, lumpsuckers, etc. Insufficient information is available with which to evaluate specific impacts of groundfish fisheries on these organisms.

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 Draft PSEIS (NMFS 2003b)). Other non-specified species caught in recent years include prowlfish, 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 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 Draft PSEIS (NMFS 2003b).

Because information is limited, predictions of impacts from different levels of harvest are described qualitatively. Direct effects include the removal of other or non-specified species from the environment as incidental catch in the groundfish fisheries. 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 a 2003 trajectory or rate. The current trajectory or rate significance criterion had been used in the Steller Sea Lion Protection Measures SEIS (Table 4.0-1 of NMFS 2001b). The criterion for evaluating significance was whether a substantial difference in bycatch amount would occur (increase by 50% = adverse or decrease by 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. No attempt was made to evaluate the significance of indirect effects.

**Table 4.1-4 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 2003 levels of harvest by more than 50%	Reasonably not expected to increase or decrease harvest by more than 50%	Reasonably expected to decrease harvest by 50%	Insufficient information available to predict change in harvest

*Effects on Incidental Catch of 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 include competition between groundfish (particularly juveniles) and

forage fish for available prey. In the Steller Sea Lion Protection Measures SEIS (NMFS 2001b) 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 in NMFS 2001b). For analysis purposes, this is assumed to be rates in 2003. The criterion for evaluating significance was a substantial change in incidental catch amount (increase >50% = adverse and decrease > 50%= beneficial). How do these relate to the table?

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 BSAI of 33 mt and in the GOA of 148<sup>3</sup> mt (2000 to 2002) is not likely to affect stocks (abundance) of forage fish species by more than 50%. In both the BSAI and the GOA more than 90% of the incidental catch by weight of all forage fish species are smelt which are taken in pollock fisheries.

Table 4.1-5 summarizes the significance criteria applicable to forage fish.

**Table 4.1-5 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 2003 levels of harvest by more than 50%	Reasonably not expected to increase or decrease harvest by more than 50%	Reasonably expected to decrease harvest by 50%	Insufficient information available to predict change in harvest

*Effects on Incidental Catch of Prohibited Species*

Retention of prohibited species is forbidden in the BSAI and GOA groundfish fisheries. These species were typically utilized in domestic fisheries prior to the passage of the Magnuson-Stevens Act in 1976. Retention was prohibited in the foreign, joint venture, and domestic fisheries to eliminate any incentive that groundfish fishermen might otherwise have to target these species. The prohibited species in the 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 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.

Potential direct and indirect effects to these species include: the impact of incidental catch of prohibited

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<sup>3</sup> The GOA harvest varied considerably around the mean, ranging from zero mt in 2000 to 351 mt in 2001.

species in the groundfish fisheries on stocks of prohibited species, the impact of incidental catch of prohibited species in the groundfish fisheries on the harvest levels of those species in their respective directed fisheries, and the effect on levels of incidental catch of prohibited species in the groundfish fisheries. Significance criteria for analyzing these effects are presented in Tables 4.1-6, 4.1-7, and 4.1-8.

Effects on the stocks of prohibited species are considered significantly adverse if they are likely to jeopardize the capacity of the stock to maintain benchmark population levels. Benchmarks for each prohibited species are defined below. The effects are considered significantly beneficial if harvest levels in the directed fisheries for the prohibited species increase without jeopardizing the stock. Effects on the harvest levels in fisheries targeting prohibited species are considered significant if they increase or decrease harvest levels by 20%. Effects on the incidental catch of prohibited species in directed groundfish fisheries are considered significant if they affect levels of incidental catch by 50% or more.

The benchmark used to determine the significance of effects under each alternative on salmon stocks was whether or not salmon minimum escapement needs would reasonably be expected to be met. If the alternative was reasonably not expected 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; and where insufficient information exists to make such conclusions, the alternative's effects were rated unknown.

The benchmark used to determine the significance of effects under each alternative on herring stocks was whether minimum spawning biomass threshold levels could be reasonably expected to be met. If the alternative was reasonably not expected 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; and where insufficient information exists to make such conclusions the alternative's effects were rated unknown.

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 reasonably be expected to lower the total constant exploitation yield (CEY) of the halibut stock below the long term estimated yield of 26,980 mt for the U.S. and Canada. If the alternative was reasonably not expected to decrease the total CEY of the halibut stock below the long term estimated yield of 26,980 mt 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 26,980 mt it was rated significantly adverse, and where insufficient information exists to make such conclusions the alternative's effects were rated unknown.

The benchmark used to determine the significance of effects under each alternative on crab stocks was whether minimum stock size threshold (MSST) levels would reasonably be expected to be maintained. If the alternative was reasonably not expected 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, and where insufficient information exists to make such conclusions the alternative's effects were rated unknown.

