ERRATA SHEET

ENVIRONMENTAL ASSESSMENT,
REGULATORY IMPACT REVIEW, AND
REGULATORY FLEXIBILITY ANALYSIS

for Amendments 65/65/12/7/8 to the
BSAI Groundfish FMP (#65), GOA Groundfish FMP (#65),
BSAI Crab FMP (#12), Scallop FMP (#7), and Salmon FMP (#8)
and Regulatory Amendments to Provide Habitat Areas of Particular Concern

April 2006

Note to Reviewers:

The Environmental Assessment / Regulatory Impact Review / Regulatory Flexibility Analysis (EA/RIR/RFA) for Amendments 65/65/12/7/8 incorrectly identifies the preferred alternative for Action 2 in the Executive Summary (page xiii) and in section 5.0 (page 120). As noted in section 6.8.1 "Council Final Action" (page 239), the North Pacific Fishery Management Council chose Alternative 3 as the preferred alternative for each of the three actions in the EA/RIR/RFA. Specifically for Action 2, the Council chose Alternative 3 Option 1. The language on pages xiii and 120 indicating that the Council also endorsed Alternative 2 Option 2 is erroneous.

At the same February 2005 meeting at which the Council picked its preferred alternative for Habitat Areas of Particular Concern, it also picked preferred alternatives for the *Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska* (EFH EIS). In that action on the EFH EIS, the Council approved a closure to bottom trawling in the same three sites along the Gulf of Alaska continental slope that are referenced in Action 2 Alternative 2 Option 2 of the EA/RIR/RFA. When the Council then took up the Habitat Areas of Particular Concern action, its approval of bottom trawl closures under Action 2 Alternative 2 Option 2 was moot because of the prior action under the EFH EIS. In other words, the three Gulf of Alaska slope areas will be closed to bottom trawling via a separate action rather than under Amendments 65/65/12/7/8.

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and regulatory amendments to provide Habitat Areas of Particular Concern**

April 2006

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Abstract: This Environmental Assessment, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis evaluates alternatives to designate and conserve Habitat Areas of Particular Concern. Habitat Areas of Particular Concern (HAPC) are site-specific areas of Essential Fish Habitat (EFH) of managed species. Identification of HAPCs provides focus for additional conservation efforts for those habitat sites that are ecologically important, sensitive to disturbance, exposed to development activities, or rare. This Environmental Assessment (EA) evaluates alternatives for designating HAPC sites in the Gulf of Alaska (GOA) and the Aleutian Islands (AI) and implementing associated fisheries management measures to provide additional conservation of specified HAPC areas.

Three separate actions are considered in this EA: (1) HAPC designation and conservation of seamounts, (2) HAPC designation and conservation of hard coral areas in the GOA, and (3) HAPC designation and conservation of hard coral areas in the Aleutian Islands.

Table of Contents

LIST OF FIGURES

LIST OF TABLES

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Executive Summary

Habitat Areas of Particular Concern (HAPC) are site-specific areas of Essential Fish Habitat (EFH) of managed species. Identification of HAPCs provides focus for additional conservation efforts for those habitat sites that are ecologically important, sensitive to disturbance, exposed to development activities, or rare. This Environmental Assessment (EA) evaluates alternatives for designating HAPC sites in the Gulf of Alaska (GOA) and the Aleutian Islands (AI) and implementing associated fisheries management measures to provide additional conservation of specified HAPC areas.

Three separate actions are considered in this EA: (1) HAPC designation and conservation of seamounts, (2) HAPC designation and conservation of hard coral areas in the GOA, and (3) HAPC designation and conservation of hard coral areas in the Aleutian Islands. Several alternatives are considered for each action, as summarized below.

Action 1: Seamounts

Alternative 1: No action.

Alternative 2: Designate five named seamounts in the EEZ (Dickens, Giacomini, Patton, Quinn, and Welker) as HAPC and prohibit all bottom contact fishing by Council-managed fisheries on these seamounts.

Alternative 3: Designate 16 named seamounts in the EEZ off Alaska as HAPC and prohibit all bottom contact fishing by Council-managed fisheries on these seamounts. *The Council's preferred alternative*.

Action 2: GOA Corals

Alternative 1: No action.

Alternative 2: Designate three sites along the continental slope (in the vicinity of Sanak Island, Albatross, and Middleton Island) as HAPC and prohibit bottom trawling or all bottom contact mobile gear (BCMG) within these areas for five years.

> Option 1: Close the sites to pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contact the bottom (including dinglebar gear) for 5 years. During the 5 years, these sites would be prioritized for undersea mapping. Areas with high-relief coral would stay closed to the specified gears and the remaining areas would be reopened.
>
> Option 2: Close the sites to bottom trawling for 5 years. During the five years, these sites would be prioritized for undersea mapping. Areas with high-relief coral would stay closed to bottom trawling and the remaining areas would be reopened. *The Council's preferred alternative.*

Alternative 3: Designate three areas in Southeast Alaska (in the vicinity of Cape Ommaney, Fairweather grounds NW, and Fairweather grounds SW) as HAPC and prohibit bottom contact gear or bottom trawl gear in several subareas within the HAPC designated areas.

> Option 1: Prohibit all Council-Managed bottom-contact gear within five smaller areas inside these HAPCs. *The Council's preferred alternative.*

Option 2: Prohibit bottom trawl gear within five areas inside the HAPCs, while designating the remainder of each of the three HAPCs in this alternative as priority areas for hook and line gear impact research.

Alternative 4: Implementation of Alternative 2, options 1 and 2, and Alternative 3.

Action 3: AI Corals

Alternative 1: No action.

Alternative 2: Designate the six coral garden sites within the Aleutian Islands as HAPC. These areas are in the vicinity of Adak Canyon, Cape Moffett, Bobrof Island, Semisopochnoi Island, Great Sitkin and Ulak Island. Bottom contact gear would be prohibited in several subareas within the HAPC designated areas.

Alternative 3: Designate an area of Bowers Ridge as HAPC prohibit mobile fishing gear that contacts the bottom. *The Council's preferred alternative*

Alternative 4: Designate four sites in the Aleutian Islands (in the vicinity of South Amlia/Atka Islands, Kanaga volcano, Kanaga Island, and Tanaga Islands) as HAPC and prohibit bottom trawling or all bottom contact mobile gear within these areas for five years.

Option 1: Close the sites to pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contacts the bottom (including dinglebar gear) for 5 years. The sites would be prioritized for undersea mapping. Areas with high relief coral would stay closed to the specified gears and the remaining areas would be reopened.

Option 2: Close the sites to bottom trawling for 5 years. During the 5 years, these sites would be prioritized for undersea mapping. Areas with high-relief corals would stay closed to bottom trawling and the remaining areas would be reopened.

Alternative 5: Implementation of Alternatives 2 and 3, and Alternative 4, options 1 and 2.

Although the biological and socioeconomic effects differed among the alternatives for each action, the analysis indicated no significant impacts of any of the alternatives. In general, additional areas designated for HAPC and associated management measures may provide positive habitat conservation benefits, with some added costs in the way of potential forgone revenue to fisheries (potential for lost catch, along with added operational costs to catch the fish in remaining open areas). The areas proposed as HAPC are, for the most part, small relative to the overall area available for fishing.

The alternatives to designate seamounts as HAPC and restrict fishing activities on the seamounts were proposed as precautionary measures. Very little fishing currently occurs on the seamounts. Submersible observations have shown some seamounts to be distinctive in bottom type living substrates. The biological and ecosystem effects provided by the alternatives remain unknown or insignificant relative to the status quo. However, as a precautionary measure, seamount protection provides positive benefits by eliminating effects of fisheries on potentially endemic (local and self-recruiting) populations of fish on these seamounts.

The proposed HAPC areas designed to further conserve hard corals in the GOA may have positive local effects. For Alternative 2, the distribution of corals along the slope remains unobserved, so it is difficult to ascertain if effort redistribution from these areas would occur in areas with more or less habitat complexity. For Alternative 3, direct submersible observations and side scan sonar indicate higher aggregations within the designated HAPC areas than nearby outside areas, so effort redistribution away from these areas may have positive effects on habitat complexity. The effect on the fisheries of any of these alternatives would be small (<1%, except for the deepwater flatfish fishery under Alternative 2) relative to the overall fisheries in the GOA area.

Alternatives to designate HAPC areas in the Aleutian Islands and to adopt associated management measures may differ in effects. Alternative 2 would provide benefits to corals, but at some cost to the fisheries, particularly the brown crab fishery and the Petrel Bank red king crab fishery. Because Bowers Ridge has had very little fishing effort in recent years, Alternative 3 may have minimal short-term impacts on the fleet. Alternative 4 sites, offered by fishing skippers as sites containing high relief coral areas, may also have small short-term impacts on the fleet. Except for the six coral garden sites proposed under Alternative 2, no submersible observations have been made in the areas described by the alternatives. Thus, it is difficult to understand the overall ecological effects of effort redistribution. Although research is lacking, some positive effects on habitat biodiversity is likely to accrue by moving fishing effort away from areas that are thought to have corals and by allowing effort to concentrate more on areas with faster recovery times.

1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

Management of the federal fisheries located off Alaska in the 3- to 200-nautical mile (nm) U.S. Exclusive Economic Zone (EEZ) is conducted under five federal fishery management plans (FMPs) approved by the Secretary of Commerce and the Protocol Amending the Convention Between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (EBS). The FMPs include *The Fishery Management Plan for the Groundfish Fishery of the Bering Sea/Aleutian Islands Area* (North Pacific Fishery Management Council [Council] 2000a) (Bering Sea/Aleutian Islands [BSAI] Groundfish FMP), *The Fishery Management Plan for Groundfish of the GOA* (Council 2000b) *(GOA [GOA] Groundfish FMP), The Fishery Management Plan for Bering Sea/Aleutian Islands Commercial King and Tanner Crabs* (Council 1998b) (BSAI Crab FMP), *The Fishery Management Plan for the Scallop Fishery off Alaska* (Council 1996) (Scallop FMP), and *The Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska* (Council 1990) (Salmon FMP).

These FMPs and their amendments were developed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and other applicable federal laws and executive orders (EOs). These FMPs were prepared by the North Pacific Fishery Management Council (Council) for approval and implementation by the Secretary of Commerce (Secretary) through the National Marine Fisheries Service (NMFS).

The 1996 amendments to the Magnuson-Stevens Act require NMFS and regional Fishery Management Councils (Councils) to describe and identify essential fish habitat (EFH) within FMPs based on guidelines established by the Secretary, minimize to the extent practicable adverse effects on EFH caused by fishing, and identify other actions to encourage the conservation and enhancement of EFH. EFH is defined in the Magnuson-Stevens Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

The regulations at 50 CFR 600.815(a)(8) provide guidance to Councils in identifying habitat areas of particular concern (HAPCs). HAPCs are areas within EFH that are of particular ecological importance to the long-term sustainability of managed species, are of a rare type, or are especially susceptible to degradation or development. HAPCs are meant to provide for greater focus of conservation and management efforts.

NMFS and the Council published a Draft Environmental Impact Statement (EIS) for EFH in January 2004. The Draft EIS evaluates three actions: describe and identify EFH, adopt an approach to identify HAPCs, and minimize to the extent practicable the adverse effects of fishing on EFH. The Council's preliminary preferred alternative for HAPCs is to adopt a site-based approach for future HAPC designations. The Council took final action on the EFH EIS in February 2005.

This Environmental Assessment (EA) evaluates alternatives for designating HAPC sites in the GOA (GOA) and the Aleutian Islands (AI) and adopting associated fisheries management measures. The HAPC identification process consisted of establishing criteria and priorities, issuing a call for proposals, using a proposal screening process, conducting scientific review, initiating a public review process, and completing the analyses contained in this document. Section 2.2 discusses background and alternative formulation and the Council HAPC process in detail.

1.2 Purpose and Need for Action

1.2.1 Problem Statement

Habitat Areas of Particular Concern (HAPC) are site-specific areas of Essential Fish Habitat (EFH) of managed species. Identification of HAPCs provides focus for additional conservation efforts for those habitat sites that are ecologically important, sensitive to disturbance, exposed to development activities, or rare. Based on these considerations, the Council has directed that each HAPC site should meet at least two of these criteria, with one being rarity.

The Council has set the priorities of seamounts and undisturbed coral beds outside of core fishing areas important as rockfish or other species habitat as priority sites for identification as HAPC and for additional conservation measures. Seamounts may have unique ecosystems, may contain endemic species, and may thus be sensitive to disturbance. Some deep-sea coral sites may provide important habitat for rockfish and other species and may be particularly sensitive to some fishing activities. The Council intends to evaluate alternatives to designate HAPC sites and take action, where practicable, to conserve these habitats from adverse effects of fishing.

The Council recognizes that Essential Fish Habitat (EFH) designations are necessarily broad in scope because of the limited available scientific information about the habitat requirements of managed species. The Council further recognizes that specific habitat areas within EFH may warrant additional management. HAPC identification provides a way to call attention to such habitats and to focus conservation and enhancement priorities within EFH.

1.2.2 Purpose of Action

The purpose of this action is to determine whether and how to amend the Council's FMPs to identify and manage site-specific HAPCs. HAPCs identified as a result of this EA would provide additional habitat protection and further minimize potential adverse effects of fishing on EFH. The HAPCs are subsets of EFH that are particularly important to the long-term productivity of one or more managed species, or that are particularly vulnerable to degradation. HAPCs may be identified based on one or more of four considerations listed in the EFH regulations: ecological importance, sensitivity, stress from development activities, and rarity of the habitat type. The Council required that each HAPC site should meet at least two of those considerations, with one being rarity.

1.2.3 Need for Action

In Section 2 of the Magnuson-Stevens Act, Congress recognized that one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Congress adopted specific requirements for fishery management plans (FMPs) to identify EFH and minimize to the extent practicable any adverse effects of fishing on EFH. In the regulations implementing the EFH provisions of the Magnuson-Stevens Act, NMFS encourages Councils to identify types or areas of habitat within EFH as HAPCs (50 CFR 600.815(a)(8)). HAPCs provide a mechanism to acknowledge areas where more is known about the ecological function and/or vulnerability of EFH and to highlight priority areas within EFH for conservation and management.

HAPCs and associated management measures considered by the Council would provide additional habitat protection and further minimize potential adverse effects of fishing on EFH. Such actions are consistent with the EFH EIS because they address potential impacts that are discussed in the EIS, even though the EIS indicates that new management measures may not be required under the Magnuson-Stevens Act to reduce those impacts. In effect, through its evaluation of HAPCs, the Council is considering new precautionary measures.

The need for this action also stems from a May 2003 joint stipulation and order approved by the U.S. District Court for the District of Columbia. That agreement reflected the Council's commitment to consider new HAPCs as part of the response to the AOC v. Daley litigation that challenged whether Council FMPs minimize to the extent practicable the adverse effects of fishing on EFH. Under the agreement, final regulations implementing any new HAPC designations and any associated management measures must be promulgated no later than August 13, 2006.

1.3 Decisions to Be Made and Proposed Schedule

Based on the analyses in this EA, the Council and NMFS will decide which, if any, new HAPCs and associated management measures to adopt for federally managed fisheries in Alaska. If the Council identifies HAPCs that include state waters, the Council will relay its concerns to the Alaska Board of Fisheries to suggest appropriate protection of HAPCs under state jurisdiction. The Council took final action in February 2005. Any resulting HAPC regulations would need to be effective by August 13, 2006 to comply with the joint stipulation and order referenced above.

1.4 Organization of the EA

This Environmental Assessment evaluates 3 actions: HAPCs for seamounts in the EEZ, HAPCs for GOA corals, and HAPCs for AI corals. Each action includes a range of alternatives. Chapter 2 describes these actions and alternatives in detail with maps, background and development information, and a discussion of alternatives not included in this analysis. Chapter 3 describes the affected environment and habitat at the proposed HAPC sites, as well as the regulatory environment for these actions. In Chapter 4, the alternatives for each action are evaluated as to their effects on the environment, including economic and socioeconomic effects. The environmental analysis conclusions are in chapter 5. Chapters 6 and 7 include the RIR/IRFA. Contributing authors are listed in Chapter 8, and references in Chapter 8.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 NEPA Guidance for Alternatives

The Council on Environmental Quality regulations for implementing the procedural provision of NEPA requires that the agency preparing the analysis must consider all reasonable alternatives in addition to the proposed management actions.

2.2 Background and Alternative Formulation

This section provides the background information and history of HAPC to better understand the development and formulation of alternatives examined in this analysis.

2.2.1 Relationship to the Environmental Impact Statement for Essential Fish Habitat

Identification of HAPC is not required by statute or regulatory guidelines. The regulations simply state the following: "FMPs should identify specific types or areas of habitat within EFH as HAPC based on one or more of the following considerations:

i) The importance of the ecological function provided by the habitat.
ii) The extent to which the habitat is sensitive to human-induced environmental degradation.
iii) Whether, and to what extent, development activities are, or will be stressing the habitat type.
iv) The rarity of the habitat."

The draft EFH EIS acknowledged long-term effects of fishing on benthic habitat features off Alaska. Additionally, it concluded that considerable scientific uncertainty remains regarding the consequences of such habitat changes for managed species. Nevertheless, the analysis concludes that the effects on EFH are minimal because scientists have no indication that continued fishing at the current rate and intensity would alter the capacity of EFH to support healthy populations of managed species over the long term. The EIS therefore finds that no Council-managed fishing activities have more than minimal and temporary adverse effects on EFH and, as such, do not meet the regulatory standard requiring action to minimize effects under the Magnuson-Stevens Act. However, the EIS notes that a variety of management actions could be taken to provide additional habitat protection.

The Council is taking a precautionary approach to habitat conservation by addressing HAPCs on a 5-year cycle (further details are provided within the draft EFH EIS Appendix J [NMFS 2004]). The initial cycle focuses on deep sea corals and seamount habitats. HAPC designation and the adoption of associated management measures would provide additional habitat protection and further minimize potential adverse effects of fishing on EFH. Such actions are consistent with the EFH EIS because they address potential impacts that are discussed in the EIS, even though the EIS indicates new management measures to reduce those impacts may not be required under the Magnuson-Stevens Act. The measures being considered by the Council would take a precautionary approach to protecting HAPCs.

2.2.2 Overview of Previous Actions to Identify HAPCs

The Magnuson-Stevens Act (MSA) was amended in 1996 by the Sustainable Fisheries Act (SFA). The amended MSA mandated that any FMP must include a provision to describe and identify essential fish habitat (EFH) for the fishery, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat. Essential fish habitat has been broadly defined by the SFA to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". All eight regional Councils were required to amend their fishery management plans by October 1998 to:

i) identify and describe EFH for species managed under a fishery management plan;
ii) describe adverse impacts to that habitat from fishing activities and non-fishing activities;
iii) recommend conservation and enhancement measures necessary to help minimize impacts, protect, and restore that habitat; and
iv) include conservation and enhancement measures necessary to minimize to the extent practicable, adverse impacts from fishing on EFH.

2.2.2.1 Existing HAPC Designations in EFH FMP Amendments 55/55/8/5/5

The Interim Final Rule providing guidance on EFH (62 FR 66531 Dec. 19, 1998) directed that FMPs should identify Habitat Areas of Particular Concern (HAPC), which are ecologically important areas or types of habitat that may require special protection because of their vulnerability to degradation or their rarity. HAPCs identified by the NMFS regional office in Alaska include living substrata in both shallow and deep water. A summary of these habitat types is provided below.

Living Substrates in Shallow Waters

Habitat areas of particular concern include nearshore areas of intertidal and submerged vegetation, rock, and other substrates. These areas provide food and rearing habitat for juvenile groundfish and spawning areas for some species (e.g., Atka mackerel, yellowfin sole), and may have a high potential to be affected by shore-based activities.

Shallow inshore areas (less than 50 m depth) are important to king crab reproduction. After molting through four larval stages, king crab larvae develop into young crabs that settle in the benthic environment in nearshore shallow areas with significant cover, particularly those with living substrates (macroalgae, tube building polychaete worms, kelp, mussels, and erect bryozoans). The area north and adjacent to the Alaska peninsula (Unimak Island to Port Moller) and the eastern portion of Bristol Bay are known to be particularly important for rearing juvenile king crab.

All nearshore marine and estuarine habitats used by Pacific salmon, such as eel grass beds, submerged aquatic vegetation, emergent vegetated wetlands, and certain intertidal zones, are sensitive to natural or human-induced environmental degradation, especially in urban areas and areas adjacent to intensive human-induced developmental activities. Many of these areas are unique and rare. The coastal zone provides limited estuarine and intertidal habitat for salmon and is under the most intense development pressure.

Herring also require shallow water living substrates for reproduction. Spawning takes place near the shoreline between the high tide level and 11 meters. Herring deposit their eggs on vegetation, primarily rockweed (*Fucus* sp.) and eelgrass (*Zostera* sp.). These "seaweeds" are found along much of the Alaska coastline, but they often occur in discrete patches.

Living Substrates in Deep Waters

Habitat areas of particular concern include offshore areas with substrates of high-micro habitat diversity, which serve as cover for groundfish and other organisms. These can be areas with rich epifaunal communities (e.g., coral, anemones, bryozoans, etc.), or with large particle size (e.g., boulders, cobble). Complex habitat structures are considered most sensitive to impact by fishing activities (see EFH analysis, NPFMC 1999).

Coral habitat has been classified in the EFH amendments as HAPC. Corals are generally considered to be very slow growing organisms. Although scientists have limited understanding of deep water coral's importance to fish habitat, coral habitat is likely very sensitive to human-induced environmental degradation from both fishing and non-fishing activity. Scientists do not know how much coral habitat exists off the coast of Alaska, but it is likely to be rare relative to other habitat types. Trawl survey data, observed fisheries bycatch, and *in situ* observations with a submersible indicate that the Aleutian Islands may harbor the highest abundance and diversity of cold water corals in the world (Heifetz, 2002). In the GOA, NMFS trawl surveys have indicated high concentrations in the immediate vicinity of Dixon Entrance, Cape Ommaney, and Alsek Valley (Draft EA/RIR for Amendment 29 to the GOA Groundfish FMP, September 1992). NMFS surveys have taken red tree coral in very deep areas (125-210 fathoms) and sea raspberries in shallower areas (70-110 fathoms).

Information on coral distribution in Alaska has been summarized in two reports. The first, "Habitat Requirements and Expected Distribution of Alaska Coral" (Cimberg et al., 1981), was written in the context of potential impacts of oil and gas exploration and development. The second, "Coral in Alaska: distribution, abundance, and species associations" (Heifetz, 2002), updates the earlier report and augments the information by using NMFS trawl survey data to document distribution abundance and the association of corals with commercially valuable fish species.

Thirty-four species of coral are found off Alaska, including several species of deepwater coral found off Alaska representing five major taxonomic groups (Cimberg et al., 1981). Soft corals, primarily *Gersemia Sp.* (sea raspberry), are most frequently encountered in the Bering Sea; Gorgonian corals primarily in the genera *Callogoria*, *Primnoa*, *Paragorgia*, *Thouarella*, and *Anthrogorgia* are the most common in the Aleutian Islands; and gorgonian corals, primarily in the genera *Callogorgia* and *Primnoa*, and cup corals, primarily *Scleractin,* occur most frequently in the GOA (Heifetz, 2002).

The large number of coral species found in Alaskan waters is probably due to the variety of habitats in terms of depth, substrate, temperature, and currents. *Primnoa*, or red tree corals, are more abundant in southeast Alaska than in any other region. The habitat provided by gorgonians can be occupied by communities with high biodiversity and can provide shelter for fish (Risk et al., 1988). Given their size and longevity, gorgonian corals may also be most vulnerable to fishing impacts (Heifetz, 2002). Other species of corals have been observed including hydro corals, cup corals, and soft corals. The frequency of occurrences increases toward the ocean entrances and further away from the fjords. This trend is likely due to swifter currents near the entrances and/or greater turbidity and lower salinities in the fjords. Areas of highest densities are found in regions where currents are 3 to 4 knots (Cimberg et al., 1981).

Distributional records were also analyzed for the depths at which Coral occur. Corals have been recorded in 13% of bottom survey trawls since 1975 (Heifetz, 2002). Out of all corals recorded by these bottom survey trawls, soft corals occurred most frequently (72.5%), followed by gorgonian corals (18.7%), cup corals (10.3%), hydrocorals (5.9%), and unidentified corals (4.8%) (Heifetz, 2002). Red tree corals have been reported at depths from 10 to 800 m. The lower depth limit varied in different regions of Alaska, increasing along a geographic gradient from the Aleutians to southeast Alaska. The lower depth limit of these corals in each area corresponds with a mean spring temperature of 3.7°C. The report indicates that in southeast Alaska the lower depth limit exhibited north of 57° latitude differs from the lower depth limit south of that line (roughly running through Sitka). The data from the report indicate that, in the area of southeast Alaska north of 57°, red tree corals are predominately found between 50 and 150 meters in depth. Significant occurrences continue to exist from 150 to 250 m, and taper off rapidly beyond 250 m. South of the 57° line, occur over a broader depth range with equal occurrences from 50 to 450 m. Other species of sea fans may be found deeper than *Primnoa*, at depths up to 2,000 m (Cimberg et al., 1981).

Bamboo corals also occur in the waters of both the inside passages of southeast Alaska and in the southeast GOA. These corals have a lower temperature tolerance, about 3.0°C, and exist in depths from 300–3,500 m. These corals are also expected to exist in a rocky, stable substrate and have a low tolerance for sediments (Cimberg et al., 1981).

The depth distribution of soft corals is, like the red tree corals, expected to range from 10-800 m, though they may exist on a much wider range of substrates. Hydrocorals, also occurring in southeast Alaska, have a depth range of 700-950 m, though they may occur at shallower depths in southeast Alaska than in the more northern, colder waters (Cimberg et al., 1981).

Recolonization of tropical coral communities requires at least several decades to recover from major perturbations (Cimberg et al., 1981). Alaskan corals would likely take much longer to recolonize following similar disturbances. For example, given a predicted growth rate of 1 cm/year for *Primnoa*, a colony 1 m high would require at least 100 years to return to the condition it was in before a major disturbance (Cimberg et al., 1981).

Freshwater Areas Used by Anadromous Fish

Habitat Areas of Particular Concern also include all anadromous streams, lakes, and other freshwater areas used by Pacific salmon and other anadromous fish (such as smelt), especially in urban areas and in other areas adjacent to intensive human-induced developmental activities.

2.2.2.2 Proposed HAPC Identification in 1999

In February 2000, the Council reviewed the first draft analysis for management measures that would identify additional HAPC as types and areas, and take additional measures to protect HAPC from potential effects caused by fishing activities. Alternative management actions that were considered included making HAPC biota (e.g., mussels, kelp, sponges) a prohibited species, and prohibiting bottom fishing in areas shown to have concentrations of Gorgonian coral, which have been shown to be long lived (500 yrs), vulnerable to fishing gear, and important habitat for rockfish. Based on public testimony, and input from its advisory committees, the Council voted to split the amendment and associated analysis into two parts. Part one final action in April 2000, would have prohibited commercial harvest and sale of HAPC biota, specifically sponges and coral. Part two of the HAPC amendments, which requires a longer time line, would develop a more comprehensive and iterative process for HAPC identification and habitat protection involving researchers, stakeholders, and management agencies.

The analysis for Amendment 65 -Part one of the HAPC identification action to prohibit the commercial harvest and sale of HAPC biota, was not implemented through the agency. The prohibition of sale or barter of HAPC biota would have pertained only to vessels carrying federal permits fishing in federal waters. Most of the biota is within state waters, and the proposed action would not have accomplished the stated goals. The Council requested state cooperation to prohibit any new fishery on HAPC biota developing in order to effectively achieve the objective of preventing a commercial fishery from developing for corals and sponges. The state completed this action in 2002.

2.2.2.2.1 Approach for Identifying HAPCs per the EFH EIS

In June 1998, the North Pacific Fishery Management Council (Council) identified several habitat types as HAPCs within essential fish habitat (EFH) amendments 55/55/8/5/5. Habitat types, rather than specific areas, were identified as HAPCs because little information was available regarding specific habitat locations. These HAPC types included the following:

1. Areas with living substrates in shallow waters (e.g., eelgrass, kelp, and mussel beds)

2. Areas with living substrates in deep waters (e.g., sponges, coral, and anemones)
3. Freshwater areas used by anadromous fish (e.g., migration, spawning, and rearing areas)

In April 2001, the Council formed the EFH Committee to facilitate industry, conservation community, Council, and general public input into the EFH EIS process. The committee worked cooperatively with Council staff and the National Marine Fisheries Service (NMFS) to identify alternative HAPC criteria, as well as approaches that could be used to designate and manage HAPC areas. The Committee aided in formulating the HAPC designation alternatives referred to in Chapter 2 of the EFH EIS and developed recommendations for a HAPC process. A joint stipulation and court order in the *AOC v. Daley* case mandated that NMFS work with the Council to develop a process for the evaluation and possible designation of HAPCs and the implementation of any associated measures.

In October 2003, the Council chose the site-based approach as its preliminary preferred alternative in the EFH EIS for a HAPC identification and review process. Council also identified priority areas and habitats for the first round of proposals as discussed next.

2.2.3 Development of Alternatives for this Analysis

2.2.3.1 Council Call for Proposals

The process the Council established for considering potential new HAPCs is documented in Appendix J of the EFH EIS. While many types of habitat may be worth considering as HAPCs, the Council determined that setting concrete and realistic priorities would expedite the designation and management of HAPCs. The Council decided that the initial HAPC proposal cycle should focus on two priorities that were to be based upon best available scientific information:

1. Seamounts in the EEZ, named on NOAA charts, that provide important habitat for managed species; and
2. Largely undisturbed, high relief, long lived hard coral beds, with particular emphasis on those located in the Aleutian Islands, which provide habitat for life stages of rockfish, or other important managed species that include the following features: The sites must have likely or documented presence of FMP rockfish species, and must be largely undisturbed and occur outside core fishing areas.

Seamounts were selected as a priority because they may serve as unique ecosystems. Some FMP species on seamounts may be endemic (exclusive to a particular place) and vulnerable to stress caused by human-induced activities. The purpose of this priority is to protect seamounts from potential disturbance from fishing activities, and therefore to ensure the continued productivity of these habitats for managed species.

Coral areas were selected as a priority because they may be linked with rockfish and other FMP species. Additionally, areas of high density "gardens" of corals, sponges, and other sedentary invertebrates were recently documented for the first time in the North Pacific Ocean and appear to be particularly sensitive to bottom disturbance. Some deep sea corals are fragile, long-lived, and slow growing organisms that provide habitat for fish and may be susceptible to human-induced degradation or stress.

Criteria for consideration also required that the proposals meet at least two of the four HAPC considerations (criteria) established in the EFH Final Rule: importance of ecological function, sensitivity, vulnerability, and rarity. Rarity was a mandatory criterion of all HAPC proposals.

The identification and review process included an initial call for proposals with a detailed nomination form. Proposals were due January 10, 2004. The Council received twenty-three proposals from six separate submitters, including NOAA fisheries.

2.2.4 Review Process Leading to Alternatives for Analysis

The NPFMC Groundfish, Shellfish, and Scallop Plan Teams met March 8-9, 2004, in Seattle to review the HAPC proposals. The Council received a report (included as an appendix) from the Plan Teams on the 23 HAPC proposals received. The teams reviewed the proposals for scientific and technical merit and their meeting the criteria for consideration described above.

In April, the Council adopted many of the HAPC proposals for further consideration. The Council tasked staff to provide a 'strawman' recommendation on boundaries for those sites where several of the proposals had overlapped. Additionally, the Council established a small technical committee to refine the boundaries for the coral sites proposed off Southeast Alaska. In June, the Council identified final alternatives for analysis in this EA. Analysis and internal review were completed over the summer. The Council reviewed a draft of this document at its October 2004 meeting.

In December 2004, the Council removed one of the proposed HAPC locations near Dixon Entrance for corals within the GOA (Action 3 Alternative 2). The Council became aware that a portion of the Dixon Entrance HAPC lies in disputed waters over which both the United States and Canada claim jurisdiction. Because of territorial concerns, the Council directed staff to remove the Dixon Entrance option from the HAPC EA but remains interested in exploring potential avenues to protect coral habitat areas at Dixon Entrance. The Council took final action on the alternatives analyzed herein in February 2005.

2.3 Background Descriptions of the Alternatives

2.3.1 Action 1 – HAPCs for Seamounts in the EEZ

2.3.1.1 Alternative 1: No Seamount HAPCs (No action)

Under this no action alternative, no HAPCs would be identified for seamounts.

2.3.1.2 Alternative 2: Identify Five Named Seamounts as HAPCs and prohibit all bottom contact fishing

Under this alternative, the groundfish and crab FMPs would be amended to identify Dickens, Giacomini, Patton, Quinn, and Welker seamounts as HAPCs (Table 2-1, bolded seamounts, and Figure 2-1) and prohibit all Council-managed bottom contact fishing in those areas.

2.3.1.3 Alternative 3: Identify 16 named seamounts as HAPCs and prohibit all bottom contact fishing. *The Council's preferred alternative*

Under this alternative, the groundfish and crab FMPs would be amended to identify Bowers, Brown, Chirkikof, Marchand, Dall, Denson, Derickson, Dickins, Giacomini, Kodiak, Odessey, Patton, Quinn, Sirius, Unimak, and Welker seamounts as HAPCs (Table 2-1, Figure 2-2) and prohibit all Council-managed bottom contact fishing in those areas.

2.3.2 Action 2 – HAPCs for GOA (GOA) corals

2.3.2.1 Alternative 1: No GOA coral HAPCs (No action)

Under this no action alternative, no HAPCs would be identified for GOA corals.

2.3.2.2 Alternative 2: Identify HAPCs at 3 sites along the GOA continental slope with 2 management options to protect corals.

Under this alternative, the GOA groundfish FMP would be amended to identify HAPCs at Sanak Island, Albatross, and Middleton Island (Table 2-2, Figure 2-2 and Figure 2-4) and implement one of 2 management options as follows:

Option 1: Close the sites to pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contact the bottom (including dinglebar gear) for 5 years. During the 5 years, these sites would be prioritized for undersea mapping. Areas with high-relief coral would stay closed to the specified gears and the remaining areas would be reopened.

Option 2: Close the sites to bottom trawling for 5 years. During the five years, these sites would be prioritized for undersea mapping. Areas with high-relief coral would stay closed to bottom trawling and the remaining areas would be reopened. ***The Council's preferred alternative.***

2.3.2.3 Alternative 3: Identify HAPCs at three sites in the Eastern GOA and prohibit all Council-managed bottom contact fishing within five areas inside the HAPCs.

Under this alternative, the GOA groundfish FMP would be amended to identify HAPCs at Cape Ommaney, the northwest portion of Fairweather grounds, and the southwest portion of Fairweather grounds. All Council-managed bottom contact fishing would be prohibited within five specified areas inside the HAPCs (Table 2-3, Figure 2-5 through Figure 2-6).

Option 1: Prohibit all Council-Managed bottom-contact gear within five smaller areas inside these HAPCs. ***The Council's preferred alternative.***

Option 2: Prohibit bottom trawl gear within five areas inside the HAPCs, while designating the remainder of each of the three HAPCs in this alternative as priority areas for hook and line gear impact research.

2.3.2.4 Alternative 4: Implementation of Alternative 2, options 1 and 2 and Alternative 3 in their entirety.

2.3.3 Action 3 – HAPCs for Aleutian Island (AI) corals

2.3.3.1 Alternative 1: No AI coral HAPCs (No action)

Under this no action alternative, no HAPCs would be identified for GOA corals.

2.3.3.2 Alternative 2: Identify 6 AI coral garden sites as HAPCs and prohibit bottom contact fishing gear in specified portions of those areas.

Under this alternative, the BSAI groundfish FMP would be amended to identify six coral garden sites as HAPCs (Adak Canyon, Cape Moffett, Bobrof Island, Semisopochnoi Island, Great Sitkin and Ulak; Table

2-4, Figure 2-7 through Figure 2-12). Bottom contact fishing gear would be prohibited in specified portions of the HAPCs.

2.3.3.3 Alternative 3: Identify Bowers Ridge as a HAPC and prohibit mobile fishing gear that contacts the bottom. *The Council's preferred alternative*.

Under this alternative, the BSAI groundfish FMP would be amended to identify a portion of Bowers Ridge as an HAPC (Table 2-5, Figure 2-13) and close the area to pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contacts the bottom (including dinglebar gear).

2.3.3.4 Alternative 4: Identify four sites in the AI as HAPCs with two management options to protect corals.

Under this alternative, the BSAI groundfish FMP would be amended to identify four HAPCs in the vicinity of South Amlia/Atka, Kanaga Volcano, Kanaga Island and Tanaga Islands (Table 2-6, Figure 2-14 and Figure 2-15) and implement one of two management options as follows:

Option 1: Close the sites to pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contacts the bottom (including dinglebar gear) for 5 years. The sites would be prioritized for undersea mapping. Areas with high relief coral would stay closed to the specified gears and the remaining areas would be reopened.

Option 2: Close the sites to bottom trawling for 5 years. During the 5 years, these sites would be prioritized for undersea mapping. Areas with high-relief corals would stay closed to bottom trawling and the remaining areas would be reopened.

2.3.3.5 Alternative 5: Implementation of Alternatives 2 and 3 and Alternative 4, options 1 and 2 in their entirety.

Table 2-1. Name, location, depth, and area of proposed HAPC seamount sites within the EEZ off Alaska (Action 1 Alternatives 2 & 3).

#	Named Seamount	Latitude	Longitude	Depth (m)	Area
1	Bowers Seamount	54 08'60"N	185 18'00"W	2,268	28.9
		54 04'12"N	185 18'00"W		
		54 04'12"N	185 07'48"W		
		54 08'60"N	185 07'48"W		
2	Brown Seamount	55 00'00"N	138 48'00"W	1,390	166.6
		55 00'00"N	138 24'00"W		
		54 47'60"N	138 48'00"W		
		54 47'60"N	138 24'00"W		
3	Chirikof &	55 06'00"N	153 41'60"W	2,560	2,248.4
4	Marchand	55 06'00"N	151 00'00"W		
		54 42'00"N	153 41'60"W		
		54 42'00"N	151 00'00"W		
5	Dall Seamount	58 17'60"N	145 48'00"W	2,507	949.9
		58 17'60"N	144 54'00"W		
		57 45'00"N	145 48'00"W		
		57 45'00"N	144 54'00"W		
6	Denson Seamount	54 13'12"N	137 35'60"W	927	286.7
		54 13'12"N	137 05'60"W		
		53 57'00"N	137 35'60"W		
		53 57'00"N	137 05'60"W		

#	Named Seamount	Latitude	Longitude	Depth (m)	Area
7	Derickson Seamount	53 00'00"N	161 30'00"W	2,890	218.4
		53 00'00"N	161 00'00"W		
		52 47'60"N	161 30'00"W		
		52 47'60"N	161 00'00"W		
8	**Dickins Seamount**	**54 38'60"N**	**137 09'00"W**	**427**	**147.0**
		54 38'60"N	**136 48'00"W**		
		54 27'00"N	**137 09'00"W**		
		54 27'00"N	**136 48'00"W**		
9	**Giacomini Seamount**	**56 37'12"N**	**146 31'48"W**	**618**	**163.9**
		56 37'12"N	**146 07'12"W**		
		56 25'12"N	**146 31'48"W**		
		56 25'12"N	**146 07'12"W**		
10	Kodiak Seamount	57 00'00"N	149 30'00"W	2,176	158.3
		57 00'00"N	149 05'60"W		
		56 47'60"N	149 30'00"W		
		56 47'60"N	149 05'60"W		
11	Odessey Seamount	54 42'00"N	150 00'00"W	1,657	209.8
		54 42'00"N	149 30'00"W		
		54 30'00"N	150 00'00"W		
		54 30'00"N	149 30'00"W		
12	**Patton Seamount**	**54 43'12"N**	**150 35'60"W**	**168**	**94.3**
		54 43'12"N	**150 18'00"W**		
		54 34'12"N	**150 35'60"W**		
		54 34'12"N	**150 18'00"W**		
13	**Quinn Seamount**	**56 27'00"N**	**145 24'00"W**	**658**	**200.9**
		56 27'00"N	**145 00'00"W**		
		56 12'00"N	**145 24'00"W**		
		56 12'00"N	**145 00'00"W**		
14	Sirius Seamount	52 06'00"N	161 05'60"W	1,929	167.0
		52 06'00"N	160 35'60"W		
		51 57'00"N	161 05'60"W		
		51 57'00"N	160 35'60"W		
15	Unimak Seamount	53 47'60"N	162 41'60"W	1,308	128.5
		53 47'60"N	162 18'00"W		
		53 38'60"N	162 41'60"W		
		53 38'60"N	162 18'00"W		
16	**Welker Seamount**	**55 13'48"N**	**140 33'00"W**	**618**	**161.5**
		55 13'48"N	**140 09'36"W**		
		55 01'48"N	**140 33'00"W**		
		55 01'48"N	**140 09'36"W**		

Table 2-2. Name, location, and area of proposed HAPC sites along the continental slope of Alaska (Action 2 Alternative 2).

Proposed HAPC Designation Area	Latitude	Longitude	Management	NOAA Chart No.	Area
Sanak Island	54 00 00 N 54 13 00 N 54 05 00 N 53 53 00 N	163 15 00 W 162 13 30 W 162 13 30 W 163 15 00 W	Option 1: no (BCMG) for 5 years Option 2: no bottom trawl gear for 5 years *	500	273 nm^2
Albatross Banks	56 16 00N 56 16 00 N 56 10 00 N 56 11 00 N	153 20 00 W 152 40 00 W 152 40 00 W 153 20 00 W	Option 1: no (BCMG) for 5 years Option 2: no bottom trawl gear for 5 years *	500	123 nm^2
Middleton Island	59 15 00 N 59 15 00 N 59 08 45 N 59 10 00 N	147 00 00 W 146 30 00 W 146 30 00 W 147 00 00 W	Option 1: no (BCMG) for 5 years Option 2: no bottom trawl gear for 5 years *	500	87 nm^2

*Council's preferred alternative

Table 2-3. Name, location, and area of proposed HAPC sites along the continental slope in the Eastern GOA (Action 2 Alternative 3).

Proposed HAPC Area	Latitude	Longitude	Management	NOAA Chart No.	Area
Cape Ommaney	56 12 51 N 56 12 51 N 56 09 32 N 56 09 32 N	135 07 41 W 135 05 30 W 135 05 30 W 135 07 41 W	HAPC Designation	17320	4.0 nm^2
Cape Ommaney	56 11 11 N 56 10 51 N 56 09 31 N 56 09 32 N	135 07 10 W 135 05 50 W 135 07 12 W 135 07 41 W	Option 1: No bottom contact gear Option2: No bottom trawl gear	17320	0.9 nm^2
Fairweather Ground NW Area	58 28 10 N 58 28 10 N 58 22 00N 58 22 00 N	139 19 44 W 139 15 42 W 139 15 42 W 139 19 44 W	HAPC Designation	16760	13.11 nm^2
Fairweather Ground NW Area 1	58 27 25 N 58 27 25 N 58 26 19 N 58 26 19 N	139 19 05 W 139 17 45 W 139 17 45 W 139 17 45 W	Option 1: No bottom contact gear Option2: No bottom trawl gear	16760	0.77 nm^2
Fairweather Ground NW Area 2	58 24 06 N 58 24 06 N 58 22 33 N 58 22 33 N	139 18 30 W 139 14 35 W 139 14 35 W 139 18 30 W	Option 1: No bottom contact gear Option2: No bottom trawl gear	16760	13.11 nm^2
Fairweather Ground Southern Area	58 16 00 N 58 16 00 N 58 13 10 N 58 13 10 N	139 09 45 W 138 51 34 W 138 51 34 W 139 09 45 W	HAPC Designation	16760	27.3 nm^2
Fairweather Ground Southern Area 1	58 16 00 N 58 16 00 N 58 13 10 N	139 09 45 W 138 59 15 W 138 59 15 W	Option 1: No bottom contact gear Option2: No bottom trawl gear	16760	7.87 nm^2
Fairweather Ground Southern Area 2	58 15 00 N 58 15 00 N 58 13 55 N 58 13 55 N	138 54 05 W 138 52 35 W 138 52 35 W 138 54 05 W	Option 1: No bottom contact gear Option2: No bottom trawl gear	16760	0.86 nm^2

Table 2-4. Names, location, and area of proposed HAPC sites in the Aleutian Islands (Action 3 Alternative 2).

Proposed HAPC Area	Latitude	Longitude	Management	NOAA Chart No.	Area
Adak Canyon	51 39 00 N 51 39 00 N 51 30 00 N 51 30 00 N 51 39 00 N 51 39 00 N 51 35 00 N 51 34 20 N 51 36 20 N 51 33 30 N 51 28 30 N 51 19 30 N 51 19 30 N	177 08 00 W 177 03 00 W 177 03 00 W 177 00 00 W 177 00 00 W 176 59 00 W 176 59 00 W 176 49 00 W 176 40 00 W 176 40 00 W 176 59 00 W 176 59 00 W 177 08 00 W	HAPC Designation	16471	140 nm^2
Adak Canyon	51 39 00 N 51 39 00 N 51 30 00 N 51 30 00 N	177 03 00 W 177 00 00 W 177 00 00 W 177 03 00 W	No bottom contact gear	16471	17 nm^2
Cape Moffett	51 59 00 N 51 59 00 N 51 56 00 N 51 56 00 N	176 52 00 W 176 51 00 W 176 51 00 W 176 56 00 W	HAPC Designation	16767	1.71 nm^2
Cape Moffett	51 59 00 N 52 02 00 N 51 57 00 N 51 57 00 N	176 48 34 W 176 41 00 W 176 41 00 W 176 50 40 W	HAPC Designation	16767	6 nm^2
Cape Moffett	51 59 00 N 51 59 00 N 51 57 00 N 51 57 00 N	176 51 00 W 176 48 34 W 176 50 40 W 176 51 00 W	No bottom contact gear	16767	14 nm^2
Bobrof Island	51 57 30 N 51 57 30 N 51 55 30 N 51 55 30 N	177 29 00 W 177 20 00 W 177 20 00 W 177 29 00 W	HAPC Designation	16467	11 nm^2
Bobrof Island	51 55 30 N 51 55 30 N 51 51 30 N 51 51 30 N	177 29 00 W 177 20 00 W 177 20 00 W 177 29 00 W	No bottom contact gear	16467	20 nm^2
Semisopochnoi I	52 01 24 N 52 01 30 N 51 57 18 N	179 36 54 E 179 39 00 E 179 46 00 E	HAPC Designation	16460	393 nm^2

Proposed HAPC Area	Latitude	Longitude	Management	NOAA Chart No.	Area
Semisopochnoi I	51 53 10 N 51 53 10 N 51 48 50 N 51 48 50 N	179 46 30 E 179 53 05 E 179 53 05 E 179 46 30 E	No bottom contact gear	16460	18 nm^2
Great Sitkin	52 02 30 N 52 06 30 N 52 10 00 N 52 10 00 N 52 06 15 N 52 02 30 N	176 16 30 W 176 16 30 W 176 10 00 W 176 03 00 W 176 03 00 W 176 12 00 W	HAPC Designation	16741	34 nm^2
Great Sitkin	52 04 40 N 52 09 30 N 52 09 30 N 52 06 35 N	176 12 20 W 176 12 20 W 176 06 00 W 176 06 00 W	No bottom contact gear	16741	13 nm^2
Ulak Island	51 18 54 N 51 18 42 N	178 58 54 W 178 59 36 W	HAPC Designation	16460	303 nm^2
Ulak Island	51 25 50 N 51 25 50 N 51 22 15 N 51 22 15 N	179 06 00 W 178 59 00 W 178 59 00 W 179 06 00 W	No bottom contact gear	16460	16 nm^2

Table 2-5. Names, location, and area of proposed HAPC sites in Bowers Ridge (Action 3 Alternative 3).

Proposed HAPC Area	Latitude	Longitude	Management	NOAA Chart No.	Area
Bowers Ridge	55 05 00 N 55 05 00 N 54 34 00 N 54 34 00 N	176 00 00 E 177 15 00 E 177 15 00 E 176 00 00 E	No bottom contact gear	50_2	1347 nm^2
Bowers Ridge	54 54 30 N 55 10 30 N 54 15 30 N 52 44 30 N 52 40 30 N 54 05 50 N	177 55 45 E 178 27 15 E 179 54 00 W 179 26 30 W 179 55 00 W 179 20 45 E	No bottom contact gear	50_2	3939 nm^2

Table 2-6. Names, location, and area of proposed HAPC sites in the Aleutian Islands (Action 3 Alternative 4).

Proposed HAPC Area	Latitude	Longitude	Management	NOAA Chart No.	Area
Kanaga South	51 47 57 N 51 43 13 N 51 38 22 N 51 35 29 N	177 33 48 W 177 20 21 W 177 17 32 W 177 30 00 W	Option 1: no (BCMG) for 5 years Option 2: no bottom trawl gear for 5 years	16460	$53nm^2$
Kanaga Volcano	51 53 00 N 51 59 00 N 51 56 03 N 51 53 00 N	179 16 55 W 179 05 59 W 179 05 59 W 179 12 00 W	Option 1: no (BCMG) for 5 years Option 2: no bottom trawl gear for 5 years	16460	$28nm^2$

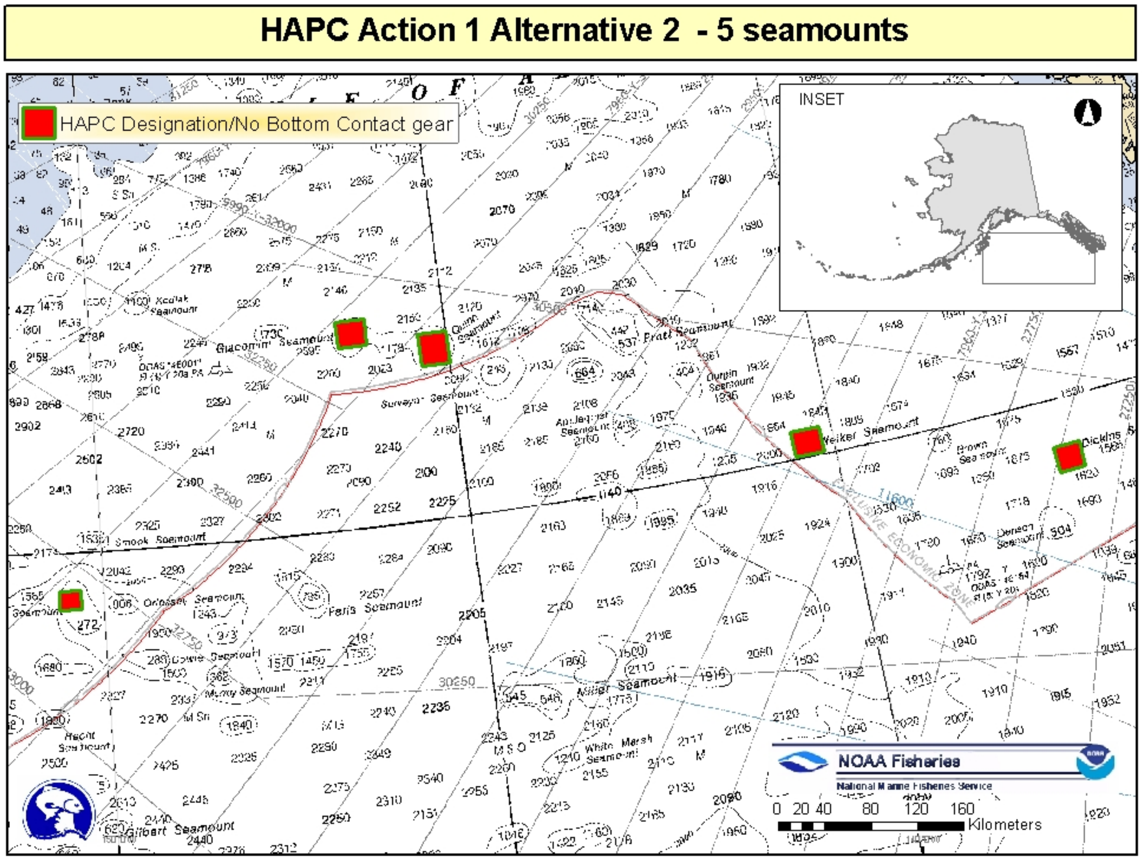


Figure 2-1. Locations of proposed HAPC sites under Action 1 Alternative 2, 5 seamounts.

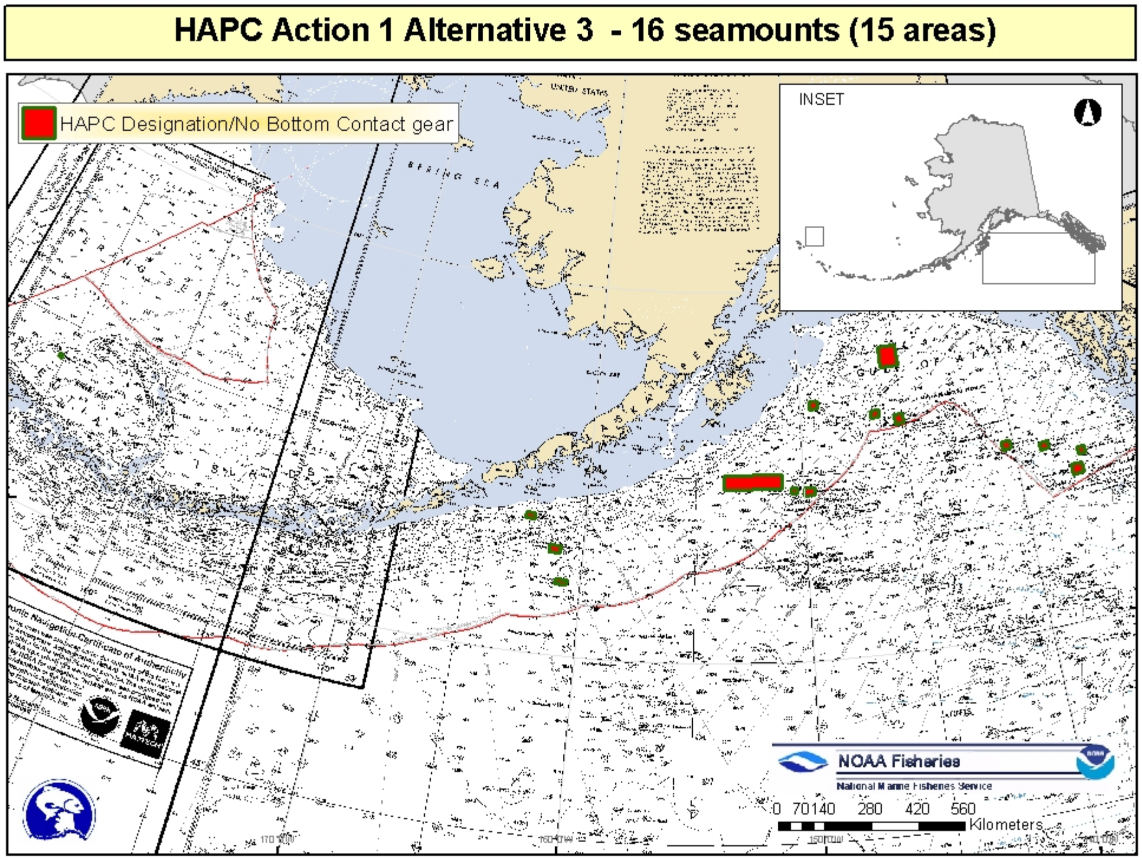


Figure 2-2. Locations of proposed HAPC sites under Action 1 Alternative 3, 16 seamounts.

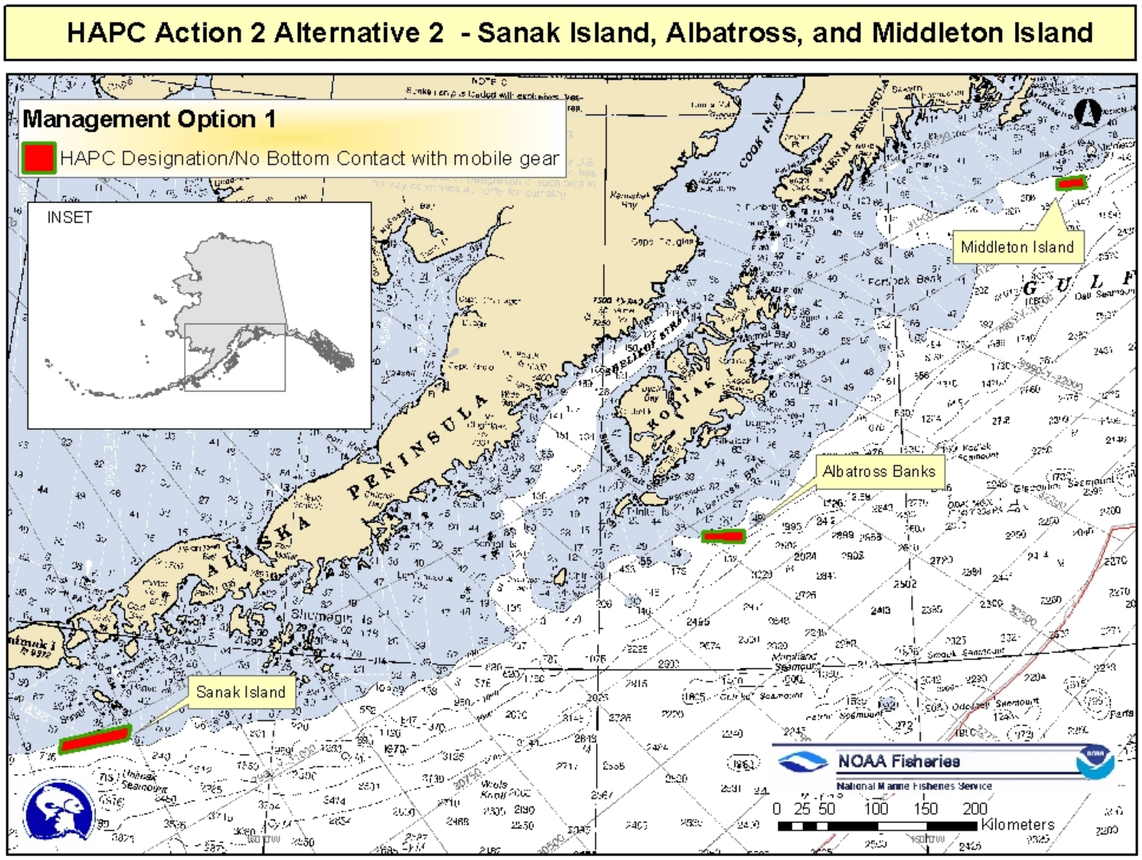


Figure 2-3. Locations of proposed HAPC sites along the GOA continental shelf, Action 2 Alternative 2 Management Option 1.

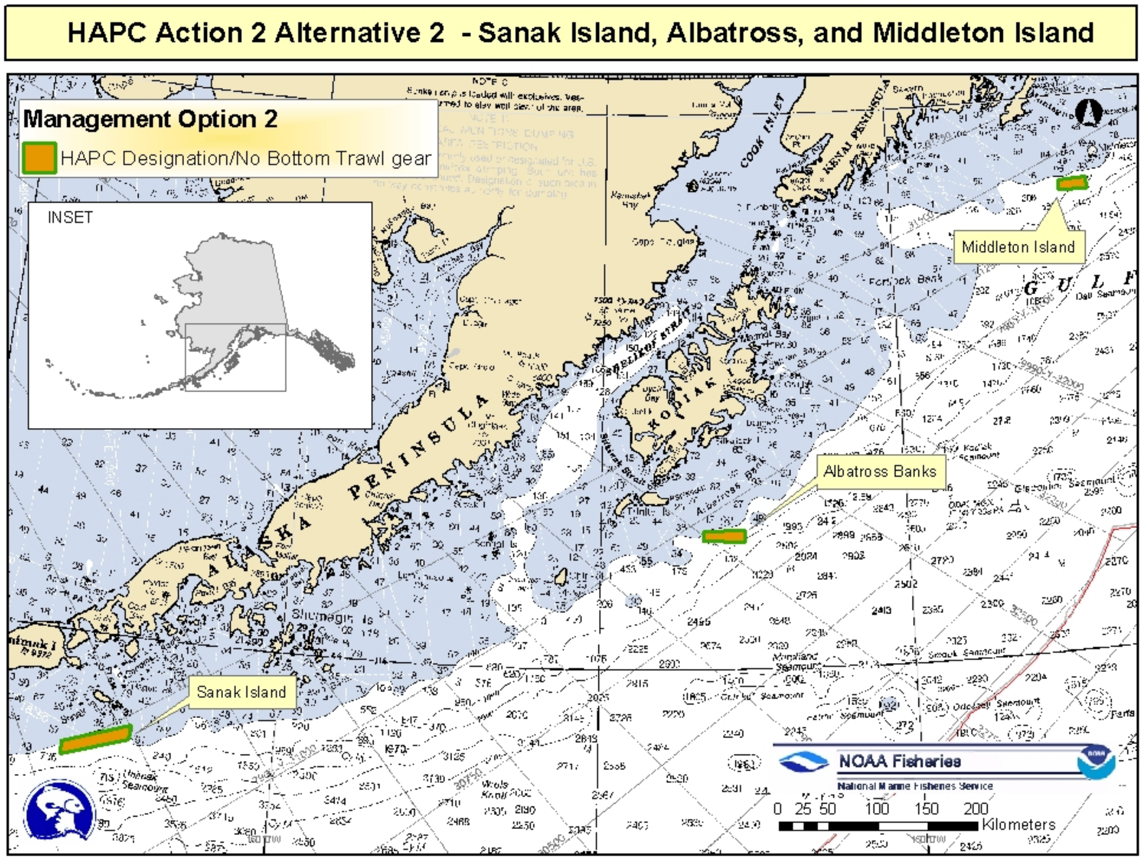


Figure 2-4. Locations of proposed HAPC sites along the GOA continental shelf, Action 2 Alternative 2 Management Option 2.

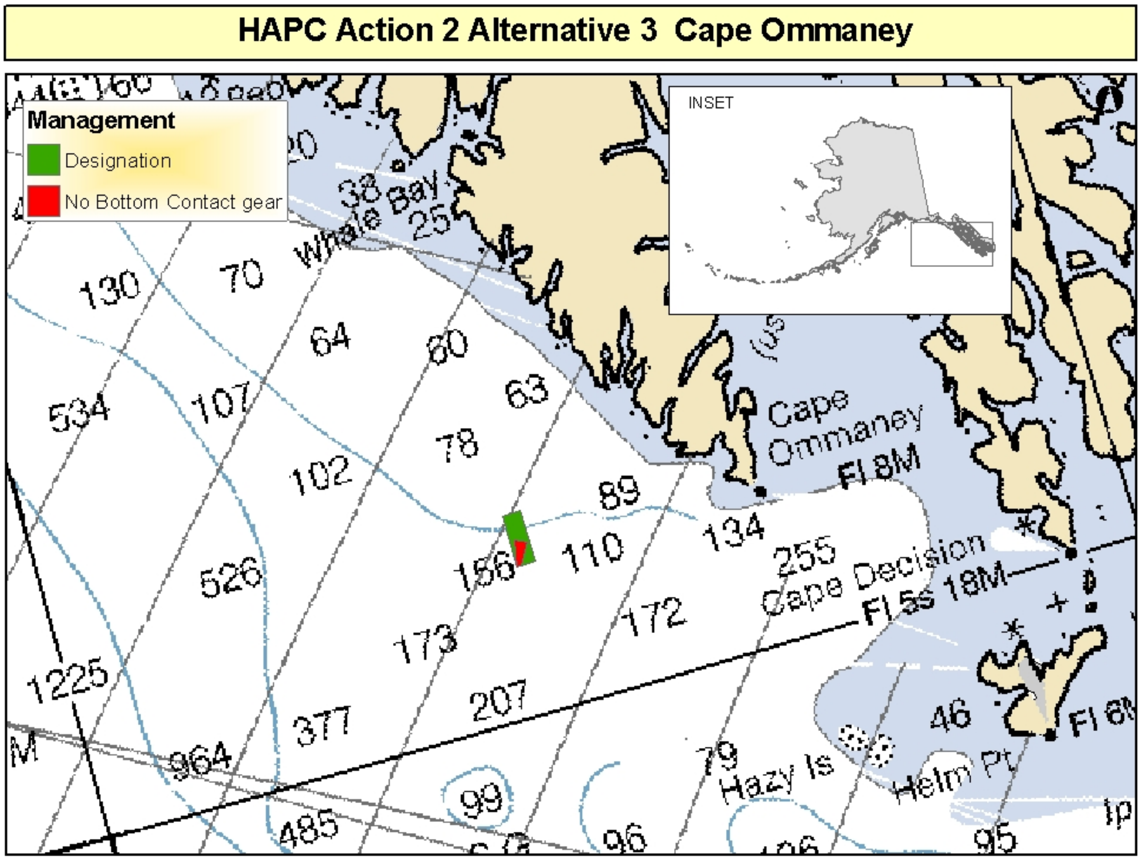


Figure 2-5. Location of proposed HAPC site at Cape Ommaney, Action 2 Alternative 3.

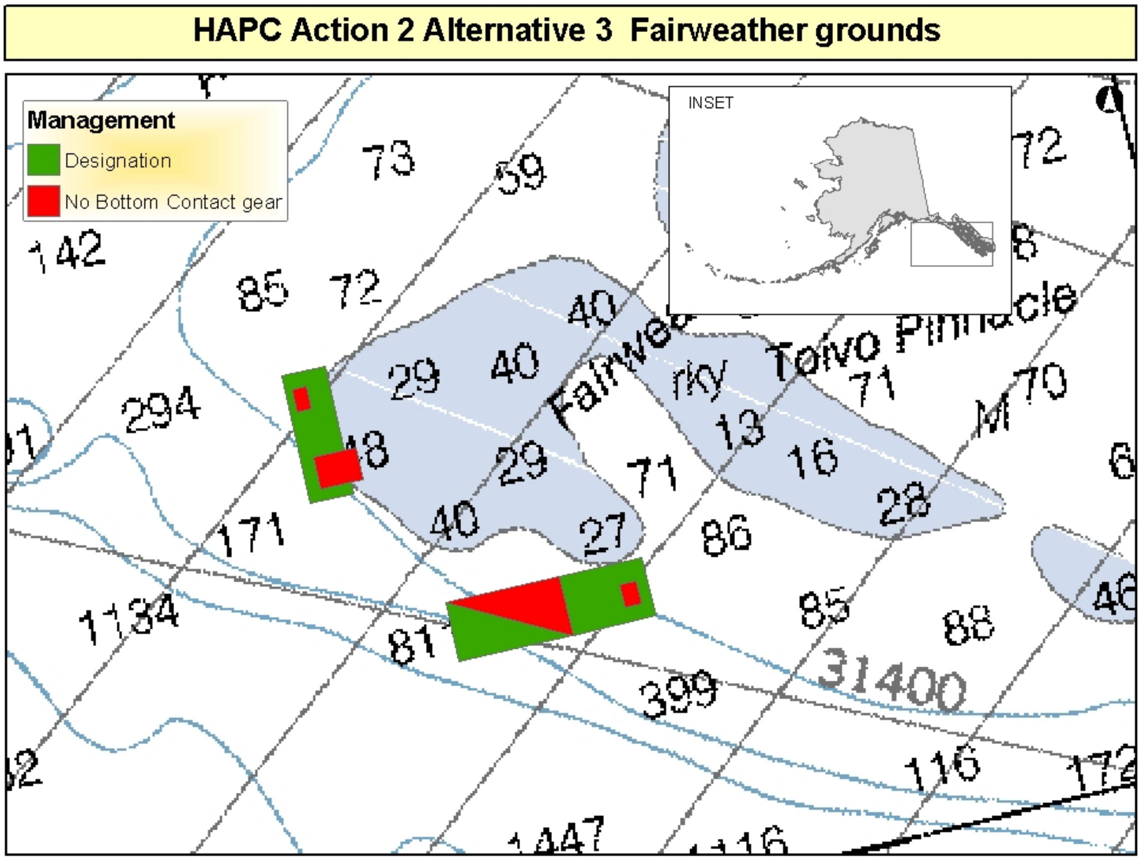


Figure 2-6. Location of proposed HAPC site at Fairweather grounds, Action 2 Alternative 3.

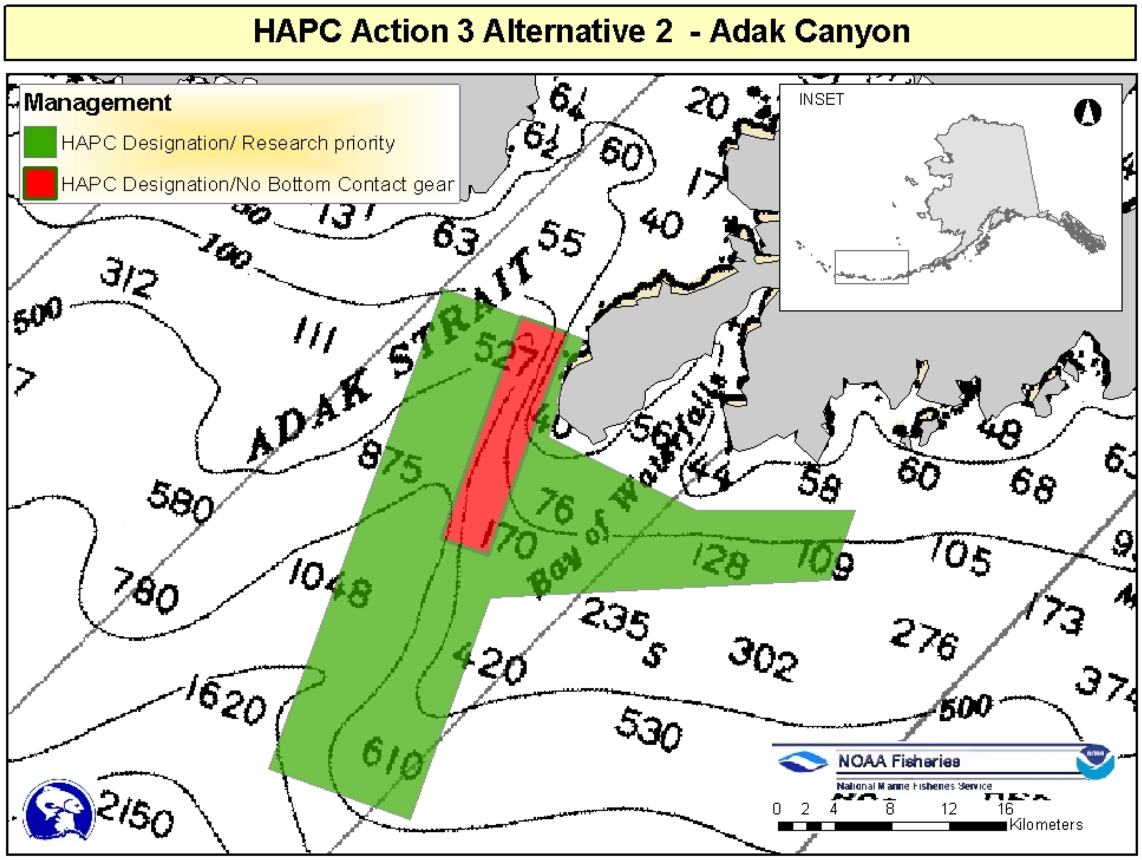


Figure 2-7. Location of proposed HAPC site at Adak Canyon, Action 3 Alternative 2.

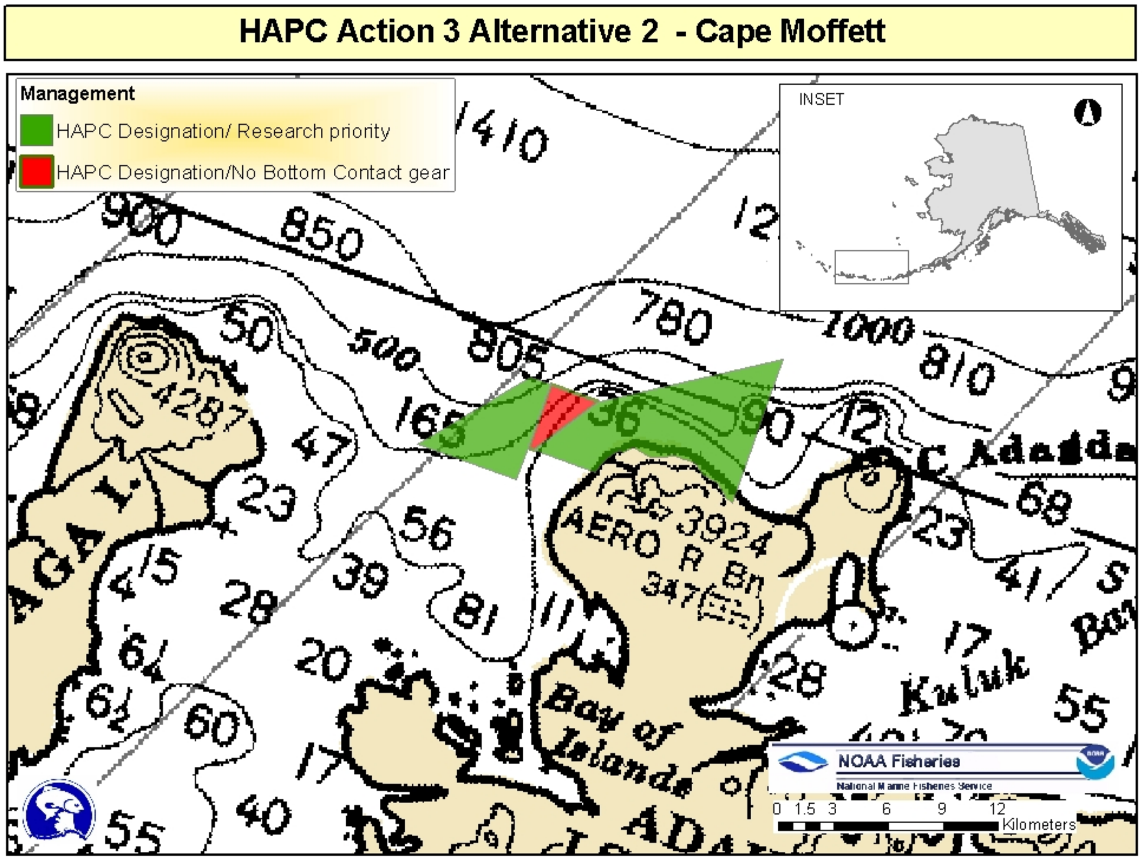


Figure 2-8. Location of proposed HAPC site at Cape Moffett, Action 3 Alternative 2.

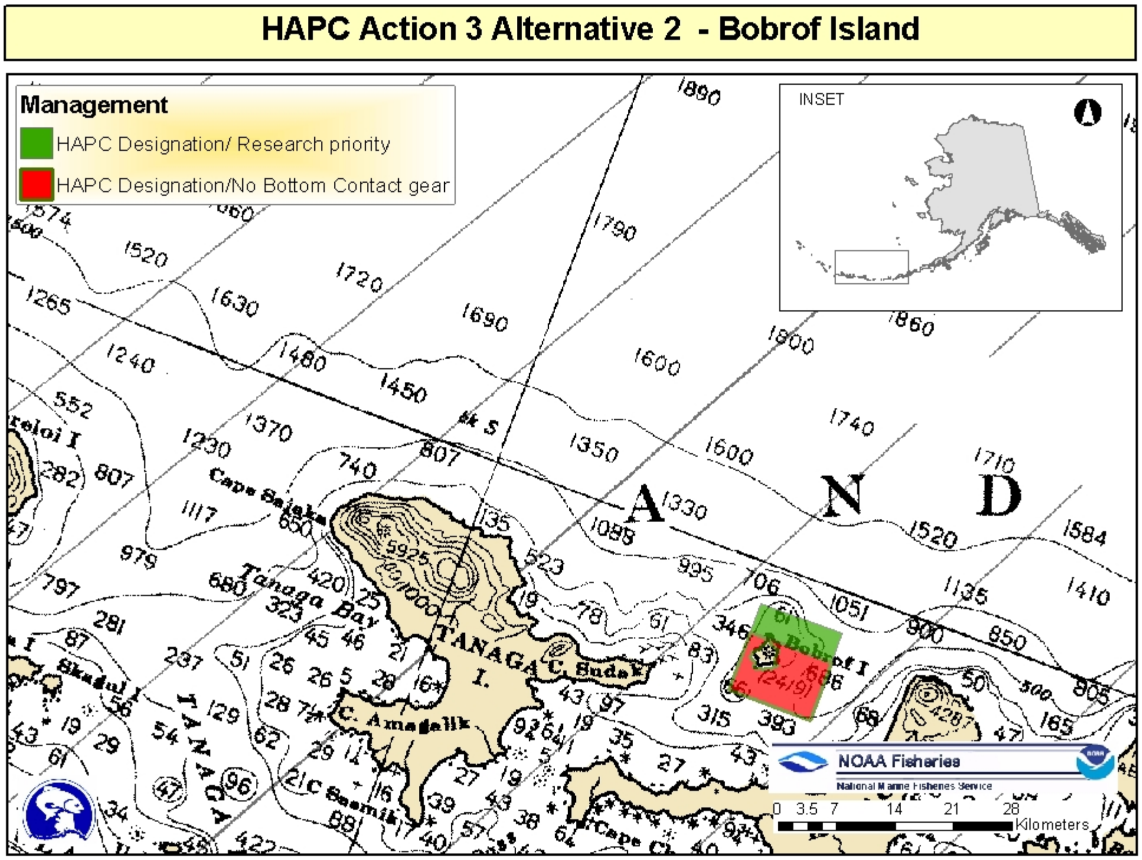


Figure 2-9. Location of proposed HAPC site at Bobrof Island, Action 3 Alternative 2.

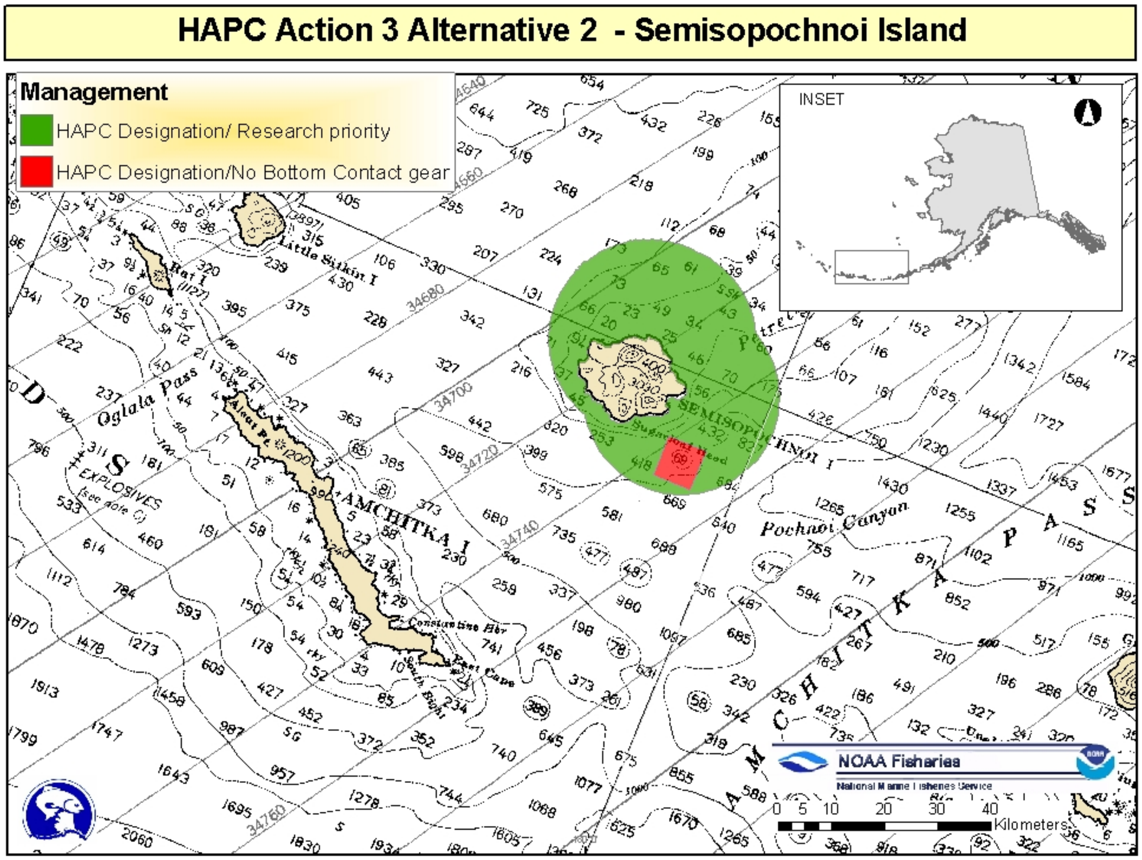


Figure 2-10. Location of proposed HAPC site at Semisopochnoi Island, Action 3 Alternative 2.

HAPC Action 3 Alternative 2 - Great Sitkin

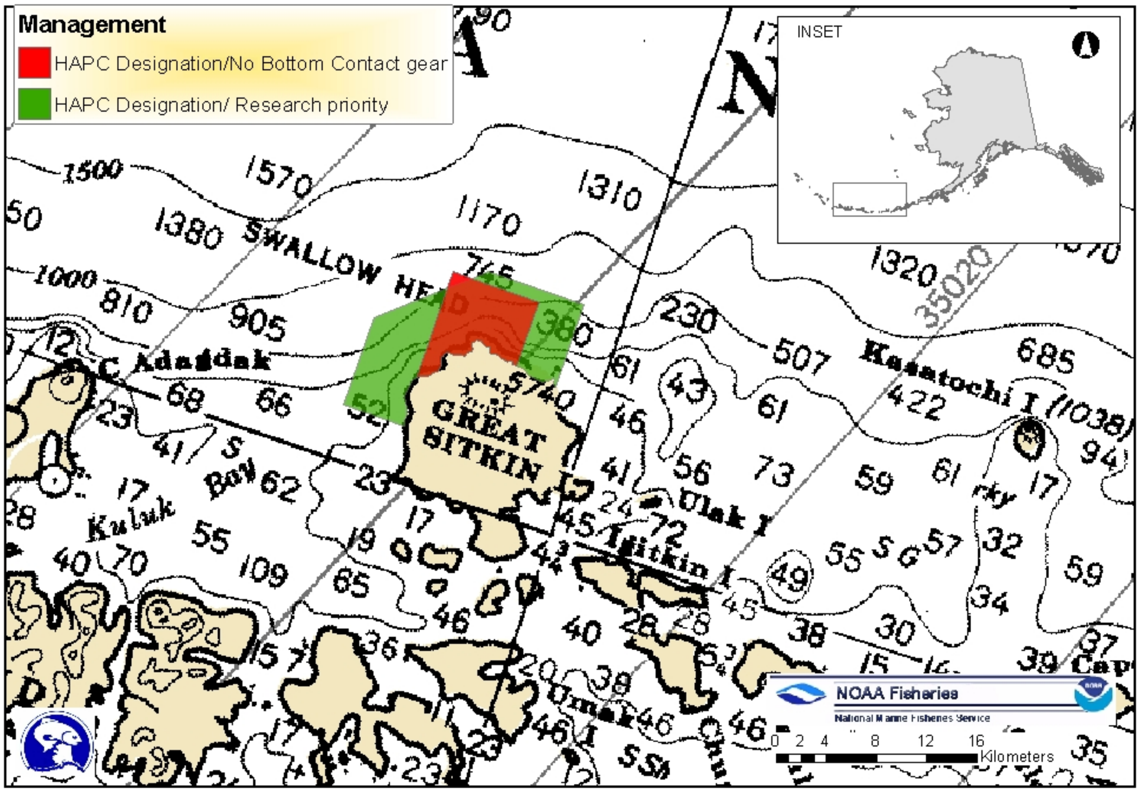


Figure 2-11. Location of proposed HAPC site at Great Sitkin, Action 3 Alternative 2.

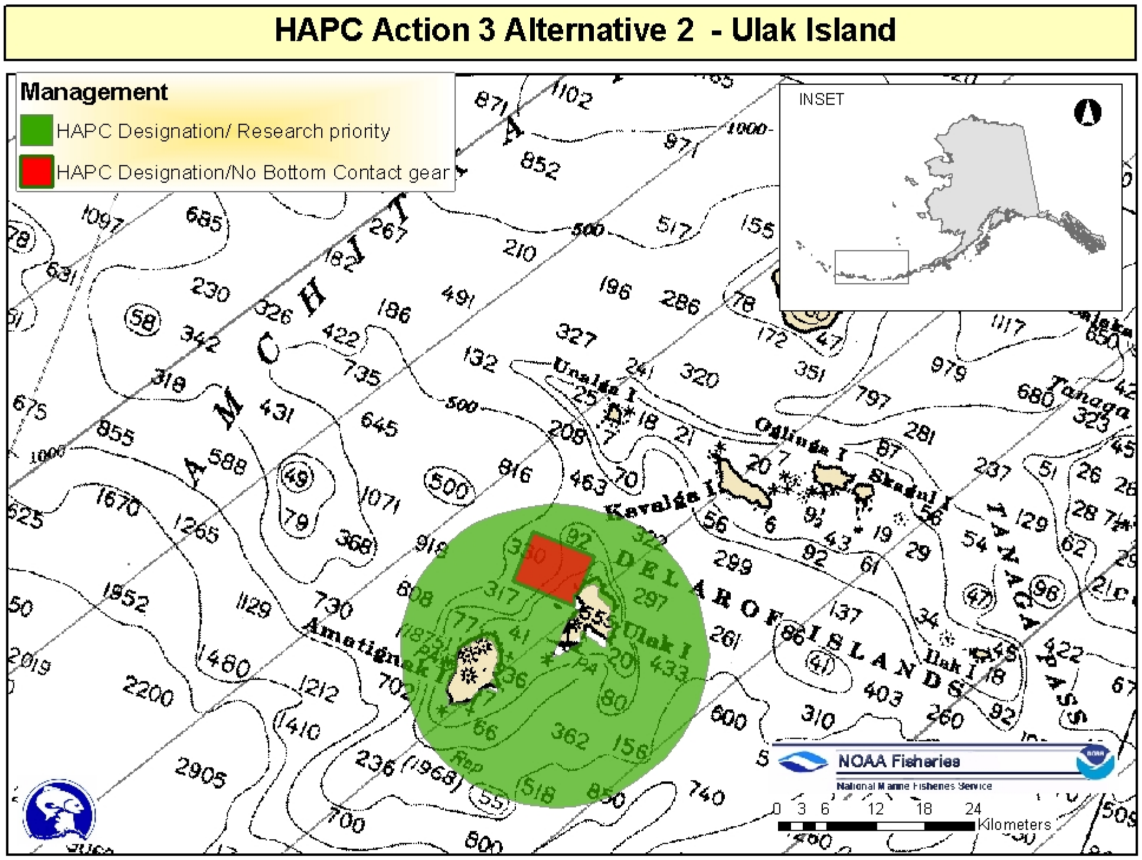


Figure 2-12. Location of proposed HAPC site at Ulak Island, Action 3 Alternative 2.

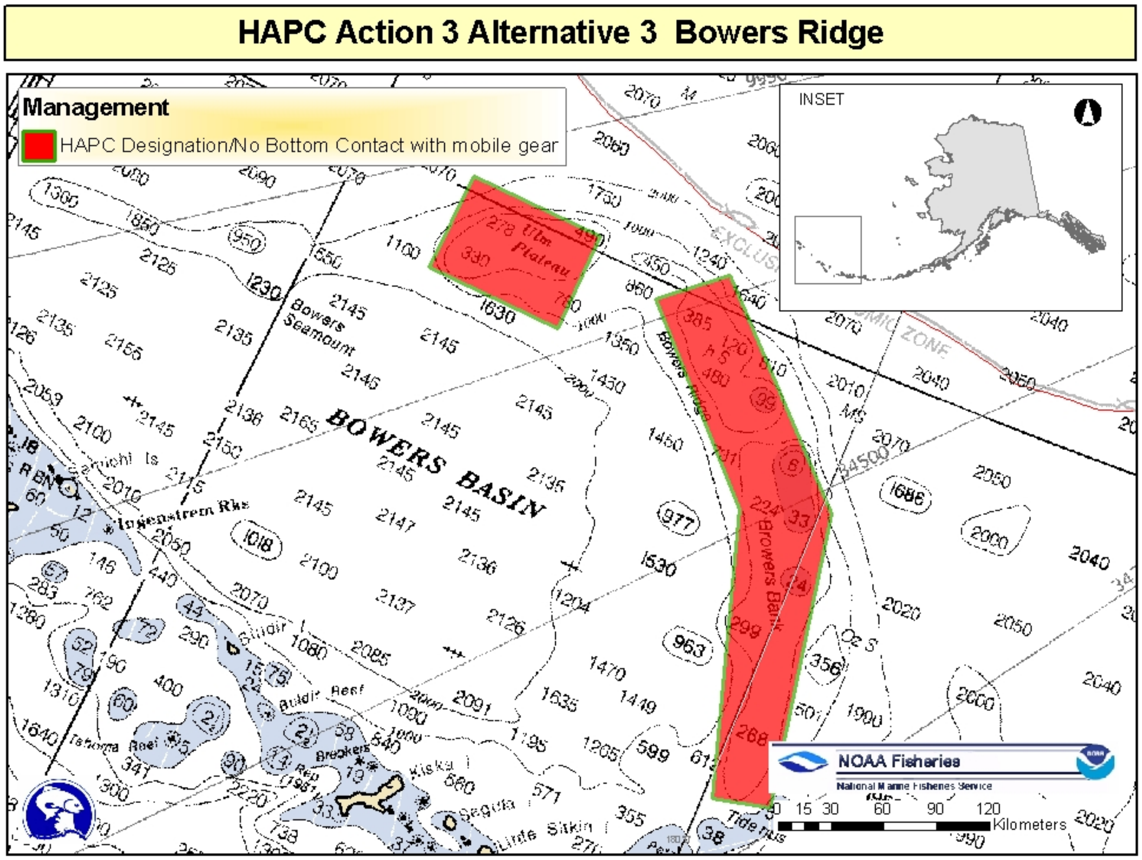


Figure 2-13. Location of proposed HAPC site at Bowers Ridge, Action 3 Alternative 3.

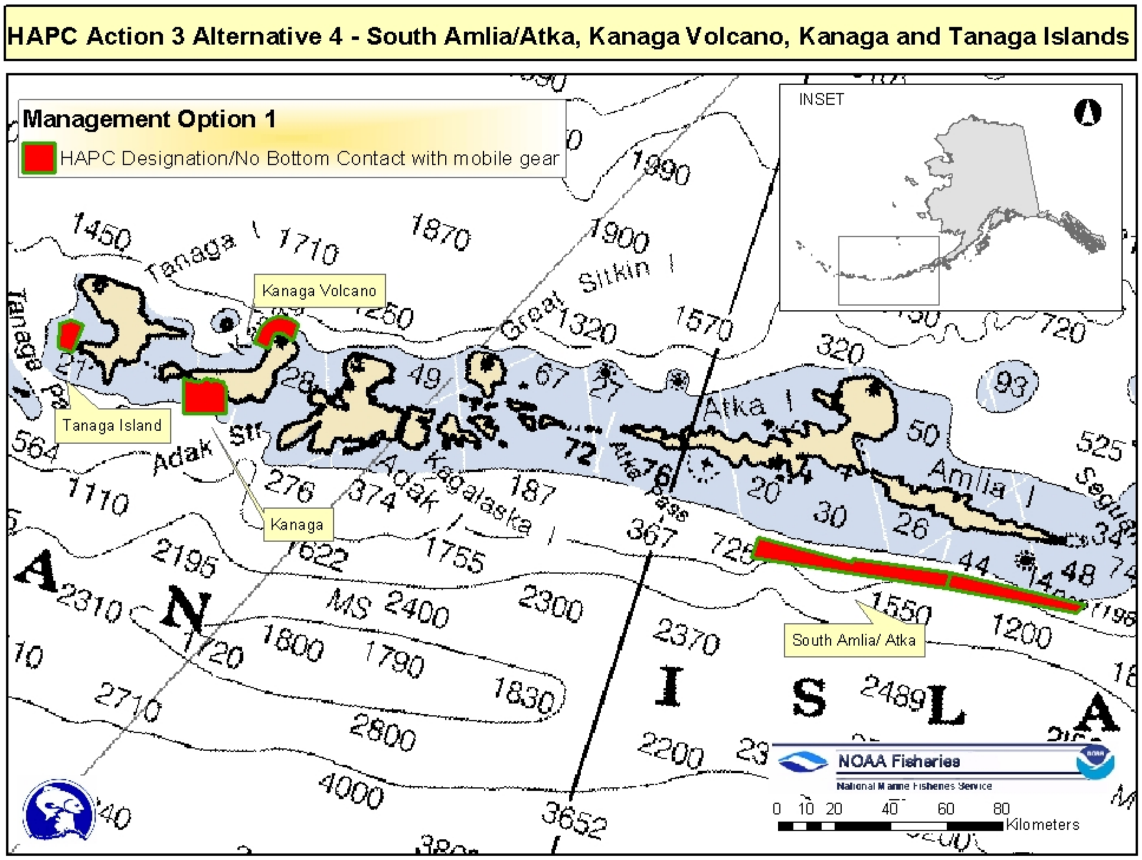


Figure 2-14. Location of proposed HAPC sites in the Aleutian Islands, Action 3 Alternative 4, Management Option 1.

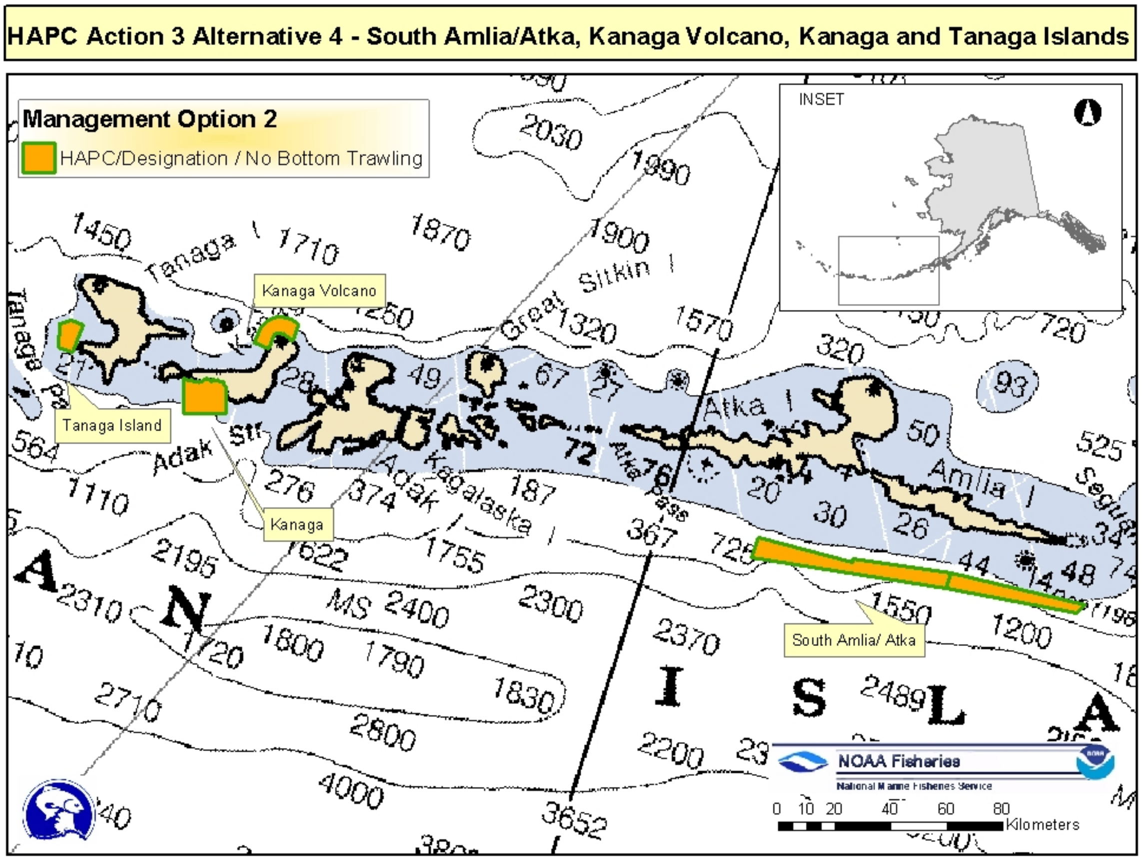


Figure 2-15. Location of proposed HAPC sites in the Aleutian Islands, Action 3 Alternative 4, Management Option 2.

3.0 AFFECTED ENVIRONMENT

3.1 Affected Environment at the Proposed HAPC Sites

3.1.1 Named Seamounts HAPC Sites

Seamounts are undersea features that rise 1,000 meters or more above the surrounding seafloor and are far from the continuous shelf and slope. A seamount rises up from the deep abyssal plain along steep faced flanks to a summit. Seamounts represent biological islands in the deep sea and often feature characteristic faunas that are quite different from those found in the surrounding soft sediment and abyssal habitat (Moore et al., 2003). Flanks usually consist of harder substrate such as bedrock and experience higher currents. The summit may be smooth or rough and consist of hard and soft substrates ranging from bedrock to mud. Seamounts can also be grouped in a chain of seamounts or isolated. Additionally, habitats vary greatly depending on the location of the seamount, currents, depth, and geological origin (Kaufmann et al., 1989). These unique features provide habitats for FMP and non-FMP groundfish and crab species.

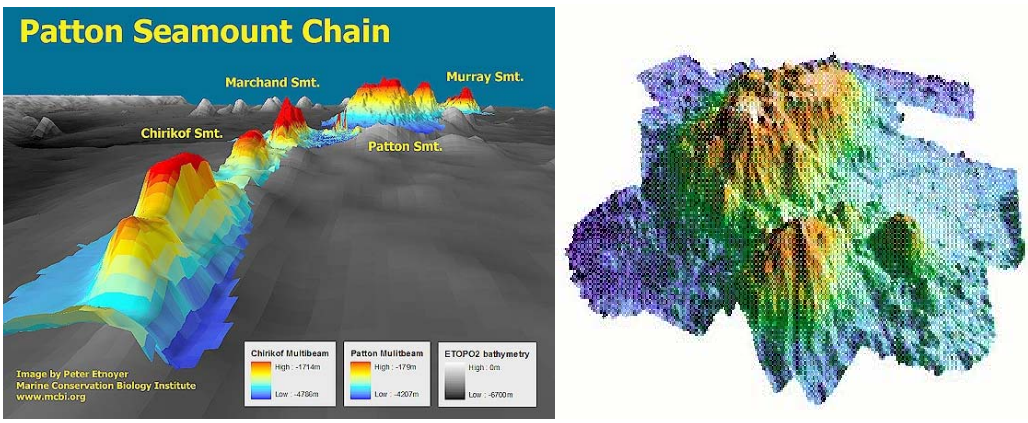


Figure 3-1. Seamount chain mosaic and isolated seamount 3-D imagery.

Of the approximately 140 named seamounts in waters of the North Pacific and Bering Sea, only 24 named seamounts are within EEZ waters managed and regulated by the NPFMC and NMFS Alaska Region. Further, of the 24 named seamounts in the EEZ, only 16 are within the deepest recorded depth range for an FMP species. This depth limit is established at 3,000 m. Records indicate sablefish and deep-sea sole range to depths of 2,750 m and 2,950 m, respectively (Fishes of Alaska 2002).