**Table 4.1-6 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
Incidental catch of prohibited species	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

Benchmarks: Salmon - minimum escapement goals, Pacific halibut - estimated long term CEY level, Pacific herring - minimum spawning biomass threshold, crab - minimum stock size threshold.

**Table 4.1-7 Criteria used to estimate the significance of effects on of harvest levels in state managed directed fisheries targeting stocks of prohibited species in the BSAI and GOA**

Effect	Significant Adverse	Insignificant	Significant Beneficial	Unknown
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

**Table 4.1-8 Criteria used to estimate the significance of effects on bycatch levels of prohibited species in directed groundfish fisheries in the BSAI and GOA**

Effect	Significantly Adverse	Insignificant	Significant Beneficial	Unknown
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

### *Effects on Steller Sea Lions*

Because the Steller sea lion is endangered and groundfish fisheries in the Aleutian Islands are currently subject to a set of protection measures established to avoid jeopardy and adverse modification in its critical habitat of this species, the Steller sea lion will be addressed separately from other marine mammals (below).

Currently, the Steller sea lion population in Alaska is divided into two distinct population segments (DPS), the eastern and the western. The western DPS of Steller sea lion inhabits Alaska's marine waters from approximately the Prince William Sound region westward to the end of the Aleutian Islands. Thus the "stock" or DPS referenced in this document is the wSSL but will be referred to as SSL. Direct and indirect interactions between Steller sea lions and groundfish harvest may occur due to overlap in the size and species of groundfish harvested in the fisheries that are also important SSL prey, and due to temporal and spatial overlap in SSL foraging and commercial fishing activities.

Impacts of the proposed AI pollock fishery are analyzed by addressing four core questions modified from Lowry (1982):

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

The reference point for determining significant impact to Steller sea lions is predicting whether the proposed action will impact the current population trajectory of the SSL. Criteria for determining significance are provided below (Table 4.1-9).

**Table 4.1-9 Criteria for determining significance of effects to Steller sea lions**

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 prey species	More temporal and spatial concentration in key areas	Spatial concentration of fishery as modified by SSL Protection Measures	Much less temporal and spatial concentration of fishery in all key areas	Insufficient information as to what constitutes a key area
Harvest of prey species	Harvest level exceeds 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 (more interaction)	Similar level of disturbance as that which was occurring in 2001	Much less disturbance by groundfish fishery	Insufficient information as to what constitutes disturbance

*Effects on Other Marine Mammals*

The other marine mammal group includes northern fur seals, ESA-listed cetaceans (North Pacific right, blue, fin, sei, humpback, sperm, and bowhead whales), other cetaceans (gray, minke, beluga, and killer whale; Pacific white-sided dolphin; harbor and Dall’s porpoise; and Baird’s, Cuvier’s, and Stejneger’s beaked whale), harbor seals, other pinnipeds (spotted, northern fur, bearded, ringed, and ribbon seals; Pacific walrus; and northern elephant seal), and sea otters. Several species of marine mammals that reportedly occur in the North Pacific (Springer et al. 1999) are poorly known, and thus are not specifically addressed in this document. These are the Bryde’s whale; short-finned pilot whale; false killer whale; and Risso’s, bottlenose, striped, common, and northern right whale dolphins. The California sea lion is not likely present in the Aleutian Islands. The polar bear also is not likely present, even when the seasonal ice cover extends to the Aleutian Islands. These latter two species also are not addressed in this document.

Direct and indirect interactions between marine mammals and groundfish harvest 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 proposed action are analyzed by addressing four core questions modified from Lowry (1982):

1. Does the proposed action result in increases in direct interactions with marine mammals (incidental take and entanglement in marine debris)?
2. Does the proposed action remove prey species at levels that could compromise foraging success of marine mammals (harvest of prey species)?

3. Does the proposed action 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. Does the proposed action 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 action will impact the current population trajectory of any marine mammal species. Significance ratings for each question are provided below (Table 4.1-10).

**Table 4.1-10 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	Spatial concentration of fishery as modified by SSL Protection Measures	Much less temporal and spatial concentration of fishery in all key areas	Insufficient information as to what constitutes a key area
Global harvest of prey species	Harvest level exceeds 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	Similar level of disturbance as that which was occurring in 2001	Much less disturbance by groundfish fishery	Insufficient information as to what constitutes disturbance

### *Effects on Seabirds*

Given the sparse information, it is not likely that groundfish fishery effects on most individual bird species are discernable. 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) abundance and availability, benthic habitat, processing waste and offal.

ESA 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 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. Because this action falls within the OY specified for the BSAI, no population level effects beyond those already identified for ESA listed seabirds are anticipated and therefore ESA consultation on seabirds is not necessary.

The effects of incidental take of seabirds (from fishing gear and vessel strikes) are described in Section 3.7.1 of the Draft Programmatic SEIS (NMFS 2003b). 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 of the PSEIS). 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. 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.