Within this subset of named seamounts, information is only available for Dickins, Giacomini, Patton, Quinn, and Welker seamounts (Figure 3-1). For these named seamounts, benthic habitat varies from soft substrate to hard substrate. However, habitats have not been characterized for the entirety of any of these features. Remote sensing using photography (Raymore 1979), acoustics (Hughes 1982), and in situ manned submarine observations (NOAA Ocean Explorers 2002), details habitats for those specific sites. As stated before, this information is limited and only exists for a few site-specific areas within the scale of any particular seamount feature.

Also, due to the drastic change in surrounding depths and their distance from the shelf and slope, seamounts may serve as stepping-stones for migratory fish species and may constitute unique ecosystems. Currents transport and deposit juvenile life stages on seamounts, which may then serve as rearing habitats for certain species. Migratory species take advantage of these features and feeding opportunities as either a stepping-stone between farther migratory areas or a long-term residency.

3.1.1.1 Dickins Seamount

Dickins Seamount is located in the eastern GOA approximately 100 nautical miles off the coast of Southeast Alaska. Dickins Seamount consists of soft and hard substrates, including rock pinnacles, which are distributed patchily across the feature. The summit has a depth of 234 fathoms minimum, and depths surrounding the flanks average over 1400 fathoms (NOAA Chart 16016).

3.1.1.2 Giacomini Seamount

Giacomini Seamount is located in the central GOA approximately 185 nautical miles east of Kodiak Island and 180 miles south of Middleton Island. Giacomini Seamount is relatively flat and consists of soft substrates with a few scattered, less prominent rock pinnacles. The summit has a depth of 338 fathoms minimum, and depths surrounding the flanks average over 1900 fathoms (NOAA Chart 16013).

3.1.1.3 Patton Seamount

Patton Seamount is located in the central GOA approximately 165 nautical miles east, south east of Kodiak Island. Patton Seamount is rough in feature. Harder substrates of rock create a series of pinnacles across the summit. The summit has a depth of 92 fathoms minimum, and depths surrounding the flanks average from 1300 to over 1900 fathoms (NOAA Chart 16013).

3.1.1.4 Quinn Seamount

Quinn Seamount is located in the central GOA approximately 210 nautical miles east of Kodiak Island and 190 miles south of Middleton Island. Quinn Seamount consists of soft substrates with a notable absence of pinnacles. The flanks are shallow sloped. The summit has a depth of 360 fathoms minimum, and depths surrounding the flanks average over 1600 fathoms (NOAA Chart 16013).

3.1.1.5 Welker Seamount

Welker Seamount is located in the eastern GOA approximately 190 nautical miles off the coast of Southeast Alaska. Welker Seamount consists of both hard and soft substrates, with softer substrates between numerous, scattered rock pinnacles. The summit has a depth of 388 fathoms minimum, and depths surrounding the flanks range from 1300 fathoms to over 1700 fathoms (NOAA Chart 16016).

3.1.1.6 Other Named Seamounts

Site-specific habitat information is not available for several other named seamounts considered in the analysis. No inferences can be made for these features due to the lack of uniformity between the named seamounts where information does exist. Basic geographic information for these named seamounts is provided in Table 2-1.

Bowers Seamount is located in the western Aleutian Islands approximately 90 nautical miles north, northwest of Attu Island. The summit has a depth of 1230 fathoms minimum, and depths surrounding the flanks range from 1600 fathoms to over 2100 fathoms (NOAA Chart 16012).

Brown Seamount is located in the eastern GOA and approximately 150 nautical miles off the coast of Southeast Alaska. The summit has a depth of 760 fathoms minimum, and depths surrounding the flanks average over 1600 fathoms (NOAA Chart 16016).

Chirikof Seamount is located in the central GOA and approximately 100 nautical miles south of Kodiak Island. The summit has a depth of 1400 fathoms minimum, and depths surrounding the flanks range from 1500 fathoms to over 2300 fathoms (NOAA Chart 16013).

Dall Seamount is located in the central GOA approximately 80 nautical miles south of Middleton Island. The summit has a depth of 1410 fathoms minimum, and depths surrounding the flanks range from 1700 fathoms to over 2400 fathoms (NOAA Chart 16013).

Denson Seamount is located in the eastern GOA approximately 140 nautical miles off the coast of Southeast Alaska. The summit has a depth of 507 fathoms minimum, and depths surrounding the flanks range from 1200 fathoms to over 1700 fathoms (NOAA Chart 16016).

Derickson Seamount is located in the western GOA approximately 110 nautical miles south of the Shumagin Islands. The summit has a depth of 1580 fathoms minimum, and depths surrounding the flanks average over 3600 fathoms (NOAA Chart 530).

Kodiak Seamount is located in the central GOA approximately 100 nautical miles west of Kodiak Island. The summit has a depth of 1190 fathoms minimum, and depths surrounding the flanks range from 1600 fathoms to over 2800 fathoms (NOAA Chart 530).

Marchand Seamount is located in the central GOA approximately 120 nautical miles south of Kodiak Island. The summit has a depth of 1380 fathoms minimum, and depths surrounding the flanks range from 1600 fathoms to over 2100 fathoms (NOAA Chart 16013).

Odyssey Seamount is located in the central GOA approximately 180 nautical miles south of Kodiak Island. The summit has a depth of 960 fathoms minimum, and depths surrounding the flanks average over 1800 fathoms (NOAA Chart 16013).

Sirius Seamount is located in the western GOA approximately 175 nautical miles south of the Shumagin Islands. The summit has a depth of 1055 fathoms minimum, and depths surrounding the flanks average over 2200 fathoms (NOAA Chart 530).

Unimak Seamount is located in the western GOA approximately 40 nautical miles south of Sanak Island and 80 nautical miles east of Unimak Pass. The summit has a depth of 715 fathoms minimum, and depths surrounding the flanks range from 1100 fathoms to over 1500 fathoms (NOAA Chart 530).

3.1.2 Biological Environment and Habitat Usage of Species

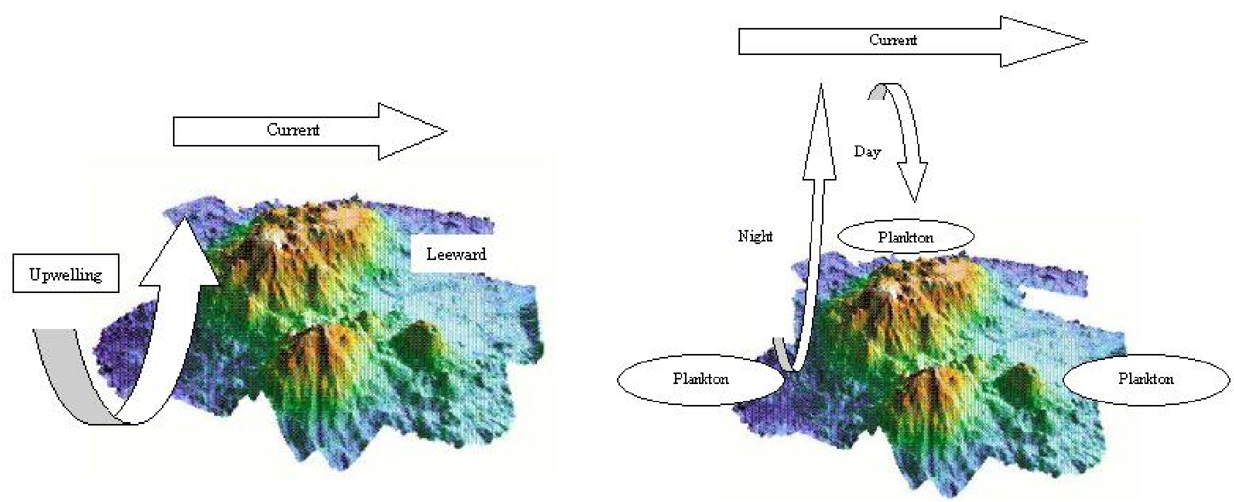
This section describes the biology and habitat of FMP-managed species found within the HAPCs. Habitats associated with FMP-managed species' are fully described in Appendix F – EFH Habitat Assessment Reports, EFH DEIS, January 2004. These assessments describe the species life history, relevant trophic information, substrate types, oceanographic features, spawning, age of maturity, and predator–prey relationships. Additional information for FMP-managed species is contained in Chapter 3, Section 3.2.1 of the EFH DEIS, January 2004.

Research has documented the presence of fish, crab, and epibenthic living structure on seamounts (Alton, 1986; Moore et al. 2003). However, limited explanations exist to ascertain which species are found on or above the feature and why they are found there. Marine scientists, using various methods of research, have investigated and documented the presence of fish, crab and living habitat structure for the 5 named seamounts analyzed in this EA. These methods include bottom sampling grabs, submersibles, remote cameras, traps, longlines, trawls, and pots. It is thought that ocean currents deposit eggs and larvae.

These early life stages may settle on the feature and grow to maturity. Another theory is that certain species take up residency during migration. Scientists do not know whether the attraction to the seamount is based on the habitat features of the seamount or prey availability or on isolated depth contours that similar fish associate with on the shelf and slope. However, research suggests small and localized populations, with little movement away from the seamount (Alton 1986).

FMP-managed species specifically documented by research on named seamounts include mostly the adult life history stages of Sablefish (*Anaplopoma fimbria*), Deep-sea sole (*Embassichthys bathybius*), Longspine thornyhead rockfish (*Sebastolobus altivelis*), Shortspine thornyhead rockfish (*Sebastolobus alascanus*), Rougheye rockfish (*Sebastes aleutianus*), Shortraker rockfish (*Sebastes borealis*), Aurora rockfish (*Sebastes aurora*), Sockeye salmon (*Oncorhynchus nerka*), Pink salmon (*Oncorhynchus gorbuscha*), Chum salmon (*Oncorhynchus keta*). Other FMP species documented on or above seamounts include crab, octopus, sculpin, and squid (Alton 1986; Hughes 1981; Maloney 2003). These species share common habitat characteristics, such as an association with greater depths, and associations with hard substrates (rockfish) or soft substrates (deep-sea sole). Three species of Pacific salmon were found by pelagic research gear in waters above the seamount summit.

In addition to habitat type, currents play a major role in the distribution of fish on and above the feature. The extreme vertical rise of the flanks toward the summit associated with offshore currents creates unique current conditions. Currents upward along the flanks and across the summit create a transverse flow and depositional area on the leeward side of the feature (Figure 3-2a). Also, geomorphic features on the summit may create local circulation and thermocline layers, such as pinnacle formations (similar to gulley and canyon habitats along the slope) (Gubbay 2003). Current may also surround the many sides of the seamount, depending on the geographic location and geomorphic condition of the seamount. This upwelling may create a slackwater condition over the summit (Gubbay 2003). Current patterns may distribute fish across the summit and along the flanks. Living habitats, such as high relief structure corals, are known to orient themselves with the higher current and attach to hard bedrock for support. Submersible dive investigations have recorded hard corals along the flanks and on the summit of seamounts (NOAA Ocean Explorers, Exploring Alaska's Seamounts, 2002).



a b

Figure 3-2. (a) Basic Seamount Current Profile (b) Diurnal Plankton Movements Across a Seamount.

Diurnal migrations of plankton may also create a unique feeding opportunity for fish on the seamount. During the night, plankton migrations move towards the surface. The cross current moves these plankton above and across the summit. Then as daylight drives the plankton back down, they become available for fish on and above the summit (Figure 3-2b). The cycle is replenished by the next diurnal cycle (Gubbay 2003, Rogers 1994). Further, the cycle may attract pelagic migratory fish to stop and feed on the seamount. Some fish may then remain as residents.

3.1.3 GOA HAPC Sites

The GOA has approximately 160,000 sq. km of continental shelf, which is less than 25% of the EBS shelf. The GOA is a relatively open marine system with landmasses to the east and the north. Commercial species are more diverse in the GOA than in the EBS, but less diverse than in the Washington-California region. The most diverse set of species in the GOA is the rockfish group of which 30 species have been identified in this area. Physical and oceanographic features, major living marine resources, and economic conditions associated with the various fisheries of the GOA can be found the EFH EIS (NMFS, 2005) and the Final Programmatic Groundfish SEIS (NMFS, 2004a).

In the GOA, six HAPC areas (9 different sites) have been identified for consideration as a HAPC for this EA (Table 2-2). Four of these areas have site-specific research. Areas that lack site-specific habitat information are thought likely to contain similar habitat.

3.1.3.1 Sanak Island Area

This area is located south of Sanak Island on the western GOA slope and encompasses 273 nm^2 (Figure 2-4, Table 2-2). This proposed HAPC site was based on anecdotal information of benthic habitat originally identified by trawl skippers who possess knowledge of the bathymetry of the GOA. These captains believe the proposed site is good rockfish habitat, and may support epifauna habitat that may be linked with FMP species. The overall contours and relief features of the slope such as vertical rock walls, gullies, and gravel areas are considered important for rockfish. Although there has been little or no information that demonstrates that high-relief hard coral concentrations exist at this proposed site, the relatively rough bottom at this site makes it a likely habitat candidate for hard corals and rockfish. The bottom in this area is thought to be rough by trawl fisherman likely from experience reading the echo-sounder in similar rough and steep sloped habitats where gear has been damaged by this type of bottom and maybe from the incidental bycatch of coral.

3.1.3.2 Albatross Bank Area

The proposed HAPC site is on Albatross Bank in the central GOA, and encompasses 123 nm^2 (Figure 2-4, Table 2-2). This proposed HAPC site was based on anecdotal information of benthic habitat originally identified by trawl skippers who possess knowledge of the bathymetry of the GOA. These captains believe the proposed site is good rockfish habitat and may support epifauna habitat that may be linked with FMP species. This HAPC site is located on the GOA slope area, one of the GOA bottom type features considered important for rockfish. Although there has been little or no information to demonstrate the presence of high-relief hard coral stands at this proposed site, the relatively rocky and rough bottom found at this site makes it a likely habitat for hard corals and rockfish.

3.1.3.3 Middleton Island Area

The proposed HAPC site is located south of Middleton Island in the eastern GOA and encompasses 87 nm^2 (Figure 2-4, Table 2-2). This proposed HAPC site was based on anecdotal information of benthic habitat originally identified by trawl skippers who possess knowledge of the bathymetry of the GOA. These captains believe the proposed site is good rockfish habitat and may support epifauna habitat that may be linked with FMP species. This HAPC site is located on the GOA slope area, one of the GOA bottom type features considered important for rockfish. Although there has been little or no information to demonstrate the presence high-relief hard coral stands this proposed site, the relatively rocky and rough bottom found at this site makes it a likely habitat for hard corals and rockfish.

3.1.3.4 Cape Ommaney Area

The Cape Ommaney HAPC is located in the eastern GOA about 28 km west of Cape Ommaney, Baranof Island, Alaska (Figure 2-5, Table 2-3). Common bottom types for Cape Ommaney area include rock, gravel, and cobble (NOAA Chart 17400). However, newer multi-beam survey technology shows that there is almost three times more rock habitat in this area than originally thought (O'Connell, 2002). Proposed designation of the Cape Ommaney site as HAPC was based on directed NMFS research that documented boulder and bedrock substrates supporting concentrations of *Primnoa* species coral (red tree coral). Bedrock and large boulders at depths between 201 and 256 m support the concentrations of *Primnoa* species. Several hundred colonies were observed at this site and many were greater than 1 m in height. High *Primnoa* sp. concentrations and associated sedentary invertebrates were also associated with the small pinnacles. A series of small pinnacles also make this area unique.

3.1.3.5 Fairweather Ground NW/SW Area

Two nearly adjacent HAPCs are located on the Fairweather Ground in the eastern GOA (2-6, Table 2-3). Common bottom types of the Fairweather Ground include bedrock, boulders, cobble, pebble, and gravel (NOAA Chart 16760; Bizzarro 2002), with a considerable amount of rock habitat on the bottom (O'Connell 2002). In 2001, NMFS/AFSC/Auke Bay Laboratory scientists conducted submersible dives with the DSV *Delta* in areas of the Fairweather Grounds where large catches of *Primnoa* sp. coral were collected as bycatch during triennial groundfish surveys. Submersible observations confirmed the presence of a series of dense *Primnoa* sp. concentrations located along the western flank. Additional submersible research has also noted areas of Primnoa species in rocky and boulder substrates. However, these two areas had greater concentrations of *Primnoa* species than other surveyed areas (Stone, *pers comm.*) Bedrock and large boulders at depths between 150 and 200 m support the concentrations of *Primnoa* species. Colonies were observed and distributed throughout the dive transects. Many colonies were greater than 1 m in height.

3.1.3.6 Biological Environment and Habitat of FMP-Managed Species

This section describes the biology and habitat of FMP-managed species found within the HAPCs. Habitats for FMP-managed species are fully described in Appendix F—EFH Habitat Assessment Reports, EFH EIS (NMFS 2005). These assessments describe the species' life history, relevant trophic information, substrate types, oceanographic features, spawning, age of maturity, and predator-prey relationships. Additional information for FMP-managed species is contained in Chapter 3, Section 3.2.1 of the EFH EIS (NMFS 2005).

Seven proposed HAPCs occur in depths that support epifauna and megafauna structure (sponges and high relief hard corals) and where the presence of FMP-managed rockfish has been documented. Three HAPCs (Cape Ommaney, NW & SW Fairweather Ground) have been found by NMFS and ADF&G to contain habitats with large rocky structures or steep rocky bedrock that provide a solid foundation for high relief hard corals, *Primnoa* species. FMP species have been observed in association with high relief hard corals at these sites. Three additional HAPCs along the slope (Sanak Island, Albatross Bank, Middleton Island) have been identified to contain habitats that may also support high relief hard corals based on anecdotal information from experienced trawl skippers and were brought forward in the HAPC proposal process. It is not known if these areas have habitats that support high relief hard corals; however, the experience of knowledgeable fisherman suggests a high likelihood of finding coral in these areas.

A habitat profile for *Primnoa* species reported by Cimberg (1981) associates *Primnoa* species with large boulders and exposed bedrock in areas with moderate to high currents and yearly temperatures above 3.7°C. Red tree coral (*Primnoa* sp.) may be the most common gorgonian coral observed in fished areas of the eastern GOA. Concentrations of *Primnoa* sp. are unique and are considered rare in the vast areas of the slope and shelf, and the current efforts that have been taken to located these concentrations. Where *Primnoa* species are found, the high relief structure appears to offer refugia for commercially important demersal fishes (Bizzarro, 2002).

Within the western and central GOA HAPCs (Sanak Island, Albatross Bank, and Middleton Island), EFH has been described for GOA groundfish FMP species, such as Pacific ocean perch, dusky rockfish, northern rockfish, shortraker rockfish, rougheye rockfish, thornyhead rockfish, yellow eye rockfish, and Dover sole (NMFS 2005).

Within the eastern GOA HAPCs (Cape Ommaney and Fairweather Ground), EFH has been described for GOA groundfish FMP species, such as Pacific cod, Pacific ocean perch, walleye pollock, dusky rockfish, northern rockfish, shortraker rockfish, rougheye rockfish, yellow eye rockfish, Dover sole, flathead sole, and rex sole (NMFS 2005).

3.1.4 Aleutian Island HAPC Sites

The Aleutian Islands lie in an arc that forms a partial geographic barrier to the exchange of northern Pacific marine waters with Bering Sea waters. The AI continental shelf is narrow compared with the Eastern BS shelf, ranging in width on the north and south sides of the islands from about 4 km or less to 42-46 km; the shelf broadens in the eastern portion of the AI arc. The AI comprises approximately 150 islands and extends about 2,260 km in length.

Bowers Ridge in the AI is a submerged geographic structure forming a ridge arc off the west-central AI. Bowers Ridge is about 550 km long and 75-110 km wide. The summit of the ridge lies in water approximately 150-200 m deep in the southern portion and deepening northward to about 800-1,000 m at its northern edge.

The AI region has complicated mixes of substrates, including a significant proportion of hard substrates (pebbles, cobbles, boulders, and rock), but data are not available to describe the spatial distribution of these substrates.

The patterns of water density, salinity, and temperature are very similar to the GOA. Along the edge of the shelf in the Alaska Stream, a low salinity (less than 32.0 ppt) tongue-like feature protrudes westward. On the south side of the central AI, nearshore surface salinities can reach as high as 33.3 ppt, as the higher salinity EBS surface water occasionally mixes southward through the AI. Proceeding southward, a minimum of approximately 32.2 ppt is usually present over the slope in the Alaska Stream; values then rise to above 32.6 ppt in the oceanic water offshore. Whereas surface salinity increases toward the west as the source of fresh water from the land decreases, salinity values near 1,500 m decrease very slightly. Temperature values at all depths decrease toward the west (NMFS 2004a).

Climate change effects on the AI area are similar to the effects described for climate change in the EBS. For more information on the physical environment of the AI, refer to the PSEIS (NMFS 2004a).

Within the AI, 6 HAPC areas (13 different sites) have been identified for consideration as a HAPC for this EA. All of these local areas have had some level of site-specific research either within, adjacent to, or nearby the proposed site. Areas that lack site-specific habitat information are thought likely to contain similar habitat.

3.1.4.1 Adak Canyon

The Adak Canyon HAPC site is a large, geologically active submarine canyon on the south end of Adak Strait. The eastern flank of the canyon is rich in corals and other sedentary invertebrates. The area contains a series of small coral gardens on the island arc slope between 150–300 m in depth (Figure 2-7, Table 2-4).

3.1.4.2 Cape Moffett

The Cape Moffett HAPC site is located on the northwest side of Adak Island. The area contains series of small coral gardens on the island arc slope between 150–250 m depth (Figure 2-8, Table 2-4).

3.1.4.3 Bobrof Island

The Bobrof Island HAPC site is located around Bobrof Island, between Tanaga and Kanaga Islands. The Bobrof Island area contains a series of small coral gardens on the island arc slope between 150–250 m depth (Figure 2-9, Table 2-4).

3.1.4.4 Semisopochnoi Island

The Semisopochnoi Island HAPC management site is located approximately 5 miles southeast of Semisopochnoi Island. Lava flows from the submarine volcano, Amchixtam Chaxsxii (whose summit is at ~115 m MLLW, with an overall height of 580 m) extend 14 km downslope to the southeast of the volcano. Strong currents were observed. Coral garden habitat exists on the west side of volcano from the summit to a depth of 365m. AFSC scientists suspect the entire undersea volcano is likely covered with coral garden habitat. Large *Primnoa* spp. colonies present at 365m indicate that the submarine volcano may not have erupted within the last several hundred years (Figure 2-10, Table 2-4).

The research area around Semisopochnoi Island consists of the 10-mile Steller sea lion rookery closure delineated by NMFS around Semisopochnoi Island.

3.1.4.5 Great Sitkin

The Great Sitkin HAPC site is located on the north side of Great Sitkin Island, near Swallow Head. The area contains series of small coral gardens on the island arc slope between 300-365 m depth (Figure 2-11, Table 2-4).

3.1.4.6 Ulak Island

The Ulak Island HAPC management site is located on the northwest side of Ulak Island. This contains series of small coral gardens on the island arc slope between 150-250 m depth (Figure 2-12, Table 2-4).

The Ulak Island HAPC research site corresponds with the 10-mile Steller sea lion rookery closures delineated by NMFS around Amatignak/Ulak Islands

3.1.4.7 Bowers Ridge

The Bowers Ridge HAPC sites are located on Bowers Ridge and roughly encompass the fishable depths of Bowers Ridge and the Ulm Plateau. Bowers Ridge is a submerged geographic structure forming a ridge arc off the west-central AI, about 550 km long and 75 to 110 km wide. The summit of the ridge lies in water approximately 150 to 200 m deep in the southern portion deepening northward to about 800-1,000 m at its northern edge (Figure 2-13, Table 2-4).

3.1.4.8 South Amlia/Atka Island

The South Amlia/Atka Island HAPC site is located south of Amlia and Atka Islands, extending to 174 degrees 30 minutes West Longitude. Trawl skippers believe that these areas contain high-relief hard coral stands and rock pile features (Figure 2-14, Table 2-4).

3.1.4.9 Kanaga Volcano

The Kanaga Volcano HAPC site is located on the north end of Kanaga Island. Trawl skippers believe that these areas contain high-relief hard coral stands and rock pile features (Figure 2-14, Table 2-4).

3.1.4.10 Kanaga Island

The Kanaga Island HAPC site is located on the south side of Kanaga Island. Trawl skippers believe that these areas contain high-relief hard coral stands and rock pile features (Figure 2-14, Table 2-4).

3.1.4.11 Tanaga Island

The Tanaga Island HAPC site is located at the southwest side of Tanaga Bay on the west side of Tanaga Island. Trawl skippers believe that these areas contain high-relief hard coral stands and rock pile features (Figure 2-14, Table 2-4).

3.1.5 Biological Environmental and Habitat of FMP-Managed Species

This section describes the biology and habitat usage of FMP-managed species found within the HAPCs.

Habitats of FMP-managed species are fully described in Appendix F – EFH Habitat Assessment Reports, EFH EIS (NMFS 2005). These assessments describe the species life history, relevant trophic information, substrate types, oceanographic features, spawning, age of maturity, and predator-prey relationships. Additional information for FMP-managed species is contained in Chapter 3, Section 3.2.1 of the EFH EIS, April 2005.

In 2002 and 2003, NMFS and AFSC scientists discovered unique habitat in the central Aleutian Islands (AI) consisting of high density "gardens" of corals, sponges, and other sedentary invertebrates (Stone 2003; Rueter 2002). This habitat had not been previously documented in the North Pacific Ocean or Bering Sea and appeared to be particularly sensitive to bottom disturbance. Garden habitat was observed *in situ* with the DSV Delta and was found at 9 of 40 dive locations. Garden habitat was found at depths between 150 and 365 m and can be distinguished from other coral habitat by a seafloor completely covered by sedentary invertebrates including hydrocorals, gorgonian corals, alcyonacean corals, and sponges (predominantly demosponges). These gardens are similar in structural complexity to tropical coral reefs with which they share several important characteristics including a rigid framework, complex vertical relief, and high taxonomic diversity (Stone, *unpublished data*).

3.1.6 Protected Species

This section is a summary of the more detailed analysis of the studies most pertinent to protected species in the Alaska region are found in the EFH EIS (NMFS 2005). The BSAI and GOA support one of the richest assemblages of marine mammals and seabirds in the world. Several of these species are considered “protected species” because of their endangered or threatened status or because of other conservation issues associated with their continued well being. Twenty-six marine mammal species are present from the orders Pinnipedia (seals, sea lion, and walrus), Carnivora (sea otter and polar bear), and Cetacea (whales, dolphins, and porpoises) in areas fished by commercial groundfish fleets (Lowry and Frost 1985, Springer et al. 1999). This region also provides habitat for dozens of species of seabirds (Dragoo et al. 2003), many of which are incidentally taken in commercial fisheries (Melvin and Parrish 2001). Most species are resident throughout the year, while others seasonally migrate into or out of the management areas. Twelve ESUs of endangered or threatened salmon and steelhead also occur in the Alaska EEZ, although all spawn in streams of the U.S. Pacific Northwest, not Alaska. Marine mammals and seabirds occur in diverse habitats, including deep oceanic waters, the continental slope, and the continental shelf (Lowry et al. 1982, Livingston 2002). The following sections contain brief descriptions of the range, habitat, diet, abundance, and population status of some of these protected species, additional information on all the species can be found in the EFH EIS (NMFS 2005). Incidental take estimates and management measures taken to address interactions with commercial fisheries are included where applicable. Updated information on fishery-related take is summarized in Wilson (2003).

Federal agencies have an affirmative mandate to conserve listed species. Federal actions, activities, or authorizations (hereafter referred to as a federal action) must be in compliance with the provisions of ESA. Section 7 of ESA provides a mechanism for consultation by the federal action agency with the appropriate expert agency (NMFS or USFWS). Informal consultations, resulting in letters of concurrence, are conducted for federal actions that may affect, but are not expected to adversely affect, listed species or critical habitat. Formal consultations, resulting in biological opinions, are conducted for federal actions that may have an adverse effect on the listed species. Through the biological opinion, a determination is made as to whether the proposed action is likely to jeopardize the continued existence of a listed species (jeopardy) or destroy or adversely modify critical habitat (adverse modification). If the determination is that the action proposed will cause jeopardy or adverse modification of critical habitat, reasonable and prudent alternatives are included which, if implemented, would modify the action to avoid the likelihood of jeopardy to the species or destruction or adverse modification of designated critical habitat. A biological opinion with the conclusion of no jeopardy or adverse modification may contain recommendations intended to further reduce the negative impacts to the listed species. These conservation recommendations are advisory to the action agency (50 CFR 402.25[j]). If any taking is likely to occur during promulgation of the action, an incidental take statement may be appended to a biological opinion to provide for the amount of take that is expected to occur from normal promulgation of the action.

ESA also provides for the development and implementation of recovery plans for the conservation and survival of listed species. Recovery plans are to include site-specific management actions and measurable criteria that, when met, would result in delisting. Public and private groups and agencies and other institutions may be enlisted to participate in a recovery team. Recovery teams work under public view and must provide for consideration of public comments on a draft recovery plan before plan approval.

Twenty-three species occurring in the GOA and/or BSAI management areas are currently listed as endangered or threatened under ESA (Table 3.2-6). The group includes whales and the Steller sea lion. Other species listed under ESA include Pacific salmon, steelhead, and seabirds (see the following sections). The Steller sea lion was the only species to be determined in jeopardy or at risk of adverse modification of its habitat based upon the FMPs. A complete discussion of the Section 7 consultations to date on the species of relevance can be found in Section 2.9 of the NMFS Groundfish DPSEIS (NMFS 2001a).

Table 3-1 Endangered and Threatened Species under the ESA that May be Present in the BSAI and GOA

Common Name	Scientific Name	ESA Status
Northern Right Whale	*Balaena glacialis*	Endangered
Bowhead Whale	*Balaena mysticetus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Snake River Sockeye Salmon	*Oncorhynchus nerka*	Endangered
Short-tailed Albatross	*Diomedia albatrus*	Endangered
Steller Sea Lion	*Eumetopias jubatus*	Endangered and Threatened [1]
Snake River Fall Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
Snake River Spring/Summer Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
Puget Sound Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
Lower Columbia River Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
Upper Willamette River Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
Upper Columbia River Spring Chinook Salmon	*Oncorhynchus tshawytscha*	Endangered
Upper Columbia River Steelhead	*Onchorynchus mykiss*	Endangered
Snake River Basin Steelhead	*Onchorynchus mykiss*	Threatened
Lower Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Upper Willamette River Steelhead	*Onchorynchus mykiss*	Threatened
Middle Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Spectacled Eider	*Somateria fishcheri*	Threatened
Steller's Eider	*Polysticta Stelleri*	Threatened

Note:
[1] Steller sea lions are listed as endangered west of Cape Suckling and threatened east of Cape Suckling.
Source: NMFS 2001a

3.1.6.1 Steller Sea Lion

The Steller sea lion (*Eumetopias jubatus*) ranges along the North Pacific Ocean rim from northern Japan to California (Loughlin et al. 1984), with centers of abundance and distribution in the GOA and AI, respectively. The northernmost breeding colony in the EBS is on Walrus Island near the Pribilof Islands and in the GOA on Seal Rocks in Prince William Sound (Kenyon and Rice 1961). Evidence of a major decline in Steller sea lion abundance throughout most of its range prompted several environmental organizations to petition NMFS to list all populations of Steller sea lion in Alaska as endangered. On April 5, 1990, NMFS issued an emergency rule (55 FR 12645) to list the Steller sea lion as a threatened species under ESA and established emergency interim measures to begin the population recovery process (55 FR 12645, 55 FR 13488, 55 FR 49204, 55 FR 50005). A recovery plan was completed in 1992, and a Steller sea lion Recovery Team is currently developing an updated recovery plan. In 1997, NMFS reclassified Steller sea lions as two distinct population segments under ESA (62 FR 24345). The population segment west of longitude 144°W, or approximately at Cape Suckling, was reclassified as endangered. The eastern stock remains listed as threatened. Both stocks are listed as "depleted" under the Marine Mammal Protection Act (MMPA).

In the EBS and GOA, the Steller sea lion diet consists of a variety of schooling fishes (e.g., pollock, Atka mackerel, Pacific cod, capelin, Pacific sand lance, rockfish, Pacific herring, and salmon), as well as cephalopods such as octopus and squid (Calkins and Goodwin 1988, Lowry et al. 1982, Merrick and Calkins 1995, Perez 1990) and other fishes such as flatfish and scuplins. Recent analyses of fecal samples collected on Steller sea lion haulouts and rookeries suggest that Atka mackerel is particularly important for Steller sea lions in the central and western AI—more than 70 percent of the animals' summer diet in this area is Atka mackerel. Pollock represent more than 60 percent of the diet in the central GOA, 29 percent in the western GOA and eastern AI, and more than 35 percent in parts of the central AI (Merrick and Calkins 1995). Small pollock (less than 20 cm) appear to be more commonly eaten by juvenile sea lions than older animals (Merrick and Calkins 1995).

NMFS observers monitored incidental take in the BSAI and GOA groundfish trawl, longline, and pot fisheries from 1990 to 1995. The minimum estimated mortality rate incidental to commercial fisheries is 30 Steller sea lions per year, based on observer data (23.7) and self-reported fisheries information (5.7), or on stranding data (0.2) where observer data were not available. No Steller sea lion mortality was observed by NMFS in the pot fishery in either the BSAI or GOA (Hill and DeMaster 1999).

Six commercial fisheries currently operate within the range of the endangered western stock of Steller sea lions off Alaska. No sea lion mortality has been observed in several of these fisheries (all pot fisheries and the BSAI longline fisheries). For the most recent 5-year period for the BSAI trawl fisheries, the mean mortality rate was 7.8; in the GOA trawl fisheries, the rate was 0.6; and in the GOA longline fisheries, the rate was 1.2 (Angliss and Lodge 2002). Under the current regulations for the Atka mackerel, Pacific cod, and pollock fisheries in the BSAI and GOA, Steller sea lions are afforded considerably greater protection from both direct take and indirect impacts from fishery removals of prey.

Steller sea lion foraging distribution is inferred from at-sea sightings or observations of presumed foraging behavior (Fiscus and Baines 1966, Kajimura and Loughlin 1988, NMFS unpublished data from the Platform-of-Opportunity Program), records of incidental take in fisheries (Perez and Loughlin 1991), and satellite telemetry studies (Merrick et al. 1994, Merrick and Loughlin 1997). Three foraging areas were designated as critical habitat for Steller sea lions based on observations and incidental takes in the vicinity of Seguam Pass, the southeastern BS, and Shelikof Strait (Loughlin and Nelson 1986, Perez and Loughlin 1991).

The value of a given area for foraging sea lions depends not only on the nutritive quality of the prey available, but also on the energetic effort required to obtain that prey. Foraging efficiency, as a function of net energy gain, thus depends in part on how far sea lions must travel, how deep they must dive, and how much time they must spend to catch prey. These parameters have been and continue to be studied with satellite telemetry techniques. The NMFS Alaska Ecosystem program and the ADF&G Steller sea lion research program collaborated to produce a white paper on the use of satellite telemetry to study Steller sea lion movements and foraging behavior (ADF&G and NMFS 2001). The limitations of this data and its use in establishing protective measures for sea lions are described in the Steller Sea Lion Protection Measures FEIS and the associated biological opinion (BiOp) (NMFS 2001b and 2001c). NOAA Fisheries has completed a supplement to the 2001 BiOp which presents recent telemetry data, how that scientific information was interpreted with relation to foraging needs of Steller sea lions, and its relevance to the efficacy of sea lion protection measures (NMFS 2003a). These telemetry studies suggest that foraging distributions vary by individual, size, age, season, site, and reproductive status (Merrick and Loughlin 1997, ADF&G and NMFS 2001, Loughlin et al. 2003).

Compared to other pinnipeds, Steller sea lions tend to make relatively shallow dives, with few dives recorded to depths greater than 250 m. Foraging patterns of adult females differ during summer months when females are with pups versus winter periods when considerable individual variation has been observed. Trip duration (the period between haulouts) for females with young pups in summer is approximately 18 to 20 hours. Dives are typically shallow (mean = 21 m), of short duration (mean = 1.4 min), and frequent (mean = 13/h). Trip length averages 17 km, and sea lions dive approximately 4.7 hours per day. In winter, females with young of the year (5 to 10 months of age) have trips averaging almost 1 day in duration, while females with yearlings (17 to 22 months of age) had trips averaging 2.3 days (Loughlin et al. 2003). During winter, mean trip length is about 130 km, and dives total about 5.3 hours per day (Merrick and Loughlin 1997). In winter, yearling sea lions' foraging trips average 30 km in distance and 15 hours in duration, with less effort devoted to diving than adult females during their trips (mean of 1.9 hours per day). Estimated home ranges are 320 km^2 (with large variation) for adult females in winter, and 9,200 km^2 for yearlings in winter (Merrick and Loughlin 1997).

Recent telemetry studies have examined the movement patterns of immature sea lions (6 to 22 months of age) whose survival rate is considered an important component in the Steller sea lion decline (Loughlin et al 2003). Young-of-the-year sea lions (6 to 12 months of age) had dives that were more brief in duration and more shallow than yearlings (13 to 22 months of age). The length of trips taken by sea lions less than 10 months old was much shorter than trips taken by older juveniles (means = 7.0 km and 24.6 km, respectively). The length of foraging trips, dive characteristics, and depth of dives, began to increase substantially after 9 months of age, corresponding with the presumed age of weaning (Loughlin et al. 2003). This study also compared the diving characteristics of sea lions from Washington with those from Alaska and found that the Washington animals spent more time diving and dove deeper than Alaska sea lions. These differences were attributed to localized differences in where their prey are concentrated (Loughlin et al. 2003). The recent telemetry data suggest that the areas of high use are with 0 to 10 nm of rookeries and haulouts. However, both older juveniles and adult females may utilize the 10 to 20 nm zone of critical habitat to a greater extent in the winter. NOAA Fisheries concluded that the 0 to 10 nm zone was of high concern from potential overlap with fisheries, the 10 to 20 nm zone was low to moderate, and beyond 20 nm was of low concern (NMFS 2003b).

3.1.6.2 ESA-listed Whales

3.1.6.2.1 North Pacific Right Whale

North Pacific right whales (*Eubalaena glacialis*) are known to occur in the North Pacific Ocean and are thought to move from subpolar regions to lower latitudes with the onset of winter (Cumming 1985, Scarff 1986, Rice 1998). A small group of right whales (up to 13 animals) has been seen consistently in the EBS since 1996 (Goddard and Rugh 1998, Tynan 1999, LeDuc et al. 2002), with an additional sighting just south of Kodiak Island in the GOA in July 1998 (Waite 1998). Right whales have been sighted annually during NMFS surveys from 1998 to 2002 (LeDuc et al. 2002). Right whales feed primarily on at least three species of calanoid copepods and, to a lesser extent, on euphausiids (Klumov 1962, Omura et al. 1969). Tynan (1999) sampled zooplankton near right whales seen in the EBS in July 1997 and reported copepod species typical of the middle-shelf assemblage (i.e., *Calanus marshallae*, *Pseudocalanus newmani*, and *Acartia longiremis*), which are smaller species than those that right whales have historically consumed (i.e., *C. plumchrus* and *C. cristatus*) in outer shelf waters.

Right whales are listed as endangered under ESA, and a recovery plan has been written (NMFS 1991). In 1983, a right whale was incidentally killed in a gill net in Russian waters (NMFS 1991). Gill nets were also possibly responsible for the death of another right whale off the Kamchatka Peninsula in October 1989 (Kornev 1994). No other known incidental takes of right whales have occurred in the North Pacific. Any mortality incidental to commercial fisheries would be considered significant (Hill and DeMaster 1999).

On October 13, 2000, NMFS received a petition, dated October 4, 2000, requesting that NMFS revise the present critical habitat designation for the northern right whale under ESA by designating an area within the EBS as critical habitat for northern right whales in the North Pacific. Initially, NMFS published a determination on February 20, 2002, that the recommended action in the petition was not warranted at the time, primarily because the extent of critical habitat could not be determined because the essential biological requirements of the population in the North Pacific Ocean were not sufficiently understood. NMFS has reevaluated the petition in light of new and existing information on Pacific right whale habitat following the completion of the 2002 right whale surveys and research and is preparing a document that identifies features of the environment considered to be essential to the conservation of this species. The NMFS Office of Protected Resources is developing an updated recovery plan.

3.1.6.2.2 Blue Whale

Blue whales (*Balaenoptera musculus*) in the North Pacific Ocean presumably migrate between subpolar feeding grounds in spring and summer and low latitudes in winter (Perry et al. 1999a, Rice 1978, Tomlin 1967); however, there is evidence that some whales remain in low latitudes year-round (Reilly and Thayer 1980). Long-term acoustic monitoring has shown that blue whales are heard along the AI westward and in the GOA from late summer through winter (Watkins et al. 2000, Stafford et al. 2001). Recent acoustic monitoring recorded blue whales off the western Aleutians from June to early January and from mid-July to mid-December in the GOA (Stafford in press). Blue whale range does not extend north of the AI, except rarely in the far southeastern corner of the EBS (Rice 1998). Blue whales were harvested in the GOA and along the AI from May to October, with most animals taken from June to August (Berlin and Rovnin 1966, Nishiwaki 1966, Tomlin 1967, Stewart et al. 1987, Brueggeman et al. 1985). However, post-whaling era aerial and visual surveys in former whaling grounds found no blue whales (Rice and Wolman 1982, Stewart et al. 1987). Prey are almost exclusively euphausiids (Kawamura 1980, Nemoto 1970). Blue whales may also eat crab larvae, copepods, and amphipods, but they are not targeting these organisms. In one study of stomach contents from harvested blue whales, copepods made up 0.4 percent, and amphipods made up 1 percent of the stomach contents (Nemoto and Kawamura 1977, Kawamura 1980). Blue whales are listed as endangered under the ESA and depleted under the MMPA.

3.1.6.2.3 Fin Whale

In the North Pacific Ocean, fin whales (*Balaenoptera physalus*) range from the Chukchi Sea to roughly longitude 20°N (Leatherwood et al. 1982, Rice 1995). In United States waters, fin whales are distributed seasonally off the coast of North America and in Hawaiian waters (Barlow et al. 1995, McDonald et al. 1995). Acoustic detections of fin whale calls indicate that whales aggregate near the AI in summer (Moore et al. 1998) and near the Hawaiian Islands in winter (McDonald 1999), although some whale calls continue to be detected in northern latitudes throughout the winter with no noticeable migratory movement south (Watkins et al. 2000). Prey includes planktonic crustaceans (euphausiids and copepods), squid, fish (herring, cod, mackerel, pollock, and capelin), and cephalopods (Gambell 1985). The total estimated annual food consumption by the EBS population is 57.5×10^3 mt, of which 9.2×10^3 mt (16 percent) is fish (Perez and McAlister 1993).

Fin whales are listed as endangered under ESA and as depleted under the MMPA. NMFS observers monitored incidental take of marine mammals in the 1990 to 1995 BSAI and GOA groundfish trawl, longline, and pot fisheries. No fin whale mortalities were observed (Hill and DeMaster 1999).

3.1.6.2.4 Sei Whale

Sei whales (*Balaenoptera borealis*) are found in all oceans, but remain in more temperate waters than other baleen whales. They migrate long distances from low-latitude winter areas to higher latitude summer grounds, but infrequently venture into cold, polar waters (Gambell 1976 and 1985, Rice 1998). In the North Pacific Ocean, the summer range extends from southern California to the GOA on the east; across the North Pacific south of the AI, extending into the EBS only in the southeastern corner of the deep southwestern Aleutian Basin; south to Japan on the west; and across the central Pacific north of the subarctic boundary (Gambell 1985, Rice 1998).

In the northern North Pacific, sei whales feed primarily on copepods when available (*Calanus cristatus, C. plumchrus*, and *C. pacificus*), but also on euphausiids such as *Thysanoessa inermis* and *T. longipes*, small schooling fish such as saury, and squid (Kawamura 1973, Nemoto 1959, Nemoto and Kawamura 1977). Sei whales use both engulfing and skimming feeding strategies, depending on the type of prey, unlike other balaenopterids, which feed by engulfing their prey (Nemoto 1959 and 1970, Perry et al. 1999b).

NMFS observers monitored incidental take in the 1990 to 1997 BSAI and GOA groundfish trawl, longline, and pot fisheries, but no mortalities or serious injuries of sei whales were observed (Hill and DeMaster 1999). Sei whales are listed as endangered under ESA. The eastern North Pacific stock is also considered a depleted and strategic stock under the MMPA (Barlow et al. 1997).

3.1.6.2.5 Humpback Whales

Humpback whales (*Megaptera novaeangliae*) are seasonal migrants to the North Pacific Ocean. They feed on zooplankton and small fishes off the coasts of the western continental United States, Canada, and Alaska, as well as eastern Russia. Some have been sighted in the BSAI during the summer. Recent genetic data suggest there are three populations of humpback whales in the Pacific Ocean, and two use Alaska marine waters seasonally. One group winters in the Hawaiian Islands and summers in the GOA and Southeast Alaska areas, and another group likely winters around Japan and migrates to the western GOA and BSAI during the summer. Reliable population trend data for the humpback whale are unavailable (Angliss and Lodge 2002). Humpbacks are listed as endangered under the ESA and depleted under the MMPA.

3.1.6.2.6 Sperm Whales

Sperm whales (*Physeter macrocephalus*) are widely distributed in the North Pacific Ocean and are seasonally present throughout the GOA. This whale is listed as endangered under the ESA and depleted under the MMPA. In the EBS, sperm whales are primarily found in areas from the Pribilof Islands to the west. Female and young sperm whales live primarily in tropical waters, while males are thought to summer in the GOA and BSAI and winter south of 40º. However, recent analyses of older tag data indicate their movement patterns are less clear (Angliss and Lodge 2002). Reliable estimates of sperm whale population trends are unavailable. Sperm whales feed on medium and large squid, as well as on large demersal and mesopelagic sharks, skates, and fishes.

3.1.6.2.7 Bowhead Whale

The western Arctic stock of bowhead whales (*Balaena mysticetus*), the only stock found in United States waters, is widely distributed in the central and western BS in winter (November to April). Bowhead whales are generally associated with the marginal ice front and found near the polynyas of St. Matthew and St. Lawrence Islands and the Gulf of Anadyr (Moore and Reeves 1993). From April through June, these whales migrate north and east, following leads in the sea ice in the eastern Chukchi Sea until they pass Point Barrow, from which they travel east toward the southeastern Beaufort Sea, where most spend June to September (Shelden and Rugh 1995). By late October and November, they arrive in the EBS (Kibal'chich et al. 1986, Bessonov et al. 1990), where they remain until the following spring migration. Studies of stable isotope ratios in bowhead baleen suggest that the Bering and Chukchi seas are the preferred feeding habitats, rather than the Beaufort Sea (Lee and Schell 1999). Historically, there were many records of bowhead whales in the Bering and Chukchi seas in summer (Townsend 1935), possibly consisting of a subpopulation that is now extinct, or nearly so (Bogoslovskaya et al. 1982, Bockstoce 1986).

Prey species identified from bowhead whale stomach contents have included crustacean zooplankton, particularly euphausiids and copepods, ranging in length from 3 to 30 mm, and epibenthic organisms, mostly mysids and gammarid amphipods. No observer program records of bowhead whale mortality incidental to commercial fisheries in Alaska exist (Hill and DeMaster 1999), although there are documented injuries to bowhead whales that may be from encounters with fishing gear (Philo et al. 1992). Bowheads are listed as endangered under the ESA and depleted under the MMPA.

3.1.6.2.8 Endangered and Threatened Pacific Salmon and Steelhead

West Coast salmon species currently listed under ESA originate in freshwater habitat in Washington, Oregon, Idaho, and California. No stocks of Pacific salmon or steelhead originating from freshwater habitat in Alaska are listed under ESA. Some of the listed species migrate as adults into marine waters off Alaska, where the potential exists for them to be caught as bycatch in the BSAI and GOA groundfish fisheries.

ESA-listed West Coast salmon and steelhead species are summarized in Table 3.2-7 and are categorized by ESUs. An ESU is a distinct population segment that is reproductively isolated and contributes to the ecological or genetic diversity of the species (Waples 1991). To date, nine ESUs of Chinook salmon, two ESUs of chum salmon, three ESUs of coho salmon, two ESUs of sockeye salmon, nine ESUs of steelhead, and one ESU of sea-run cutthroat trout have been listed as either threatened or endangered under ESA. Of those listed, only six ESUs of Chinook salmon, one ESU of sockeye salmon, and five ESUs of steelhead are thought to range into marine waters off Alaska during the ocean migration portion of their life history (Table 3.2-7). Those ESUs that are likely to migrate into marine waters off Alaska are highlighted and are either Chinook salmon, sockeye salmon, or steelhead from rivers in Washington and Oregon. NMFS designated critical habitat in 1993 (57 FR 57051) for Snake River sockeye, Snake River spring/summer Chinook, and Snake River fall Chinook salmon. NMFS designated critical habitat in 2000 (65 FR 7764) for Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River spring Chinook salmon and Upper Columbia River, Snake River Basin, Lower Columbia River, Upper Willamette River, and Middle Columbia River steelhead. These designations did not include any marine waters and, therefore, do not include any habitat where Alaska groundfish fisheries are prosecuted.

In the marine waters off Alaska, ESA-listed salmon ESUs are mixed with hundreds to thousands of other salmon stocks originating from the Columbia River in Washington and Oregon and river drainages in British Columbia, Alaska, and Asia. ESA-listed fish are not visually distinguishable from these other, unlisted, stocks. Mortal take of them in the salmon bycatch portion of the fisheries is assumed, based on limited abundance, timing, and migration pattern information gleaned from recovery locations of coded-wire-tagged surrogate stocks (closely related hatchery stocks that are tagged with coded wire tags).

The effects of the BSAI and GOA groundfish fisheries on listed salmon were considered through a series of informal and formal ESA Section 7 consultations with NMFS, Northwest Region, from 1992 to 1999.

ESA-listed Pacific salmon were also considered in the FMP level consultation on the groundfish FMPs (NMFS 2000a). The conclusion for Pacific salmon was that "after reviewing the current status, trends, distribution, and abundance of Snake River fall Chinook, Snake River spring/summer Chinook, Puget Sound Chinook, Upper Columbia River spring Chinook, Upper Willamette River Chinook, Lower Columbia River Chinook, Upper Columbia steelhead, Upper Willamette River steelhead, Middle Columbia steelhead, Lower Columbia River steelhead, and Snake River Basin steelhead, in the action area, interactions between these species and the BSAI and GOA groundfish fisheries do not appear to be significant" (NMFS 2000a). Of the Chinook and steelhead ESUs considered likely to migrate into marine waters off Alaska, steelhead were considered to be an unlikely component of groundfish bycatch because none were reported as such from 1995 to 1999, and only two coded wire tagged steelhead were recovered in Southeast Alaska seine salmon fisheries sampled from 1982 to 1993.

Chinook salmon and chum salmon are caught incidentally in Alaska groundfish fisheries, primarily in the walleye pollock trawl fishery. On average, from 1990 to 2001, 37,500 Chinook salmon and 69,000 other salmon species (more than 95 percent are chum salmon) were caught annually in EBS groundfish trawl fisheries, and 21,000 Chinook salmon and 20,500 other salmon were caught annually in GOA trawl fisheries. Factors influencing the level of salmon bycatch are location, gear type, and timing of the fishery (Witherell et al. 2002). Salmon bycatch is primarily composed of juvenile fish that are 1 or 2 years away from returning to the river of origin as adults.

Coded wire tag recoveries of listed Chinook salmon surrogate stocks since 1984 are given in Table 3.2-8. Most tag recoveries are from Upper Willamette River Chinook ESU surrogate stocks in the GOA, with Lower Columbia River Chinook surrogate stock tags also recovered in the GOA. Only two coded wire tags have been recovered in the BSAI from surrogate stocks. Because it is not possible to know if any actual fish from the listed Chinook salmon were taken, the 1999 biological opinion assumed that these would be a small fraction of the observed recovery of coded wire tags. An incidental take statement was appended to the biological opinion that allowed for an observed take of 55,000 Chinook salmon in the BSAI and 40,000 Chinook salmon in the GOA. These are the non-extrapolated bycatch levels expected from current fishing operations. Should incidental take levels exceed these amounts, then consultation should be reinitiated with the anticipated outcome of an incidental take statement commensurate with expected take resulting from normal operations in these fisheries. The NMFS Alaska Region was also given conservation recommendations for Chinook salmon to continue to monitor bycatch levels, seek ways to improve region-of-origin and stock composition estimates, and reduce bycatch through regulatory action such as time and area restrictions and incentive programs.

The indirect effects of the BSAI and GOA groundfish fisheries could include impacts to Chinook salmon or steelhead prey if they are taken as bycatch in the BSAI and GOA groundfish fisheries or if prey habitat is disrupted by fishing operations. Chinook salmon prey upon fish and invertebrates, including herring (adult and larval), sand lance, juvenile rockfish, pilchards, crab larvae, pelagic amphipods, and euphausiids (Healey 1991). Chinook salmon are considered opportunistic feeders, but fish are more dominant in diets of larger fish while invertebrates are more dominant in the diets of smaller fish (less than 25 inches [63 cm] long). Chinook salmon appear to feed most actively in spring and summer. Steelhead trout are also considered opportunistic feeders, although fish (including juvenile sablefish and rockfish), squid, amphipods, and polychaetes (in some years) predominated in ocean diet studies in the GOA (LeBrasseur 1966, Manzer 1968, Pearcy et al. 1988). Squids predominated in the subarctic current, from 51 to 49° N, fish in areas south of 50° N, and amphipods and polychaetes in areas north of 50° N. High similarities were found in the diets of all Pacific salmon species, and there is little evidence for specialization of diets between them, except for chum salmon.

Many of the prey of salmon are either target species (sablefish, rockfish), prohibited species (herring), or other bycatch species in the BSAI and GOA groundfish fisheries. Squid and other species (sculpin, skate, shark, and octopi) are not targeted by the groundfish fisheries, but bycatch levels are estimated. Forage fish include smelt, euphausiids, deep sea smelts, and lantern fishes. Amendments 36 and 39 of the BSAI and GOA FMPs limit forage fish bycatches through specific catch percentages on all groundfish participants to prevent development of directed forage fish fisheries.

3.1.6.2.9 ESA-listed Seabirds

Three species of seabirds that range into the BSAI and/or GOA are listed under ESA: the endangered short-tailed albatross (*Phoebastria albatrus*), the threatened spectacled eider (*Somateria fischeri*), and the threatened Steller's eider (*Polysticta stelleri*). The current population status, history of ESA Section 7 consultations, and NMFS actions carried out as a result of those consultations are described in the draft programmatic groundfish SEIS (NMFS 2001a). The life history, population biology, and foraging ecology of these three species are also described in detail in the Steller Sea Lion Protection Measures (NMFS 2001b).

The short-tailed albatross population was drastically reduced early in the century by commercial harvest (Hasegawa and DeGange 1982) and now numbers only about 1,600 breeding birds. Based on egg counts from 1980 to 1998, the population on Torishima Island, Japan (the main breeding site), is increasing at an annual rate of 7 to 8 percent (Cochrane, J., personal communication, USFWS, Grand Marais). Although the short-tailed albatross population is increasing, it is still extremely vulnerable because of its small size and the fact that it breeds on only two islands near Japan, one of which is an active volcano. Short-tailed albatross forage on the outer shelf. They take foods similar to those taken by Laysan and black-footed albatrosses and may forage at night (Sherburne 1993).

USFWS published final rules designating critical habitat for the spectacled eider (66 FR 9146; February 6, 2001) and the Steller's eider (66 FR 8850; February 2, 2001). The marine areas designated as critical habitat are reduced from the areas that were proposed and are further discussed in the draft programmatic groundfish SEIS (NMFS 2001a). No critical habitat was designated within United States territory or waters for the short-tailed albatross.

Critical habitat is defined as the specific areas containing the physical or biological features essential to the conservation of the species and that may require special management considerations or protection. Qualitative criteria used in identifying the eider critical habitat were focused on identifying (1) areas where eiders have been documented as consistently occurring at relatively high densities; (2) areas where eiders are especially vulnerable to disturbance and contamination during breeding, molting, wintering, or flightless periods; and (3) areas essential to the survival and recovery of the species. These final rules do not include requirements or regulations for special management measures or protection areas.

For the spectacled eider, the proposed marine units in the Yukon-Kuskokwim Delta and the North Slope were not designated critical habitat. The proposed marine units in Norton Sound and Ledyard Bay were reduced by 40 and 35 percent, respectively. The proposed wintering marine unit between St. Lawrence Island and St. Matthew Island did not change and was designated as critical habitat. For the Steller's eider, most of the proposed marine units were eliminated (Ninivak Island, Eastern Aleutians, south side of the Alaska Peninsula, Kodiak Archipelago, and Kachemak Bay/Ninilchik). The four units that are designated as critical habitat are subsets of the proposed Kuskokwim Bay (Kuskokwim Shoals and Seal Islands) and the north side of the Alaska Peninsula (Nelson Lagoon [including portions of Port Moller and Herendeen Bay] and Izembek Lagoon). See Figure 3.2-37 for the designated critical habitats for both species and the published final rules for exact coordinates and additional details.

NMFS initiated two Section 7 consultations with USFWS in 2000. The first FMP-level consultation is on the effects of the BSAI and GOA FMPs in their entirety on the listed species (and any designated critical habitat) under the jurisdiction of USFWS (NMFS 2000a). The second consultation is action-specific and is on the effects of the 2001-to-2004 TAC specifications for the BSAI and GOA groundfish fisheries on the listed species (and any critical habitat) under the jurisdiction of USFWS (NMFS 2000b). The most recent biological opinion on the effects of the groundfish fisheries on listed seabird species expired December 31, 2000. NMFS requested and was granted an extension of that biological opinion and its accompanying incidental take statement (USFWS 2001). USFWS intends to issue a biological opinion in mid-2003. This will allow for the consideration of the following new information: recommendations by the Washington Sea Grant Program on suggested regulatory changes to seabird avoidance measures based on a 2-year research program, as well as Council and NMFS action on the proposed alternatives in the Steller Sea Lion Protection Measures SEIS (NMFS 2001b).

Recently, USFWS has determined that trawl gear also may pose a threat to seabirds, primarily albatrosses and fulmars, that may strike the cable (third wire) connecting the trawl sonar device on the headrope to electronic gear on the vessel. No short-tailed albatross have been observed taken on trawl third-wire gear, but mortalities to Laysan albatross have been observed. An incidental take limit (for short-tailed albatross) may be imposed on the trawl groundfish fisheries off Alaska and will be included in USFWS' biological opinion expected in mid-2003. Industry, USFWS, and NMFS are working on a cooperative program to gather additional information on seabird interactions with trawl gear.

3.1.6.2.10 Other Seabirds

Seabirds spend most of their life at sea, rather than on land. The group includes albatrosses, shearwaters, petrels (*Procellariiformes*), cormorants (*Pelecaniformes*), and two families of *Charadriiformes*, gulls (*Laridae*), and auks (*Alcidae*), which include puffins, murres, auklets, and murrelets. Several species of sea ducks (*Merganini*) also spend much of their lives in marine waters. Other bird groups contain pelagic members, such as swimming shorebirds (*Phalaropodidae*), but they seldom interact with groundfish fisheries and, therefore, will not be further discussed.

Breeding and non-breeding seabird populations ranging into the BSAI and/or GOA include the northern fulmar (*Fulmarus glacialis*), storm petrels, other albatross species, shearwaters (non-breeders in Alaska), cormorants, jaegers, gulls, kittiwakes, terns, murres, guillemots, auklets, murrelets, puffins, and eiders. Most of these species rely primarily on forage fish, although several auklets are more planktivorous and eiders take more crustacea. The life history, population biology, and foraging ecology of these species and species groups are described in detail in the Steller Sea Lion Protection Measures SEIS (NMFS 2001b).

Thirty-eight species of seabirds breed in Alaska. More than 1,600 colonies have been documented, ranging in size from a few pairs to 3.5 million birds. USFWS is the lead federal agency for managing and conserving seabirds and is responsible for monitoring the distribution and abundance of populations. Breeding populations are estimated to contain 36 million individual birds in the EBS and 12 million birds in the GOA; total population size (including subadults and nonbreeders) is estimated to be approximately 30 percent higher. Five additional species that occur in Alaska waters during the summer months contribute another 30 million birds.

Time series data are collected for seabirds by USFWS. Time series data with a duration of 3 years or more exist for northern fulmar, storm petrels, cormorants, gulls, kittiwakes, terns, murres, guillemots, auklets, murrelets, puffins, and eiders. The sizes of breeding populations of seabirds in the GOA, EBS, and AI are not static. The size of breeding populations and discussions of their respective species are presented in the NMFS Groundfish DPSEIS (NMFS 2001a) There have been considerable changes in the numbers of seabirds breeding in Alaska colonies since the original counts made in the mid-1970s. Trends are reasonably well known for species that nest on cliffs or flat ground such as fulmars, cormorants, glaucous-winged gulls, kittiwakes, and murres, as well as for storm petrels and tufted puffins. Trends are known for one or two small areas of the state for pigeon guillemots, two areas for murrelets, and two areas for auklets. Not known are trends for other species (jaegers, terns, most auklets, and horned puffins (Byrd and Dragoo 1997, Byrd et al. 1998 and 1999). Population trends differ among species. Trends in many species vary independently among areas of the state, due to differences in food webs and environmental factors.

Seabirds are characterized by low reproductive rates, low annual mortality, long life span, and delayed sexual maturity—traits that make populations extremely sensitive to changes in adult survival (Ricklefs 1990, 2000). Population trends can result from changes in either productivity or survival, but most trends that have been investigated are attributed to changes in productivity. Such changes may have more to do with the difficulty of obtaining long-term demographic data on seabirds than from a clear link between trends and productivity. Many seabirds have life-history traits that favor adult survival over reproductive effort (Russell et al. 1999, Saether and Bakke 2000). For this reason, Russell et al. (1999) cautions against relying on productivity studies to reach conclusions about population dynamics.

In long-lived animals, observable impact on the breeding population may take years or decades. One study, which modeled impacts of loss of juveniles from longline incidental catch, estimated it would take 5 to 10 years to detect the decline in breeding populations and 30 to 50 years for the population to stabilize after conservation measures were taken (Moloney et al. 1994). A major constraint on seabird breeding is the distance between the breeding grounds on land and the feeding zones at sea (Weimerskirch and Cherel 1998). Breeding success in most species varies among years, but in stable populations, poor success is compensated for by occasional good years (Boersma 1998, Russell et al. 1999). Fluctuations in fish stock recruitment are likely to affect the survival of adult seabirds differently than seabird reproduction. Adult seabird survival is unlikely to be affected by the common interannual variability of prey stock because adults can shift to alternative prey or migrate to seek prey in other regions. In contrast, breeding birds are tied to their colonies, and local fluctuations in fish recruitment can have a dramatic effect on seabird reproduction. If food supplies are reduced below the amount needed to generate and incubate eggs, or if the specific species and size of prey needed to feed chicks are unavailable, local reproduction by seabirds will fail (Hunt et al. 1996). The natural factor most often associated with low breeding success is food scarcity (Kuletz 1983, Murphy et al. 1984, Murphy et al. 1987, Springer 1991, Furness and Monaghan 1987, Croxall and Rothery 1991, Cairns 1992). Seabird populations, therefore, are usually limited by food availability (Furness 1982, Croxall and Rothery 1991).

Foraging ecology differs among seabird species. Diets consist largely of fish or squid less than 15 cm long, large zooplankton, or a combination of both. Most seabirds in a given area depend on one or a few prey species (Springer 1991). Diets and foraging ranges are most restricted during the breeding season, when high-energy food must be delivered efficiently to nestlings, and are somewhat more flexible at other times of the year. Seabird species differ greatly from one another in their requirements for prey and feeding habitats and, consequently, in their response to changes in the environment. Winter foraging ecology is not known for most species (Hunt et al. 1999).

The availability of prey to seabirds depends on a large number of factors and differs among species and seasons. All seabird species depend on one or more oceanographic processes that concentrate their prey at the necessary time and place; these include upwellings, stratification, ice edges, fronts, gyres, and tidal currents (Schneider et al. 1987, Coyle et al. 1992, Elphick and Hunt 1993, Hunt and Harrison 1990, Hunt 1997, review in Hunt et al. 1999, Springer et al. 1999). Prey availability may also depend on the ecology of food species, including productivity, other predators, food-web relationships of the prey, and prey behavior, such as migration of fish and zooplankton. Once prey is captured, its value depends on its energy content.

Access to prey is limited by each bird's foraging behavior and range, as well as by prey size, depth, and behavior. Prey availability and density within each seabird species' foraging range are likely principal factors that determine whether seabird populations are stable, increasing, or declining.

Groundfish fisheries can impact seabird survival directly through incidental take in gear. Seabirds are caught in commercial fishing gear while attempting to seize baits or discards, or while pursuing their natural food near gear. The majority of seabird incidental catch in Alaska groundfish fisheries takes place on longline gear, but trawlers also interact with birds.

Some seabird species scavenge discards from floating and onshore processors. Such behavior may make them vulnerable to being caught in gear. Large-scale exploitation of an artificial food source also can cause a seabird population to increase, which can result in major shifts within the avian food web.

The presence of vessel traffic in Alaska waters imposes the risk of accidents that can affect seabirds, and this risk would be influenced by changes in the number of groundfish vessel days per year. Among the threats to seabirds are oil and fuel spills from collisions, groundings, and routine operations. Another threat from vessels is the introduction of rats to nesting islands from groundings or via ports; rats are voracious predators on young birds and can reduce seabird populations severely.

3.2 Effects of Fishing Activities on Fish Habitat

This section provides descriptions of fishing gear and methods used in the proposed HAPCs and their effects on fish habitat. It is a summary of the more detailed analysis of the studies most pertinent to the gear and habitats of the Alaska region found in the EFH EIS (NMFS 2005). Only a few studies have been completed in Alaska on the habitat effects of fishing gear, so the review incorporates the results of pertinent studies from other regions. The descriptions and research summaries below are organized by gear type.

Four main classes of fishing gear are used in the fisheries affected by the proposed alternatives: otter trawls, scallop dredges, longlines, pots, and troll gear (including dinglebar). These gear types have different characteristics that determine their impact on the benthic environment and on the amount of habitat encountered. Effects also depend on properties of the substrate and organisms. Because no comprehensive, systematic surveys have been conducted on the effects of these gears on habitat, this information is based on the knowledge of NMFS gear researchers and related information available to them.

Research conducted on effects of fishing gear on benthic habitats broadly recognizes several factors that influence the occurrence and degree of effect. Among these are (1) the intensity of fishing, (2) the frequency of fishing, (3) the class and specific characteristics of the fishing gear, (4) the environmental/ habitat characteristics, and (5) the level of naturally occurring disturbance. This section summarizes worldwide literature on the habitat effects of fishing gear relevant to the groundfish fisheries of Alaska, which is discussed and referenced in greater detail in the EFH EIS (NMFS 2005).

3.2.1 Non-pelagic Otter Trawls

Otter trawls (Figure 3-3) are conical nets that are pulled through the water, gathering fish into the open forward end and retaining them in a restricted bag (codend) at the back end. This type of trawl has four main components that may contact the seabed: doors, sweeps, footrope, and netting.

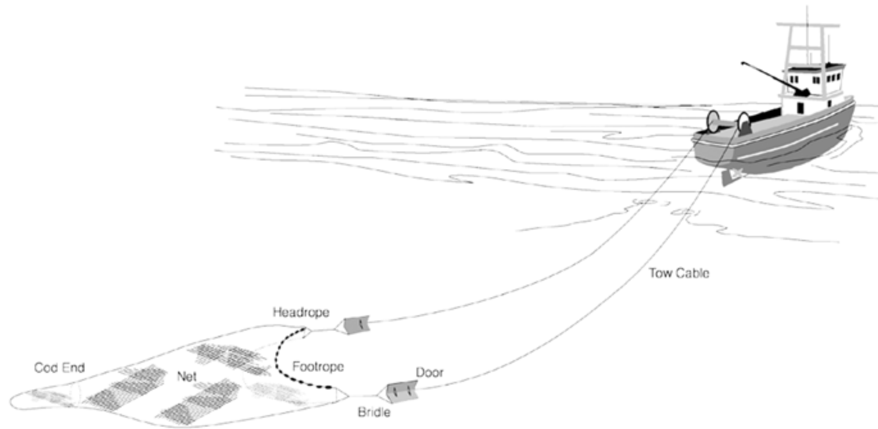


Figure 3-3. Bottom trawl.

Doors are flattened metal structures that ride vertically in the water and use the force of their motion through the water to spread the net horizontally. Some bottom trawl doors also use contact with the seafloor to augment this hydrodynamic spreading force. The weight of the doors (and some hydrodynamic forces) overcomes the upward pull of the towing cables to force the net down into the water.

Sweeps (as the term is used here; nomenclature varies between regions and individuals) are steel cables that connect the doors to the trawl net. Fiber and combination fiber/steel cables are also used. On bottom trawls, sweeps are commonly in contact with the seafloor and often have protective disks strung on them (more than 7 cm in diameter). The sweeps pass over the bottom at a narrow angle (i.e., 15º to 20º) from the direction of travel and herd near-bottom fish toward the trawl net.

The footrope consists of cable or chain connected along the bottom edge of the trawl net and is designed to contact the seafloor on bottom trawls. A 1996 survey of footrope types used off Alaska (168 observers delivered and returned forms from 95 vessels; Rose, C., NMFS, unpublished data) indicated that all vessels used large-diameter (averaging 39–47 cm by fishery) cones, spheres, or disks (i.e., bobbins). These bobbins are usually made of rubber, strung over the entire length of the footrope. Large-diameter bobbins are separated by sections of small-diameter disks, creating openings under the footrope that are an average of 13 cm in height and average two-thirds of the footrope in length. Elevating most of the footrope above the seabed reduces damage to netting and bycatch of crabs and other invertebrates. During fishing, the footrope is shaped like a horizontally spread “U” with the opening forward. Bobbins are nearly always used on the sides of the U (wings). In the center section, “tire gear” is used for cod, rockfish, and Dover and rex sole, as reported in all six reports from the Atka mackerel fishery and about half of the reports from the GOA fisheries. This gear consists of vehicle tires or sections of tires linked side-by-side to form a continuous cylinder (averaging 68 cm in diameter). Tire gear and other large-diameter bobbins are very effective at protecting the netting and making it possible to fish in areas with hard and uneven substrates.

The netting is the most easily damaged component of bottom trawls; hence, trawls are designed to prevent the netting from contacting the seafloor. Bobbin or tire footropes raise the netting so that only particularly prominent seafloor features should touch the netting. If the codend contained enough fish sufficiently heavier than water (flatfish) or rocks, pulling it down to the sea floor, the bottom of the codend would drag across the sea floor. Because codends have to be pulled up the vessel’s stern ramp, they are equipped with ropes that limit their diameter to less than 8 feet, which also limits the amount of bottom affected by a dragging codend. Chafing gear is also installed on the underside of the codend to prevent damage to the net during towing, which probably also reduces the amount of interaction between habitat and the web of the trawl.

An important aspect of gear design, when considering bottom habitat effects, is the proportion of the trawl contact footprint that is made by each of the components. Trawl doors used in Alaska are typically less than 3 m along the edge that contacts the seafloor; because they are fished at an angle to their direction of movement, the doors will affect a path narrower than 3 m. The length of the sweeps will vary with target species, substrate, and individual/operator preference. A large vessel targeting flatfish on a smooth bottom may use 350 m of sweeps on each side, while a small rockfish trawler on rough bottom may only use 30 m. Adjusting for the angle of the sweeps, the sweep path may vary from 10 to 100 m on either side of the net. Thus, the area covered by the sweeps can vary significantly. The width of the trawl net itself will depend on how large a trawl the vessel can pull and whether a high opening or a wide, low trawl is selected. An approximate range would be from 12 to 30 m wide. Thus, most of the trawl's footprint results from the sweeps, followed by the footrope, with a relatively small area contacted by the doors.

Alaska experiences lower overall fishing intensity relative to many of the areas where fishing effects research has been done (i.e., NW Atlantic and North Sea) (NRC 2002). Overall, the areas experiencing trawling intensities above one trawl tow per year in small (5 by 5 km) areas are less than 2% for the EBS, 3% for the Aleutians, and 2% for the GOA; in comparison, it is 56% for northeastern United States fisheries. A more detailed study of the distribution of effort intensities during recent years is being conducted by the AFSC. Estimated for each study summarized below are fishing intensities, in number of trawl contacts of studied locations (see Table 3-2).

Table 3-2. Comparison of gear, fishing intensity, and habitat features for studies of the effects of bottom trawl on benthic habitat.

Study	Relevance Rank	Substrate	Footrope (cm diam.)	Depth (m)	Lat (deg)	Region	Intensity (# of passes/yr)	Recovery (yr)
McConnaughey et al. 2000	0	sand	40	44-52	58	Alaska	see text	4
Freese et al. 1999, 2002	0	pebble,cobble	60	206-274	58	Alaska	1	1
Schwinghamer et al. 1996, 1998	0	fine-med sand	46	120-146	48	NW Atlantic	12	1
Prena et al. 1999	0	fine-med sand	46	120-146	48	NW Atlantic	12	
Kenchington et al. 2001	0	fine-med sand	46	120-146	48	NW Atlantic	12	1
Gilkinson et al. 1998	0	fine-med sand	doors	lab	48	NW Atlantic	1	
Brown Thesis 2003	0	sand	> 30	30	58	Alaska	0.5	
Brylinsky et al. 1994	1	silt over sand	29	5-10	45	NW Atlantic	1	0.3
Van Dolah et al. 1987	1	hard bottom	30	20	32	SE USA	1	1
Bergman and Santbrink 2000	1	sand & silt	20	45	55	North Sea	1	
Rose 1999	1	sand	42	68	56	Alaska	1	
Rumohr and Krost 1991	1	?	small doors	20	58	Baltic	1	
Moran and Stephenson 2000	2	? with epifauna	20	50-55	20	NW Australia	4	
Sainsbury et al 1997	2	? with epifauna	15	?	20	NW Australia	1	
Engel and Kvitek 1998	2	grvl.,sand, silt	?	180	36	West USA	4	
Wassenberg et al. 2002	2	coarse sand	8	25-358	20	NW Australia	1	
Sparks-McConkey & Watling 2001	2	silt/clay	1.8 (10?)	60	44	NW Atlantic	4	0.25, .5
Smith et al. 2000	2	silt/clay	?	200	35	Mediterranean	?	0.2
Sanchez et al. 2000	2	silt/clay	?	30-40	41	Mediterranean	1, 2	
Mayer et al. 1991	2	silt/clay	2	20	45	NW Atlantic	1	
Frid et al 1999, 2000	2	silt/clay	2	80	55	North Sea	?	
Ball et al. 2000	2	silt/clay	2	30-40	53	Irish Sea	2, 7.5	
Tuck et al. 1998	2	silt/clay	?	32	56	Scotland	18	1.5
Drabsch et al. 2001	2	sand(2) silt (1)	?	20	35	S. Australia	2	
Lindegarth et al. 2000	2	?	2	75-90	58	Sweden	18	
Gibbs et al. 1980	2	sand	0.8	?	35	SE Australia	?	
Thrush et al. 1998	2	?	14.5	13-35	36	New Zealand	1 trawl & 5 seine	
Bradstock and Gordon 1983	2	bryozoan reefs	?	10-35	41	New Zealand	?	
Probert et al. 1997	2	seamounts	?	662-1524	44	New Zealand	?	
Koslow and Garrett-Holmes 1995	2	seamounts	?	700-2000	44	S. Australia	?	
Recent Studies (Field work completed)								
Stone et al. A	0	fine sand	> 30	105-157	57	Alaska		
Stone et al. B	0	fine sand	42	142	57	Alaska	1, 6	
McConnaughey et al.	0	fine sand	36	49	57	Alaska	4	

While Alaska marine waters include a full range of substrates, the dominant bottom trawl fisheries target species that primarily occur over sand and gravel substrates, including yellowfin and rock soles (Smith and McConnaughey 1999, McConnaughey and Smith 2000) and cod. Studies on silt/clay environments are more relevant to the smaller fisheries for flathead, Dover and rex soles, and Alaska plaice. Studies of hard bottom, gravel, and boulder habitats are most applicable to the rockfish and Atka mackerel fisheries of the GOA and AI.

While fishing depths off of Alaska also range widely (10 to 1,000 m), most of the effort is concentrated in the 25 to 100 m range. Average fishing depth is deeper in the GOA than in the EBS, with more effort in the 100 to 200 m range. Alaska fisheries are conducted between latitude 51º and 61º N. Biotic habitat responses affecting recovery may be different in warmer climates.

Based on the information available to date, the predominant direct effects caused by bottom trawling include smoothing of sediments, moving and turning of rocks and boulders, resuspension and mixing of sediments, removal of seagrasses, damage to corals, and damage or removal of epibenthic organisms (Auster et al. 1996, Heifetz 1997, Hutchings 1990, ICES 1973, Lindeboom and de Groot 1998, McConnaughey et al. 2000). Trawls affect the seafloor through contact of the doors and sweeps, footropes and footrope gear, and the net sweeping along the seafloor (Goudey and Loverich 1987). Trawl doors leave furrows in the sediments that vary in depth and width depending on the shoe size, door weight, and seabed composition. The footropes and net can disrupt benthic biota and dislodge rocks. Larger seafloor features or biota are more vulnerable to fishing contact, and, larger diameter, lighter footropes may reduce damage to some epifauna and infauna (Moran and Stephenson 2000).

Seamounts are also affected by trawl fishing. Corals from seamount slope areas comprised the largest bycatch from otter trawls with large bobbins along the ground rope fished in water depths of 662 to 1,524 m in tropical New Zealand. These coral patches may require over 100 years to recover, and many may be crushed or overturned without coming to the surface in a net (Probert et al. 1997). Koslow and Garrett-Holmes (1998) sampled benthic fauna over seamounts in Tasmania subject to varying levels of fishing effort. Substrates in heavily fished areas were predominantly bare rock or coral rubble and sand. Colonial corals and associated fauna were lacking. Species abundance and richness were also lower than in lightly fished areas. Observed differences in faunal compostion and distrubtion on fished and unfished seamount off Tasmania and concluded that although the depths of the seaounts differed, trawling was response for stripping coral cover from the fished features (Koslow and Garrett, 2001). The authors attribute these differences to fishing effort and recommend permanently closed areas to protect fragile seamount ecosystems.

In summary, only very limited chronic and immediate effects of bottom trawling were detected by these studies. Whereas these results are consistent with some reports for other shallow, sandy, and naturally disturbed areas, an unequivocal determination of negligible effect is not possible in this case. However, seamounts are widely recognized as areas of high productivity, and important commercial fisheries worldwide focus on these habitats because fish species form large aggregations in such areas (Clark and O'Driscoll, 2003).

Reports of several relevant studies done recently in Alaska waters are in process and are expected to provide relevant and useful information on the effects of bottom trawling in this region. Comparative parameters of these studies are included in Table 3.2.1.

In relating trawl research to the fisheries of Alaska, some conclusions can be drawn:

1. Bottom trawls commonly, but not always, cause detectable short-term changes in infauna, epifauna, megafauna and substrate in different habitat types.

2. In comparable environments, studies using larger diameter footropes with noncontinuous contact along their length, such as those used in Alaska, indicated less damage to upright, attached epifauna than those with smaller diameters and continuous contact (Moran and Stephenson 2000, Van Dolah et al. 1987).

3. At higher trawling intensities, bottom trawling with large-diameter footropes can produce persistent changes in megafauna communities (McConnaughey et al. 2000) on naturally disturbed sandy substrates.

4. Even at relatively high intensities (12 tows per year), effects on infaunal communities may be ephemeral (Kenchington et al. 2001) on fine- to medium-grained sandy bottoms.

5. Large bodied, attached, and emergent epifauna are particularly vulnerable to trawl damage, even by a single pass at unimpacted sites (Collie et al. 2000, Van Dolah et al. 1987, Freese et al. 1999, Moran and Stephenson 2000), and effects can remain for at least a year in Alaska waters (Freese 2002).

6. Specific effects on EFH will depend on the fine-scale distribution and intensity of fishing effort relative to habitat distribution, levels of natural variability relative to fishing effects, and the nature of habitat dependencies of managed fish stocks. These are poorly known for Alaska EFH. Given discrete but overlapping spatial distributions of species reflecting different habitat preferences/requirements (e.g., McConnaughey and Smith 2000), differential responses to fishing gear effects are likely. In general, the ecological implications of reported changes due to bottom trawling are poorly known, particularly as they relate to sustainable fishery production and healthy ecosystem function.

3.2.2 Pelagic Trawls

Pelagic trawls (Figure 3-4) are special types of otter trawls that are fished off the seabed. These trawls are typically much larger than bottom otter trawls, but the leading parts of the net are constructed of large meshes (more than 1 m) for herding pelagic species into the trawl. The very large mesh openings greatly reduce hydrodynamic drag, so vessels can fish pelagic trawls that are much taller and wider than any bottom trawls they may use. These large meshes are required by law to allow for the escape of bycatch species that are not herded by these large meshes as easily as pollock, including halibut, sole, and crabs. Walleye pollock in the BSAI are caught exclusively by pelagic trawls, since non-pelagic trawling for pollock is prohibited. Pelagic trawls dominate the GOA pollock fishery and are sometimes used in rockfish fisheries. Seafloor contact is discouraged by prohibiting devices that protect trawl footropes. In the BSAI, vessels fishing for pollock are also limited by a performance standard prohibiting vessels from having more than 20 crab on board, which would be an indication of bottom trawling. The danger of trawl damage is likely to be effective in minimizing on-bottom trawling with pelagic trawl gear in areas of rough, hard, or complex substrates, but not necessarily in areas where significant obstructions are unlikely. Anecdotal evidence indicates that pelagic trawls are frequently fished on the bottom in areas with smooth floors. An indication of the distribution of such substrates in the EBS is that NMFS surveys the entire EBS shelf with a trawl whose footrope is as vulnerable as those of pelagic trawls; however, NMFS uses bobbin-protected footropes in the GOA and Aleutians because of the frequency of rough substrates.

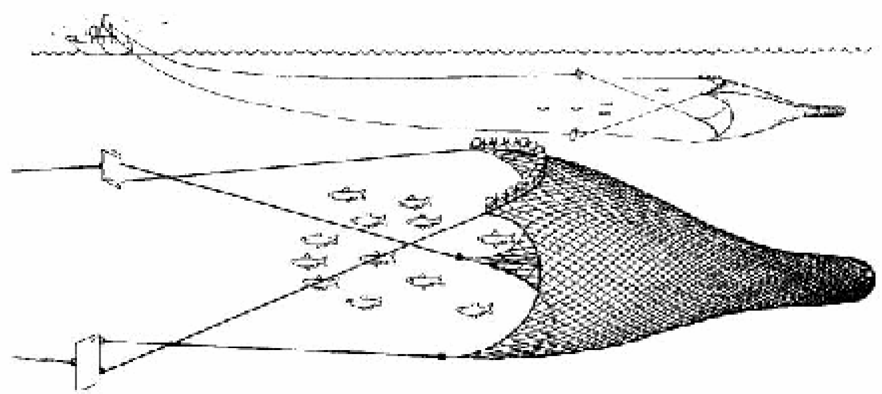


Figure 3-4. Pelagic Trawl

Pelagic trawls fished off-bottom have no known effect on benthic EFH. While some pelagic habitats may be very important to fish species, the chemical and hydrological features that make them important are not subject to change by the passage of fishing gear because of the continuous/fluid nature of the environment.

Indirect and anecdotal evidence suggests that, in some seasons and areas, pollock are distributed so close to the seabed that they could not be caught effectively without putting some parts of pelagic trawls in contact with the seafloor. Confirmation that such near-bottom distributions can be widespread includes the following: (1) in 5 out of 9 years that both acoustic and bottom trawl surveys were conducted in the EBS, the bottom trawl, which opens only 2 m high, detected more than 95% of the total biomass estimate for pollock more than 2 years old (2000 BSAI SAFE); and (2) the average acoustic measurements of pollock density from those surveys were five times higher half a meter above the bottom than at 2 to 4 m (Williamson, N., unpublished data, AFSC). As such, there is a strong incentive for fishing pelagic pollock trawls near/on the bottom.

The effects from pelagic gear being fished on the bottom have not been specifically studied, and there are some important differences from bottom trawls in ways that must be considered in assessing likely habitat impacts. Pelagic trawls used off Alaska are generally designed to fish downward, with the entire net fishing deeper in the water column than the doors. Pelagic doors are not designed to contact the seafloor. Pelagic trawls are pulled downward by weights attached to the lower wing ends, producing several hundred pounds of downward force. If the trawl is put in firm contact with the seafloor, most of this weight will be supported by the bottom, producing narrow scour tracks. Pelagic trawl footropes used in Alaska are most commonly made of steel chain, with some use of steel cable. Thus, their effects on habitat are more similar to tickler chains or small-diameter trawl footropes than to the large-diameter, bobbin-protected, footropes used in Alaska bottom trawls. Small footrope diameter will reduce the height that sediments are suspended into the water column, but make penetration of the sediment when bumps and ridges are encountered more likely. Animals anchored on or in the substrate would be vulnerable to damage or uprooting by this type of footrope. The very large mesh openings in the bottom panels of these trawls make it unlikely that animals not actively swimming upward in reaction to the net will be retained and hence removed from the seafloor, though they may be displaced a short distance or damaged in place.

In summary, 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. No data are available to estimate the frequency of this practice. Potential impacts would depend on the vulnerability of epibenthic animals in sand or mud substrates to contact with the small-diameter footropes. Prohibition of footrope protection makes the use and, hence, the impact of such gear on hard or rugged substrates unlikely.

3.2.3 Scallop Dredges

The Alaska weathervane scallop fishery is pursued using a standard "New Bedford style" scallop dredge (Figure 3-5) (Posgay 1957, von Brandt 1984, Smolowitz 1998, NREFHSC 2002, Barnhart 2003, Figure 1). These dredges are heavy-framed devices with an attached holding bag, and they are towed along the surface of the seabed. The upper and forward part of the rectangular frame, or bail, is attached to the towing bar. The fixed opening in the frame is low in height relative to its width. Steel dredge "shoes" are welded onto both lower corners of the cutting bar, which is located at the bottom of the aft part of the frame. The dredge shoes bear most of the weight and act as "sled runners," permitting the dredge to move easily along the substrate. Regulation requires that the trailing ring bag, which retains the catch, consists of 4-inch (inside-diameter) steel rings connected with steel links to allow undersized scallops to escape. Rubber chaffing gear may be used to protect the steel links and the integrity of the ring bag. The top of the bag consists of 6-inch stretched mesh polypropylene netting, known as the "twine back." The mesh netting helps hold the bag open while it is dragged along the ocean floor. A club stick attached at the end of the bag helps maintain the shape of the bag and provides for an attachment point to dump the dredge contents on the deck. A sweep chain footrope sweeps back in an arc and is attached to the bottom of the mesh bag. The bottom of the bag was formerly attached directly to the lower bar of the frame, but most fishers believe that the dredge tends bottom better with the chain footrope rigging. Bottom tending is also assisted by a pressure plate, which is a length of steel attached along the width of the dredge and angled so that the water pressure passing over it creates a downward force on the dredge.

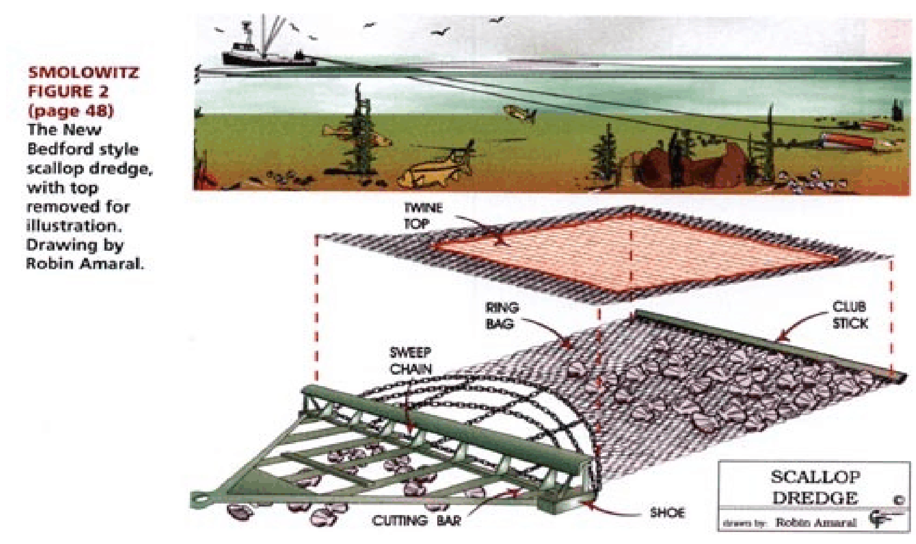


Figure 3-5. Scallop dredge, the New Bedford style.

When fishing properly, the dredge shoes, ring bag, and club stick maintain contact with the seabed. The side of the bail is designed so that the angle between the bail and the mouth of the dredge may be changed to suit bottom conditions. When the bottom is soft, the dredge is rigged so that the cutting bar (or scraper blade) will tend to ride up over the bottom and there will be less tendency for the dredge to become clogged with mud. The turbulence created by the cutting bar stirs the substrate and kicks up scallops into the ring bag. On harder bottoms, a different setting is used so that the dredge will dig in somewhat and catch more of the scallops in its path. In Alaska fisheries, however, the cutting bar is fixed and rides above the surface of the substrate (Kandianis, T., April 30, 2003, Kodiak Fish Company, personal communication). Tickler chains that run from side to side between the frame and the ring bag may also be used in harder areas or as an alternate fishing method when catch rates are low (Kandianis, T., April 30, 2003, Kodiak Fish Company, personal communication). If used on softer bottoms, the tickler chains will also stir up the substrate and kick scallops into the twine top (Turk, T., May 1, 2003, NMFS Northwest Fisheries Science Center, personal communication). Rock chains that run from front to back are used in Atlantic scallop fisheries to keep larger rocks out of the ring bag, but are not used in Alaska.

Vessels used in the Alaska weathervane scallop fishery range in size from 58 to 124 feet LOA. The number of vessels is tightly limited, so vessels can be selective regarding the times and places that they fish. Those fishing inside the Cook Inlet Registration Area are limited to operating a single dredge not more than 6 feet wide. Vessels fishing in the remainder of the state are limited to operating no more than two scallop dredges at one time, and each scallop dredge is limited to a maximum width of 15 feet. Each dredge is attached to the boat by a single steel cable operated from a deck winch. On average, a 15-foot New Bedford dredge weighs approximately 2,600 pounds, and a 6-foot dredge weighs about 900 pounds.

The magnitude and extent of seabed disturbances by scallop fishing vary according to the gear used and the habitats that are fished. For example, Drew and Larsen (1994) conducted a worldwide trawl and dredge study for the submarine cable industry to determine the depths to which various fishing gears penetrate the seabed. For normal fishing conditions, maximum cutting depths ranged from 40 mm for a New Bedford style dredge on sandy/rocky bottom to 300 mm for a mechanized (hydraulic) dredge on softer bottoms. Scallop dredges as a class penetrated less (40 to 150 mm) than beam trawls (60 to 300 mm) and bottom (otter) trawls and doors (50 to 300 mm). Box dredges that are used in shallow water European and Australian bivalve fisheries, some with toothed cutting bars, penetrated up to 250 mm. Overall, lower values were associated with light gear and hard bottoms, while higher values resulted from heavier gears and softer bottoms. Even within a particular gear class, such as scallop dredges, there may be substantial differences in effects. For example, damage to noncaptured scallops is reported to be significantly higher on rock substrate as compared to sand, perhaps due to crushing action of the dredge (Murawski and Serchuk 1989, Messiah et al. 1991, Shepard and Auster 1991). Moreover, a panel of experts recently concluded that much of the scientific literature on benthic habitat effects is based on the European style dredge, which differs in structure and use from the New Bedford style dredge (NREFHSC 2002). The leading edge of the European dredge contains teeth which dig into the substrate. This type of gear is used by smaller vessels that cannot tow a non-toothed dredge fast enough (4 to 5 knots) to fish effectively. The panel noted that because of these differences, research using the European dredge was not very relevant to North American scallop fisheries or the habitats in which they are found, and should only be applied in a limited fashion. The fishing configuration is also an important consideration influencing seabed effects. Although spring-loaded scallop dredges used in Ireland may be relatively narrow (75 cm), some vessels tow as many as 14 of these dredges simultaneously (Maguire et al. 2002). For East Coast and most Alaskan scallop fisheries, two 15-foot New Bedford dredges are simultaneously towed from opposites sides of the vessel, effectively doubling the footprint for each tow.

The weathervane scallop fishery in Alaska occurs in limited, but well-defined areas of the GOA and the EBS (Barnhart 2003). Based on an analysis of sediment properties associated with 28,000 individual dredge hauls for the period 1993 to 1997, Turk (2001) concluded that commercially fished beds occur most frequently on sand and sandy-silt in the GOA. Limited effort occurred in silty-clay substrates and in areas where bedrock and gravelly mud occurred, but was relatively high in sand, sandy to muddy gravel, gravelly sand, and clayey silt to silt substrates. These same data indicate commercial aggregations of scallops in the GOA occur over fairly narrow depth ranges from 25 to 195 m. The overall broad depth range was attributed to additional physical factors that were not investigated. Barnhart (2003) reports the majority of fishing effort for all of Alaska occurs at 40 to 60 fathoms (73 to 110 m). Although there are some areas or portions of areas that contain rock (e.g., Alaska Peninsula Registration Area), the Alaska scallop fishery occurs primarily on soft-bottom areas because fishers avoid harder areas if possible, because of probable damage to their fishing gear (Barnhart, J., May 1, 2003, Alaska Department of Fish and Game, Kodiak, personal communication).

Scallop dredges are designed to disturb the seabed in order to dislodge and capture scallops (NRC 2002). The following summaries of scientific research detail physical effects on the seafloor and effects on living substrate such as benthic invertebrates. Generally, these studies discuss changes that occur as a result of scallop dredging, but do not interpret the ecological consequences of these changes.

Physical effects: Sediment plumes generated by scallop dredging may cause burial, clog respiratory surfaces, and reduce light levels; they may also release heavy metals, nutrients, or toxic algal cysts (Black and Parry 1999). The magnitude and spatial extent of the suspended sediment field around any dredging operation are a function of the type of dredge used, the physical/biotic characteristics of the material being dredged (e.g., density, grain size, organic content), and site-specific hydrological conditions (e.g., currents, water body size/configuration). The rate of change of plume characteristics depends critically on suspended sediment grain sizes, current strength, and the related water column turbulence (Black and Parry 1999).

Biological effects: At least some of these reported effects can be considered unintentional bycatch by dredges that have inherently poor selection characteristics (Bourne 1966). Overall, dredge impact studies that are relevant to the Alaska fishery and environments, particularly those with a biological focus, are very limited. Similarly, although offshore scallop dredging has occurred on the sandy Scotian Shelf off eastern Canada since 1862, the thorough review by Messiah et al. (1991) of trawl and dredging impact literature did not include a single study from this area. Although there are obvious differences in the nature of trawls and scallop dredges, it is nevertheless reasonable under the circumstances to consider the results of bottom trawl studies in softer sediments, including sand, as representative of the effects due to scallop dredging. In fact, dredge and trawl studies summarized in major reviews of the literature are frequently handled in this fashion (e.g., Auster and Langton 1999, NRC 2002).

3.2.4 Longlines

Demersal longlines (Figure 3-6) consist of two buoy systems that are situated on each end of a mainline to which leaders (gangions) and hooks are attached. The groundline (or mainline), usually made of sinking line (more dense than water), can be several miles in length and have several thousand baited hooks attached. Small weights may be attached to the groundline at intervals. Below each buoyed end is a weight or an anchor. A vessel may set a number of lines, depending on the area, fishery, and site. The principal components of the longline that can contact the seabed are the anchors or weights, the hooks, the gangions (lines connecting the hooks to the groundline), and the groundline (ICES 2000). This gear is used in both the GOA and BSAI cod and sablefish fisheries.

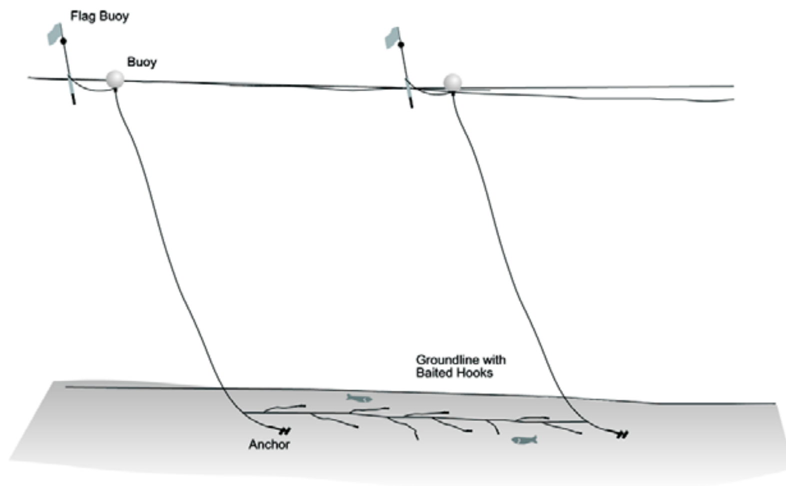


Figure 3-6. Set longline gear.

Longline gear in Alaska is fished on-bottom. In 1996, average mainline set length was 9 km for the sablefish fishery, 16 km for Pacific cod, and 7 km for Greenland halibut; average hook spacing was 1.2 m for the sablefish fishery, 1.4 m for Pacific cod, and 1.3 m for Greenland halibut. The gear is baited by hand or by machine, with smaller boats generally baiting by hand and larger boats generally baiting by machine. Circle hooks usually are used, except for modified J-hooks on some boats with machine baiters. The gear usually is deployed from the vessel stern with the vessel traveling at 5 to 7 knots. Some vessels attach weights at intervals along the longline, especially on rough or steep bottom, so that the longline stays in place and lays on-bottom.

Very little information exists regarding the effects of longlining on benthic habitat, and published literature is essentially nonexistent.

Observers on hook and line vessels have recorded bycatch of HAPC biota. Bycatches of benthic epifauna by Pacific cod fisheries using longline gear off Alaska were comparable to those using trawl gear (NMFS 2000). Bycatches of anemones and seawhips/pens were higher for longlines than trawls, while trawl bycatches were higher for corals and sponges. On a regional scale, these removals do not represent a large portion of the population. For example, anemone abundance on the EBS shelf, likely underestimated due to the sampling trawl not catching 100% of anemones in the trawl path, was estimated at 26,570,000 kg (McConnaughey, B., unpublished data) of which the 3-year (1997 to 1999) longline bycatch of 86,063 kg was at most 0.3%. A similar estimate for the Aleutian Islands area, where more of the hard substrates favored by anemones are available, could not be included because the trawl used for those surveys retains very few of the anemones in its path.

Observations of halibut gear made by NMFS scientists during submersible dives studying other aspects of longline gear off southeast Alaska provide some information on potential ways that longlines can affect bottom habitats (High 1998). The following is a summary of these observations:

Setline gear often lies slack and meanders considerably along the bottom. During the retrieval process, the line sweeps the bottom for considerable distances before ascending. It snags on objects in its path, including rocks and corals. Smaller rocks are upended, hard corals are broken, and soft corals appear unaffected by the passing line. Invertebrates and other lightweight objects are dislodged and pass over or under the line. Fish, notably halibut, frequently moved the groundline numerous feet along the bottom and up into the water column during escape runs, disturbing objects in their path. This line motion was noted for distances of 50 feet or more on either side of the hooked fish.

In addition to High's (1998) observations, Sigler and Lunsford (2001) cite observations by K.J. Kreiger of small *Primnoa* colonies attached to less than 0.4-m-diameter boulders that had been tipped and dragged, which he attributed to longline gear.