As noted in Section 3.7.1 of the Draft PSEIS (NMFS 2003b), 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 haul time in the trawl fleet) each year (NMFS 2003b). In the longline fleet, new regulations became effective in February 2004 (69 *FR* 1930; 1-13-04). 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, largely due to bycatch reduction measures used by longline fisheries (outlined on pages 3.7-7 through 3.7-10 of the draft programmatic SEIS (NMFS 2003b)). 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, USFWS, 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.

A description of the effects of prey abundance and availability on seabirds is in Section 3.7.1 of the Draft PSEIS (NMFS 2003b). 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 2003b; 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 fishery effects on benthic habitat are described in Section 3.6.4 of the Draft PSEIS (NMFS 2003b). 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. in the PSEIS) (NMFS 2003b). 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). Additional impacts from bottom trawling may occur if sand lance habitat is adversely impacted. This would affect a wider array of piscivorous seabirds that utilize sand lance, particularly during the breeding season, when this forage fish is also used for feeding chicks. Bottom trawl gear has the greatest potential to indirectly affect seabirds via their habitat. The harvest of pollock in the AI will be restricted to pelagic trawl gear which will have less effect on the benthos than bottom trawl gear.

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. Should the use of seabird avoidance gear prove effective over time, the negative aspects of seabird attraction to vessels will be reduced. The amount of TAC levels could affect 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 any disposal actions.

Table 4.1-11 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 4.1-11 Criteria used to determine significance of effects on seabirds.**

Effects	Rating		
	Significant	Insignificant	Unknown
Incidental take	Take number and/or rate increases or decreases substantially	Take number and/or rate is the same.	Take number and/or rate is not known.
Prey (forage fish) availability	Prey availability is substantially reduced or increased	Prey availability is the same.	Changes to prey availability are not known.
Benthic habitat	Impact to benthic habitat is substantially increased or decreased	Impact to benthic habitat is the same.	Impact to benthic habitat is not known.
Processing waste and offal	Availability of processing wastes is substantially decreased or increased	Availability of processing wastes is the same.	Changes in availability of processing wastes is not known.

*Effects on Habitat*

The Draft 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, against which the criteria are applied is the current size and quality of marine benthic habitat and other essential fish habitat. Criteria used to evaluate effects of the proposed action on habitat are provided in Table 4.1-12.

**Table 4.1-12 Criteria used to determine significance of effects on habitat**

Effect	Significant	Insignificant	Beneficial	Unknown
Mortality and damage to living habitat species	Substantial increase in mortality and damage; long-term irreversible impacts to long-lived, slow growing species	Likely to not increase mortality or damage to long-lived, slow growing species	Decrease in mortality or damage to long-lived, slow growing species	Insufficient information available
Benthic community structure	Substantial decrease in community structure from baseline	Likely to not decrease community structure	Increase in community structure from baseline	Insufficient information available on baseline habitat
Distribution of fishing effort	Substantial increase in fishing activity in habitats lightly or not fished	Likely to be similar to baseline conditions of lightly- or not-fished state	Decrease in fishing activity in areas that have been lightly or not fished	Not applicable

*Effects on the Ecosystem*

The proposed action could affect the marine ecosystem through removals of pollock biomass or other actions that could affect either removals, discards, or discharge of processing materials such that this marine system is altered. Three primary means of measurement of ecosystem change are evaluated here: predator-prey relationships, energy flow and balance, and ecosystem diversity. The criteria used to evaluate the significance of the effects on the ecosystem from the proposed action are provided in Table 4.1-13.

**Table 4.1-13 Significance thresholds for fishery induced effects on ecosystem attributes.**

<b>Issue</b>	<b>Effect</b>	<b>Significance Threshold</b>	<b>Indicators</b>
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, nonresource 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 re-direction	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)
Ecosystem 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*

*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 criteria used in estimating the effects are outlined below in Table 4.1-14. 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. The authors felt that a change of 50% or more in either direction was clearly a significant change and that a change of less than 50% in either direction was clearly insignificant as stocks of groundfish frequently change over the short term within this range. The authors acknowledge that 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% level. The year 2003 was used as a benchmark for comparison.

The significance criteria used for the analysis in this section to determine changes to harvest levels in state-managed and parallel fisheries can be reviewed in Table 4.1-14. An action is considered to have significant effects if it is likely to change harvest levels in these fisheries by at least 50%.

**Table 4.1-14 Criteria used to estimate the significance of effects on harvest levels in state managed groundfish fisheries in the BSAI and GOA.**

<b>Effect</b>	<b>Significant Adverse</b>	<b>Insignificant</b>	<b>Significant Beneficial</b>	<b>Unknown</b>
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

*Economic and Socio-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, 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 4.1-15.

**Table 4.1-15 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 judgement 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.	
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 directed regulated fishery should be considered, as well as impacts in related fisheries (for example, will restrictions or rationalization in one fishery lead to increased capacity in a second fishery). In the absence of behavioral models, this discussion will generally be qualitative.	
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