These submersible observations only demonstrate the potential, and some mechanisms for, effects of longlines on benthic habitat, particularly structure-forming animals. Those observations are insufficient to assess whether habitats are significantly altered at either local or regional levels or whether they vary in fisheries that use different gear or methods (i.e., setting mainline under tension). Important missing information includes the area of seafloor affected by longlines, the proportion of animals in that area that are affected, the severity of effects, rates of recovery, and the importance of affected structures in the function of EFH.

3.2.5 Pot Gear

Pots are baited enclosures (Figure 3-7), usually with one-way entrances, that retain entering fish and crab. They are used in the GOA cod fishery, and in BSAI cod, brown king crab, red king crab, and sablefish and turbot fisheries. Pots used in the Alaska cod fishery are generally modified from the designs developed for the crab fishery, with the one-way entrances modified to account for differences in crab and cod behavior. The most common design is a rectangular frame approximately 2 by 2 by 1 m made of welded steel rods with entrances on opposite walls. Because of solid steel construction, the pot weight (500 to 700 pounds) is not greatly reduced by immersion in water such that no additional anchors are required. Except in the Aleutians and certain months in the EBS, Alaska groundfish regulations require that each pot have its own buoyed line, so there are no underwater lines connecting adjacent pots (longlining). An exception to this is the deep-water golden king crab fishery in the Aleutian region, where the pots are longlined.

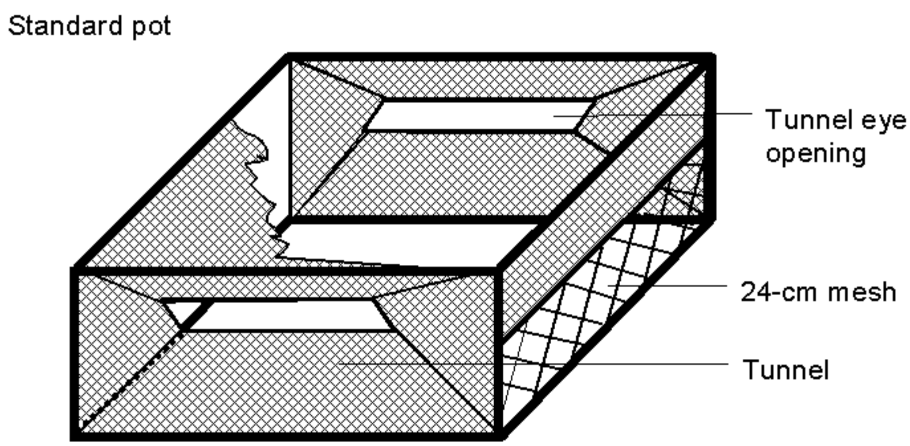


Figure 3-7. Crab Pot / Pacific Cod Pot

Pots are considered to be less damaging than mobile gear, because they are stationary in nature, and thus, come into direct contact with a much smaller area of the seafloor. Pots affect habitat when they settle to the bottom and when they are hauled back to the surface (Eno et al. 2001, Stewart 1999), but single pots and pots connected in strings or longlines may also affect seafloor habitat when they are pulled along the seafloor. This would occur in steeper terrain when wind and tide conditions dictated that gear be pulled upslope rather than to open water.

Physical damage from pots is highly dependent on habitat type. Sand and soft sediments are less likely to be affected, whereas reef-building corals, sponges, and gorgonians are more likely to be damaged because of their three-dimensional structure above the seafloor (Quandt 1999). Damage by pots also makes coral more susceptible to secondary infections.

Eno et al. (2001) observed effects of pots set in water depths from approximately 14 to 23 m over a wide range of sediment types in Great Britain, including mud communities with sea pens, limestone slabs covered by sediment, large boulders interspersed with coarse sediment, and rock. Observations demonstrated that sea pens were able to recover fully from pot impact (left in place for 24 to 48 hours) within 72 to 144 hours of the pots being removed. Pots remained stationary on the seafloor, except in cases where insufficient line and large swells caused pots to bounce off the bottom. When pots were hauled back along the bottom, a track was left in the sediments, but abundances of organisms within that track were not affected. The authors did observe detached ascidians and sponges and damage to rose coral, but it was not clear if these resulted from this study or from previous damage. Authors concluded that no short-term effects result from the use of pots, even for sensitive species. The study did not examine chronic effects.

The pots used off Alaska are much larger and heavier than those in any of the studies cited. Except in the Aleutians and certain months in the EBS, Alaska groundfish regulations require that each pot have its own buoyed line, so there are no underwater lines connecting adjacent pots (longlining) which could be an additional source of effects. Little research has been conducted to date on their habitat effects. The area of seafloor contacted by each pot during retrieval is unknown and is expected to depend on vessel operations, weather, and current.

However, there is some evidence from submersible video transects conducted in the central AI that damage sustained to dense areas of coral and sponge habitat may have been caused by crab pots in contact with that habitat (Robert Stone, NOAA Fisheries). Scientists observed elongated tracks where sessile epifuana had been removed or pushed and piled aside. Tracks were well delineated, straight, and about 3 m wide. Tracks did not appear to be consistent with damage observed from longlines or bottom trawl gear, nor that expected from submersible contact with the seafloor or landslides. There is still some uncertainty as to whether pot fishing was responsible for the damage, and the researchers are planning, pending the availability of research funds, to drag longlines of pots through the area to determine if they can replicate such tracks.

A large number of pots are lost in Alaska fisheries every year. Although pots might be considered less damaging to habitat than mobile gear, lost pots can have effects on populations of fish and crustaceans. Bullimore et al. (2001) observed traps left out off the coast of Wales for 398 days and reported that lost pots continued to collect fish for as long as they were left out, even though the bait was gone after 13 to 27 days. Derelict pots add vertical structure that is frequently colonized by sedentary invertebrates, altering the local environment. Alaska pot fisheries must install untreated biodegradable cotton twine in pot walls to eventually stop ghost fishing.

3.2.6 Troll Gear

Troll vessels catch fish, typically salmon, or groundfish by moving lures or bait through the water column and feeding concentrations of fish. Two forms of trolling are legal, power troll and hand troll (Figure 3-8). The gear is typically comprised of four main wire lines that fish. They have a large lead sinker, referred to as a canon ball, on the terminal end and 8-12 nylon leaders spaced out along its length, each of which ends in either a lure or baited hook. To retrieve hooked fish, the main lines are brought on board by hand or power, and the fish can be gaffed when they are alongside the vessel. The leaders are then rebaited and let back down to the desired depth with the cannon ball (ADF&G 1999a).

Troll vessels come in a variety of sizes and configurations, ranging from small, hand troll skiffs to large, ocean-going power troll vessels of 50' or more in length. Troll fisherman operate throughout Southeast Alaska in both state and federal waters (ADF&G 1999b).

Dinglebar troll gear (Figure 3-9) consists of a single line that is retrieved and set with a power or hand troll gurdy, with a terminally attached weight (cannon ball -12 lbs.), from which one or more leaders with one or more lures or baited hooks are pulled through the water while a vessels is underway (NPFMC 2003). Dinglebar troll gear is essentially the same as power or hand troll gear, the difference lies in the species targeted and the permit required. For example, dinglebar troll gear can be used in the directed fisheries for groundfish (e.g. cod) or halibut. These species may only be taken incidentally while fishing for salmon with power or hand troll gear. There is a directed fishery for ling cod in Southeast Alaska using dinglebar troll gear.

Trolling can occur over any bottom type and at almost any depths. Trollers work in shallower coastal waters, but may also fish off the coast, such as on the Fairweather Grounds. In most situations, the gear rarely contacts the ocean bottom.

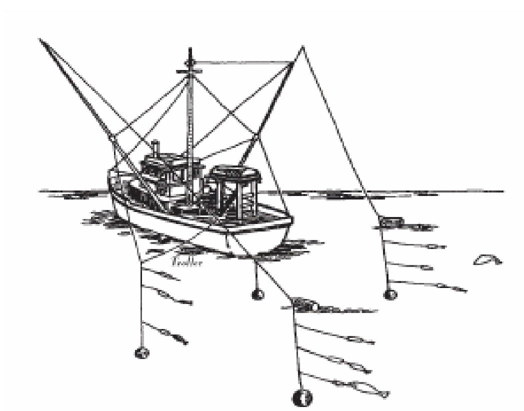


Figure 3-8. Troll Gear (courtesy A. Dean-ADF&G).

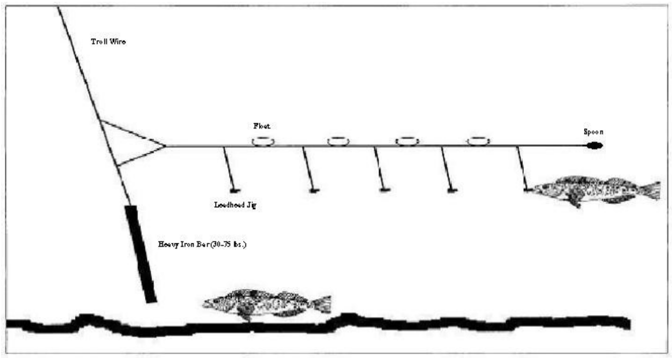


Figure 3-9. Troll, dinglebar gear (courtesy D. Gordon & T. O'Connell, ADF&G)

3.3 Effects of Non-fishing Activities on Fish Habitat

The following are descriptions of types of non-fishing uses that could occur in offshore marine areas where HAPCs may be identified: Marine transit and anchoring, marine dredging for harbors and navigations, marine disposal areas, vessel scuttling, off shore oil and gas lease sales, submersible communication cable laying, and offshore mineral extraction. However, other than fishing, few human-induced activities have the potential to affect the HAPCs. Importantly, NOAA Fisheries does not directly manage non-fishing activities. However, provisions within the MSA mandate NOAA Fisheries to provide conservation recommendations during consultation with federal agencies when their actions may adversely affect EFH. The EFH FR discusses EFH consultation and regulatory procedures for non-fishing activities. Appendix G of the EFH EIS (NMFS, 2005) also provides a more comprehensive review of non-fishing activities associated with EFH.

3.4 Regulatory Environment

The following sections summarize major laws and regulations directly applicable to these actions. Other relative laws and requirements (e.g., Executive Order [EO] for Federalism, Marine Protected Areas) will be addressed elsewhere in the Record of Decision and/or in the classification section of the proposed and final rule. The regulatory environment for these actions are similar for those from the EFH EIS (NMFS, 2005).

3.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 is legislation signed into law in response to an overwhelming national sentiment that federal agencies should take the lead in providing greater protection for the environment. It established environmental policy for the nation, provided an interdisciplinary framework for federal agencies, and established procedures and a public process to ensure that federal agency decisionmakers take environmental factors into account. The analysis prepared for the federal decisionmaker is typically an environmental assessment (EA) or an EIS.

NEPA requires an EA to determine whether the action considered will result in significant impact on the human environment. If the action is determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact (FONSI) would be the final environmental documents required by NEPA.

An EIS must be prepared for major federal actions significantly affecting the human environment. As stated in 40 CFR 1502.9(c):

Agencies shall prepare supplements to either draft or final environmental impact statements if: (i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

3.4.2 Magnuson-Stevens Fishery Conservation and Management Act

In 1976, Congress passed into law what is currently known as the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). This law authorized the United States to manage its fishery resources in an area extending from 3 to 200 nm (4.8 to 320 km) off its coast, referred to as the EEZ. The management of these marine resources is vested in the Secretary and in regional fishery management councils (FMCs). In the Alaska region, the Council is responsible for preparing FMPs for marine fishery resources requiring conservation and management. These FMPs are submitted National Standards of the Magnuson-Stevens Act.

1. Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

2. Conservation and management measures shall be based upon the best scientific information available.

3. To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

4. Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (a) fair and equitable to all such fishermen, (b) reasonably calculated to promote conservation, and (c) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

5. Conservation and management measures shall, where practicable, promote efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

6. Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

7. Conservation and management shall, where practicable, minimize costs and avoid unnecessary duplication.

8. Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities, and (b) to the extent practicable, minimize adverse economic impacts on such communities.

9. Conservation and management measures shall, to the extent practicable, (a) minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

10. Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The Magnuson-Stevens Act established a set of national standards for fishery conservation and management. For example, each FMP must specify the optimum yield from each fishery that would provide the greatest benefit to the United States and must state how much of that optimum yield can be expected to be harvested in United States waters. FMPs must also specify the level of fishing that would constitute overfishing. In addition, each FMP contains a suite of additional management tools that together characterize the fishery management regime. These management tools are either a framework type measure, thereby allowing for annual or periodic adjustment using a streamlined notice process, or are conventional measures that are fixed in the FMP and its implementing regulations and require a formal plan or regulatory amendment to change. Amendments to the FMP or its regulations are considered annually by the Council, with proposed amendments submitted by both the resource agencies and the public. As a result, the FMPs are dynamic and are continuously changing as new information or problems arise.

Additional information in regards to Magnuson-Stevens Act Provisions and Regulations for Essential Fish Habitat can be found within the EFH EIS Section 3.5.6.

3.4.3 Regulatory Flexibility Act

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 agencies' 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. The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) and small government jurisdictions.

The objective of the RFA is to require consideration of the capacity of those affected by regulations to bear the direct and indirect costs of regulation. If an action will have a significant impact on a substantial number of small entities, an Initial Regulatory Flexibility Analysis (IRFA) must be prepared to identify the need for the action, alternatives, potential costs and benefits of the action, distribution of these impacts, and determination of net benefits. The central focus of the IRFA should be on the economic impacts of a regulation on small entities and on the alternatives that might minimize the impacts and still accomplish the statutory objectives. The level of detail and sophistication of the analysis should reflect the significance of the impact on small entities. An IRFA for this action is included with this analysis in Appendix C.

3.4.4 Executive Order 12866

The requirements for all regulatory actions specified in EO 12866 are summarized in the following statement from the order:

In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environment, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

EO 12866 and the RFA require a determination of whether an action is significant under EO 12866 or will result in significant impacts on small entities under the RFA. This determination is found in an RIR. An RIR is included with this analysis in Appendix C. EO 12866 requires that the Office of Management and Budget (OMB) review proposed regulatory programs that are considered to be significant.

4.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

4.1 Background, Significance Analysis and Criteria for Proposed HAPCs

An EA must consider whether an action will have a significant effect on the quality of the human environment (40 CFR 1508.27; NAO 216-6, 6.01b). Significance is determined by considering the contexts (geographic, temporal, societal) in which the action will occur, and the intensity of the effects 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 consistency with other laws. If an impact is not considered significant, a Finding of No Significant Impact (FONSI) is issued.

This section describes the criteria by which the impacts of the proposed action are analyzed for each of the following resource categories:

- Habitat
- Target Species
- Economic and Socioeconomic Aspects of Federally Managed Fisheries
- Other Fisheries and Fishery Resources
- Protected Species
- Ecosystem
- Non-fishing Activities

Evaluation criteria have been developed for each of these categories recently within other analyses (2004 Annual TAC Specifications EA; EFH EIS, NMFS 2005). The significance analysis used in this EA draws upon the criteria used in those recent analyses. The four ratings used to assess each potential effect are:

> ***Significantly negative (S-):*** **Significant adverse effect in relation to the reference point. Information, data, and/or professional judgment indicate that the action will cause a significant adverse effect on the resource.**
> ***Insignificant impact (I):*** **Insignificant effect in relation to the reference point. Information, data, or professional judgment suggests that the action will not cause a significant adverse effect on the resource.**
> ***Significantly positive (S+):*** **Significant beneficial effect in relation to the reference point. Information, data, and/or professional judgment indicate that the action will cause a significant benefit to the resource.**
> ***Unknown (U):*** **Unknown effect in relation to the reference point. There is an absence of information to determine a reference point for the resource, species, or issue and data is insufficient to adequately assess the effect of the action. Professional judgment is also not able to determine the effect of the action on the resource.**

The reference point condition, where used, represents the state of the environmental component in a stable condition or in a condition judged not to be threatened at the present time. For example, a reference point condition for a fish stock would be the state of that stock in a healthy condition, able to sustain itself, successfully reproducing, and not threatened with a population-level decline.

The following subsections describe the significance criteria used to evaluate the proposed alternatives. Significance criteria are provided for each of the resource categories listed above.

4.1.1 Effects on Habitat

This section focuses on the effects of each action by alternative on benthic habitat important to commercial fish species within the HAPC areas. Benthic habitat is characterized by HAPC biota, which are taxa that form living substrate and have been identified by NMFS to meet the criteria for special consideration (rarity, sensitivity, stress and ecological importance) as HAPC within EFH. A full description of the action is contained in Section 2 of this EA. Additionally, Section 3.1 describes the affected environment and lists the specific areas discussed in this section. Section 3.2 summarizes fishing gear effects to the HAPC areas.

Any determinations regarding the effects of the alternatives on HAPC are provided in the summary of this section. Measures to mitigate any effects on HAPC, if applicable, are within each action by alternative as management measures. Further, technical guidance on EFH issued by NMFS (1998f) to aid regional fishery management councils in implementing the EFH requirements of the Magnuson-Stevens Act advises focusing the assessment on whether "anthropogenic factors reduce habitat suitability for marine resources." This fits with the NEPA requirement to evaluate factors that affect the human environment.

The issues of primary concern with respect to the effects of fishing on HAPCs are the potential for damage or removal of fragile biota within each area that are used by fish as habitat and the potential reduction of habitat complexity, benthic biodiversity, and habitat suitability. Habitat complexity is a function of the structural components of the living and nonliving substrate and could be affected by a potential reduction in benthic diversity from long-lasting changes to the species mix. Many factors contribute to the intensity of these effects, including the type of gear used, the type of bottom, the frequency and intensity of natural disturbance cycles, and the history of fishing in an area. This process is presented in more detail in section 3.2. Most worldwide studies have identified some general effects of bottom trawling, which have been confirmed by studies, conducted in Alaska (Freese et al., 1999; McConnaughy et al., 2000; Brown, 2003). Worldwide studies have also recommended a precautionary approach in light of the uncertainty that still exists in respect to fishing effects on habitat in different regions, using different types of gear. Further, an Alaska-based fishery impacts assessment model analyzes the effect of fishing gears on habitats, including fragile biota. This model is Appendix B of the EFH EIS (NMFS 2005).

Each alternative was rated by significance criteria for any effect on marine benthic habitat. The significance criteria are outlined under section 4.1 and are grouped into four categories:

1. Mortality and damage to living habitat species: Damage to or removal of HAPC biota by direct contact with fishing gear;
2. Modification of non-living substrate by direct contact with fishing gear (non-living substrates such as rock and cobble);
3. Modification of the community structure in terms of benthic biodiversity;
4. Modification of habitat suitability to support healthy fish populations.

These categories are similar to previous analyses including the Final Programmatic SEIS (PSEIS) (NMFS 2004a), Final Steller Sea Lion EIS (NMFS 2001), and EFH EIS (NMFS 2005). Each of the criteria was assessed qualitatively, due to the lack of existing habitat data. Specifically, the second category, "modifications to nonliving substrate by gear" is somewhat hypothetical, as problems have been identified in assessing impacts for all gears, especially fixed longline and pot gear. Fixed gear impact analysis has centered on the bycatch of HAPC species and not on studies of direct gear impacts to the seafloor. The third category identifies effects from fishing that may result in a change in the biodiversity within the habitat area. Intense or high frequency fishing activities within a relatively small area may result in a change in diversity by removing resident species and by attracting opportunistic fish species that feed on injured or uncovered marine organisms disturbed in the wake of the tow. Also, diversity may or may not be an important attribute to isolated habitats, such as seamount features on the abyssal plain. However, diversity likely is an important prey consideration for the attraction and retention of species settling and taking residency on isolated seamounts.

This analysis was mainly qualitative because a quantitative assessment model was not possible with the level of habitat data currently available. Specific impacts to habitat from different management regimes are very difficult to predict. The ability to predict the potential effects on HAPC from mitigative measures that change the geographical and seasonal patterns of fishing, depends on having detailed information regarding habitat features, life histories of living substrates, the natural disturbance regime, and how fishing with different gear types at different levels of intensity affects different habitat types.

Several simplifying assumptions were made:

1. Disturbances, such as fishing, in sensitive habitats add additional stress on HAPCs with slow recovery times and fragile sessile marine organisms.
2. Closing areas to disturbances benefits HAPC.
3. Removal or disruption of non-living structure, such as boulders, may remove attachment substrate for species, such as *Primnoa* coral species.
4. Seamounts are isolated features that may serve as stepping-stones for migratory species or become resident habitat for those species settling on these features far offshore of slope and shelf habitats.
5. Seamounts are diverse in habitat structure and may be rough or smooth or both.
6. If more area is restricted or closed to fishing, fewer alterations and disturbances to marine habitat from fishing are expected. Conversely, increasing the fishing effort in an area will place additional stress on HAPC.

In all of the action alternatives, management measures propose to protect HAPC that will likely result in benefits to HAPC and EFH, with only slight increased stress on habitats elsewhere. Also, a NPFMC directive for HAPC designation during this proposal cycle was to identify and describe named seamounts and high relief corals that support rockfish in areas thought to be relatively undisturbed from fishing activities. Thus, habitats in these areas are thought to be in good condition and have not been subject to routine fishing with bottom fishing gear.

The size of the area closed to fishing for each action by alternative is provided in Table 2-1 through 2-6. Due to the relatively small size of the HAPCs and the limited fishing effort in those areas, adjacent areas will likely support the minimal amount of fishing being displaced if fishing were restricted in the HAPC. It is then possible to assume that some fishing grounds would be fished with more frequency, with the potential for increased direct impact. However, it is likely that the increased fishing effort in habitats currently fished would not be significantly higher than already exists.

This analysis is limited to the impacts that these alternative management measures would have on protecting HAPCs from further disturbance, damage, or removal. The closure of several small HAPC areas may seem insignificant in relation to the vast areas open to fishing in Alaska EEZ waters; however, taking action to protect areas known or thought to contain sensitive marine habitats is a precautionary approach recognized in marine fisheries management (NMFS 2004a). An effect summary table for each alternative by management option is provided in Table 4-1.

Criteria used in this EA to evaluate effects of the proposed action on habitat are provided in Table 4-1. The reference point against which the criteria are applied is the current size and quality of marine benthic habitat and other essential fish habitat.

Table 4-1. Criteria used to determine significance of effects on habitat.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (+)**	**Unknown (U)**
Habitat complexity: Mortality and damage to living habitat species	Substantial increase in mortality and damage; long-term irreversible impacts to long-lived, slow growing species.	Likely not to increase mortality or damage to long-lived, slow growing species.	Substantial decrease in mortality or damage to long-lived, slow growing species.	Information, magnitude and/or direction of effects are unknown.
Habitat complexity: (non-living substrates such as rock and cobble	Substantial increase in the rate of removal or damage of non-living substrates.	Likely not to alter or damage non-living substrates.	Substantial decrease in the rate of removal or damage of non-living substrates.	Information, magnitude and/or direction of effects are unknown.
Benthic biodiversity	Substantial decrease in community structure from baseline.	Likely not to decrease community structure.	Substantial increase in community structure from baseline.	Information, magnitude and/or direction of effects are unknown.
Habitat suitability	Substantial decrease in habitat suitability over time.	Likely not to change habitat suitability over time.	Substantial increase in habitat suitability over time.	Information, magnitude and/or direction of effects are unknown.

Methodology

Seamounts: Sixteen seamounts have been identified in the EEZ off Alaska in depths that support FMP species, but only 5 have been sampled by direct research efforts. This analysis used the data from the seamounts that have been studied and assumes that the species composition, physical features, and other environmental parameters of the remaining seamounts are comparable. The analysis assessed qualitatively the potential benefits to the habitat features that may accrue from identifying the seamounts as HAPCs and restricting fishing effort in those areas. The qualitative analysis addressed potential positive and negative effects on habitat complexity, benthic biodiversity, and habitat suitability using the best professional judgment of the analysts.

High relief hard corals: The overall abundance of high relief hard coral structures in Alaska is unknown. The analysis used the data from documented locations of high relief hard corals sites that have primarily been observed *in situ* by NMFS and ADF&G submersible research. Additional information from bycatch within the commercial fisheries as well as bycatch within NMFS research surveys was used as a supplement where appropriate. The analysis assessed qualitatively the potential benefits to the habitat features that may accrue from identifying the coral areas as HAPCs and restricting fishing effort in those areas. The qualitative analysis addressed potential positive and negative effects on habitat complexity, benthic biodiversity, and habitat suitability using the best professional judgment of the analysts.

4.1.2 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. 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). Pacific halibut is considered a target species within this analysis. Other non-groundfish targeted FMP species in Federal waters include crab and scallops.

It was determined within the EFH EIS (NMFS 2005) that considerable scientific uncertainty remains regarding the consequences of habitat changes for managed species. Nevertheless, the EIS analysis concludes that the effects on EFH from fishing target species are minimal because there is no indication that continued fishing at the current rate and intensity would alter the capacity of EFH to support healthy populations of managed species over the long term. Additionally the EIS finds that no Council-managed fishing activities have more than minimal and temporary adverse effects on EFH.

The effects of each HAPC alternative on target groundfish commercial species were assessed by overlaying the recorded spatial concentration of each species and the spatial configuration of each HAPC alternative. The observer data set was used as a proxy for a quantitative assessment of the relative impact each HAPC alternative might have on the stock biomass, mortality, and spatial/temporal distribution of target species, as well as the prey items that are important to fish harvested in target fisheries. Analyses were prepared for each target fishery by HAPC action and alternative that had the potential to affect target fishery catch. This quantitative assessment was based on the percentage of observed catch within each HAPC action and alternative as compared to the total target fishery catch in the NMFS statistical area where HAPC is located during 1995-2003. Additionally the effect of each HAPC alternative on halibut were assessed from catch information combined with logbook information provide by the International Pacific Halibut Commission (IPHC) by IPHC statistical areas. This information is qualitative due to the data restrictions under confidentiality agreement, but is fully considered in the RIR/IRFA Chapters 5 and 6 of this document.

As a minimum threshold, target fisheries which had a minimum of one percent of total observed catch inside a HAPC area were highlighted for further analysis and are discussed in detail within each Action. The 1 % threshold was chosen specifically to look at relatively small impacts to target fisheries. Fisheries that had less than a 1 % effect based on the total observed catch were rated as insignificant in this analysis, and those that rated over 1 % were further evaluated for the actual amount of catch relative to the overall health of the target stock.

State-Managed Crab and Invertebrate Fisheries

ADF&G manages king, snow, and Tanner crab fisheries under federal FMPs in the EBS and AI. A full report on these fisheries is provided by ADF&G (2000b). The section on effects of other target species provides a discussion of the effects of mitigation alternatives on FMP crab species. ADF&G also manages a Korean hair crab fishery in the EBS and Dungeness crab fisheries and all other crab species in the GOA. Harvests from these fisheries are reviewed in the ADF&G overview of state-managed marine fisheries (ADF&G 2000b). Korean hair crabs are harvested around the Pribilof Islands, and Dungeness crabs are harvested around Kodiak, in the EGOA, and intermittently in the AI. In recent years, most Tanner and king crab fisheries in the GOA have been closed because of low abundance trends. Other stocks such as grooved and triangle Tanner crab are small and do not typically attract commercial interest (Kruse et al. 2000). The effects of each HAPC alternative on target shellfish commercial species were assessed by using documented fisheries catch from ADF&G observer program in relationship to each HAPC alternative. The ADF&G crab catch data are confidential due to limited effort of crab fisheries in the proposed HAPC sites in the Aleutians. These data are not reported for the EA but are fully considered in the RIR/IRFA Chapters 5 and 6 of this document.

Table 4-15 provides a detailed summary of target fishery effects for each HAPC action and alternative.

For more information on each stock, species or species group in the Aleutian Islands and the Gulf of Alaska, please refer to the stock assessment and fishery evaluation (SAFE) reports (NPFMC, 2003 a,b).

Gear conflicts should be limited within the context of all HAPC alternatives. Fishing gear types tend not to overlap HAPC areas based on data from observed groundfish vessels in 1995-2003, and it would be expected that a similar pattern would occur as fishery effort is redistributed (Table 4-14).

The reference point against which the criteria were applied was the current status of managed stocks. The significance criteria used to evaluate the impacts of the alternatives on target species are provided in Table 4-2.

Table 4-2. Criteria used to estimate the significance of effects on the FMP managed target stocks within the Aleutian Islands and Gulf of Alaska on proposed HAPC.

Effect	Criteria			
	Significantly Negative (-)	Insignificant (I)	Significantly Positive (+)	Unknown (U)
Stock Biomass: Potential for increasing and reducing stock size	Changes in fishing mortality are expected to jeopardize the ability of the stock to sustain itself at or above its MSST	Changes in fishing mortality are expected to maintain the stock's ability to sustain itself above MSST	Changes in fishing mortality are expected to enhance the stocks ability to sustain itself at or above its MSST	Magnitude and/or direction of effects are unknown
Fishing mortality	Reasonably expected to jeopardize the capacity of the stock to yield fishable biomass on a continuing basis.	Reasonably expected not to jeopardize the capacity of the stock to yield fishable biomass on a continuing basis.	Action allows the stock to return to its unfished biomass.	Magnitude and/or direction of effects are unknown
Spatial or temporal distribution	Reasonably expected to adversely affect the distribution of harvested stocks either spatially or temporally such that it jeopardizes the ability of the stock to sustain itself.	Unlikely to adversely impact the distribution of harvested stocks either spatially or temporally such that it has no effect on the ability of the stock to sustain itself.	Reasonably expected to positively affect the harvested stocks through spatial or temporal increases in abundance such that it enhances the ability of the stock to sustain itself.	Magnitude and/or direction of effects are unknown
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.	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.	Magnitude and/or direction of effects are unknown

4.1.3 Economic and Socioeconomic Aspects of Federally-Managed Fisheries

The reference point against which the criteria are applied was the current economic and socioeconomic conditions. Significance criteria to evaluate the impacts of the alternatives on economic and socioeconomic factors are provided in Table 4-3.

Methodology

The analysis examined the significance criteria qualitatively when data were unavailable. The criteria were grouped by those relating to the potential direct effects, the potential indirect effects, and the potential for industry to mitigate direct effects. The analysis was limited by the availability of data and the time and resources made available to conduct the analysis. The presentation of findings was also limited by Federal law and agency policy regarding confidentiality of certain data.

Table 4-3. Economic and socioeconomic significance criteria.

Issue	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (+)**	**Unknown (U)**
Passive Use Values	Substantial reductions in passive use value are anticipated	No substantial changes in passive use value are anticipated	Substantial Increases in passive use value are anticipated	Magnitude and/or direction of effects are unknown
Gross Revenues	Substantial reductions in revenue are anticipated	No substantial changes in gross revenues are anticipated	Substantial increases in gross revenues are anticipated	Magnitude and/or direction of effects are unknown
Operating Costs	Relocation of fishing effort will be required, or catch rates will be reduced	No substantial changes in operating costs expected	Relocation of fishing effort will not be required, or catch rates will not be reduced	Magnitude and/or direction of effects are unknown
Costs to Consumers	Substantially higher prices for consumers are expected	No substantial changes in retail prices are expected	Substantially lower prices for consumers are expected	Magnitude and/or direction of effects are unknown
Safety	Substantial increased risk of accidents and injuries are expected	No changes in safety are expected	Substantial reduced risk of accidents and injuries expected	Magnitude and/or direction of effects are unknown
Effects to Fishing Communities	Substantial reduction in community revenues and employment are anticipated	No substantial effects on communities are expected	Substantial increase in community revenues and employment are anticipated	Magnitude and/or direction of effects are unknown
Regulatory and Enforcement Programs	Substantial increased number and complexity of closures and quotas; additional staff and resources needed for monitoring and enforcement	No substantial changes in regulatory or enforcement requirements are expected	Substantial reduced number and complexity of closures and quotas; fewer staff and resources needed for monitoring and enforcement	Magnitude and/or direction of effects are unknown

4.1.4 Effects on Other Fisheries

4.1.4.1 Effects on Other Target Species and Fisheries

Alternatives were evaluated with respect to three potential impacts for other directed fisheries or the species harvested in other directed fisheries. The ratings used 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 employed 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 reference point against which the criteria were applied is the current overall stock biomass. The significance criteria used to evaluate the proposed action on other directed fisheries or fish stocks are provided in Table 4-4.

Table 4-4. Criteria used to estimate the significance of effects on other directed fisheries or the fish stocks targeted in other directed groundfish fisheries.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (+)**	**Unknown (U)**
Fishing mortality	Reasonably expected to jeopardize the capacity of the stock to yield fishable biomass on a continuing basis.	Reasonably expected not to jeopardize the capacity of the stock to yield fishable biomass on a continuing basis.	Action allows the stock to return to its unfished biomass.	Magnitude and/or direction of effects are unknown
Spatial or temporal distribution	Reasonably expected to adversely 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.	Magnitude and/or direction of effects are unknown
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.	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	Magnitude and/or direction of effects are unknown

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

At present no active management and only limited monitoring of the species in this category takes place, 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 PSEIS (NMFS 2004a).

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 criteria are applied is the current population trajectory or harvest rate of the non-specified species. 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. See Table 4-5 for significance criteria for direct and indirect criteria for other and non-specified species.

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 4-5. The reference point against which the criteria were applied was whether the current harvest levels would be maintained.

Table 4-5. Criteria used to estimate the significance of effects on incidental catch of other species, non-specified species, forage fish, prohibited species.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (+)**	**Unknown (U)**
Incidental catch of other species and non-specified species	Reasonably expected to increase harvest levels by >50%	Reasonably expected not to increase or decrease harvest levels by >50%	Reasonably expected to decrease harvest levels by >50%	Magnitude and/or direction of effects are unknown.
Incidental catch of forage fish	Reasonably expected to increase harvest levels by >50%	Reasonably expected not to increase or decrease harvest levels	Reasonably expected to decrease harvest levels by >50%	Magnitude and/or direction of effects are unknown.
Incidental catch of prohibited species	Reasonably expected to jeopardize the capacity of the stock to maintain benchmark population levels.	Reasonably expected not 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.	Magnitude and/or direction of effects are unknown.
Habitat disturbance and disruption of food web	Disturbance is reasonably expected to jeopardize the capacity of the stock to maintain benchmark population levels	Disturbance is not expected to increase or decrease the population >50 % above or below benchmark levels.	Disturbance is reasonably expected to increase harvest levels in directed fisheries targeting prohibited species without jeopardizing capacity of stock to maintain benchmark population levels. Reasonably expected to increase populations >50 % from benchmark levels	Impacts on habitat or location in food web uknown

4.1.4.3 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 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.

State-Managed Herring Fisheries

ADF&G manages 25 fisheries for herring, including roe, food and bait, and spawn on kelp. Harvests from these fisheries are reported in tables in Section 3.4.2.4 of the EFH EIS.

Current habitat protection measures include small closures to commercial harvest of herring to protect spawning areas and other important habitat. Additionally, herring bycatch limitation zones were adopted as Amendment 16A on July 12, 1991, to constrain herring bycatch in the EBS groundfish fisheries. The bycatch areas are seasonal closures that mimic the herring migration route in the EBS (Funk 1991). These zones are triggered when a cap of 1 % of herring spawning biomass between Port Moller and

Norton Sound is attained in any groundfish fishery. Most herring bycatch occurs in the pollock pelagic trawl fishery (pers. com., Funk).

This analysis focused 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.

The reference point used to determine the significance of effects on salmon stocks was whether the current minimum escapement needs would reasonably be expected to be met. The reference point used to determine the significance of effects on herring stocks was whether the current minimum spawning biomass threshold levels would be reasonably expected to be met. The reference point used to determine the significance of effects on the halibut stock was whether 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. The reference point used to determine the significance of effects on crab stocks was whether MSST (minimum stock size threshold) levels would reasonably be expected to be maintained. See Table 4-6 for significance criteria for incidental catch of prohibited species.

Table 4-6. Criteria used to estimate the significance of effects on harvest levels in state or internationally managed directed fisheries targeting stocks of prohibited species.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (+)**	**Unknown (U)**
Harvest levels in directed fisheries targeting catch of prohibited species	Substantial decrease in harvest levels in directed fisheries targeting prohibited species.	No substantial increase or decrease in harvest levels in directed fisheries targeting prohibited species.	Substantial increase in harvest levels in directed fisheries targeting prohibited species.	Magnitude and/or direction of effects are unknown
Salmon stocks	The minimum escapement needs would not be expected to be met.	The minimum escapement needs would reasonably be expected to be met.	The minimum escapement needs would be increased.	Magnitude and/or direction of effects are unknown
Herring stocks	The minimum spawning biomass threshold levels would not reasonably be expected to be met.	The minimum spawning biomass threshold levels would be reasonably expected to be met.	The minimum spawning biomass threshold levels would increase.	Magnitude and/or direction of effects are unknown
Halibut stocks	Incidental catch of halibut in the groundfish fisheries would reasonably be expected to exceed the total Constant Exploitation Yield (CEY).	Incidental catch of halibut in the groundfish fisheries would not effect the the total Constant Exploitation Yield (CEY).	Incidental catch of halibut in the groundfish fisheries would reasonably be expected to lower the total Constant Exploitation Yield (CEY).	Magnitude and/or direction of effects are unknown
Crab stocks	MSST (minimum stock size threshold) levels would not be expected to be maintained.	MSST (minimum stock size threshold) levels would reasonably be expected to be maintained.	MSST (minimum stock size threshold) levels would be expected to increase.	Magnitude and/or direction of effects are unknown

The reference point used to determine the significance of effects under each alternative is whether the recent levels of incidental catch of prohibited species in the groundfish fisheries would be maintained.

Table 4-7. Criteria used to estimate the significance of effects on bycatch levels of prohibited species in directed groundfish fisheries.

Effect	Criteria			
	Significantly Negative (-)	Insignificant (I)	Significantly Positive (+)	Unknown (U)
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.	No substantial increase or decrease 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.	Magnitude and/or direction of effects are unknown

4.1.5 Effects on State of Alaska-Managed State Waters and Parallel Fisheries for Groundfish Species

"Whereas fisheries in the EEZ from 3 to 200 nm fall under federal authority by virtue of the MSFCMA, the State of Alaska has management authority for fishery resources within state territorial (0 to 3 nm) waters by virtue of the Submerged Lands Act (1953) and further recognized by the MSFCMA. For most groundfish fisheries, ADF&G issues emergency orders (EOs) for state waters that duplicate all NMFS groundfish fishery management actions. These EOs establish parallel fishing seasons such that vessels may fish for groundfish in either state or federal waters. In some other instances, the State of Alaska establishes separate catch quotas, termed GHLs in state management, and fishing seasons under state groundfish FMPs" (Kruse et al. 2000). The HAPC mitigation measures that include inside waters also include an assumption that the State of Alaska would adopt similar mitigation measures for parallel fisheries which occur concurrently in state and federal waters.

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 parallel fisheries accrue towards their respective federal TACs.

Current habitat protection measures include the closure of most state waters to nonpelagic trawling in the GOA, as well as many smaller closures to commercial harvest to protect spawning areas and other important habitat on a species-specific basis. Please refer to "An Inventory of Marine Managed Areas in Alaska" (Mabry *et al*, unpublished) for more information on specific state-managed fisheries restrictions.

ADF&G manages GHL fisheries for walleye pollock, Pacific cod, sablefish, lingcod, and rockfish species inside state waters, lingcod and black and blue rockfishes throughout the EEZ, and demersal shelf rockfishes in the eastern GOA. Harvests from these fisheries are reported in tables in Chapter 3 of the EFH EIS.

The Prince William Sound pollock fishery is conducted inside state waters, which are mostly closed to bottom trawl and also have pelagic trawl restrictions. The state-managed Pacific cod fisheries and sablefish in the GOA occur inside state waters. Black rockfish are nearshore pelagic rockfish and are harvested near Sitka, Kodiak, Chignik, on the south Alaska peninsula, and near Akutan. Lingcod are generally found nearshore and harvested in the EGOA, Prince William Sound, Cook Inlet, and Kodiak areas. Demersal shelf rockfish in the EGOA are managed by ADF&G in waters that are currently closed to bottom trawling.

Table 4-8. Criteria used to estimate the significance of effects on harvest levels in state managed groundfish fisheries.

Effect	Criteria			
	Significantly Negative (-)	Insignificant (I)	Significantly Positive (+)	Unknown (U)
Harvest levels of groundfish in state waters seasons and parallel seasons	Substantial decrease in harvest levels.	No substantial decrease or increase in harvest levels.	Substantial increase in harvest levels.	Magnitude and/or direction of effects are unknown

4.1.6 Protected Species

Protected species are marine mammals, seabirds, and ESA listed species of salmonids (Pacific salmon and steelhead trout) which are considered protected resources because either they are listed as endangered or threatened under the Endangered Species Act (ESA), they are marine mammals protected under the Marine Mammal Protection Act (MMPA), they are candidates or being considered as candidates for ESA listing, their populations are declining in a manner of concern to State or Federal agencies, they have experienced large bycatch or other mortality related to fishing activities, or they are believed to be particularly vulnerable to direct or indirect adverse effects from some fishing activities. These species have been given various levels of protection under the current FMPs of the NPFMC, and are the subjects of continuing research and monitoring to further define the nature and extent of fishery impacts on these species.

The proposed actions to designate and protect HAPC in the Alaskan EEZ may affect protected resources in various ways. The criteria used to determine the significance of effects of the HAPC actions on protected resources are provided in Section 4.1. That section also provides the rationale and justification for the criteria and how the criteria were used to determine significance of effect from each alternative. The sections following describe how fishing activities resulting from each action may affect these species. Wilson (2003) outlines the status of knowledge of how groundfish fishing activities may affect protected resource species, and lays the groundwork for the sections in this EA that examine effects of each action on these resources. The information presented in Wilson (2003) will not be repeated in the analyses of alternatives, but rather is the basis for the arguments stated in the analyses of each action.

Assumed in all of this analysis is the global potential for fuel spills, other accidental contaminant releases, and accidental loss of fishing gear (nets, lines, buoys, pots or traps, hooks) from fishing activities throughout the North Pacific. Much of this lost gear or released contaminants disperse in the ocean, settle to the sea floor, or wash up on shore along the Alaskan or other coastlines. Some of the lost gear may entangle with marine mammals or birds, and this is further discussed below. Some contaminants may contact swimming fish, mammals, or birds and be absorbed by animal tissues. While these instances of contamination are most likely not lethal, some mortalities may occur to these species that are unseen and undocumented. Vessel strikes of mammals also may occur and be either unknown to the vessel operator or unreported. Thus there likely are some unrecorded mortalities to marine mammals from ship strikes, but Angliss and Lodge (2002) note that the mortality levels from such instances can only be estimated and they have made some attempts to estimate a minimum mortality level to marine mammals from vessel strikes where possible. It is likely that strikes are few in number and have little effect on overall animal populations in the North Pacific. To summarize, these elements of fishing activities cannot be quantified to the extent necessary to be evaluated in any one fishery, region, or season, but are considered here generally and recognized as a byproduct of commercial fishing in the North Pacific and are not considered a major factor in any of the actions contemplated in this EA.

The criteria for determining significance of effect from various fisheries were developed based on known interactions of protected species with commercial fisheries in the North Pacific. For the purposes of this analysis, two main groups of protected species were discussed—seabirds and marine mammals. It is very unlikely, given the very small geographic areas involved in these HAPC actions, that ESA-listed salmonids will be affected from the very small changes in fishing activities anticipated from any of the HAPC s; thus, salmonids were not discussed in detail in the following analyses.

Potential impacts of the HAPC actions involve primarily fisheries that employ bottom contact gear. While the impacts of this type of gear on benthic habitat are the primary reason for the HAPC, fishing activities surrounding use of this gear, other than the issue of seafloor contact, may be of concern to protected species. Vessels may use ropes, warps, or third wire gear when fishing with bottom contact gear, resulting in some encounters with potential injury or mortality to seabirds. Nets may entangle seabirds or marine mammals, resulting in injury or mortality. Seabirds may strike vessel hulls or superstructure causing injury or mortality. Sea otters may enter pots and drown, although this is not likely a concern in offshore areas beyond sea otter habitat. Offal discharged from processing vessels may attract seabirds to vessels, resulting in more mortality from encounters with wires, rigging, nets, or vessel hulls and superstructure. Conversely, offal production may provide a food source for seabirds, which may be considered a positive impact. Fishing may take important protected species prey resources from the marine environment, particularly near nesting areas for seabirds and rookeries and haulouts for marine mammals.

Many measures are already in place to protect marine mammals and seabirds from adverse encounters with fishing activities. These measures include seasonal and geographic closed areas, requirements for seabird avoidance mitigation devices, observer requirements, and voluntary industry research activities to reduce vessel and gear encounters with protected species. These measures will remain in place in the future. And as new knowledge becomes available to minimize adverse impacts of fishing activities on protected species, the Council and NMFS likely will consider employing additional or modified measures to further reduce adverse interactions with protected species.

Descriptions of how fisheries in the North Pacific may interact with protected species and discussions of how designating EFH areas (and also HAPC areas) may either exacerbate or reduce fishing impacts on protected species are provided in many other documents. These relevant discussions were incorporated from the following: Wilson (2003), the EFH EIS, the Programmatic Supplemental EIS, the SAFE documents for 2004, the draft EA/RIR for establishing an AI pollock fishery, and Angliss and Lodge (2002).

4.1.6.1 Effects on Marine Mammals

Direct and indirect interactions between marine mammals and groundfish harvest activity may occur due to overlap of groundfish fishery activities and marine mammal habitat. Fishing activities may either directly take through injury, death, or disturbance marine mammal species, or indirectly affect these animals by removing prey items important for growth and nutrition or cause sufficient disturbance that marine mammals avoid or abandon important habitat. Fishing also may result in loss or discard of fishing nets, line, etc. that may ultimately entangle marine mammals causing injury or death.

The reference point for determining significant impact to marine mammals was predicting whether the proposed action would negatively impact the current population trajectory of any marine mammal species. Significance criteria are provided below (Table 4-9).

Table 4-9. Criteria for determining significance of effects to marine mammals.

Effect	Criteria			
	Significantly Negative (-)	Insignificant (I)	Significantly Positive (+)	Unknown (U)
Incidental take/ entanglement in marine debris	Action may result in concentration of fishing activity that results in more take or entanglement.	Action is unlikely to result in any increase or decrease in take or entanglement.	Action may result in decreases in marine mammal take or reduced levels of entanglement.	Magnitude and/or direction of effects are unknown
Spatial/temporal concentration of fishery	Action may result in concentration of fishing activity resulting in a rate or magnitude of marine mammal prey removal that could affect nutrition, lactation, or other physiological impacts that could reduce marine mammal growth, reproduction, and population viability.	Action will not likely increase concentration of fishing activity that may result in prey removals that could compromise marine mammal growth, reproduction, and population viability.	Action may result in decreased fishing activity which in turn could reduce removals of marine mammal prey items such that their growth and reproduction is enhanced which in turn may enhance population viability.	Magnitude and/or direction of effects are unknown
Disturbance	Action may result in increased disturbance such that marine mammals may avoid or abandon habitat important to breeding, resting, lactating, pupping, foraging, or other vital activities.	Action will not likely result in disturbance to marine mammals such that they may avoid or abandon habitat important to breeding, resting, lactating, pupping, foraging, or other vital activities.	Action may result in decreased levels of disturbance to marine mammals such that access to habitats important for breeding, resting, lactating, pupping, foraging, or other vital activities is increased.	Magnitude and/or direction of effects are unknown

4.1.6.2 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 may be considered possible receptors of fishing activity impacts: northern fulmar, short-tailed albatross, spectacled and Steller's eiders, other albatrosses and shearwaters, piscivorus seabird species, and all other seabird species. The fishery effects that may impact seabirds are direct effects of incidental take (in gear and vessel strikes), and indirect effects from fishery removals of prey (forage fish), fishing gear impacts on benthic habitat, or fishery-related 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 seabirds.

A description of the effects of prey abundance and availability on seabirds is in Section 3.7.1 of the PSEIS (NMFS 2004a). 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 2004a; NMFS 2001b), although commercial fisheries do not greatly compete directly with seabirds. There is no directed commercial fishery for those species that 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 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, and 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 feed on 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.

Table 4-10 outlines the qualitative significance criteria or thresholds that were used for determining if an effect has the potential to create a significant impact on seabirds. The reference point against which the criteria were applied is whether the criteria change from the current levels without the action.

Table 4-10. Criteria used to determine significance of effects on seabirds.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (-)**	**Unknown (U)**
Incidental take	Take number and/or rate increases substantially	Take number and/or rate is the same.	Take number and/or rate decreases substantially	Magnitude and/or direction of effects are unknown
Prey (forage fish) availability	Prey availability is substantially reduced	Prey availability is the same.	Prey availability is substantially increased	Magnitude and/or direction of effects are unknown
Benthic habitat	Impact to benthic habitat is substantially increased	Impact to benthic habitat is the same.	Impact to benthic habitat is substantially decreased	Magnitude and/or direction of effects are unknown
Processing waste and offal	Availability of processing wastes is substantially decreased (or increased)	Availability of processing wastes is the same.	Availability of processing wastes is substantially increased (or decreased)	Magnitude and/or direction of effects are unknown

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4.1.7 Effects on the Ecosystem

In this section the HAPC alternatives were qualitatively analyzed from a broad ecological viewpoint that included: (1) predator-prey relationships; (2) energy flow and redirection; and (3) biodiversity. Changes in these variables were determined to have significantly positive, significantly negative, insignificant, or unknown effects on the ecosystem. Table 4.1-11 lists the effects and criteria used for evaluating the environmental consequences to the ecosystem from the alternative actions. For more information, a review of ecosystem-based fishery management measures implemented for Alaska groundfish fisheries can be found in Witherell et al. (2000), and an evaluation of how well the status quo management regime achieves ecosystem-based management objectives is contained in the final programmatic groundfish SEIS (NMFS 2004a).

Fisheries can remove predators, prey, or competitors and thus alter predator-prey relationships relative to an unfished system. Fishing has the potential to impact food webs, but each ecosystem must be examined to determine how important the potential impacts to the food webs are for that ecosystem. A review of fishing impacts to marine ecosystems and food webs of the North Pacific under the status quo and other alternative management regimes was provided in the programmatic groundfish SEIS (NMFS 2004a).

Fishing may alter the amount and flow of energy in an ecosystem by removing energy and altering energetic pathways through the return of discards and fish processing offal back into the sea. From an ecosystem point of view, total fishing removals are a small proportion of the total system energy budget and are small relative to internal sources of interannual variability in production.

Fishing can alter different measures of diversity. Species level diversity, or the number of species, can be altered if fishing removes a species from the system. Fishing can alter functional or trophic diversity if it selectively removes a trophic guild member and changes the way biomass is distributed within a trophic guild. Fishing can alter genetic level diversity by selectively removing faster growing fish or removing spawning aggregations that might have different genetic characteristics than other spawning aggregations. Large, old fishes may be more heterozygous (i.e., have more genetic differences or diversity) and some stock structures may have a genetic component (see review in Jennings and Kaiser [1998]), thus one would expect a decline in genetic diversity due to heavy exploitation.

The proposed action could affect the marine ecosystem through removals of fish biomass or alteration of the habitat. Three primary means of measurement of ecosystem change are evaluated here: predator-prey relationships, energy flow and balance, and ecosystem diversity. The reference point for predator-prey relationships against which the criteria are compared are fishery induced changes outside the natural level of abundance or variability for a prey species relative to predator demands. The reference point for energy flow and balance will be based on bottom gear effort (qualitative measure of unobserved gear mortality particularly on bottom organisms) and a quantitative assessment of trends in retained catch levels over time in the area. The reference point for ecosystem diversity will be a qualitative assessment whether removals of one or more species (target, nontarget) effects overall species or functional diversity of the area. The criteria used to evaluate the significance of the effects on the ecosystem from the proposed action are provided in Table 4-11.

Table 4-11. Significance thresholds for fishery induced effects on ecosystem attributes.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (-)**	**Unknown (U)**
Predator-prey relationships	A decline outside of the natural level of abundance or variability for a prey species relative to predator demands.	No observed changes outside the natural level of abundance or variability for a prey species relative to predator demands	Increases of abundance or variability for a prey species relative to predator demands	Magnitude and/or direction of effects are unknown
Energy flow and balance:	Long-term changes in system biomass, respiration, production or energy cycling, due to removals.	No observed changes in system biomass, respiration, production or energy cycling, due to removals.	Increases in system biomass, respiration, production or energy cycling, due to lack of removals.	Magnitude and/or direction of effects are unknown
Ecosystem Diversity	Removals from area decreases either species diversity or the functional diversity outside the range of natural variability. Or loss in one or more genetic components of a stock that would cause the stock biomass to fall below minimum biologically acceptable limits	No observed changes outside the natural level for species diversity, functional diversity or genetic components of a stock.	Non-removal from the area increases the species diversity or functional diversity or improves the genetic components of a stock.	Magnitude and/or direction of effects are unknown

4.1.8 Effects on Non-fishing Activities

The proposed actions could affect non-fishing activities in the vicinity of the proposed HAPCs. The criteria used to evaluate the significance of the effects on non-fishing activities of the proposed action are provided in Table 4-12. The reference point against which the criteria are applied is the current cost level to agencies or industries of non fishing actions due to consultations from the EFH consultations.

Table 4-12. Significance thresholds for effects on non-fishing activities.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (+)**	**Unknown (U)**
Costs to federal agencies	Significant increase in the cost of authorizing, funding, or undertaking non-fishing actions	No effect on the cost of authorizing, funding, or undertaking non-fishing actions.	Significant decrease on the cost of authorizing, funding, or undertaking non-fishing actions.	Magnitude and/or direction of effects are unknown
Costs to non-fishing industries or other proponents of affected activities	Significant increase in the cost of obtaining permits or funding from federal or state agencies, and/or increase in the project costs attributable to conditions to protect habitat	No effect on the cost of obtaining permits or funding from federal or state agencies	Significant decrease in the cost of obtaining permits or funding from federal or state agencies, and/or increase in the project costs attributable to conditions to protect habitat	Magnitude and/or direction of effects are unknown

4.2 Consequences of HAPCs for Seamounts- Action 1

4.2.1 Effects on Habitat

As described in Section 3.1.1, 24 named seamounts exist in EEZ waters off Alaska. These seamounts are considered to be rare, isolated geomorphic features as compared to lack of these features throughout the remaining North Pacific Ocean and Bering Sea waters. Of these 24, only 16 seamounts are within fishable depths, depths less than 3,000 meters. Of these sixteen, five named seamounts have been scientifically investigated: Dickens, Giacomini, Patton, Quinn, and Welker Seamounts. Specific locations and depths, including proposed management closure areas, are listed in Table 2-1. Site-specific habitat and species presence/absence data are presented in Table 4-13.

Table 4-13. List of FMP species identified on seamounts.

FMP Species	Scientific name
Sablefish adults, including gravid females and larger males	*Anaplopoma fimbria*
Deep sea sole	*Embassichthys bathybius*
Sockeye salmon adults	*Oncorhynchus nerka*
Pink salmon adults	*Oncorhynchus gorbuscha*
Chum salmon adults	*Oncorhynchus keta*
Longspine thornyhead rockfish, adults	*Sebastolobus altivelis*
Shortspine thornyhead rockfish, adults	*Sebastolobus alascanus*
Rougheye rockfish adults	*Sebastes aleutianus*
Shortraker rockfish adults	*Sebastes borealis*
Aurora rockfish adults	*Sebastes aurora*
Golden king crab	*Lithodes aequispina*
Scarlet red king crab	*Lithodes couesi*
Grooved tanner crab	*Chionoecetes tanneri*
Squid	(Unidentified)
Sculpins	*Cottidae*

In current geomorphic understanding, the seamounts are thought to originate at an epicenter that lies offshore of the north-central West coast of North America. "Younger" seamounts are closer to the center and have been exposed to fewer geological and oceanic events over time, "older" seamounts, have migrated farther from the center. Alaska Seamounts originated at this center and began to migrate across the North Pacific toward the Aleutian trench about as fast as a human fingernail grows (Shirley, 2003).

Habitat type also seems to be related to the geological age of a seamount. Seamounts with relatively flat, shallow-sloped flanks, such as Giacomini and Quinn Seamounts, consist of softer substrates. These two seamounts are also "older" or farther north than the other three seamounts. Likewise, seamounts with steep-slope flanks, such as Dickins, Patton, and Welker Seamounts, consist of both hard and soft substrates, and pinnacle features are scattered across the flanks. Dickins and Welker Seamounts are closer to the epicenter and considered to be young seamounts. Patton Seamount is in the center of the GOA and part of a larger seamount chain. Patton Seamount has steep flanks and is rough in feature. This chain of seamounts includes other named seamounts such as Marchand and Chirikof. Therefore, until additional data becomes available on additional seamounts, one might assume that the more northern and shallower sloped seamounts would consist of softer substrates and the more steep flanked and eastern seamounts would consist of harder substrates, or both hard and soft substrates. The remaining unexplored, named seamounts within fishable depths includes: Bowers, Brown, Chirikof, Dall, Denson, Derickson, Kodiak, Marchand, Odessey, Sirius, and Unimak Seamounts.

Each alternative under this action was analyzed on a qualitative basis when specific habitat information was not available.

Alternative 1: No action (no seamount HAPCs).
Under Alternative 1, the no action alternative, HAPC identification and measures to protect HAPC for named seamount HAPC sites would not be adopted.

The effects of this alternative are determined as follows:

Habitat Complexity (living habitat): Insignificant (I).
The 'no action' alternative does not offer additional protection to living habitats on named seamounts from damage or mortality from fishing gear. Most named seamounts have not been investigated and where observations exist, living habitats appear to provide some complexity. Removal or damage of the bio-shelter habitat will likely change the complexity of the area. However, limited fishing occurs on the seamounts, and living habitat information does not exist to determine if disturbance from bottom contact fishing gear is significant. Since limited fisheries occur on the seamounts, the effect of not taking action to identify and protect named seamounts as HAPCs is considered insignificant.

Habitat Complexity (non-living): Insignificant (I).
Information is not available to assess the extent of non-living structures on all named seamounts within the EEZ. Comprehensive bottom sampling has not occurred for all these features. Limited substrate information is available for only five named seamounts in offshore Alaska waters. Information comes mainly from a limited number of direct research efforts and *in-situ* submersible observations. It is unlikely that any substantial alteration of the physical structure occurs from fishing gear. Therefore, the effect on non-living habitat is insignificant.

Benthic Biodiversity: Unknown (U).
Information is not available to assess the benthic biodiversity of named seamounts within the EEZ and the impact of continued fishing activities on the biodiversity. Due to the paucity of information, the magnitude or direction of effect of continued fishing on benthic biodiversity cannot be determined. Based on the significance criteria in Table 4-1, the effect of not taking action to identify and protect named seamount features is unknown.

Habitat Suitability: Unknown (U).
Information is not available to assess the suitability of seamount habitat for managed species or the effects of not implementing HAPC identification and management on habitat suitability. Due to the paucity of information, the magnitude or direction of the effect of continued fishing on habitat suitability cannot be determined Based on the significance criteria in Table 4-1, the effect of not taking action to identify and protect named seamount features is unknown.

Alternative 2: Designate 5 named seamounts in the EEZ off Alaska as HAPCs. All Council-managed bottom contact fishing would be prohibited within the proposed HAPC.

The effects of this alternative are determined as follows:

Habitat Complexity (living habitat): Insignificant (I).
Several species of high relief coral have been documented on these five seamounts as living habitats. Fish and crab have been documented *in situ* on or near the high relief living structures. Fishery data suggests little effort has occurred on these features. These areas would be closed from future fishing disturbances. Therefore, a slight benefit to these habitats is expected; however, the extent of this benefit is not likely to cause a substantial increase in complexity and therefore the effects are likely insignificant.

Habitat Complexity (non-living): Insignificant (I).
Information is available to assess non-living structures for these five named seamounts and from which we may infer conditions for the other eleven. Three-dimensional contour imagery is available for Patton Seamount; however, comprehensive bottom sampling has not occurred. Substrate information reveals that these seamounts consist of hard bedrock, soft substrates, and a range of both hard and soft substrates. A fisheries gear assessment model (Fujioka 2004), suggests that harder substrates, such as bedrock, are able to withstand direct impacts from bottom contact gear. The model also suggests that fishing impacts on soft substrates can leave trenches and gear marks. Therefore, hard and soft non-living substrate could be altered minimally from bottom contact fishing and it is unlikely that any substantial alteration of the physical structure occurs. HAPC identification and management could alleviate such effects, but the overall effect to non-living habitat is insignificant.

Benthic Biodiversity: Insignificant (I).
While species information does exist for these 5 named seamounts, the direct relationship between benthic fish, prey, and other species is unknown. A prohibition of bottom contact gear may reduce effects to the benthic community, and is likely to protect the benthic community and decrease the likelihood of changing the community structure. A substantial increase in community structure is not anticipated with this alternative, and therefore the effects are likely insignificant.

Habitat Suitability: Insignificant (I).
Information is not available to assess the effects of Alternative 2 on the suitability of seamount on managed species. Regardless, the protection measures are likely to preserve the suitability of habitat but are not expected to enhance habitat to cause a substantial increase in suitability. Therefore, the effect of identifying and protecting 5 named seamount features is likely insignificant.

Alternative 3: Designate 16 named seamounts in the EEZ off Alaska as HAPCs. All Council-managed bottom contact fishing would be prohibited within the proposed HAPC.

As described in Section 3.1.1, 24 named seamounts exist in EEZ waters off Alaska. Of these 24, only 16 seamounts are within fishable depths (i.e., depths less than 3,000 meters) which is the deepest recorded range of FMP species (Table 4-13). Although habitat and species data on the presence of habitat and species are available for 5 named seamounts, only species composition may be inferred for the remaining 11 unexplored seamounts. Taking into account levels of current knowledge specific to fish presence and habitats of Alaska seamounts from research (Alton 1986, Hughes 1981, Maloney 2003) and recent exploration (NOAA Oceanexplorers 2002 to present) we may infer that similar species compositions and habitats likely exist on these seamounts for which we have little or no information.

The effects of Alternative 3 are similar to Alternative 2 and determined as follows:

Habitat Complexity (living habitat): Insignificant (I).
Several species of high relief coral have been documented for 5 seamounts and living habitats are inferred for the remaining 11 named seamounts. Fish and crab have been documented *in situ* on or near the high relief living structures. Fishery data suggest that little effort has occurred on these features. These areas would be closed from future fishing disturbances. Therefore, a slight benefit to these habitats is expected; however, the extent of this benefit is not likely to cause a substantial increase in complexity, and therefore the effects are likely insignificant.

Habitat Complexity (non-living): Insignificant (I).
Information is available to assess non-living structures for 5 of the 11 named seamounts. Three-dimensional contour imagery is available for Patton Seamount; however, comprehensive bottom sampling has not occurred. Substrate information reveals that these seamounts consist of hard bedrock, soft

substrates, and a range of both hard and soft substrates. A fisheries gear assessment model (Fujioka 2004), discusses that harder substrates, such as bedrock, are able to withstand direct impacts from bottom contact gear. The model also suggests that fishing impacts on soft substrates can leave trenches and gear marks. Therefore, hard and soft non-living substrate could be altered minimally from bottom contact fishing and it is unlikely that any substantial alteration of the physical structure occurs from applying protection measures. Therefore, the effect to non-living habitat is insignificant.

Benthic Biodiversity: Insignificant (I).
While species information does exist for 5 of the 16 named seamounts, the direct relationship between resident fish, prey, and other species is unknown. A prohibition of bottom contact gear may reduce the effect on the benthic community, and is likely to protect the benthic community and decrease the likelihood of changing the community structure. A substantial increase in structure is not anticipated with this alternative, and therefore the effects are likely insignificant.

Habitat Suitability: Insignificant (I).
Information is not available to assess the suitability of habitat for named seamounts. Regardless, the protection measures are likely to preserve the suitability of habitat but are not expected to enhance habitat to cause a substantial increase in suitability. Therefore, the effect of identifying and protecting 16 named seamount features is likely insignificant.

Table 4-14. Significance thresholds for effects on habitat.

Effect	Criteria			
	Significantly Negative (-)	**Insignificant (I)**	**Significantly Positive (+)**	**Unknown (U)**
Habitat complexity: 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.	Substantial decrease in mortality or damage to long-lived, slow growing species.	Information, magnitude and/or direction of effects are unknown.
Habitat complexity: (non-living substrates such as rock and cobble	Substantial increase in the rate of removal or damage of non-living substrates.	Likely to not alter or damage non-living substrates.	Substantial decrease in the rate of removal or damage of non-living substrates.	Information, magnitude and/or direction of effects are unknown.
Benthic biodiversity	Substantial decrease in community structure from baseline.	Likely to not decrease community structure.	Substantial increase in community structure from baseline.	Information, magnitude and/or direction of effects are unknown.
Habitat suitability	Substantial decrease in habitat suitability over time.	Likely to not change habitat suitability over time.	Substantial increase in habitat suitability over time.	Information, magnitude and/or direction of effects are unknown.

4.2.2 Effects on Target Species

Historically, very little fishing effort has taken place on seamounts. The fisheries that have occurred here target rockfish and Pacific cod with trawl and hook and line gear. Minimal amounts of crab have been harvested from two seamounts in the GOA. All fisheries that overlap with HAPC alternatives for seamounts affect less than 1% of the observed target fishery in the NMFS statistical areas in which they are located.

Impacts to the groundfish target species stock or species group affected under each HAPC alternative for seamounts are evaluated to be insignificant (I) for all target fisheries. Impacts to halibut and crab were additionally evaluated and concluded to be insignificant; however these impacts are not reported due to confidentiality constraints. These ratings are based on the significance criteria in Table 4-2.

Although the impacts to the target species were evaluated as insignificant, the resulting effect of restricting bottom contact mobile gear within a seamount closure area could either be (1) a reduction of total fishing effort in that area as effort is displaced, or (2) no reduction in total effort if fishers converted to permitted gear types.

Table 4-15. Groundfish fishing gear distribution by HAPC alternative, based on observed fishing 1995-2003.

Action/ Alternative	1.3	2.2.1	2.2.2	2.3.1	2.3.2	2.4.1	2.4.2	3.2	3.3	3.4.1	3.4.2	3.5.1	3.5.2
Bottom Trawl	15	675	675	12		687	687	45	43	110	110	198	198
Pelagic Trawl										37		37	
Pot	8												
Hook and line				26	26	26	26	509				509	509
Total Effort	23	675	675	38	26	713	713	554	43	147	110	744	707

4.2.3 Effects on Economic and Socioeconomic Aspects of Federally Managed Fisheries

The alternatives to the status quo contained in this action were extensively analyzed in the Regulatory Impact Review (RIR). What is presented here is a summary of the findings for the action and the alternatives within the action. For a more detailed explanation of the findings and the methodology used to conduct the analysis, please review the RIR in Chapter 6.

A comprehensive examination of catch data found no significant Council-managed fishing activity in any of the proposed HAPCs contained in this action. Therefore, the alternatives to the status quo are unlikely to have the potential to create a significantly negative economic effect on commercial fishing relative to the status quo. As a result, all of the alternatives to the status quo in Action 1 have been found to have insignificant effects on gross revenues, operating costs, costs to consumers, vessel safety, and fishing communities. Habitat protection associated with HAPCs, defined in the alternatives, are assumed to have the potential to maintain and/or enhance the present flow of passive use values associated with ecosystem health and biodiversity of sensitive habitat areas by potentially reducing adverse effects of fishing activities. Until information is available to the contrary, it is assumed that no substantial changes in passive use values are expected, and therefore the effects are likely insignificant. Finally, because the alternatives that designate HAPCs will generate regulations prohibiting certain fishing activities, management and enforcement costs are likely to increase relative to the status quo. Alternatives 2 and 3 would create a need for more complicated and costly regulatory and enforcement programs, due to the fishery closure areas. The primary cost associated with these alternatives would be increased monitoring of the proposed seamount areas; however such increases are considered insignificant.

4.2.4 Effects on Other Fisheries

Under these alternatives, only insignificant impacts are expected. The no action alternative would keep status quo. Under Alternatives 2 and 3, the HAPC designations at 5 and 16 sites, respectively, would occur in areas that are not currently fished for council-managed FMP species. Because these areas are outside of current fishing effort, only insignificant effects on fishing mortality, spatial and temporal distribution of catch, and changes in prey availability are expected. Also, associated bycatch and incidental catch are considered insignificant, as well. It is possible that this designation and associated bottom contact restrictions could prevent these types of effects in the future, but these effects are considered insignificant in this analysis.

Table 4-16. Target fishery effects (in metric tons) by HAPC alternative, based on observed fishing 1995-2003.

Target	Alternative	1.2	1.3	2.2.1	2.2.2	2.3.1	2.3.2	2.4.1	2.4.2	3.2	3.3	3.4.1	3.4.2	3.5.1	3.5.2
Atka Mackerel	HAPC MT			5	5			5	5		84	231	231	314	314
	NMFS Stat Area MT			59,817	59,817			59,817	59,817		107,213	209,243	209,243	258,788	258,788
	% Fishery/NMFS Stat Area			0.01%	0.01%			0.01%	0.01%		0.08%	0.11%	0.11%	0.12%	0.12%
Pacific Cod	HAPC MT		0.09	22	22			22	22	59		24	24	83	83
	NMFS Stat Area MT		124,373	389,082	389,082			389,082	389,082	533,371		129,615	129,615	662,986	662,986
	% Fishery/NMFS Stat Area		0.00%	0.01%	0.01%			0.01%	0.01%	0.01%		0.02%	0.02%	0.01%	0.01%
Deep Water Flatfish	HAPC MT			50	50			50	50						
	NMFS Stat Area MT			678	678			678	678						
	% Fishery/NMFS Stat Area			7.38%	7.38%			7.38%	7.38%						
Flathead Sole	HAPC MT			19	19			19	19						
	NMFS Stat Area MT			69,486	69,486			69,486	69,486						
	% Fishery/NMFS Stat Area			0.03%	0.03%			0.03%	0.03%						
Turbot	HAPC MT									8				8	8
	NMFS Stat Area MT									12,052				12,052	12,052
	% Fishery/NMFS Stat Area									0.07%				0.07%	0.07%
Shallow water Flatfish	HAPC MT			23	23			23	23						
	NMFS Stat Area MT			4,848	4,848			4,848	4,848						
	% Fishery/NMFS Stat Area			0.48%	0.48%			0.48%	0.48%						
Rockfish	HAPC MT		4	891	891			891	891	2	2	39	39	43	43
	NMFS Stat Area MT		20,145	89,410	89,410			89,410	89,410	22,345	18,840	44,730	44,730	85,915	85,915
	% Fishery/NMFS Stat Area		0.02%	1.00%	1.00%			1.00%	1.00%	0.01%	0.01%	0.09%	0.09%	0.05%	0.05%
Other Species	HAPC MT			90	90			90	90	141				141	141
	NMFS Stat Area MT			536,496	536,496			536,496	536,496	724,790				724,790	724,790
	% Fishery/NMFS Stat Area			0.02%	0.02%			0.02%	0.02%	0.02%				0.02%	0.02%
Pollock	HAPC MT											315		315	
	NMFS Stat Area MT											1,486,834		1,486,834	
	% Fishery/NMFS Stat Area											0.02%		0.02%	
Sablefish	HAPC MT					10	10	10	10	1.07				1.07	1.07
	NMFS Stat Area MT					6,748	6,748	6,748	6,748	3,624				3,624	3,624
	% Fishery/NMFS Stat Area					0.15%	0.15%	0.15%	0.15%	0.03%				0.03%	0.03%
Arrowtooth Flounder	HAPC MT			32	32			32	32						
	NMFS Stat Area MT			36,139	36,139			36,139	36,139						

4.2.4.1 Harvest levels of groundfish in state waters seasons and parallel seasons

Under these alternatives, only insignificant impacts are expected. The no action alternative would keep status quo. Under Alternatives 2 and 3, only insignificant impacts are expected. All of the 16 designations are outside of state waters, so the parallel fisheries and the state-managed fisheries inside 3 nautical miles are not affected. Other state-managed fisheries outside of 3 nautical miles, including lingcod, black and blue rockfish, and Demersal Shelf Rockfish in the EGOA, do not spatially overlap with these designation and restriction areas; therefore, only insignificant impacts are expected.

4.2.5 Effects on Protected Species

Action 1 would close fishing with bottom contact gear to various seamounts in the GOA. Historically, very little fishing effort has taken place on these seamounts. Presumably, the fisheries employing this gear would either cease to fish or it prosecute the effort elsewhere; thus under this action, it is likely that there would be minor changes in the current fishing patterns in seamount areas.

Little is known about the importance of seamount areas to seabirds or marine mammals. It is possible that some marine organisms that are prey species for seabirds and marine mammals occur in greater abundance near seamounts. During studies of radio-tagged Steller sea lions during 1988–1993, Merrick and Loughlin (1997) proved that two tagged adult female Steller sea lions moved from Chirikof Island near Kodiak to forage on Patton Seamount during the winter. These sea lions remained over Patton Seamount for long periods, apparently resting at sea and feeding in waters over 2 km deep. No other definitive information on importance of seamounts to seabirds or marine mammals is available. Currently, restrictions on Pacific cod, Atka mackerel, and pollock fisheries in the GOA region support Steller sea lion protection measures specified in the recent Biological Opinions and in NMFS regulations. These measures provide some limits on fishing for these 3 target species, and thus further restrictions causing closures for HAPC protection may or may not have further implications given the already-closed nature of some of these areas.

Seabirds are abundant in the GOA region. The GOA also provides important habitat for the endangered short-tailed albatross, which may be present throughout the region throughout the year. Radio tracking studies show that this species disperses from nesting grounds near Japan to the Aleutians and around the GOA, and juvenile and adult birds remain in the area until adult mature birds return to nest. Recent Biological Opinions on endangered or threatened seabirds provide incidental take allowances for groundfish fisheries. Industry currently employs seabird avoidance measures that have, for the most part, mitigated the potential for take of any endangered or threatened seabirds and other seabirds as well. Many seabirds nesting in the GOA region prey on forage fish species in the regions around nesting sites, but fisheries that may be either reduced or displaced from HAPC sites do not target these species of fish, and thus the implications to prey for seabirds from the proposed action are not likely to be of concern. The seamount sites proposed for regulatory action in Action 1 are well offshore; however, it is likely that seabirds forage in the waters over seamounts. The minor changes in distribution of fishing effort that may result from new HAPC site protection measures will not likely appreciably change the fishing patterns in the GOA seamount areas, and thus the overall effects on seabirds from implementation of the alternatives under Action 1 are expected to be negligible.

It seems likely that impacts of Action 1 on marine mammals and seabirds would be very minimal. In some instances, it might be argued that closure of seamounts to bottom contact gear would reduce fishing activity, thus reducing the potential interactions between these gear type fisheries and marine mammals or seabirds. It also could be argued that fishing might be merely displaced from seamount areas to other areas remaining open to these gear types, possibly concentrating fishing in other areas where fishing already occurs. But it is unlikely that this concentration of fishing activity would be large enough to have a discernable effect.

The overall net effect of Action 1 (Alternatives 2 and 3) on protected species appears to be negligible—that is, impacts occurring now on seamounts would either cease to occur or might be merely displaced. Analysis of displaced fishery effects on protected resources was discussed in some detail in the EFH EIS (NMFS 2005). Relevant information and discussion on effects of closing certain EFH areas on protected resources from the EFH EIS are incorporated herein by reference (NMFS 2005, Chapters 4.0 and 4.1). If fishing is permanently reduced because of this action, the impacts on protected species might be considered beneficial; but the magnitude of exiting fisheries on seamounts, and the resultant potential reduction in fishing under this action, is believed to be very small and would be negligible in context with other existing fisheries that currently have some effects on protected species.

With regard to the criteria for determining significance of effects to seabirds or marine mammals, Action 1 would not likely concentrate fishing activity in a manner that would result in greatly increased encounters with these species. This is because of the currently low levels of fishing activity in seamount areas and the current very low levels of encounters between fishing activity and protected species. Entanglement with fishing debris would not be appreciable nor would resultant take from such encounters; if fishing is reduced at seamounts, loss of gear would be reduced, providing some benefit to marine mammals and seabirds, but this is expected to be a very small fishing effort reduction and benefits to these species would be considered to be very small. The displaced fishing activities would be small in magnitude, if any displacement occurs at all, and thus spatial/temporal concentration of fishing activity, and any contact between vessel operations and marine mammals or seabirds, would be expected to be very minimal. This action similarly would not result in appreciably increased disturbance to marine mammals or seabirds. Offal production would not likely be appreciably changed from status quo, and thus seabird impacts also would not change appreciably. Seabird prey would likely also not be affected given the expected very small changes in fishing activity from either displaced fishing near seamounts or fishing effort that would cease under Action 1 (Alternatives 2 and 3). Some benthic habitat may be impacted beneficially from reduced bottom contact fishing activity, but this will be in such small amounts that impacts to seabirds that use such habitat would be very minimal. Therefore, the action is determined to have insignificant impacts on protected species.

4.2.6 Effects on Ecosystem

Under these alternatives, only insignificant or unknown impacts are expected. The no action alternative would maintain the status quo and continued lack of protection for these important habitat areas have an unknown impact on the ecosystem. Under Alternatives 2 and 3, the HAPC designations at 5 and 16 sites, respectively, would occur in areas that are not currently fished for council-managed FMP species. Regardless, the restrictions to bottom contact fishing could prevent fishing in the future, and would prevent the possibility of future effects from fishing activities. Because of the protection provided by Alternatives 2 and 3, changes in predator-prey relationships, energy flow and balance, and ecosystem diversity due to fishing would be less likely. It is possible that this designation and associated bottom contact restrictions could prevent fisheries effects in the future, but these effects are unlikely to result in increases of prey, energy flow, or balance and diversity. Therefore, the effects of Alternatives 2 and 3 on the ecosystem are likely insignificant.

4.2.7 Effects on Non-fishing Activities

The identification and management of HAPCs under any of the alternatives would have no effect on non-fishing activities such as marine transportation, navigational dredging, marine disposal areas, oil and gas development, mineral extraction, or cable laying. NMFS and the Council have no authority to restrict such activities under the Magnuson-Stevens Act. NMFS and the Council would encourage agencies with appropriate jurisdiction to ensure that non-fishing activities do not adversely affect HAPCs.

4.2.8 Summary of the Effects of the Alternatives under Action 1

Action 1, Alternative 1 would result in no HAPC identification for seamount areas within Alaska's EEZ. The effect on habitat of not taking action to identify and protect named seamounts as HAPCs is insignificant. Limited fishing occurs on the seamounts; however, living habitat information does not exist to determine if disturbance from bottom contact fishing gear is significant. Alternative 1 could have positive effects for the industries that currently harvest fish or shellfish in these areas, and/or those industries that could develop new fisheries in these areas in the future. However, such positive effects could be short term and small in magnitude for the fishing industry due to the small geographic extent of most areas. If more fishing effort occurs in these seamount areas because no seamount HAPCs are identified and protected, effects on target fisheries and the ecosystem may change.

Action 1, Alternative 2 would result in the identification of 5 separate HAPCs for seamounts; these would have associated management measures to restrict fishing with bottom contact gear. There would be no short-term negative impacts for the fishing industries since no fishing effort has been documented within these 5 areas, according to NORPAC observer data. There could be a long-term negative impact for the fishing industries that would prevent new fisheries from developing within these areas. However by choosing the areas as HAPCs and preventing bottom contact fisheries. The Council could create long-term positive impacts for habitat, ecosystem, and some of the species within the target and other fisheries. The selection of Alternative 2 would be a precautionary measure to protect unique, rare, and fragile marine habitats and the associated FMP species on these seamounts.

Action 1, Alternative 3 would result in the identification of 16 separate HAPCs for seamounts; these would have associated management measures to restrict fishing with bottom contact gear. There would be some short-term negative impacts for the fishing industries since small amounts of harvest and revenue for Pacific cod, rockfish, and crab within at least 2 of the named 16 seamounts have been documented. There could be a longer-term negative impact for the fishing industries that would prevent new fisheries from developing within these areas. However by choosing the areas as HAPCs and preventing bottom contact fisheries the Council could create long term positive impacts for habitat, ecosystem, and some of the species within the target and other fisheries. The selection of Alternative 3 would be a precautionary measure to protect unique, rare, and fragile marine habitats and the associated FMP species on all 16 seamounts, which are at depths that support FMP species.

Alternatives 2 and 3 provide methods to adopt precautionary measures to protect unique, and rare fragile marine habitats per guidance to Councils in 50 CFR 600.815(a)(8). The management measures associated for Alternatives 2 and 3 have insignificant or unknown effects for each category analyzed. While both action alternatives would provide protections to seamounts within the EEZ, Alternative 2 would be less conservative and is based on existing documented research of seamounts. Further research is being conducted beyond the current 5 seamounts named under Alternative 2. Alternative 3 constitutes a more conservative approach for the Councils to adopt precautionary measures for HAPC protection.

4.3 Consequences of HAPCs for Gulf of Alaska Corals-Action 2

4.3.1 Effects on Habitat

<u>Alternative 1</u>: No Action (No GOA HAPC Sites).
Under Alternative 1, the no action alternative, HAPC identification and measures to protect HAPC for areas where high relief coral and rockfish exist would not be adopted.

As described in Section 3.1.2, relatively undisturbed to pristine sensitive, high relief marine bio-habitats (corals) associated with council-managed rockfish species exist and have been documented by directed research efforts and observed fishery bycatch data. Importantly, anecdotal information has been offered by experienced fishers with local knowledge of these conditions in areas of the shelf that they fish. Concentration areas of high relief coral are considered to be rare due to oceanic and substrate conditions required to support these organisms. Directed research has documented the presence of corals and also noted the absence of corals in other areas. Based on several hundred manned submersible dive transects in the GOA, the basic assumption is that these corals are concentrated in certain areas. However comprehensive coral distribution research has not been conducted for all waters off Alaska.

Alternative 1 has positive, but unquantified effects on the complexity of living substrates. The status quo management program offers an unquantified amount of protection to documented long-lived, slow-growing, high relief coral habitats in the GOA from damage or mortality from fishing gear. For example, the closure of Southeast Alaska to all trawling and the trawl closures established to mitigate effects of fishing on Steller sea lions provide some measure of protection, but the relative amount is unknown. Of those areas observed, high relief coral habitats provide habitat complexity. Removal or damage of the bio-shelter habitat could change the complexity of the area; however, existing impacts of bottom contact fishing gear on living habitat appear to be minimal (see EFH EIS, NMFS 2005). Overall, the effect of not taking action to identify and protect small HAPCs in the GOA is unknown.

Alternative 1 would likely have insignificant effects on the habitat complexity provided by non-living substrates. Information is not available to assess the overall extent of non-living habitat in the GOA; substrate information is only available for a few areas scattered across the GOA where direct research efforts and opportunistic sampling have occurred. Fishing gear has been observed *in situ* to alter smaller boulders and become stranded in crevices of vertical bedrock formations. Because trawl fishing gear can become damaged when set on areas of high complexity, these areas are generally avoided. Further, it is unlikely that any alteration of the larger or more permanent physical structure occurs from fishing gear. Therefore, the effect on non-living habitat is insignificant.

In terms of benthic biodiversity and habitat suitability, the effects of Alternative 1 are unknown. Information is not available to assess the benthic biodiversity of the GOA or to determine whether lack of action to protect small HAPC areas would have a significant effect. Therefore, the effect on benthic biodiversity of not taking action to identify and protect small HAPCs in the GOA is potentially negative, but potential impacts are highest with no action.

Alternative 2, Option 1: Designate three HAPC sites along the slope in waters offshore Sanak Island, on Albatross Bank, and offshore Middleton Island and include a management measure to restrict bottom contact with mobile gear for 5 years and prioritize mapping in these areas to determine high relief coral distribution.

Option 1 would restrict bottom contact mobile gear for 5 years until mapping delineates high-relief coral distribution. Experienced fishers offer these areas as habitats they use for fishing, and it is assumed their knowledge of these habitats is accurate. Therefore, the likelihood of finding high-relief corals in these areas is considered high. Following the mapping of corals, areas will either be closed to this gear type if corals are present or be re-opened to this gear type in areas where high-relief corals are not present. The HAPC designation would sunset after 5 years if the presence of coral had not been documented.

Information is not available to assess the overall extent of high relief living habitats in these three areas, or the effects on habitat complexity. However, based on anecdotal information from experienced fishers, these areas are thought to contain high relief corals. Therefore, until such a time that mapping is complete, the 5-year closure will allow, at a minimum, limited recovery of any areas already disturbed by bottom contact gear and remove the near term potential to disturb high-relief habitats from bottom contact gear. Once high relief coral areas are delineated, any resulting closure will reduce the disturbance of sensitive habitats from this gear while allowing fishing to occur in less sensitive areas. While general assumptions about positive effects can be made for these sites, the overall effect on living substrates within the GOA is not likely to be substantial because of the limited number of sites affected. Therefore, the effects are likely insignificant.

As noted for Alternative 1, the effects on habitat complexity offered by non-living substrate are likely to be insignificant. Experienced fishers have testified that these areas are thought to contain hard substrates such as bedrock formations and boulders. Fishing gear is unlikely to affect this type of hard-bottom habitat. Therefore, the effect on non-living habitat is insignificant.

No information is available to assess the benthic biodiversity of benthic habitats or habitat suitability for these 3 areas. Regardless, protecting these areas from fishing effects is likely to preserve the community structure and habitat suitability. It is not likely to substantially change the community structure or suitability because of the limited areas affected. Therefore, the effects on biodiversity and suitability are likely insignificant.

<u>Alternative 2, Option 2</u>: Designate the 3 areas as described and include a management measure to restrict bottom trawl gear for 5 years and prioritize mapping in these areas to determine high relief coral distribution.

Similar to Alternative 2, Option 1, Option 2 offers a restriction measure for bottom trawl gear. Specifically, Option 2 proposes to restrict bottom trawl gear for 5 years until mapping delineates high-relief coral distribution. Anticipated effects on habitat from this gear change are not considered to be significant and the same effect determinations for Options 1 apply to Option 2.

<u>Alternative 3, Option 1</u>: Designate 3 HAPC areas with a total of 5 HAPC sites at Cape Ommaney (1 site), Fairweather Ground NW (2 sites), and Fairweather Ground SW (2 sites), and include a management measure to restrict bottom contact gear within the HAPCs.

These 5 sites have been scientifically investigated *in situ* using submersibles, and information on several sites comes also from side scan sonar imagery. High relief coral have been documented in these areas and offer living structure habitat. A scientific review team chose these areas where high-relief living coral concentrations exist in contrast to areas that do not exhibit these concentrations. Additionally, these specific areas have been observed to be fairly pristine in condition.

Investigations noted some presence of derelict longline gear. Also, all HAPC sites for Alternative 3 are within the existing GOA bottom trawl closure area east of 144° longitude. However, the coral concentrations appear relatively untouched as compared to other areas along the slope where damage was evident. The restriction of bottom contact gear in these sites will allow some recovery of the area already impacted by gear and remove future disturbances to high-relief habitats from bottom contact gear while allowing fishing to occur in less sensitive areas.

Removal or damage of the bio-shelter habitat would change the complexity of these areas. Because these coral species are long lived and slow growing, recovery after disturbance is likely to take decades. However, a dedicated coral distribution survey for the GOA has not been completed, and the overall amount of habitat that supports coral is not known. Therefore, the restriction of bottom contact gear in these sites will reduce potential disturbance from the gear, but to what extent the disturbance affects living habitats and habitat complexity throughout the GOA is unknown. Because the effects are likely to be positive, but confined to these identified areas, the effects are not expected to be substantial, and therefore are considered likely to be insignificant.

Substrate information is available within these areas. These five sites have been scientifically investigated by direct manned submersible observations, and information of several sites also comes from side scan sonar imagery. Hard substrates consisting of bedrock and boulder formations have been documented in these areas. Fishing gear has been observed *in situ* to alter smaller boulders and become stranded in crevices of vertical bedrock formations. It is unlikely that any substantial alteration of the physical structure occurs from fishing gear. Therefore, the effect on non-living habitat is insignificant.

Benthic biodiversity information is available for these areas. These observations note concentrations of adult fish, juvenile fish, crab, forage fish, high relief corals, sponges and invertebrates. Fishery data also document the presence of council-managed rockfish and other species. The bottom gear restriction reduces the potential for removal and disturbance of benthic organisms and prey resources within the designated closure areas. The overall extent of this effect on benthic biodiversity in the region is unknown, but the impacts on the identified areas are likely to be positive. Because the effects are likely to be positive, but confined to these identified areas, the effects are not expected to be substantial, and therefore, are considered likely to be insignificant.

No information is available to assess the benthic biodiversity of benthic habitats or habitat suitability for these sites. Regardless, protecting these areas from fishing effects is likely to preserve the community structure and habitat suitability. It is not likely to substantially change the community structure or suitability because of the limited areas affected. Therefore, the effects on biodiversity and suitability are likely insignificant.

<u>Alternative 3 Option 2</u>: Designate 3 HAPC areas with a total of 5 HAPC sites at Cape Ommaney (1 site), Fairweather Ground NW (2 sites), and Fairweather Ground SW (2 sites), and include a management measure to restrict bottom trawl gear within the HAPCs, while designating the remainder of each of the three HAPCs in this alternative as priority areas for hook and line gear impact research.

Similar to those in Alternative 3, Option 1, this alternative includes a designation-only option as well as an area where bottom trawl gear would be prohibited. Bottom trawl gear is already prohibited within these areas, and this suboption would allow hook and line gear to occur in these areas, while designating the remainder of each of the three HAPCs in this alternative as priority areas for hook and line gear impact research. HAPC designation by itself does not have a direct impact on marine habitat. Habitat consequences are the same as in Alternative 3, Option 1, and although not quantified the impact of hook and line gear would be less than bottom trawl gear, but more than with no bottom contact gear since bottom trawling is currently prohibited in these areas.

<u>Alternative 4</u>: Combine Alternatives 2 and 3 as follows:

<u>Option 1 (Alt 2, Option 1 + Alt 3, Option 1)</u>: Designate 6 HAPC areas that total 8 HAPC sites to include management measures that prohibits bottom contact with mobile gear for the Sanak Island, Albatross Bank, and Middleton Island sites, prioritizes mapping, and prohibits bottom contact gear within the six sites at Cape Ommaney (1 site), Fairweather Ground NW (2 sites), and Fairweather Ground SW (2 sites).

Effects to habitat for this alternative are discussed above in each individual alternative.

<u>Option 1 (Alt 2 Option 1 + Alt 3 Option 2)</u>: Designate 6 HAPC areas that total 8 HAPC sites and include management measures that prohibit bottom contact with mobile gear for the Sanak Island, Albatross Bank, and Middleton Island sites, prioritize mapping, and prohibit bottom trawl gear within the five sites

at Cape Ommaney (1 site), Fairweather Ground NW (2 sites), and Fairweather Ground SW (2 sites) while designating the remainder of each of the three HAPCs in this alternative as priority areas for hook and line gear impact research.

Effects on habitat for this alternative are discussed above in each individual alternative.

Option 2 (Alt 2 Option 2 + Alt 3 Option 1): Designate 6 HAPC areas that total 8 HAPC sites and include management measures that prohibit bottom trawl gear for the Sanak Island, Albatross Bank, and Middleton Island sites, prioritize mapping, and prohibit bottom contact gear within the 5 sites at Cape Ommaney (1 site), Fairweather Ground NW (2 sites), and Fairweather Ground SW (2 sites).

Effects on habitat for this alternative are discussed above in each individual alternative.

Option 2 (Alt 2 Option 2 + Alt 3 Option 2): Designate 6 HAPC areas that total 8 HAPC sites and include management measures that prohibit bottom trawl gear for the Sanak Island, Albatross Bank, and Middleton Island sites, prioritize mapping, and prohibit bottom trawl gear within the 5 sites at Cape Ommaney (1 site), Fairweather Ground NW (2 sites), and Fairweather Ground SW (2 sites) while designating the remainder of each of the three HAPCs in this alternative as priority areas for hook and line gear impact research.

Effects on habitat for this alternative are discussed above in each individual alternative.

4.3.2 Effects on Target Species

Alternative 1: (No action Alternative) No coral HAPC in the GOA would be identified.

The impacts of the no action alternative on target species are described in detail in the Alaska Groundfish supplemental programmatic environmental impact statement (NMFS 2004a) and in the EIS for EFH (NMFS 2005). By not identifying coral HAPC in the GOA, fishery impacts would continue to be possible on species that may depend on these areas. Continued fishing in the coral HAPC areas may have a negative impact on those species that depend directly or indirectly on these areas for either their own life stage(s) or for life stage(s) of potential prey species. Because these areas are very limited in relation to the entire GOA and the current level of fishing is very small, any impact is not likely to affect the sustainability of the target species regarding stock biomass, spatial distribution or changes in prey availability. Therefore, the impacts of Alternative 1 are insignificant.

Alternative 2: Identify HAPCs at 3 sites along the GOA continental slope with 2 management options to protect corals.

Two target fisheries exceeded the 1% threshold for further analysis in this alternative: the deepwater flatfish and rockfish fisheries. Both of these affected fisheries were associated with all 3 sites in the central and western GOA. Both management options under Alternative 2 (2.2.1, 2.2.2) would affect approximately 7.4% of the deepwater flatfish fishery (which represents 50 metric tons of a harvest of 678 metric tons over the 9-year period). Approximately 1% of the rockfish fishery affected, with 891 of 89,409 metric tons affected from 1995–2003 (Table 4.2-1).

The HAPC alternatives are relatively small in area with a total catch of 941 metric tons over the 9-year period, averaging of just over 10 metric tons per year. This catch would likely be redistributed outside of these HAPC areas. Impacts to the target species stock or species group affected under this HAPC alternative would be insignificant due to the relatively small reduction of average yearly catch in proportion to the total catch.

Alternative 3, Option 1: Identify HAPCs at 3 areas in the Eastern GOA and prohibit all Council-managed bottom contact fishing within 5 sites inside the HAPCs.

No target fisheries would be affected more than 1% by this HAPC alternative (Table 4.2-1). However, any catch within the HAPCs would likely be redistributed outside of the HAPC areas. Impacts to the target species stock or species group affected by this HAPC alternative would be insignificant.

Alternative 3, Option 2: Identify HAPCs at 3 areas in the Eastern GOA and prohibit all Council-managed bottom trawl fishing within 5 sites inside the HAPCs while designating the remainder of each of the three HAPCs in this alternative as priority areas for hook and line gear impact research.

No target fisheries would be affected by more than 1% by this HAPC alternative (Table 4.2-1). However, any catch within the HAPCs would likely be redistributed outside of the HAPC areas. Impacts to the target species stock or species group by this HAPC alternative would be insignificant.

Alternative 4: Combine Alternatives 2 and 3 in their entirety. Impacts to the target species stock or species group affected by this combined Alternative 4 are predicted to be insignificant for all target fish evaluated under the HAPC. This conclusion was based on the combined evaluation of Alternatives 2 and 3 (Options 1 and 2).

HAPC alternatives where no bottom contact mobile gear is allowed would impose either a reduction in fishing with existing gear types or conversion to a non-mobile gear type that would not contact the seafloor and would allow fishing activity to continue at or near previous levels. There are also HAPC alternatives that prescribe areas where no bottom contact fisheries could occur; in these areas, fisheries using pot, longline, dredge, dinglebar, or trawl gear would be suspended. Presumably such fishing activities would continue only in areas not closed to this gear. In the case of a 5-year restriction on bottom contact mobile gear, these fisheries would cease for that period and either restart again after 5 years or continue to be prohibited if the time restriction is continued. Because of these various possibilities, most likely there would be area closures to a variety of fisheries with effort either ceasing in these areas or shifted to other open areas. There likely would be offsetting impacts—that is, impacts that may currently occur in HAPC alternative areas would now occur elsewhere, may not occur at all, or could increase as fisheries shift to less productive fishing grounds. There are no increases or reductions in harvest levels in the HAPC alternatives; target species catch that is excluded from the HAPC alternatives would presumably be redistributed to areas outside the HAPCs.

4.3.3 Effects on Economic and Socioeconomic Aspects of Federally Managed Fisheries

The alternatives to the status quo contained in this action were extensively analyzed in the Regulatory Impact Review (RIR) appended to this EA. What is presented here is a summary of the findings for the action and the alternatives within the action. For a more detailed explanation of the findings and the methodology used to conduct the analysis please review the RIR in Chapter 6.

A comprehensive examination of catch data found no significant Council-managed fishing activity in any of the proposed HAPCs contained in this action. Therefore, the alternatives to the status quo are unlikely to have the potential to create a significantly negative economic effect on commercial fishing relative to the status quo. As a result, all of the alternatives to the status quo in Action 2 have been found to have insignificant effects on gross revenues, operating costs, costs to consumers, vessel safety, and fishing communities. Habitat protection associated with HAPCs, defined in the alternatives, are assumed to have the potential to maintain and/or enhance the present flow of passive use values associated with ecosystem health and biodiversity of sensitive habitat areas by potentially reducing adverse effects of fishing activities. Because the direction of the effect is likely positive and no information indicates a substantial increase in passive use value, the effect is likely insignificant. Finally, because the alternatives that designate HAPCs will generate regulations prohibiting certain fishing activities, management and enforcement costs are likely to increase relative to the status quo. Alternatives 2, 3, and 4 would create a need for more complicated and costly regulatory and enforcement programs, due to the fishery closure areas. The primary cost associated with these alternatives would be increased monitoring of the proposed coral areas through both vessel and aircraft monitoring; however, such increases are considered insignificant because increase monitoring is likely to occur in the course of existing monitoring activities without additional resources provided with this action.

4.3.4 Effects on Other Fisheries

Under these alternatives, only insignificant impacts are expected. The no action alternative would maintain the status quo. Alternative 2 would designate HAPCs with two options for management restrictions, but would have only insignificant impacts on fishing mortality, spatial and temporal distribution of fisheries, prey availability, harvest levels of groundfish in state and parallel fisheries, and bycatch and incidental catch of prohibited, forage, and non-specified species. It is possible that the designation could restrict additional bottom contact, and prevent future fisheries effects, but these effects are considered insignificant in this analysis. Alternatives 3 and 4 include restrictions on bottom contact fishing, or bottom trawl only (Alt. 3, Option 2), but the areas that would be affected are very small and experience only a limited amount of fishing effort. Therefore, any impacts on these fisheries would be insignificant.

4.3.5 Effects on Protected Species

Potential impacts on protected species from fisheries prosecuted in these small and specific areas in the GOA are small because of the geographic areas involved and the limited number of areas being considered. Given the possible scenarios, it seems likely that impacts of Action 2 on marine mammals and seabirds would be fairly minimal. The closure of coral concentration areas to bottom contact gear would reduce fishing activity, thus reducing the potential interactions between these gear type fisheries and marine mammals or seabirds. But such fishing might simply be displaced from these coral concentration areas to other areas remaining open to these gear types, possibly concentrating fishing in areas already fished by others. But it is unlikely this action would appreciably change fishing patterns or that the concentration of fishing activity would be large enough to have a discernable effect.

Little is known about the importance of the coral concentration areas identified in this action to seabirds or marine mammals. It is possible that some prey species for seabirds and marine mammals occur in greater abundance in these habitats. But little is known about the association between coral habitats and seabirds and marine mammals. Seabirds and marine mammals are found in all areas of the North Pacific, and closures or gear restrictions in specific coral habitats may still encounter and interact with seabirds and marine mammals unless these fisheries cease to be prosecuted.

Currently there are restrictions on Pacific cod, Atka mackerel, and pollock fisheries in the GOA region because of Steller sea lion protection measures specified in the recent biological opinions and in NMFS regulations. These measures provide some limits on fishing activity for these three target species, and thus further restrictions causing closures for HAPC protection may or may not have further implications given some of these areas are already closed. In the GOA region, the proposed HAPC area designations are not near shore and do not occur within Steller sea lion critical habitat or protection areas. It seems unlikely, then, that fisheries that may be displaced or otherwise affected by restrictions imposed on GOA HAPC sites would affect Steller sea lions.

Seabirds are abundant in the GOA region. The Gulf also provides important habitat for the endangered short-tailed albatross which may be present throughout the region throughout the year. Radio tracking studies show that this species disperses from nesting grounds near Japan to the Aleutians and around the GOA, and juvenile and adult birds remain in the area until adult mature birds return to nest. Recent biological opinions on endangered or threatened seabirds provide incidental take allowances for groundfish fisheries. The industry currently employs seabird avoidance measures that have, for the most part, mitigated the potential for take of any endangered or threatened seabirds and other seabirds as well. Many seabirds nesting in the GOA region prey on forage fish species in the regions around nesting sites, but fisheries that may be either reduced or displaced from HAPC sites do not target these species of fish, and thus the implications to prey for seabirds from the proposed action are not likely to be of concern. The minor changes in distribution of fishing effort that may result from new HAPC site protection measures will not appreciably change the fishing patterns in the GOA region, and thus the overall effects on seabirds are expected to be negligible.

While there is uncertainty over likely impacts on protected species from displacing fisheries or closing certain fisheries in the coral concentration areas, the geographic areas involved are fairly small individually, and are fairly deep and likely not habitat for seabird or marine mammal prey species. However, these still are areas where seabirds or marine mammals may forage in upper water strata, and thus fisheries displaced into adjacent habitats may interact with these protected species. The overall net effect of Action 2 on protected species appears to be negligible—that is, impacts occurring now in coral concentration areas would either cease to occur or might be merely displaced. Analysis of displaced fishery effects on protected resources was discussed in some detail in the EFH EIS (NMFS 2005). Relevant information and discussion on effects of closing certain EFH areas on protected resources from that EIS is incorporated herein by reference (NMFS 2005, Chapter 4.3). If fishing is permanently reduced because of this action, the impacts on protected species might be considered beneficial; but the magnitude of exiting fisheries in coral concentration areas and the resultant potential reduction in fishing under this action are believed to be very small and would be negligible in cumulative effects with other existing fisheries that currently have some effects on protected species.

With regard to the criteria for determining significance of effects to seabirds or marine mammals, Action 2 would not likely concentrate fishing activity in a manner that would result in greatly increased encounters with these species. This is because of the small size of the coral concentration areas and, thus, the currently-low to moderate levels of fishing activity that might be present in such areas. Entanglement with fishing debris would not be appreciable nor would resultant take from such encounters; if fishing is reduced in coral areas, loss of gear would be reduced, providing some benefit to marine mammals and seabirds, but this is expected to be a very small fishing effort reduction and benefits to these species would be considered to be very small, as well. The displaced fishing activities would be small in magnitude, if any displacement occurs at all, and thus spatial/temporal concentration of fishing activity, and any appurtenant contact between vessel operations and marine mammals or seabirds, is expected to be minimal. This action similarly would not result in appreciably increased disturbance to marine mammals or seabirds. Offal production would not likely be appreciably changed from status quo, and thus seabird impacts also would not change significantly. Seabird prey would likely also not be affected given the expected very small changes in fishing activity from either displaced fishing from coral concentration areas or fishing effort that would cease under Action 2. Some benthic habitat may be impacted beneficially from reduced bottom contact fishing activity, but this will be in such small amounts that impacts to seabirds that use such habitat would be minimal. The action is thus determined to have insignificant impacts to protected species.

4.3.6 Effects on Ecosystem

Under these alternatives, only insignificant impacts are expected. The no action alternative would maintain the status quo. Alternative 2 would designate HAPCs with two options for management restrictions, but would have only insignificant impacts to predator-prey relationships, energy flow and balance, and ecosystem diversity. It is possible that the designation could restrict additional bottom contact which could prevent future fisheries effects, but these effects are considered insignificant in this analysis. Alternatives 3 and 4 include restrictions to bottom contact fishing; or bottom trawl only (Alt. 3, Option 2), however, the areas that would be affected are very small and experience only a limited amount of fishing effort. Therefore, any effects on the ecosystem would be insignificant.

4.3.7 Effects on Non-fishing Activities

The identification and management of HAPCs under any of the alternatives would have no effect on non-fishing activities such as marine transportation, navigational dredging, marine disposal areas, oil and gas development, mineral extraction, or cable laying. NMFS and the Council have no authority to restrict such activities under the Magnuson-Stevens Act. NMFS and the Council would encourage agencies with appropriate jurisdiction to ensure that non-fishing activities do not adversely affect HAPCs.

4.3.8 Summary of the Effects of Alternatives- Action 2

Action 2, Alternative 1 would result in no HAPC identification for known coral locations in the GOA. A comprehensive effort to map coral distribution has not been conducted for all waters off Alaska; consequently, the overall negative impacts from fishing and non-fishing activities to the entire abundance level of corals are unknown. It is acknowledged, however, that certain fishing activities damage and remove fragile benthic marine organisms. The no action alternative could have positive short-term impacts for the fishing industries since there have been small amounts of harvest and revenue have been documented for fishing in areas with coral. However, no action could have a negative impact in the long term for fragile marine habitats and target or other fish stocks that may have associations with coral species that are currently unidentified.

Action 2, Alternative 2 would designate 3 sites along the Continental Shelf as HAPC. The GOA groundfish FMP would be amended for these 3 sites. These areas were brought forward by skippers who possess a wealth of information on bottom habitat. However, no evidence of high-relief hard corals has been documented in these areas. The 2 management options (one for no mobile bottom contact gear, the other no bottom trawl gear) would sunset within 5 years if no directed research within the areas provides evidence of high-relief corals. There would be a short-term negative impact for the fishing industries within these areas for the 5-year time period, specifically the trawl catcher and catcher processors. If there are high-relief coral stands within these areas, there could be a short-term negative impact for the habitat and ecosystem. Consequently, if during the 5-year period high relief corals are identified within these areas, and the areas remain closed, there will be a long-term negative impact on the fishing industries, and a positive long-term impact on the habitat and ecosystem.

Action 2, Alternative 3 would designate 3 areas in the Eastern GOA as HAPC, and 5 sites inside the HAPCs would have a prohibition on all Council-managed bottom contact fishing. These 3 areas were selected based on the presence of high-relief hard coral habitat in the GOA documented by hundreds of submersible dives. There could be negative impacts on fishing industries in the closed areas, in particular the halibut hook and line fishery, but the harvest will likely be displaced into adjacent areas. Alternative 3, Option 2 would avoid this displacement. By designating the areas as HAPCs and preventing bottom contact fisheries, there is an anticipated long term positive impact for habitat, ecosystem, and some of the species within the target and other fisheries. Alternative 3, Option 2 would provide sustained protection within the 3 EGOA areas, by preventing bottom trawling (currently no bottom trawling is permitted in the EGOA overall).

Action 2, Alternative 4 would result in both Alternatives 2 and 3 being adopted in their entirety.

Some deep-sea coral sites may provide important habitat for rockfish and other species and may be particularly sensitive to some fishing activities. Each of the non-status-quo alternatives provide methods to adopt precautionary measures to protect unique and rare fragile marine habitats pursuant to 50 CFR 600.815(a)(8). The management measures associated with Alternatives 2, 3, and 4 have insignificant effects for each category analyzed. While Alternatives 2 and 3 both would provide protections to areas within the GOA, Alternative 2 is based less on scientifically observed corals and more anecdotal information. Alternative 3 is based on existing documented research of high relief hard coral areas. Within Alternative 3 Option 1 provides restrictions on continued fishery impacts to the corals areas, where Option 2 would allow for monitoring of fishery impacts in the hook and line fishery.

4.4 Consequences of HAPCs for Aleutian Islands Corals – Action 3

4.4.1 Effects on Habitat

As described in Section 3.1.2, relatively undisturbed pristine coral garden bio-habitats associated with council-managed rockfish species exist and have been documented by direct research efforts. Important anecdotal information has also been offered by experienced fishers with local knowledge of these conditions in areas of the AI. Continuous, undisturbed coral garden habitat is considered to be rare due to oceanic and substrate conditions required to support these gardens.

Directed research, including *in situ* observations from manned submersible dive transects, has documented near continuous coral coverage or coral gardens on various substrates in discrete sites and noted an absence of continuous coral gardens in other areas of the AI. However, a comprehensive investigation of coral distribution has not been conducted for all waters off Alaska. Therefore, due to the overall lack of coral distribution information, protection for those areas where these coral gardens do exist is a precautionary management strategy that acknowledge the potential impact of fishing on fragile benthic marine organisms.

<u>Alternative 1</u>: No Action (No AI HAPC Sites)

Under Alternative 1, the no action alternative, HAPC identification and measures to protect HAPC for areas where coral and rockfish exist would not be adopted.

Alternative 1 has no effect on the complexity of living substrates. The status quo management program offers a substantial amount of protection to documented long-lived, slow-growing, high relief coral habitats in the AI area from damage or mortality from fishing gear. For example, the trawl closures established to mitigate effects of fishing on Steller sea lions provides protection to over half of management area with depths of less than 1,000 m. It is likely that a vast amount of coral and other living substrates occurs within these areas. In some areas where observations exist, coral gardens habitats are extremely complex. In some areas, these living habitats completely cover the substrate with a biological, multi-dimensional mat. Many species have not been identified or documented in northern cold-water environments. Removal or damage of the bio-shelter habitat will likely change complexity, but the trawl fisheries occur on a very small portion of the available area and are generally located on smooth bottom areas where coral does not occur. The effect of not taking action to identify and protect small HAPCs in the AI is potentially negative because fishing could still disturb those habitats, although (as discussed above) many areas of coral habitat would remain protected.

Information is limited to assess the overall extent of non-living habitat in the AI. Substrate information is only available for a few areas scattered across the AI where direct research and opportunistic sampling have occurred. Fishing gear has been observed *in situ* to alter smaller boulders and become stranded into crevices of vertical bedrock formations. It is unlikely that any substantial alteration of the physical structure occurs from fishing gear. Therefore, the effect on non-living habitat complexity is insignificant.

Information is not available to assess the benthic biodiversity and habitat suitability of the AI and determine whether or not taking action to protect small HAPC areas will have a significant effect. Therefore, the effect of not taking action to identify and protect small, isolated HAPCs within the AI is unknown.

<u>Alternative 2</u>: Designate 6 HAPC sites at Adak Canyon, Cape Moffett, Bobrof Island, Semisopochnoi Island, Great Sitkin Island, and Ulak Island and prohibit all Council-managed bottom contact fishing within each designated HAPC area.

Alternative 2 includes a designation only option for each HAPC site as well as an area where bottom contact gear would be prohibited. HAPC designation by itself does not have a direct impact on habitat. A scientific review team chose these six HAPC areas because living coral habitat concentrations exist at these sites and note that these coral concentrations appear relatively pristine.

These 6 areas have been scientifically investigated by direct manned submersible observations and by side scan sonar imagery. Coral gardens are extremely complex in the six proposed areas. Most of these habitats are a continuous cover of coral and sponge, a biological multi-dimensional mat. Complexity is defined as high taxonomic species diversity in layer upon layer of coral, sponge, and invertebrate species. Many of these are recognizable species; however, many species have not yet been identified or documented in northern cold-water environments. Removal or damage of the bio-shelter habitat will change the complexity of these areas. Also, many of the coral species are long lived and slow growing; therefore, recovery from disturbance would be likely to take decades. Life histories, reproductive associations, and habitat requirements of these newly discovered species are unknown. A prohibition of bottom contact gear would prevent any loss of living habitat complexity within these localized areas. However, the overall area wide effects are likely insignificant because of the limited areas being protected are not likely to result in substantial changes in habitat.

Information is available for these 6 areas to assess substrate composition that supports coral garden habitats. Direct research efforts document bedrock, boulders, cobble, and harder sand substrates. However, living habitat structure can be so thick in places that specific non-living substrates are not possible to observe. Although fishing gear has been observed *in situ* to alter smaller boulders, fishing gear is unlikely to substantially alter the physical structure. Trawl fishermen usually avoid these areas to prevent gear loss and damage. Therefore, the effect on non-living habitat is insignificant.

Submersible observations of these sites have found concentrations of adult fish, juvenile fish, crab, forage fish, high relief corals, sponges and invertebrates. Fishery data also document the presence of Council-managed rockfish and other species. The bottom gear restriction reduces the potential for removal and disturbance of benthic organisms and prey resources. However, the overall extent of this effect on benthic biodiversity and habitat suitability is insignificant because of the limited areas protected are not likely to result in substantial changes.

<u>Alternative 3</u>: Designate an HAPC area on Bowers Ridge and prohibit the use of bottom contact mobile contact gear for Council-managed fishing activities within the HAPC.

Bowers Ridge has not been thoroughly surveyed or investigated with direct submersible observations, so the effects of prohibiting mobile gear in this area are, for the most part, inferred. Reductions in fishing effects are likely beneficial with this action; but because of the limited area, it is not likely to result in substantial changes. Therefore, the effects are likely to be insignificant.

Alternative 4 Option 1: Designate 4 HAPC areas in South Amilia/Atak Island, Kanaga Volcano, Kanaga Island, and Tanaga Island; include management measures to restrict bottom contact with mobile contact gear for 5 years; and prioritize mapping in these areas to determine high relief coral distribution.

Similar to Alternative 2, Options 1 and 2, Alternative 4 includes a designation-only option as well as an area where bottom contact gear would be prohibited. HAPC designation by itself does not have a direct impact on marine habitat.

Specifically, Alternative 4, Option 1 would restrict bottom contact mobile gear for 5 years until mapping delineates high-relief coral distribution. Again, as in Alternative 2, Options 1 and 2, experienced fishers identified these areas as coral habitat, so the likelihood of finding high-relief corals is considered high. Following the mapping of corals, areas will either be closed to this gear type if corals are present, or re-opened to this gear in areas with no corals.

Importantly, research investigations for areas of coral are ongoing in the AI. Two of these areas are within the South Amilia/Atak Island HAPC site. However, physical observation and research are not complete for this area. Habitat reports will not be available for a year or longer after the investigation. However, initial observations suggest that continuous coral concentrations are in certain areas and not in every area where *in situ* observations are being conducted.

Information is not available for these 3 areas to assess the overall extent of living habitats, so the effect on habitat complexity is inferred. Anecdotal information from experienced fishers suggests that these areas contain living habitats, such as high relief corals. Therefore, until such a time that mapping is complete, the 5-year closure will allow, at a minimum, limited recovery of any areas already disturbed by bottom contact gear and remove the near term potential to disturb high-relief habitats from bottom contact gear. Once high relief coral areas are delineated, any resulting closure will reduce the disturbance of sensitive habitats from this gear while allowing fishing to occur in less sensitive areas. While general assumptions of positive impacts can be made for these sites, the overall effect on living substrate in the AI area is likely insignificant because of the limited area affected. For the same reasons described for the other alternatives, the effect on non-living substrate complexity is insignificant, and the effects on benthic biodiversity and habitat suitability is insignificant.

Option 2: Designate 4 HAPC areas in South Amilia/Atak Island, Kanaga Volcano, Kanaga Island, and Tanaga Island; include management measures to restrict bottom trawl gear for 5 years; and prioritize mapping in these areas to determine high relief coral distribution.

Similar to Alternative 4, Option 1, Option 2 offers a restriction measure for bottom gear. Specifically Option 2 proposes to restrict bottom trawl gear (but no other bottom contact mobile gear) for 5 years until mapping delineates high-relief coral distribution. Anticipated effects to habitat from this gear change are not considered to be significant and the same determinations for Options 1 apply to Option 2.

Alternative 5: Combine Alternatives 2, 3, and 4 as follows:

Designate 11 HAPC areas to include management measures that prohibit bottom contact gear within six sites at Adak Canyon, Cape Moffett, Bobrof Island, Semisopochnoi Island, Great Sitkin Island, and Ulak

Island, prioritizes mapping, and restricts either bottom trawling or all bottom contact with mobile gear for the Amilia/Atak Island, Kanaga Volcano, Kanaga Island, and Tanaga Island sites.

Effects to habitat for this alternative are discussed in each individual alternative. Cumulatively, this alternative has the greatest potential benefits to habitat because it would protect the largest number of sites.

4.4.2 Effects on Target Species

There was no target fisheries for which more than 1% of observed catch fell within these HAPC areas in Action 3 (Table 4.2-1). Catch within the HAPCs would likely be redistributed outside of the HAPC areas. Impacts to the target species stock or species group affected under HAPC alternatives for AI corals are predicted to be insignificant for all target fish evaluated under the HAPC alternatives because of the following expectations in relation to significance criteria:

(1) The alternatives would not be expected to jeopardize the capacity of the stock to produce maximum sustainable yield on a continuing basis, as harvest levels are not changed under HAPC alternatives.;

(2) The alternatives would not alter the genetic sub-population structure so to jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold.;

(3) The alternatives would not alter harvest levels such that it jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold.; and

(4) The alternatives would not alter harvest levels or distribution of harvest so that prey availability would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold.

HAPC alternatives where no bottom contact mobile gear is allowed would experience either a reduction in fishing with existing gear types or conversion to a non-mobile gear type that would not contact the seafloor. However, fishing activity might continue at or near previous levels, if conversions to other gear types occur. There are also HAPC alternatives that prescribe areas where no bottom contact fisheries could occur; in these areas, fisheries using pot, longline, dredge, dinglebar, or trawl gear would be precluded. Presumably these fishing activities with these gear types would cease in the HAPC alternatives areas or would continue to occur in other areas. In the case of a 5-year restriction on bottom contact mobile gear, these fisheries would cease for that period and either restart again after 5 years or continue to be prohibited, if the restriction is continued. Because of these various possibilities, most likely other areas would be closed to a variety of fisheries, with effort either ceasing in these areas or shifted to other open areas. Offsetting impacts may or may not occur in HAPC alternative areas and in areas where harvesting is shifted to avoid restriction areas. These areas may be less productive fishing grounds. There are no expected increases or reductions in harvest levels in the HAPC alternatives; target species catch that is excluded from the HAPC alternatives could be redistributed to areas outside the HAPCs.

4.4.3 Effects on Economic and Socioeconomic Aspects of Federally Managed Fisheries

The alternatives to the status quo contained in this action were extensively analyzed in the Regulatory Impact Review (RIR). Presented here is a summary of the findings for the action and the alternatives within the action. For a more detailed explanation of the findings and the methodology used to conduct the analysis, see the RIR in Chapter 6.

A comprehensive examination of catch data found no significant Council-managed fishing activity in any of the proposed HAPCs contained in this action, although small amounts of groundfish fishing were reported under all of the alternatives. Therefore, the alternatives to the status quo are unlikely to have the potential to create a significantly negative economic effect on commercial fishing. As a result, all of the alternatives to the status quo in Action 3 have been found to have insignificant effects on gross revenues, operating costs, costs to consumers, vessel safety, and fishing communities. Habitat protection associated with HAPCs, defined in the alternatives, is assumed to have the potential to maintain and/or enhance the present flow of passive use values associated with ecosystem health and biodiversity of sensitive habitat areas by potentially reducing adverse effects of fishing activities. The direction of the effect is likely positive but no information indicates that a substantial increase in passive use values is likely. Therefore, the effect on passive use values is likely insignificant. Finally, because the alternatives that designate HAPCs will generate regulations prohibiting certain fishing activities, management and enforcement costs are likely to increase. Alternatives 2, 3, 4, and 5 would create a need for more complicated and costly regulatory and enforcement programs, due to the fishery closure areas. The primary cost associated with these alternatives would be increased monitoring of the proposed coral areas from both vessels and aircraft; however, such increases are considered insignificant because no additional funding is associated with this action and activities are likely to be absorbed into current monitoring and enforcement practices.

4.4.4 Effects on Other Fisheries, and Incidental Catch of Prohibited, Forage, and Non-specified Species

Under these alternatives, only insignificant impacts are expected. The no action alternative would maintain the status quo. Alternative 2 would designate HAPCs and prohibit bottom contact fishing in 6 coral garden sites in the AI; however, the areas are small and have experienced a limited amount of fishing effort. The restricted the limited amount of harvest which has occurred in this area is not likely to substantially change amounts or spatial or temporal distribution of harvest. Incidental take of prohibited, forage and non-specified species is unlikely to be affected to due the potential minor changes that may occur in target fish harvest. Therefore, any impacts on fishing mortality, spatial and temporal distribution of fisheries, prey availability, and bycatch and incidental catch of prohibited, forage, and non-specified species would be insignificant. It is possible that the designation of larger HAPCs around the areas could lead to associated bottom contact restrictions which could prevent future fisheries effects, but these effects are considered insignificant in this analysis.

Alternative 3 would designate HAPC at Bowers Ridge and prohibit bottom trawling. This area is larger than the other HAPCs, but has experienced only a limited amount of fishing effort. As explained above under Alternative 2, because of the limited about of fishing that occurs in this area, the removal of this effort is expected to have insignificant impacts on fishing mortality, spatial and temporal distribution of fisheries, prey availability, and bycatch and incidental catch of prohibited, forage, and non-specified species.

Alternative 4 would designate HAPCs at 4 sites in the AI and prohibit either all bottom contact mobile gear fishing or bottom trawling. These areas are small and have experienced only a limited amount of fishing effort. As explained under Alternative 2 above, any impacts on fishing mortality, spatial and temporal distribution of fisheries, prey availability, and bycatch and incidental catch of prohibited, forage, and non-specified species would be insignificant.

Alternative 5 combines Alternatives 2, 3, and 4. While the cumulative effects of these three alternatives may be slightly larger, the effects on fishing mortality, spatial and temporal distribution of fisheries, prey availability, and bycatch and incidental catch of prohibited, forage, and non-specified species will still likely be insignificant due to the limited amount of fishing effort currently occurring in these areas.

4.4.4.1 Harvest levels of groundfish in state waters seasons and parallel seasons

In Alternative 2, all 6 of the coral garden HAPC site designations and associated fisheries restrictions fall at least partially within 3 nautical miles (nm). Groundfish fisheries inside these proposed HAPCs within 3 nm are parallel fisheries managed by the State of Alaska. As discussed in Section 1.1.5, the Alaska Department of Fish and Game (ADF&G) issues an Emergency Order annually that duplicates federal fisheries management measures, allowing fishers to take their harvest from inside or outside of state waters during the federal fishery. NMFS and the NPFMC should work with the ADF&G and Alaska Board of Fisheries if this action goes forward so that appropriate management measures can be issued from the State of Alaska. If the State of Alaska were to duplicate the federal HAPC designations and associated fisheries restrictions, only very small areas of the parallel fishery would be closed, and would not substantially decreased the harvest in those fisheries. Therefore, only insignificant effects are expected.

In Alternative 4 (as discussed above in Alternative 3), 3 of the 4 AI HAPC designations and fisheries restrictions fall within 3 nm. Groundfish fisheries inside the HAPCs at Tanaga Island, Kanaga, and Kanaga Volcano are parallel fisheries managed by the State of Alaska. If the State of Alaska were to duplicate the federal HAPC designations and associated fisheries restrictions, only very small areas of the parallel fishery would be closed, so these restrictions such would not substantially decrease the harvest in those fisheries. Therefore, only insignificant effects are expected.

Alternative 5 combines Alternatives 2, 3, and 4. While the cumulative effects of these three alternatives may be slightly larger, effects on the harvest levels of parallel fisheries will still likely be insignificant due to the limited amount of fishing effort currently occurring in these areas.

4.4.5 Effects on Protected Species

Action 3 would close various known coral concentration areas to fishing with bottom contact gear in the AI region. Several alternatives include restrictions on use of bottom contact mobile gear, bottom trawls, and 5-year restrictions on bottom contact mobile gear.

Areas where no bottom contact mobile gear is allowed would experience a reduction in fishing with mobile gear, or perhaps some other gear would be used so as to not contact the seafloor and fishing activity might continue at or near previous levels. This action also prescribes areas where no bottom contact fisheries could occur. In these areas, this action would preclude fisheries that use pot, longline, dredge, dinglebar, or trawl gear. Presumably, these fishing activities would cease or would continue to occur in areas that were not closed to this gear. In the case of a 5-year restriction on bottom contact mobile gear, these fisheries would cease for that period and either restart again after 5 years or continue to be prohibited. Because of these various possibilities, most likely there would be area closures to a variety of fisheries with effort either ceasing in these areas or shifted to other open areas. There likely would be offsetting impacts—that is, impacts that may currently occur in coral concentration areas would now occur elsewhere or would not occur at all.

Given available data on current fishing effort in the areas proposed for HAPC designation and management action in the AI region, impacts on protected species from fisheries prosecuted in these small and specific areas in the AI region currently are small because of the small geographic areas involved and the limited number of areas being considered. Given the various possible scenarios, it seems likely that impacts of Action 3 on marine mammals and seabirds would be fairly minimal. In some instances, it might be argued that closure of coral concentration areas to bottom contact gear would reduce fishing activity, thus reducing the potential interactions between these gear type fisheries and marine mammals or seabirds. It also could be argued that fishing might be merely displaced from these coral concentration areas to other areas remaining open to these gear types, possibly concentrating fishing in these other areas if fishing by others already occurs there. But it is unlikely this concentration of fishing activity would be large given the small areas to be closed under Action 3.

Little is known about the importance of the coral concentration areas identified in this action to seabirds or marine mammals. It is possible that some marine organisms that are prey species for seabirds and marine mammals may occur in greater abundance in these habitats. But little is known about the association between seabirds and marine mammals and coral habitats. Seabirds and marine mammals may be found in any area of the North Pacific, and thus fisheries that may be displaced by closures or gear restrictions in specific coral habitats may be prosecuted elsewhere and thus may still encounter and interact with seabirds and marine mammals unless these fisheries cease to occur.

While there is uncertainty over likely impacts on protected species from displacing fisheries or closing certain fisheries in the coral concentration areas, the geographic areas involved are fairly small individually and in the aggregate. Coral-bearing substrates generally are fairly deep and likely are not major habitat for seabird or marine mammal prey species. However, these still are areas where seabirds or marine mammals may forage in upper water strata, and thus fisheries displaced into adjacent habitats may continue to interact with protected species, just in different geographic areas. The overall net effect of Action 3 on protected species appears to be negligible—that is, impacts from fisheries prosecuted in waters over coral concentration areas would either cease to occur or might be merely displaced. Dispaced fishery effects on protected resources were analyzed in some detail in the EFH EIS (NMFS 2005). Relevant information and discussion on effects of closing certain EFH areas on protected resources from that EIS are incorporated herein by reference (NMFS 2005, Chapter 4.3). If fishing is permanently reduced because of this action, the impacts on protected species might be considered beneficial; but the magnitude of exiting fisheries in coral concentration areas and the resultant potential reduction in fishing under this action are believed to be very small and would be negligible in context with other existing fisheries that currently have some effects on protected species.

The southwest Alaska Distinct Population Segment (DPS) of northern sea otter is listed as threatened under the Endangered Species Act because of its steep decline in the AI and Alaska Peninsula areas. Several HAPC sites proposed for fishing restrictions include northwest and southwest Adak Island, Bobrof Island, Ulak Island, and Great Sitkin Island. If fishing that now occurs in these areas is displaced into other areas that are important habitats for sea otters, some adverse impacts on this marine mammal could result, if these fisheries involve pot gear fished near shore such that otters might access this gear. While no record exists of sea otter mortality as a result of the groundfish fisheries in the EEZ (NMFS observer program data, Kitty McCauly, personal communication, October 4, 2005, and NMFS Marine Mammal Self Report data, Patricia Lawson, personal communication, September 30, 2005) this may be a concern to State waters fisheries in some localized areas where 8 sea otters were observed taken in Pacific cod pots in the AI (NMFS observer data). Any displacement of fishing effort into other near shore areas is expected to be offset by the protection of the nearshore areas by the alternatives under this action. As a whole, the U. S. Fish and Wildlife Service has determined that commercial fishing is not likely to contribute to the population decline of sea otters (70 FR 46365, August 9, 2005).

Currently there are restrictions on Pacific cod, Atka mackerel, and pollock fisheries in the AI region because of Steller sea lion protection measures specified in the recent biological opinions and in NMFS regulations. These measures provide some limits on fishing activity for these three target species, and thus further restrictions causing closures for HAPC protection may or may not have further implications given the already-closed nature of some of these areas. Currently, there are pollock and Atka mackerel trawl fishery restrictions at Cape Moffett, Bobrof Island, Adak Canyon, Ulak Island, Great Sitkin Island, and the Kanaga, Kanaga Volcano, and Amlia sites, and these fisheries would not be affected by further restrictions imposed by HAPC protection measures. Similarly there are some Pacific cod trawl restrictions near Bobrof Island, Adak Canyon, Ulak Island, Great Sitkin Island, and near the Amlia, Kanaga Volcano, and Tanaga sites, but additional HAPC restrictions would not likely measurably affect these fisheries in these areas. There are Steller sea lion rookeries at Cape Yakak (Adak Canyon site) and on Ulak Island, and haulouts on Bobrof Island, Great Sitkin Island, and Kanaga Island (Kanaga Volcano site). These areas are important sea lion habitat and thus are already afforded some protection from fishing activity disturbance and prey removals. Fisheries that are prosecuted in these areas, other than for Pacific cod, pollock, and Atka mackerel, could be affected by the proposed action. However, this fishing effort currently is very small and, while there could be some benefit to Steller sea lions from additional reductions in fishing activities in these areas, the expected reduction in effort is expected to be very small and is considered to be negligible.

Seabirds are abundant in the AI region, and this area is considered important habitat for the endangered short-tailed albatross and the threatened Steller's eider. The Steller's eider primarily inhabits coastal bays and inlets in the region in the winter, and remains nearshore during that period feeding on benthic organisms. No critical habitat for Steller's eiders is near the Action 3 HAPC sites, and thus it is unlikely that fisheries that may be displaced from these HAPC sites will occur in this habitat, particularly since the important habitat for Steller's eiders is close to shore, generally distant from groundfish or shellfish fishing activity. The short-tailed albatross occurs throughout the AI region throughout the year. Radio tracking studies show that this species disperses from nesting grounds near Japan to the Aleutians, and juvenile and adult birds remain in the area until adult mature birds return to nest. Recent biological opinions on endangered or threatened seabirds provide incidental take allowances for groundfish fisheries. Industry currently employs seabird avoidance measures that have, for the most part, mitigated the potential for take of any endangered or threatened seabirds and other seabirds as well. Ulak Island is an important seabird monitoring site for the U.S. Fish & Wildlife Service (storm-petrels, cormorants). Many seabirds nesting in the AI region prey on forage fish species in the regions around nesting sites, but fisheries that may be either reduced or displaced from HAPC sites do not target these species of fish, and thus the implications to prey for seabirds from the proposed action are not likely to be of concern. The minor changes in distribution of fishing effort that may result from new HAPC site protection measures will not appreciably change the fishing patterns in the AI region, and thus the overall effects on seabirds are expected to be negligible.

With regard to the criteria for determining significance of effects to seabirds or marine mammals, Action 3 would not likely concentrate fishing activity in a manner that would result in greatly increased encounters with these species. This is because of the small size of the coral concentration areas and, thus, the currently-low to moderate levels of fishing activity that might be present in such areas. Entanglement with fishing debris would not be appreciable nor would resultant take from such encounters; if fishing is reduced in coral areas, loss of gear would be reduced, providing some benefit to marine mammals and seabirds, but this is expected to be a very small fishing effort reduction and benefits to these species would be considered to be very small. The displaced fishing activities would be small in magnitude, if any displacement occurs at all, and thus spatial/temporal concentration of fishing activity, and any appurtenant contact between vessel operations and marine mammals or seabirds is expected to be minimal. This action similarly would not result in appreciably increased disturbance to marine mammals or seabirds. Offal production would not likely be appreciably changed from status quo, and thus seabird impacts also would not change appreciably. Seabird prey would likely also not be affected given the expected very small changes in fishing activity from either displaced fishing from coral concentration areas or fishing effort that would cease under Action 3. Some benthic habitat may be impacted beneficially from reduced bottom contact fishing activity, but this will be in such small amounts that impacts to seabirds that use such habitat would be minimal. The action is thus determined to have insignificant impacts to protected species.

4.4.6 Effects on Ecosystem

Under these alternatives, only insignificant impacts to the ecosystem are expected. The no action alternative would keep status quo. Alternatives 2, 3, and 4 do include fisheries restrictions in addition to HAPC designation; however, the areas that would be affected are small and have only experienced a limited amount of fishing effort. Therefore, any effects on predator-prey relationships, energy flow and balance, and ecosystem diversity would be insignificant. Alternative 5 combines alternatives 2, 3, and 4, and while the cumulative effects of these three alternatives may be slightly more beneficial to the ecosystem, effects will still likely be insignificant due to the limited amount of fishing effort currently occurring in these areas. It is possible that the designation of larger HAPCs could lead to associated fisheries restrictions which could prevent future fisheries effects on the ecosystem, but these effects are considered insignificant in this analysis.

4.4.7 Effects on Non-fishing Activities

The identification and management of HAPCs under any of the alternatives would have no effect on non-fishing activities such as marine transportation, navigational dredging, marine disposal areas, oil and gas development, mineral extraction, or cable laying. NMFS and the Council have no authority to restrict such activities under the Magnuson-Stevens Act. NMFS and the Council would encourage agencies with appropriate jurisdiction to ensure that non-fishing activities do not adversely affect HAPCs.

4.4.8 Summary of the Effects of Alternatives- Action 3

Action 3, Alternative 1 would result in no HAPC identification for known coral locations in the AI. New research has shown evidence of unique coral gardens within the AI; however, a comprehensive effort to map coral distribution has not been conducted for all waters off Alaska. Consequently, the overall negative impacts from fishing and non-fishing activities on the entire distribution of corals are unknown. It is acknowledged, however, that certain fishing activities damage and remove fragile benthic marine organisms. The no action alternative would have positive short-term impacts for the fishing industries since small amounts of harvest and revenue have been documented for fishing in areas with coral. However, there could be a longer term negative impact for fragile marine habitats and target or other fish stocks that currently have unidentified associations with coral species.

Action 3, Alternative 2 would result in 6 coral garden sites in the Aleutians being identified as HAPC, and specified portions of those areas would have associated management measures. If selected this alternative would result in amending the BSAI groundfish FMP. There would be short term and long term negative impacts to the fishing industries, in particular the brown crab fishery and trawl catcher and catcher/processor vessels. There would be both positive short-term and long-term impacts on these fragile and sensitive habitats. If selected, this could be a precautionary measure to protect unique, rare, and fragile marine habitats. All of these effects are likely to be insignificant based on the analysis in section 4.4.

Action 3, Alternative 3 would identify 2 sites along Bowers ridge as HAPC, with additional management measures that would prohibit mobile fishing gear that contacts the bottom. If selected, this alternative would result in amending the BSAI groundfish FMP. This alternative would likely have minimal short-term negative impacts to the fishing industries due to small historic catch of Atka mackerel and rockfish from trawl catcher vessels. However, the fishing catch could be increased in adjacent areas. There would be both positive short-term and long-term impacts on these fragile and sensitive habitats. As with Alternative 2, this alternative would constitute a precautionary measure to protect unique, rare, and fragile marine habitats, and all effects are likely to be insignificant based on the analysis in section 4.4.

Action 3, Alternative 4 would identify 4 sites in the Aleutian Island archipelago as HAPC. The BSAI groundfish FMP would be amended for these 4 sites. These areas were brought forward by skippers who possess a wealth of information on bottom habitat. However no evidence that high-relief hard corals are present in these areas has been documented. The 2 management options (1 for no mobile bottom contact gear, the other no bottom trawl gear) would sunset in 5 years if there was no directed research in the areas providing evidence of high-relief corals. This alternative would likely have a short-term negative impact on fishing in these areas for that 5-year time period, specifically on the trawl catcher and catcher processors for various groundfish species. If high-relief coral stands are within these areas, there could be a short term positive impact for the habitat and ecosystem. Consequently, if during the 5-year period high relief corals are formed in these areas, and the areas remain closed, there will be a long-term negative impact on the fishing industries and a positive long-term impact on the habitat and ecosystem. All effects are likely to be insignificant based on the analysis in section 4.4.

Action 3, Alternative 5 would result in Alternatives 2, 3, and 4 being adopted in their entirety.

Some deep-sea coral sites may provide important habitat for rockfish and other species and may be particularly sensitive to some fishing activities. Each of the non-status-quo alternatives provides methods to adopt precautionary measures to protect unique, fragile, and rare marine habitats pursuant to 50 CFR 600.815(a)(8). The management measures associated for Alternatives 2, 3, 4, and 5, have insignificant effects for each category analyzed. While all of the actions provide protections to high relief coral areas within the AI, Alternative 2 is based entirely on scientifically observed corals garden areas. Alternatives 3 and 4 are based on anecdotal information.

4.5 Cumulative Effects

In accordance with the NEPA, the cumulative effects of these proposed HAPC designations and fisheries restrictions are analyzed by determining the significance of impacts associated with these actions on environmental quality in addition to other internal and external factors. CEQ regulations 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 non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time." (40 CFR 1508.7)

This section analyzes the cumulative effects of the three actions considered in this environmental assessment: designating HAPCs and restricting fishing at seamounts in the EEZ (Action 1), at coral sites in the GOA (Action 2), and at coral sites in the AI (Action 3). This analysis provides a brief review of the internal and external factors affecting environmental quality that are most directly related to the proposed actions. Internal factors include effects from the harvest of federally managed fish species and current habitat protection from federal fishery management measures. External factors include effects from state-managed fisheries and their associated protection measures, efforts to protect endangered species by other federal agencies, and other non-fishing activities and natural events.

The significance criteria used in this section are the same as in the direct and indirect environmental effects sections. Those significance criteria are described in Section 4.1. Cumulative effects are also described in the EFH EIS in Chapter 4.4 (NMFS 2005). The EFH EIS cumulative effects described for target species, habitat, other federal and state fisheries, protected resources, ecosystems, and non-fishing activities were all found to be either positive or neutral. Due to the similarity of the EFH and HAPC actions, the cumulative effects descriptions in the EFH EIS are applicable to this HAPC action and are therefore adopted here by reference. Additional information regarding cumulative effects for this action follows.

4.5.1 Current Fisheries Management

Section B.3 of Appendix B in the Final PSEIS (NMFS, 2004a) describes the current fisheries management process for federal fisheries in Alaska. Harvest specifications are set annually with current stock assessment information for most managed species through a series of analyses and meetings, according to detailed FMPs. Amendments to the FMPs require NEPA analyses, such as this one. Similarly, the Alaska Board of Fisheries develops policy and direction for the management of fisheries in near-shore waters, including fishing seasons, harvest limits, and restricted areas.

4.5.1.1 Effects on Target, Other, and Protected Species

The Final PSEIS discusses current fishing management effects on stocks of harvested species, on other species, and on protected species. The proposed actions in this analysis have insignificant direct and indirect effects on these species. The HAPC fisheries restrictions areas are small in comparison to existing protections and have experienced a very limited amount of fishing effort. Table 4-16 shows the metric tons of groundfish catch by species group in the areas that are analyzed in this document. In the areas potentially restricted by these actions, a total of approximately 5,000 mt of catch has been harvested between 1995 and 2003. In comparison to the over 2 million mt optimal yield cap on the groundfish fisheries of the BS, AI, and GOA, 5,000 mt of harvest is negligible. Additionally, these restrictions do not affect TAC specifications or fishing seasons for groundfish. As discussed in the target fisheries section, a very minimal amount of spatial redistribution of fishing effort may occur, shifting effort into areas adjacent to HAPC fisheries restriction zones. Because the effects on target species are negligible, the effects on other species and protected species are also expected to be negligible.

Table 4-17. Catch by species group (metric tons), by HAPC action and alternative. Amount shown is total harvest for 1995–2003.

Action:	1	1	2	2	2	3	3	3	3
Alternative:	2	3	2	3	4	2	3	4	5
Species Group:									
Atka Mackeral			9.671		9.67	0.68	62.79	249.45	312.92
Flatfish			223.61		223.61	6.17	0.94	2.56	8.73
Other Species			10.12	0.10	10.12	0.45	0.06	2.19	2.70
Pacific cod			3,368.72	0.15	3,368.73	116.67	3.03	170.63	288.35
Pollock			17.49		17.49	0.14	1.00	325.83	326.98
Rockfish	0.01	0.62	415.05	9.04	416.08	4.48	20.50	37.21	60.93
Sablefish	0.39	14.40	12.96	30.80	28.47	35.68		0.62	23.81
Total MT	0.39	15.03	4,057.63	40.09	4,074.18	164.28	88.32	788.48	1,024.41

4.5.1.2 Habitat Protection Measures Currently in Place

Many actions have been taken by the North Pacific Fishery Management Council, NOAA Fisheries, and the State of Alaska to protect habitat and species in the GOA, BS, and AI. Other actions closely monitor the amount of harvest taken of individual fish species, by area and season (in some cases), and have an ancillary effect of protecting rare and sensitive habitat by reducing fishing effort in those areas. These actions must be considered in conjunction with the proposed HAPC actions in order to assess cumulative impacts on environmental quality. The Essential Fish Habitat EIS describes these past, present, and future actions in the context of cumulative effects of identifying EFH, minimizing the effects of fishing on EFH, and establishing an approach to identifying HAPCs. The Final PSEIS (NMFS 2004a) provides a detailed description of current fisheries management and associated protection measures in Appendix B. In Table 4.5-94, the Final PSEIS gives the effects of status quo management on living habitat a conditionally significant negative rating.

Actions Taken to Protect Habitat

The Alaska Board of Fisheries has closed most near-shore waters to non-pelagic trawling in the GOA in order to protect this sensitive, near-shore habitat. Federal fisheries restrictions such as the Nearshore Bristol Bay no trawl restriction area, the Pribiliof Islands Area Habitat Conservation Zone, Cape Edgecumbe (Sitka) Pinnacles, Kodiak Type 1-3 trawling restrictions, and the Red King Crab Savings Area are designed to protect juvenile crab habitat and other sensitive habitat areas for federal FMP-managed species. Additionally, the EFH EIS (NMFS 2005) describes a process for identifying and protecting essential fish habitat for federal FMP-managed species.

Other Actions that Protect Habitat

Appendix B of the Final PSEIS describes the accumulation of federal fisheries management measures currently in place. Management measures such as observer programs, bycatch caps, bycatch closure areas, marine mammal protection measures, overfishing definitions and rebuilding plans, rationalization programs, and the annual harvest specifications process ensure that fishing effort is sustainable and stocks are protected in vulnerable life stages and in sensitive habitat areas. The State of Alaska also protects additional areas in near-shore waters for managed stocks of groundfish, shellfish, herring, salmon, and dive fisheries, by prohibiting harvest of these species in these areas during the fishery. This mitigated fishing effort prohibits damage to vulnerable habitat in these areas.

4.5.1.3 Proposed HAPCs

As discussed earlier in this chapter, the three proposed actions with their suite of alternatives and options offer varying degrees of protection for seamounts in the EEZ and corals in the GOA and AI. Most of these areas are very small, and options provide localized protection for specific habitat features. This kind of fisheries restriction is different from the larger-scale protection measures described above. At present only the Cape Edgecumbe Pinnacles closure area, (GOA FMP Amendment 59) is similar in purpose and scope to the proposed action alternatives described in this EA (NPFMC 1999).

4.5.1.4 Cumulative Effects of Current Fisheries Management and HAPCs

The environmental effects of these proposed actions were considered insignificant when analyzed individually earlier in this chapter. When combined with the effects from current fisheries management measures, past, and reasonably foreseeable future, these actions fall within the range of alternatives analyzed under a more precautionary fishery management policy, discussed in the Final PSEIS (NMFS 2004a). Figure 4-1 and Table 4-18 present the cumulative picture of habitat protection in the EEZ, for both current management and proposed actions.

Figure 4-1 depicts current marine managed areas in the Alaska EEZ when some type of bottom-contact fishing is prohibited. The areas shown in pink offer at least minimal protection to habitat and fished stocks by limited fishing effort in those spatial areas. Some restrictions are only for certain gear types, some have other conditions, and some prohibit all fishing, but all of these areas offer some kind of habitat protection. Other areas that may offer ancillary habitat protection, such as bycatch closure areas, are not shown on this map. The red areas represent all of the proposed HAPCs analyzed in this document.

Table 4-18 shows the amount of area currently closed to fishing, and the amount of area proposed to be restricted for HAPC protection. In comparison to the almost 11% of the EEZ currently closed to trawling, the proposed HAPCs would add another 1.26% of the EEZ in HAPC designation and protection. The green dots in Figure 4-1 represent sample non-pelagic trawl haul locations from 2000-2001. Figure 4-1 and Table 4-18 above suggest that these restriction areas do not experience large amounts of bottom trawling fishing effort. Orange dots indicate the locations of seamounts. Most of the seamounts in the EEZ depicted on this map would be protected under Action 1, Alternative 3.

4.5.2 Other External Factors

Besides the actions of NOAA Fisheries, NPFMC, and the Alaska Board of Fisheries as described above, other federal agencies, organizations, and natural events impact the environmental quality of these areas. These actions and events could include offal discharge, port expansion and use, marine pollution, storm surges and wind-induced waves, and climate changes and regime shifts as well as actions taken to protect endangered species managed by other agencies, these external factors are discussed in the Final PSEIS (NMFS 2004a) and ratings are presented in Table 4-18.

4.5.3 Conclusions

The cumulative effects of the actions included in this analysis when combined with past, present, and reasonably foreseeable future actions, are expected to be insignificant to the environmental quality of these areas and not different from effects that have been analyzed in the Final PSEIS (NMFS 2004a). The cumulative effects of these actions would not substantially change the amount or distributions of harvest of groundfish or the amount of protected habitat in the EEZ. The cumulative effects could include a small spatial redistribution of fishing effort into areas adjacent to HAPCs and a slightly increased amount of protection for seamounts in the EEZ and corals in the GOA and AI. However, these effects are not expected to change the current environmental quality to any significant degree.

Table 4-18. Square nautical miles of current fisheries restriction areas and proposed HAPCs, as depicted in Figure 4-1.

Management Measures	Area (nm^2)	% of EEZ
Current Management:		
Exclusive Economic Zone (EEZ) drawn in blue outline	985,181.31	100.00
No Fishing/No Transit areas drawn in pink	1,021.94	0.10
No Trawling areas drawn in pink	104,650.89	10.62
HAPC Action 1 drawn in red:		
Alternative 2 (no bottom contact)	767.60	0.08
Alternative 3 (no bottom contact)	5,330.10	0.54
HAPC Action 2 drawn in red:		
Alternative 2 (no BCMG/no bottom trawl)	483.00	0.05
Alternative 3 (designation/no bottom contact)	90.91	0.01
Alternative 4 (combines alternatives 2 and 3)	573.91	0.06
HAPC Action 3 drawn in red:		
Alternative 2 (designation/no bottom contact)	922.71	0.09
Alternative 3 (no bottom contact)	5,286.00	0.54
Alternative 4 (no BCMG/no bottom trawl)	277.00	0.03

Alternative 5 (combines alternatives 2, 3, and 4)	6,485.71	0.66

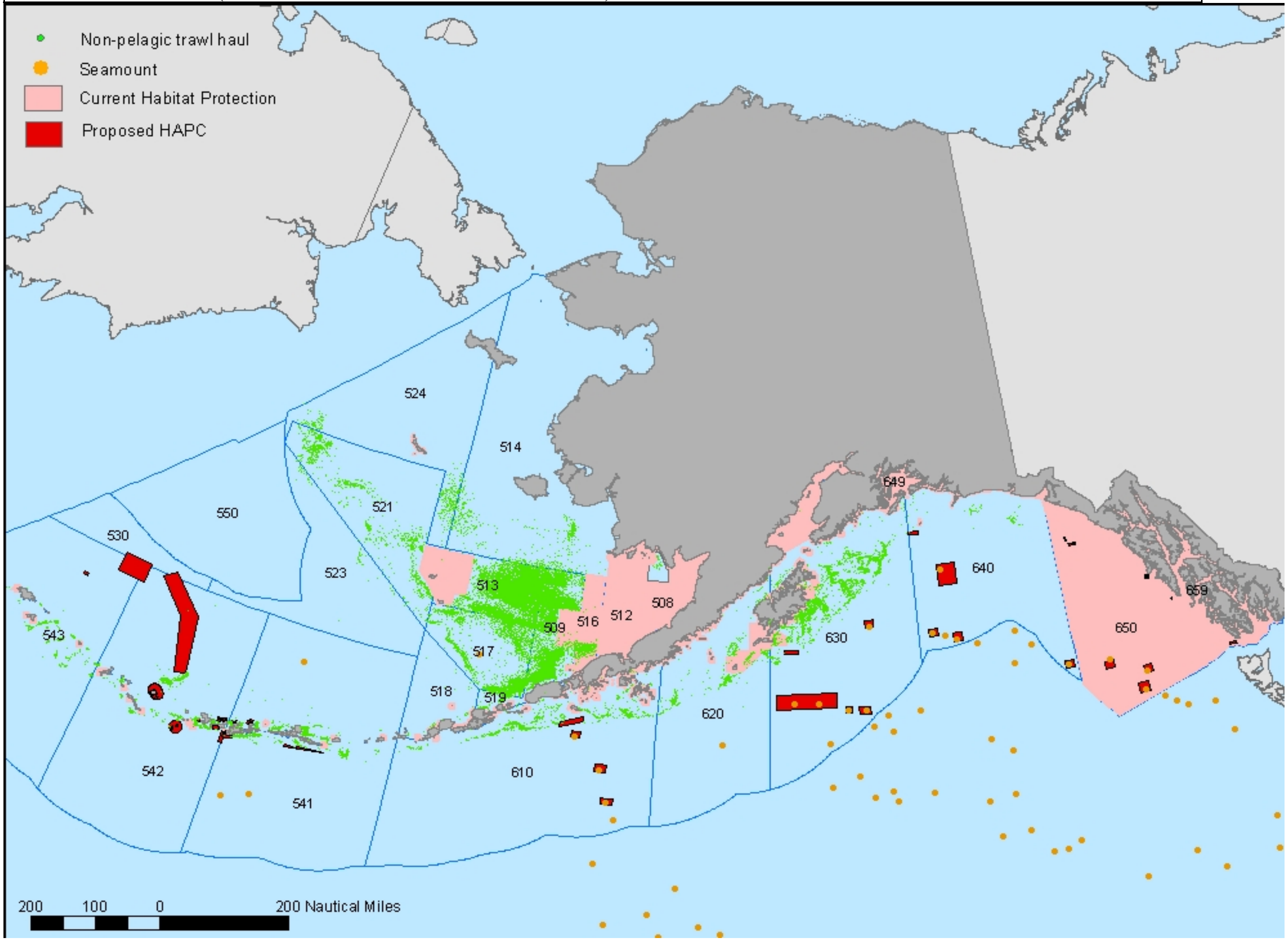


Figure 4-1. Current habitat protection in the EEZ and proposed HAPCs.

This figure depicts areas that have bottom-contact fishing restrictions currently in place in pink, including: Red King Crab Savings Area, Walrus Islands, St. Matthew, Kodiak, near-shore State of Alaska waters, Cook Inlet, and Nearshore Bristol Bay. HAPCs proposed in this document are shown in red. Green dots represent a sampling of non-pelagic trawl haul locations from 2000 and 2001. Orange dots are seamounts. [Note that this is not a comprehensive map and .other spatial fisheries restrictions do exist.

5.0 ENVIRONMENTAL ANALYSIS CONCLUSIONS OF THE ALTERNATIVES

This environmental assessment (EA) evaluated alternatives to designate and conserve Habitat Areas of Particular Concern (HAPCs). HAPCs are site-specific areas of Essential Fish Habitat (EFH) of managed species. Identification of HAPCs provides focus for additional conservation efforts for those habitat sites that are ecologically important, sensitive to disturbance, exposed to development activities, or rare. This EA evaluates alternatives for designating HAPC sites in the Gulf of Alaska (GOA) and the Aleutian Islands (AI) and implementing associated fisheries management measures to provide additional conservation of specified HAPC areas.

Three separate actions are considered in this EA: (1) HAPC designation and conservation of seamounts, (2) HAPC designation and conservation of hard coral areas in the GOA, and (3) HAPC designation and conservation of hard coral areas in the Aleutian Islands. The significance of impacts of the actions analyzed in this EA were determined through consideration of NEPA, NOAA Administrative Order (NAO) 216-6, section 6.01b and 40 CFR Section 1508.27. Significance was determined by considering the contexts (geographic, temporal, and societal) in which the action would occur, and the intensity of the effects of the action. The evaluation of intensity included 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 consistency with other laws.

The North Pacific Fishery Management Council recommended preferred alternatives within each action of this EA. Additionally concepts of mitigation measures to protect fragile marine habitats from these EAs alternatives were chosen within the EFH EIS (NMFS 2005).

The preferred alternatives are as follows:

Action 1- Seamounts

Alternative 3: Identifies 16 named seamounts as HAPCs and prohibit all Council-managed bottom contact fishing in those areas. Under this alternative, the groundfish, scallop, and crab FMPs would be amended to identify Bowers, Brown, Chirkikof, Marchand, Dall, Denson, Derickson, Dickins, Giacomini, Kodiak, Odessey, Patton, Quinn, Sirius, Unimak, and Welker seamounts as HAPCs

Action 2- Gulf of Alaska corals

Alternative 2, Option 2: Identify HAPCs at Sanak Island, Albatross, and Middleton Island (Table 2-2, Figure 2-2 and Figure 2-4) and close the sites to bottom trawling for 5 years. During the five years, these sites would be prioritized for undersea mapping. Areas with high-relief coral would stay closed to bottom trawling and the remaining areas would be reopened.

Alternative 3 Option 1: Identify HAPCs at three areas in the Eastern GOA Cape Ommaney, the northwest portion of Fairweather grounds, and the southwest portion of Fairweather grounds (through, and prohibit all Council-managed bottom contact fishing within five sites inside the HAPCs.

Action 3 Aleutian Islands corals

Alternative 3: Identify Bowers Ridge as a HAPC and prohibit mobile bottom contact fishing gear. Under this alternative, the BSAI groundfish FMP would be amended to identify a portion of Bowers Ridge as a HAPC and close the area to pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contacts the bottom (including dinglebar gear).

The significance of impacts of the actions analyzed in this EA was determined through consideration of the following information, as required by NEPA and 40 CFR 1508.27.

Context

For these actions, the setting is the groundfish, crab, and scallop fisheries of the AI and GOA. Any effects of these actions are limited to these areas. The effects of these actions on society within these areas are on individuals directly and indirectly participating in these fisheries and on those who use the ocean resources. Because these actions may result in the protection of a present and future resource, these actions 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 NAO 216-6, Section 6. Each consideration is addressed below in order as it appears in the regulations with important issues bolded.

Adverse or beneficial impact determinations for marine resources, including habitat, target species, economic and socioeconomic aspects of federally managed fisheries, other fisheries and fishery resources, protected species, ecosystem, and non-fishing activities were evaluated within chapter 4. Each preferred action and alternative evaluated had insignificant impacts identified.

The preferred alternative regarding seamounts was evaluated as insignificant under habitat and ecosystems. Several species of high relief coral have been documented for 5 seamounts and living habitats are inferred for the remaining 11 named seamounts. Fish and crab have been documented *in situ* on or near the high relief living structures. Fishery data suggest that little effort has occurred on these features. These areas would be closed from future fishing disturbances. Therefore, a positive benefit to these habitats is expected; however, the extent of this benefit is not likely to result in substantial changes and is therefore insignificant. While species information does exist for 5 of the 16 named seamounts, the direct relationship between resident fish, prey, and other species is inferred for the remaining 11 seamounts. A prohibition of bottom contact gear may reduce the effect on the benthic community, creating a positive benefit, but no information indicates that the effect would be a substantial change, and therefore the effect is insignificant. Information is not available to assess the suitability of habitat for named seamounts, however it is likely a positive, but not substantial benefit would occur. Therefore, the effects on suitability of habitat are likely insignificant. Since no substantial changes in current fishing activities would occur, changes in predator-prey relationships, energy flow and balance, and ecosystem diversity due to fishing are not expected. It is possible that this designation and associated bottom contact restrictions could prevent fisheries effects in the future, but these effects are considered to have a slight benefit in this analysis and are therefore insignificant.

The preferred alternative regarding corals in the Gulf of Alaska was evaluated as insignificant under habitat. These 5 sites have been scientifically investigated *in situ* using submersibles, and information on several sites comes also from side scan sonar imagery. High relief coral have been documented in these areas and offer living structure habitat. A scientific review team chose these areas where high-relief living coral concentrations exist in contrast to areas that do not exhibit these concentrations. Additionally, these specific areas have been observed to be fairly pristine in condition. A dedicated coral distribution survey for the GOA has not been completed, and the overall amount of habitat that supports coral is not known. Regardless, the restriction of bottom contact gear in these sites will reduce potential disturbance from the gear, resulting in a positive benefit. The benefit is not expected to be substantial because of the limited number of areas involved, and therefore the effects are likely insignificant.

The preferred alternative regarding corals in the Aleutian Islands was evaluated as insignificant under habitat. Bowers Ridge has not been thoroughly surveyed or investigated with direct submersible observations, so the effects of prohibiting mobile gear in this area are, for the most part, inferred beneficial. Because of the limited area impacted, the effects are likely insignificant

Public health and safety will not be affected in any way under any of these analyzed actions or alternatives. It is likely that in any areas with no fishing or limitations on fishing gear a reduction in fishery related injuries and mortality would result, but the lack of income may result in adverse effects on public health, if participants are not able to adjust fishing activities to offset any potential loss of income. Because of the lack of fishing in the proposed protection areas and the limited number of areas, it is unlikely that income would be impacted to the level of causing adverse effects on public health.

Cultural resources and ecologically critical areas: These actions take place in the geographic areas of the Aleutians Islands and Gulf of Alaska, generally from 3 nm to 200 nm offshore. Some areas within the Aleutian Islands region will fall within state waters (0-3 nm from shore). The land adjacent to these areas contains 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 the selection of the preferred alternatives and are likely to be protected by these actions.

Controversiality: These actions deal with management of habitat within the context of EFH. Differences of opinion exist among various industries, environmental, management, and scientific groups on the appropriate precautionary approach for habitat and sustainable fisheries protection. The selected alternatives adopt a balanced approach among various opinions.

Risks to the human environment, including social and economic effects: Risks to the human environment by adopting precautionary measures for protection of fish habitat are described in detail in the EFH EIS (NMFS, 2005) and in this EA. Only insignificant impacts were identified for the preferred alternatives for the environmental components analyzed. Additionally, socioeconomic impacts for these alternatives are also addressed fully in the RIR/IRFA (Chapter 6 and 7). Analysis for socioeconomic impacts included insignificant and unknown effects. Some socio-economic unknown effects may be adverse. For example, cost increases may be associated with various management measure used to reduce adverse effects on the environment. These effects, although characterized as unknown, are not likely to have a negative effect on a regional level. No significant socio-economic impacts, either beneficial or adverse, were identified. Under Council of Environmental Quality regulations, (40 CFR 1508.14) socioeconomic impacts alone do not require the development of an environmental impact statement and therefore, the results of the analysis allow for the finding of no significant impacts for the preferred alternatives.

Cumulatively significant effects analysis is in Section 4.5 of this EA focused on current fisheries management. In addition, the cumulative effects analysis from Chapter 4.4 of the EFH EIS (NMFS 2005) is adopted by reference. In the cumulative effects summary of the EFH EIS, cumulative effects on target species, habitat, other federal and state fisheries, protected resources, ecosystems, and non-fishing activities were all found to be either positive or neutral. Based on the description of potential cumulative effects in the EFH EIS and this analysis in combination with the direct and indirect effects identified in this analysis, all effects are insignificant.

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.

Impacts of ESA listed species and their critical habitat: Some ESA listed species occur in the range of areas protected by these preferred alternatives. These include Steller Sea Lions and other marine mammals, as well as seabirds. This action is likely to provide some additional protection to these species by reducing interaction in nearshore areas which are closed to bottom fishing activities.

This action poses **no known violation of Federal, State, or local laws** or requirements for the protection of the environment. Implementation of management measures for the HAPCs 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.

These preferred alternatives pose insignificant effects on the **introduction or spread of nonindigenous species** into the AI and GOA because they do not change fishing, processing or shipping practices that may lead to the introduction of nonindigenous species.

6.0 REGULATORY IMPACT REVIEW

An Analytical Clarification

A benefit/cost framework is the appropriate way to evaluate the relative economic and socioeconomic merits of the alternatives under consideration in this Regulatory Impact Review (RIR). When performing a benefit/cost analysis, the principal objective is to derive informed conclusions about probable net effects of each alternative under consideration (e.g., net revenue impacts). However, in the present case, necessary empirical data (e.g., operating costs, capital investment, debt service, opportunity costs) are not available to the analysts, making a quantitative net benefit analysis impossible. Furthermore, empirical studies bearing on other important aspects of these alternative actions (e.g., non-use value, domestic and international seafood demand) are also unavailable, and time and resource constraints prevent their preparation for use in this analysis.

Nonetheless, the following RIR uses the best available information and quantitative data, combined with accepted economic theory and practice, to provide the fullest possible assessment (both quantitative and qualitative) of the potential economic benefits and presumptive costs attributable to each alternative action. Based upon this analysis, conclusions are offered concerning the likely economic and socioeconomic effects of each of the alternatives. This analytical approach is consistent with applicable policy and established practice for implementing Executive Order (EO) 12866.

As noted, ideally an RIR analysis of alternatives is based on net economic impact estimates. For the reasons cited, this is not possible. Therefore, this analysis is, by default, predicated on gross level effects. The analysts do not assert that gross and net measures are effective proxies for one another. However, empirical experience with these fisheries, anecdotal information from well-informed sources, and accepted economic theory suggest that gross effects (e.g., gross revenue at risk) can provide useful insights into the probable relative impacts of the alternative actions under consideration in the absence of net impact measures.

Furthermore, to paraphrase EO 12866, "... costs and benefits are, herein, understood to include, and have been assessed on the basis of, both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider." The EO continues: "... in choosing among alternative regulatory approaches, agencies should select... (Presumably, based upon the combined interpretation of the quantitative and qualitative measures explicitly provided for in the preceding sentence from the EO)...those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity)...."

NMFS' Guidelines for Economic Analysis of Fishery Management Actions (as revised August 16, 2000) state, "Economists may use several analytical options to meet the spirit and requirements of EO 12866, the RFA, and other applicable laws. The appropriate options depend on the circumstances to be analyzed, available data, the accumulated knowledge of the fishery and of other potentially affected entities, and on the nature of the regulatory action."

Elsewhere, the guidelines state, "... the analyst is expected to make a reasonable effort to organize the relevant information and supporting analyses, (but)... at a minimum, the RIR and Regulatory Flexibility Act Analysis (RFAA) should include a good qualitative discussion of the economic effects of the selected alternatives. Quantification of these effects is desirable, but the analyst needs to weigh such quantification against the significance of the issue and available studies and resources. Generally, a good qualitative discussion of the expected effects would be better than poor quantitative analyses." This RIR has been prepared consistent with these prescriptions.

The analysis of the suite of HAPC designation alternatives is explicitly framed within the prevailing open-access management context. As such, the implications of each proposed alternative have been interpreted within the (now familiar) limits of the Olympic or derby fishing system. Within the RIR, open access management is acknowledged to induce inefficient economic and operational behavior among fishery participants, which would not be observed if the fisheries were rationalized. Open access inefficiencies potentially result in excess capacity, increased economic and physical risk taking, a dissipation of resource rents, and greater potential economic vulnerability and instability in the effected vessel classes. Except in the few fisheries that have been rationalized (e.g., halibut and sablefish longline fisheries, EBS and AI pollock fisheries), the analysis that follows reflects the implications of the continuing race for fish that prevails in most of the GOA and AI commercial fisheries.

6.1 Introduction

This Regulatory Impact Review (RIR) examines the costs and benefits of 3 actions. Each of these actions has been analyzed independently of one another. The combined effect of these actions, as a single action alternative, is also discussed in the summary of costs and benefits.

6.2 What is a Regulatory Impact Review?

The preparation of an RIR is required under Presidential Executive Order (E.O.) 12866 (58 FR 51735: October 4, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following Statement from the E.O.:

> *In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and Benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

E.O. 12866 requires that the Office of Management and Budget (OMB) review proposed regulatory programs that are considered to be "significant." A "significant regulatory action" is one that is likely to:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

6.3 Statutory Authority

Under the Magnuson-Stevens Act, the United States has exclusive fishery management authority over all marine fishery resources found within the Exclusive Economic Zone (EEZ), which extends 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 (Secretary) and in the Regional Councils. In the Alaska Region, the Council has the responsibility for preparing Fishery Management Plans (FMPs) for the marine fisheries it finds that require conservation and management and for submitting their recommendations to the Secretary. Upon approval by the Secretary, NMFS is charged with carrying out the federal mandates of the Department of Commerce with regard to marine and anadromous fish. The groundfish fisheries in the EEZ off Alaska are managed under the FMP for the Groundfish Fisheries of the GOA and the FMP for the Groundfish Fisheries of the BSAI. The crab fisheries in the EEZ off Alaska are managed under the FMP for the Crab Fisheries of the BSAI. The scallop fisheries in the EEZ off Alaska are managed under the FMP for the Scallop Fisheries of Alaska. The halibut fishery is managed by the International Pacific Halibut Commission (IPHC), which was established by a Convention between the governments of Canada and the United States. The IPHC's mandate is research on and management of the stocks of Pacific halibut within the Convention waters of both nations.

Actions taken to amend FMPs or implement other regulations governing these fisheries must meet the requirements of federal laws and regulations. In addition to the Magnuson-Stevens Act, the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), EO (EO 12866), and the Regulatory Flexibility Act (RFA).

6.4 Purpose and Need for Action

The Council recognizes that Essential Fish Habitat (EFH) designations are necessarily broad in scope, because of the limited available scientific information about the habitat requirements of many managed species. The Council further recognizes that specific habitat areas within EFH may warrant additional management, because they are ecologically important, stressed, susceptible to adverse effects of fishing and other human activities, and/or rare. A Habitat Area of Particular Concern (HAPC) designation provides a way to call extra attention to such habitats and to focus conservation and enhancement priorities within EFH.

6.4.1 Need for Action

In Section 2 of the Magnuson-Stevens Act, Congress recognized that one of the greatest long-term threats to the viability of commercial, subsistence/personal use, and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Congress adopted specific requirements for FMPs to identify EFH and minimize to the extent practicable any adverse effects of fishing on EFH. In the regulations implementing the EFH provisions of the Magnuson-Stevens Act, NMFS encourages Councils to identify types or areas of habitat within EFH as HAPCs (50 CFR 600.815(a)(8)). HAPCs provide a mechanism to acknowledge areas where more is known about the ecological function and/or vulnerability of EFH, and to highlight priority areas within EFH for conservation and management.

HAPCs and associated management measures considered by the Council would provide additional habitat protection for EFH. Such actions are consistent with the EFH EIS, because they address potential impacts that are discussed in the EIS, even though the EIS indicates new management measures are not required under the Magnuson-Stevens Act to reduce those impacts. In effect, through its evaluation of HAPCs, the Council is considering new measures that would be precautionary.

The need for this action also stems from a May 2003 joint stipulation and order, approved by the U.S. District Court for the District of Columbia. That agreement reflected the Council's commitment to consider new HAPCs as part of the response to the AOC v. Daley litigation that challenged whether the Council's FMPs minimize to the extent practicable the adverse effects of fishing on EFH. Under the agreement, final regulations implementing any new HAPC designations, and any associated management measures, must be promulgated no later than August 13, 2006.

6.4.1.1 Market Failure Rationale

The OMB guidelines for analysis under E.O. 12866 state that…

> *in order to establish the need for the proposed action, the analysis should discuss whether the problem constitutes a significant market failure. If the problem does not constitute a market failure, the analysis should provide an alternative demonstration of compelling public need, such as improving governmental processes or addressing distributional concerns. If the proposed action is a result of a statutory or judicial directive, that should be so stated.*

The management programs that will be modified by the alternatives reviewed in this RIR are a response to common property and "public goods" market failures interfering with the ability to adequately protect marine habitat, and the ecosystems and associated species that habitat supports.

6.4.2 Purpose of Action

The purpose of this action is to determine whether and how to amend the Council's FMPs to identify and manage site-specific HAPCs. HAPCs, identified as a result of this EA/RIR/IRFA, would provide additional habitat protection and further minimize potential adverse effects of fishing on EFH. The HAPCs would be subsets of EFH that are particularly important to the long-term productivity of one or more managed species, or that are particularly vulnerable to degradation. The Council may identify HAPCs based on one or more of 4 considerations listed in the EFH regulations: ecological importance, sensitivity, stress from development activities, and rarity of the habitat type. The Council required that each HAPC site should meet at least two of those considerations, with one being rarity.

The Council established a process for considering potential new HAPCs, which is documented in Appendix J of the draft EFH EIS (NMFS, 2005). While many types of habitat may be worth considering as HAPCs, the Council determined that concrete and realistic priorities should be set to move forward expeditiously with the designation and possible protection of HAPCs. The Council decided that the initial HAPC proposal cycle should focus on two priorities:

1. Seamounts in the EEZ, named on NOAA charts, that provide important habitat for managed species; and
2. Largely undisturbed, high relief, long lived hard coral beds, with particular emphasis on those located in the Aleutian Islands, which provide habitat for life stages of rockfish, or other important managed species that include the following features:
    a) sites must have likely or documented presence of FMP rockfish species; and
    b) sites must be largely undisturbed and occur outside core fishing areas.

Coral areas were selected as a Council HAPC priority, because they may be linked with rockfish and other FMP species. Additionally, areas of high density "gardens" of corals, sponges, and other sedentary invertebrates were recently documented for the first time in the North Pacific Ocean and appear to be particularly sensitive to bottom disturbance. Some deep sea corals are fragile, long-lived, and slow-growing organisms that provide habitat for fish and may be susceptible to human induced degradation or stress.

Seamounts were selected as a Council HAPC priority, because they may serve as unique ecosystems. Some FMP species on seamounts may be endemic (exclusive to a particular place) and vulnerable to stress caused by human induced activities. The purpose of this priority is to protect seamounts from potential disturbance from fishing activities, and therefore to ensure the continued productivity of these habitats for managed species.

If the Council identifies HAPCs that include State of Alaska waters, the Council will relay its concerns to the Alaska Board of Fisheries to suggest appropriate protection of HAPCs under state jurisdiction.

6.5 Alternatives Considered

The alternatives are discussed in detail in Section 2.3 of the EA. The alternatives are summarized as follows:

Action 1: Seamounts.

Alternative 1: No action

Alternative 2: Designate 5 named seamounts in the EEZ off Alaska as HAPCs (Dickens, Giacomini, Patton, Quinn, and Welker) and prohibit all Council-managed bottom-contact fishing within these proposed HAPCs.

Alternative 3: Designate 16 named seamounts in the EEZ off Alaska as HAPCs (Bowers, Brown, Chirkikof, Marchand, Dall, Denson, Derickson, Dickens, Giacomini, Kodiak, Odessey, Patton, Quinn, Sirius, Unimak, Welker) and prohibit all Council-managed bottom-contact fishing within these proposed HAPCs.

Action 2: GOA Corals.

Alternative 1: No action

Alternative 2: Designate 3 sites along the continental slope—at Sanak Island, Albatross, and Middleton Island— as HAPCs with two options as follows:

Option 1: Close sites to bottom-contact with mobile gear (BCMG) for 5 years. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the 3 sites that are high-relief deep-water corals. The portion of these sites that are in fact high-relief coral sites should remain closed to BCMG after the 5 years and the portion of the areas that are not high relief coral sites should re-open to BCMG after the 5 years.

Option 2: Close sites to bottom trawling for 5 years. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the 3 sites that are high-relief deep-water corals. The portion of these sites that are in fact high-relief coral sites should remain closed to bottom trawling after the 5 years and the portion of the areas that are not high relief coral sites should re-open to trawling after the 5 years.

Alternative 3: Designate 3 areas at Cape Ommaney, Fairweather grounds NW, and Fairweather grounds SW, as HAPCs. (See EA Tables 2 and 3, and Figures 2.5 and 2.7)

Option 1: Prohibit all Council-Managed bottom-contact gear within 5 smaller areas inside these HAPCs.

Option 2: Prohibit bottom trawl gear within 5 areas inside the HAPCs, while designating the remainder of each of the 4 HAPCs in this alternative as priority areas for hook and line gear impact research.

Alternative 4: Combine Alternatives 2 and 3 as modified.

Action 3: AI Corals.

Alternative 1: No action.

Alternative 2: Adopt the following 6 coral garden sites within the Aleutian Islands as HAPC:

1. Adak Canyon: Accept the bottom-contact gear closure defined within staff's hybrid (two-tier approach), increase the designation-only portion of the boundary to include the entire AMCC and MCA proposals.
2. Cape Moffett: Modify the hybrid proposal boundaries for no bottom-contact gear as follows: The square would be split into two triangles from SW to NE, the right (SE/S) side of the square would be open to fishing (with a HAPC designation), the other side (NW) would be closed to bottom-contact gear. The designation-only areas of the hybrid would remain the same.
3. Bobrof Island: Utilize the boundaries of the NMFS proposal, adjusted on the northern extent of the island (per public comment in notebooks) to define the no bottom-contact gear areas. The designation-only area of the hybrid would remain the same.
4. Semisopochnoi Island: Utilize the original NMFS proposal and management measures of no bottom-contact gear for analysis. The designation-only area from the hybrid proposal would remain the same.
5. Great Sitkin: Utilize the boundaries of the NMFS proposal and management measures of no bottom-contact gear for analysis. The designation area would be from the hybrid proposal.
6. Ulak Island: Utilize the boundaries of the NMFS proposal and management measures of no bottom-contact gear for analysis. The designation area would be from the hybrid proposal.

Alternative 3: Adopt the hybrid area for Bowers Ridge with management measures of no bottom-contact with mobile gear.

Alternative 4: Adopt 4 sites in the Aleutian Islands—South Amlia/Atka, Kanaga Volcano, Kanaga Island, and Tanaga Islands— as HAPCs with two options as follows:

Option 1: Close sites to bottom-contact with mobile gear (BCMG) for 5 years. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the sites that are high-relief deep-water corals. The portion of these sites that are in fact high-relief coral sites should remain closed to BCMG after the 5 years and the portion of the areas that are not high relief coral sites should re-open to BCMG after the 5 years.

Option 2: Close sites to bottom trawling for 5 years. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the sites that are high-relief deep-water corals. The portion of these sites that are in fact high-relief coral sites should remain closed to bottom trawling after the 5 years and the portion of the areas that are not high relief coral sites should re-open to trawling after the 5 years;

Alternative 5: Adopt Alternatives 2, 3, and 4 in conjunction with the same boundaries and management measures.

6.6 Description of the Fisheries

The various regulatory alternatives considered could potentially affect a broad array of fishing vessels that harvest groundfish, crab, scallop, and halibut resources. This section describes potentially affected fisheries in terms of their utilization patterns, trends, and current status. The specific fisheries described are as follows:

- Bering Sea and Aleutian Islands groundfish fisheries (Section 6.6.1)
- Gulf of Alaska groundfish fisheries (Section 6.6.2)
- Aleutian Islands golden (brown) king crab and red king crab fisheries (Section 6.6.4.1)
- Alaska weathervane scallop fishery (Section 6.6.4.2)
- Pacific halibut fishery off Alaska (Section 6.6.4.3)
- Gulf of Alaska dinglebar troll fishery for lingcod (Section 6.6.4.4)

Detailed information on the various types of vessels that participate in the BSAI and GOA groundfish fisheries is provided in Section 6.6.3.

In addition, the description of fisheries includes a subsection describing the regions and communities that support these fisheries (Section 6.6.5).

6.6.1 Description of BSAI Groundfish Fisheries by Species

Generally, the fishery descriptions presented here describe each BSAI groundfish fishery by species for the period 1995 through 2003. Historical information for the years prior to 1995 is also included to provide a more complete perspective on catch. Catch data for each fishery are provided by gear type. Trawl, hook-and-line, pot, and jig gear account for virtually all the catch in the BSAI groundfish fisheries. This description of the BSAI groundfish fisheries is drawn from NPFMC (2003a) and from groundfish catch statistics obtained from the NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/ sustainablefisheries/catchstats.htm.

6.6.1.1 BSAI Pollock Fishery

The directed pollock fishery is conducted exclusively by pelagic trawl gear in the BSAI. From 1954 to 1963, pollock were harvested at low levels in the eastern Bering Sea. Directed foreign fisheries began in 1964. Catches increased rapidly during the late 1960s, and reached a peak in 1970-75, when catches ranged from 1.3 to 1.9 million mt annually. Following a peak catch of 1.9 million mt in 1972, catches were reduced through bilateral agreements with Japan and the USSR.

Since the advent of the U.S. EEZ in 1977, the annual average eastern Bering Sea pollock catch has been 1.2 million mt and has ranged from 0.9 million mt in 1987 to nearly 1.5 million mt (including the Bogoslof Islands area catch— Table 6-1). Stock biomass has apparently ranged from a low of 4-5 million mt to highs of 10-12 million mt. U.S. vessels began fishing for pollock in 1980, and by 1987 they were able to take 99% of the quota. Since 1988, only U.S. vessels have been operating in this fishery. The pattern of the modern pollock fishery (since the early 1990s) has been to focus on a winter spawning-aggregation fishery (the “A-season”), with an opening on January 20th. This first season typically lasts about 4-6 weeks, depending on the catch rates. A second season opening has occurred on September 1st (although in 1995, it opened on Aug 15th). This has changed considerably over the past few years, and management has focused on minimizing the possibility that the pollock fishery inhibits the recovery of the endangered Steller sea lion (SSL) population, or adversely modifies its habitat.

Table 6-1. Catch (mt) of Pollock in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	3,069	2,894	4,480	3,231	3,380	4,687	5,320	5,901	7,129
JIG	No data are available until 2003								0
OTHR	0	0	0	0	0	0	0	0	0
POT	15	42	64	44	25	60	18	29	21
TRW	1,229,024	1,126,631	1,057,127	1,037,865	887,150	1,015,522	1,242,098	1,326,641	1,335,378
Total	1,232,108	1,129,567	1,061,671	1,041,140	890,555	1,020,269	1,247,436	1,332,571	1,342,528

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Since the closure of the Bogoslof management district (statistical area 518) to directed pollock fishing in 1992, the “A-season” (January – March) pollock fishery on the eastern Bering Sea shelf has been concentrated primarily north and west of Unimak Island. Depending on ice conditions and fish distribution, there has also been effort along the 100 m contour between Unimak Island and the Pribilof Islands. This pattern has gradually changed during the period 1999-2002.

After 1992, the “B-season” (typically September – October) fishery has been conducted to a much greater extent west of 170°W than it had been prior to 1992. This shift was due to the implementation of the Catcher Vessel Operational Area (CVOA) in 1992, and also the geographic distribution of pollock by size. The pattern in the past few years shows an increase in this trend (towards catching pollock west of 170°W) and decreasing amounts within the Steller sea lion conservation area (SCA) until 2001. Compared to 2000, concentrated removals occurred within the SCA in the second half of both 2001 and 2002. However, the 2002 catch seems more evenly distributed within the SCA when compared to that of 2000.

In 1998, Congress passed the American Fisheries Act (AFA), which made the following changes to the BSAI pollock fishery:

- Limited the number of harvesting and processing vessels allowed to participate in the BSAI pollock fishery;
- Modified specific allocations of the BSAI pollock quota as follows: 10% to the western Alaska CDQ program, with the remainder allocated 50% to the inshore sector, 40% to the offshore sector, and 10% to the mothership sector;
- Established the authority and mechanisms by which the pollock fleet can form fishing cooperatives;
- Changed catch measurement and monitoring in the BSAI pollock fishery.

In response to continuing concerns over the possible impacts groundfish fisheries may have on rebuilding populations of SSL, NMFS and the NPFMC have made changes to the Atka mackerel, Pacific cod, and pollock fisheries in the BSAI and GOA. These have been designed to reduce the possibility of competitive interactions with SSL. For the pollock fisheries, comparisons of seasonal fishery catch and pollock biomass distributions (from surveys) by area in the eastern Bering Sea led to the conclusion that the pollock fishery had disproportionately high seasonal harvest rates within critical habitat, which could lead to reduced sea lion prey densities. Consequently, management measures were designed and implemented to redistribute the fishery, both temporally and spatially, according to pollock biomass distributions. The underlying assumption in this approach was that the independently derived area-wide and annual exploitation rate for pollock would not reduce local prey densities for sea lions.

Three types of measures were implemented in the pollock fisheries:

• Additional pollock fishery exclusion zones around sea lion rookery or haulout sites,

• Phased-in reductions in the seasonal proportions of TAC that can be taken from critical habitat, and

• Additional seasonal TAC releases to disperse the fishery in time.

Disentangling the specific changes in the temporal and spatial dispersion of the eastern Bering Sea pollock fishery resulting from the sea lion management measures from those resulting from implementation of the AFA is difficult. Beginning in 1999, reduction of the capacity of the catcher processor fleet, resulting from the AFA, reduced the rate at which the catcher processor sector (allocated 36% of the eastern Bering Sea pollock TAC) caught pollock. Provisions of the AFA, allowing the formation of cooperatives, gave the industry the ability to respond efficiently to changes mandated for sea lion conservation that otherwise could have been more disruptive to the industry.

In 2000, further reductions in seasonal pollock catches from BSAI Steller sea lion critical habitat were realized by closing the entire Aleutian Islands region to pollock fishing. Reductions in the proportions of seasonal TAC that could be caught from the SCA, an area that overlaps considerably with sea lion critical habitat, were phased in beginning in 2000. In 1998, over 22,000 mt of pollock were caught in the Aleutian Islands region, with over 17,000 mt caught in Aleutian Islands SSL critical habitat. Since 1998, directed fishery removals of pollock have been prohibited. A directed fishery for pollock in the Aleutian Islands is expected to resume in 2005, at the direction of the U.S. Congress (Section 803 of the Consolidated Appropriations Act of 2004).[1] The terms, conditions, and limitations of that fishery are contained in the EA/RIR for Amendment 82 to the Bering Sea and Aleutian Islands Groundfish Management Plan, approved on February 9, 2005.

6.6.1.2 BSAI Pacific Cod Fishery

During the early 1960s, a Japanese longline fishery harvested BSAI Pacific cod (P. cod) for the frozen fish market. Beginning in 1964, the Japanese trawl fishery for pollock expanded and cod became an important bycatch species and an occasional target species when high concentrations were detected during pollock operations. By the time that the 1976 MFCMA went into effect, in 1977, foreign catches of P. cod had consistently been in the 30,000-70,000 mt range for a full decade. In 1981, a U.S. domestic trawl fishery and several joint venture fisheries began operations in the BSAI. The foreign fishery off Alaska received its final TALFF allocation in 1985. The joint venture sectors dominated catches through 1988, but, by 1989, the domestic sector was dominant. By 1991, the joint venture sector had been displaced entirely.

Presently, there are P. cod target fisheries for all major gear groups, including trawl, hook-and-line, pot, and jig (Table 6-2). From 1980 through 2003, BSAI P. cod TAC averaged about 76% of ABC, and aggregate commercial catch averaged about 87% of TAC. In 8 of these 24 years (33%), TAC equaled ABC exactly, and in 4 of these 24 years (17%), catch exceeded TAC. Changes in ABC, over time, are typically attributable to 3 factors: 1) changes in resource abundance, 2) changes in management strategy, and 3) changes in the stock assessment model. For example, from 1980 through 2003, 5 different

[1] Congress provided for the possibility of a "zero" TAC for the Aleutian Islands directed pollock fishery, should that be justified for conservation and/or management reasons. The Council did not find this to be the case, and chose to set a "non-zero" pollock TAC for the AI management area, beginning in 2005.

assessment models were used, though the present model has remained unchanged since 1997 (except for the addition of a new fishery selectivity era beginning in 2000). Historically, the great majority of the BSAI P. cod catch has come from the eastern Bering Sea area. During the most recent 5-year period (1997-2001), the eastern Bering Sea accounted for an average of about 84% of the BSAI cod catch.

Table 6-2. Catch (mt) of Pacific Cod in the BSAI by Gear, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	102,600	94,701	124,233	98,094	78,852	85,106	96,874	89,802	94,323
JIG	599	267	173	192	169	71	71	166	156
POT	20,299	32,617	22,047	13,657	16,150	18,783	16,507	15,054	21,959
TRW	121,530	113,089	111,212	81,308	67,190	73,476	50,752	78,178	78,210
Total	245,028	240,674	257,665	193,251	162,361	177,436	164,204	183,200	194,648

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.

Current regulations specify that BSAI catches of P. cod will be allocated according to gear type as follows: the trawl fishery will be allocated 47%, the jig fishery will be allocated 2%, and the fixed gear (longline and pot) fishery will be allocated 51%. Of the fixed gear allocation, the longline fishery will be allocated 80.3% (not counting catcher vessels less than 60 ft LOA), the pot fishery will be allocated 18.3% (not counting catcher vessels less than 60 ft. LOA), and fixed-gear catcher vessels less than 60 ft. LOA will be allocated 1.4%. Typically, as the harvest year progresses, it becomes apparent that one or more gear types will be unable to harvest their full allotment(s) by the end of the year. This is addressed by reallocating TAC between gear types, in September of each year. Most often, such reallocations shift TAC from the trawl, jig, and sometimes pot components of the fishery to the longline catcher processors. The longline catcher processors typically receive 15,000-20,000 mt per year through such transfers.

6.6.1.3 BSAI Sablefish Fishery

Japanese longliners had a directed fishery for sablefish in the eastern Bering Sea in 1958. The fishery expanded rapidly in this area and catches peaked at 25,989 mt in 1962. As the fishing grounds in the eastern Bering Sea were preempted by expanding Japanese trawl fisheries, the Japanese longline fleet expanded to the Aleutian Islands region and the GOA. Heavy fishing by foreign vessels during the 1970s led to a substantial population decline and fishery regulations in waters off Alaska, which sharply reduced catches. Catch in the late 1970s was restricted to about one-fifth of the peak catch in 1972.

The expansion of the U.S. fishery was helped by exceptional stock recruitment during the late 1970s. The high recruitment fueled an increase in abundance for the population, which had been heavily fished during the 1970s. Increased abundance led to relaxation of fishing quotas and catches peaked again in 1988, at about 70% of the 1972 peak. Abundance has since fallen, as the exceptional late-1970s year classes have died off. Catches have also fallen, and, in 2000, were about 42% of the 1988 peak.

In 1989, Amendment 13 to the BSAI Groundfish FMP allocated the sablefish quota by gear type, 50% to fixed gear and 50% to trawl in the eastern Bering Sea, and 75% to fixed gear and 25% to trawl gear in the Aleutians, effective 1990 (Table 6-3). A 1992 regulatory amendment prohibited longline pot gear in the Bering Sea. The prohibition on sablefish longline pot gear use was removed for the Bering Sea in 1996, except from June 1 through June 30, to prevent gear conflicts with trawlers. Sablefish longline pot gear is allowed in the Aleutian Islands.

By the late 1980s, the average season length decreased to one to two months. In some areas, this open access fishery was as short as 10 days, warranting the label “derby” fishery. Season length continued to decrease until Individual Fishing Quotas (IFQs) were implemented for longline vessels in 1995 along with an 8-month season. The season ran from March 15 to November 15, until 2003, when the starting date was changed to March 1 to extend the season to eight and half months. The sablefish IFQ fishery is concurrent with the IFQ halibut fishery.

Table 6-3. Catch (mt) of Sablefish in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	1,625	1,246	1,364	969	893	1,220	1,302	1,393	1,167
JIG			No data are available until 2003						0
POT	17	1	0	1	31	100	149	283	507
TRW	405	165	73	129	287	310	388	318	232
Total	2,047	1,412	1,437	1,099	1,211	1,630	1,839	1,994	1,906

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

The directed fishery is primarily a hook-and-line fishery, with some pot fishing (longline pots) occurring in the Aleutian Islands. Sablefish are also caught as incidental catch during directed trawl fisheries for other species groups, such as rockfish. Three State water limited entry fisheries—Prince William Sound, Chatham Strait, and Clarence Strait—land sablefish outside the IFQ program.

6.6.1.4 BSAI Atka Mackerel Fishery

From 1970-1979, Atka mackerel were landed off Alaska exclusively by the distant water fleets of the U.S.S.R., Japan, and the Republic of Korea. U.S. joint venture fisheries began in 1980, and dominated the landings of Atka mackerel from 1982 through 1988. The last joint venture allocation of Atka mackerel off Alaska was in 1989, and, since 1990, U.S. fishermen have made all Atka mackerel landings.

Total landings declined from 1980-1983, primarily due to changes in target species and allocations to various nations, rather than changes in stock abundance. From 1985-1987, Atka mackerel catches were some of the highest on record, averaging 34,000 mt annually. Beginning in 1992, TACs increased steadily in response to evidence of a large exploitable biomass, particularly in the central and western Aleutian Islands.

Prior to 1992, ABCs were allocated to the entire Aleutian management district, with no additional spatial management. However, because of increases in the ABC beginning in 1992, the Council recognized the need to disperse fishing effort throughout the range of the stock to minimize the likelihood of localized depletions. In 1993, an initial Atka mackerel TAC of 32,000 mt was caught by March 11, almost entirely south of Seguam Island (Seguam Bank). This initial TAC release represented the amount of Atka mackerel that the Council thought could be appropriately harvested in the eastern portion of the Aleutian Islands subarea, since there was no mechanism in place at the time to spatially allocate TACs. In mid-1993, however, Amendment 28 to the BSAI Groundfish FMP became effective, dividing the Aleutian Islands subarea into 3 districts for the purposes of spatially apportioning TACs. On August 11, 1993, an additional 32,000 mt of Atka mackerel TAC was released to the Central (27,000 mt) and Western (5,000 mt) districts. Since 1994, the BSAI Atka mackerel TAC has been allocated to the 3 regions, based on the average distribution of biomass estimated from the Aleutian Islands bottom trawl surveys. Catch by gear for 1995-2003 is shown in Table 6-4.

Table 6-4. Catch (mt) of Atka Mackerel in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	61	36	40	90	71	138	270	43	21
JIG			No data are available until 2003						0
POT	81	54	50	15	11	9	17	53	211
TRW	81,413	103,853	65,755	55,768	53,561	42,293	56,249	41,945	54,052
Total	81,555	103,943	65,845	55,873	53,643	42,440	56,536	42,041	54,284

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Amendment 34 further allocates up to 2% of the Atka mackerel TAC, specified for the eastern AI management area, to vessels using jig gear.

In June 1998, the Council passed a fishery regulatory amendment that proposed a 4-year timetable to temporally and spatially disperse and reduce the level of Atka mackerel fishing within SSL critical habitat in the BSAI. Temporal dispersion was accomplished by dividing the BSAI Atka mackerel TAC into two equal seasonal allowances, an A-season beginning January 1 and ending April 15, and a B-season from September 1 to November 1. Spatial dispersion was accomplished through a planned 4-year reduction in the maximum percentage of each seasonal allowance that could be caught within critical habitat in the Central and Western Aleutian Islands. This was in addition to bans on trawling within 10 nm of all SSL rookeries in the Aleutian district and within 20 nm of the rookeries on Seguam and Agligadak Islands (in area 541), which were instituted in 1992. The goal of spatial dispersion was to reduce, to no more than 40%, the proportion of each seasonal allowance caught within critical habitat by the year 2002. No critical habitat allowance was established in the Eastern Aleutian Islands, because of the year-round 20-nm trawl exclusion zone around SSL rookeries on Seguam and Agligadak Islands that minimized effort within critical habitat. The regulations implementing this 4-year phased-in change to Atka mackerel fishery management became effective on 22 January 1999, and lasted only 3 years (through 2001). In 2002, new regulations affecting management of the Atka mackerel, pollock, and Pacific cod fisheries went into effect. Furthermore, the Western District of the Federal Court prohibited all trawling in critical habitat from 8 August 2000, through 30 November 2000, because of violations of the ESA.

As part of the plan to respond to the Court and comply with the ESA, NMFS and the NPFMC formulated new regulations for the management of SSL and groundfish fishery interactions that went into effect in 2002. The objectives of temporal and spatial fishery dispersion, cornerstones of the 1999 regulations, were retained. Season dates and allocations remained the same (A season: 50% of annual TAC from 20 January to 15 April; B season: 50% from 1 September to 1 November). However, the maximum seasonal catch percentage from critical habitat was raised from the goal of 40%, in the 1999 regulations, to 60%. To compensate, effort within critical habitat in the Central (542) and Western (543) areas was limited by allowing access to each area to only half the fleet at a time. Vessels fishing for Atka mackerel are randomly assigned to one of two teams. Vessels may not switch areas until the other team has caught the critical habitat allocation assigned to that area. In the 2002 regulations, trawling for Atka mackerel was prohibited within 10 nm of all SSL rookeries in areas 542 and 543; this was extended to 15 nm around Buldir Island, and 3 nm around all major SSL haulouts. Steller sea lion critical habitat east of 178°W in the Aleutian district, including all critical habitat in area 541, and a 1° longitude-wide portion of area 542, is closed to directed Atka mackerel fishing.

6.6.1.5 BSAI Flatfish Fisheries

The several flatfish fisheries that occur in the BSAI are managed as separate species or species groups. In this analysis, data on flatfish catches are aggregated across all flatfish species and species groups. Therefore, a table of total flatfish catch, by gear type, from 1995-2003, is provided (Table 6-5).

Table 6-5. Catch (mt) of All Flatfish in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	6,812	8,026	9,823	10,494	5,885	7,290	5,656	4,692	5,032
JIG	No data are available until 2003								0
POT	103	294	87	116	135	95	119	285	276
TRW	225,249	225,395	300,208	187,910	151,105	181,684	133,555	142,097	137,219
Total	232,164	233,715	310,118	198,520	157,125	189,069	139,330	147,074	142,527

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.1.5.1 BSAI Yellowfin Sole Fishery

Yellowfin sole is one of the most abundant flatfish species in the eastern Bering Sea and is the target of the largest flatfish fishery in the United States. The directed fishery typically occurs from spring through December. The resource inhabits the eastern Bering Sea shelf and is considered one stock. Abundance in the Aleutian Islands region is negligible. Catch by gear type, for 1995-2003, is shown in Table 6-6.

Table 6-6. Catch (mt) of Yellowfin Sole in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	60	148	237	260	150	288	618	570	573
JIG	No data are available until 2003								0
POT	81	256	71	111	71	70	46	38	90
TRW	124,611	129,254	181,081	100,783	67,099	83,491	62,731	72,391	73,734
Total	124,752	129,658	181,389	101,154	67,320	83,849	63,395	72,999	74,397

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Yellowfin sole have been caught with bottom trawls on the Bering Sea shelf since the fishery began in 1954. Foreign fisheries overexploited yellowfin sole during the period from 1959 through 1962, when catches averaged 404,000 mt annually. As a result of reduced stock abundance, catches declined to an annual average of 117,800 mt from 1963 through 1971, and further declined to an annual average of 50,700 mt, from 1972 through 1977. The lower yield in this latter period was partially due to the discontinuation of the U.S.S.R. fishery. In the early 1980s, after the stock condition had improved, catches again increased, reaching a recent peak of over 227,000 mt in 1985. During the 1980s, there was also a major transition in the characteristics of the fishery. Yellowfin sole were traditionally taken exclusively by foreign fisheries, and these fisheries continued to dominate through 1984. However, U.S. fisheries developed rapidly during the 1980s in the form of joint ventures. During the last half of the decade U.S. fisheries began to dominate, as the foreign fisheries were phased out of the eastern Bering Sea. Since 1990, only domestic harvesting and processing has occurred, primarily by trawl catcher processors producing kirimi (steaks) or headed and gutted products.

The catch was 181,389 mt in 1997, the largest since the fishery became completely domestic. It decreased to 101,201 mt in 1998. The 2003 catch totaled 74,397 mt. Due to the attainment of halibut PSC limits, the yellowfin sole harvest in 2002 was constrained by two seasonal closures: from May 11-May 21 and from June 15-June 30. In addition, zone 1 was closed on May 21 for the remainder of 2002 to prevent exceeding the 2002 bycatch allowance of red king crab specified for the yellowfin sole target fishery.

The catch information presented above also includes yellowfin sole that were discarded. The rate of discard has ranged from a low of 14% of the total catch in 2001 to 30% in 1992. The trend has been toward fuller retention of the catch in recent years. Discarding primarily occurs in the yellowfin sole directed fishery, with lesser amounts in the Pacific cod, rock sole, flathead sole, and “other flatfish” fisheries.

6.6.1.5.2 BSAI Greenland Turbot Fishery

Greenland turbot, within the U.S. EEZ off Alaska, are mainly distributed in the eastern Bering Sea. Prior to 1985, Greenland turbot and arrowtooth flounder were managed together. Since then, the Council has recognized the need for separate management quotas given the large differences in the market value between these species. Furthermore, the abundance trends for these two species are clearly distinct.

Beginning in the 1970s, the fishery for Greenland turbot intensified. Catches of this species peaked in the years from 1972 to 1976, when between 63,000 mt and 78,000 mt were caught annually. Catches of turbot declined after implementation of the MFCMA in 1977, but were still relatively high over the period 1980 through 1983, with an annual range of 48,000 to 57,000 mt. After 1983, however, trawl harvests declined steadily to a low of 7,100 mt in 1988, before increasing slightly to 8,822 mt in 1989, and to 9,619 mt in 1990. This overall decline was due mainly to catch restrictions placed on the fishery, because of declining recruitment. For the period 1992 through 1997, the Council set the TAC at 7,000 mt, as an added conservation measure, due to concerns about apparent low levels of recruitment in several preceding years. This has resulted in primarily incidental catch-only fisheries for this species. The geographical distribution of Greenland turbot catch, by trawl and longline vessels, has been fairly consistent in recent years. Catch by gear type for 1995 through 2003 is shown in Table 6-7.

Table 6-7. Catch (mt) of Greenland Turbot in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	4,214	4,900	6,327	7,177	3,880	4,723	3,096	2,468	2,495
JIG			No data are available until 2003						0
POT	1	2	0	3	37	13	35	75	65
TRW	3,978	1,653	1,209	1,576	1,710	1,905	2,116	982	866
Total	8,193	6,555	7,536	8,756	5,627	6,641	5,247	3,525	3,426

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Discard levels of Greenland turbot have typically been highest in the sablefish fisheries (accounting for about one half of all Greenland turbot discards during 1992-2002), while Pacific cod fisheries and the very limited Greenland turbot directed fishery have also contributed to the discard levels.

6.6.1.5.3 BSAI Alaska Plaice Fishery

Prior to 2001, Alaska plaice were managed as part of the "other flatfish" complex. Flathead sole were also part of the other flatfish complex, until they were removed in 1995, but in recent years Alaska plaice was the dominant species of the complex and comprised 87% of both the 2000 catch and the estimated 2001 trawl survey biomass. In 2002, Alaska plaice were removed from the other flatfish complex, and placed under separate management. Given the differences in biological information, assessment techniques, and management, it was deemed appropriate to separate the assessment of Alaska plaice from the remaining other flatfish.

The distribution of Alaska plaice is mainly on the eastern Bering Sea continental shelf, with only small amounts found in the Aleutian Islands region. The Alaska plaice distribution overlaps with rock sole and yellowfin sole, but the center of the distribution is north of these two species.

Catches of Alaska plaice increased from approximately 1,000 mt in 1971 to a peak of 62,000 mt in 1988, the first year of joint venture processing. Part of this apparent increase was due to better species identification and reporting of catches in the 1970s. Because of the overlap of the Alaska plaice distribution with that of yellowfin sole, much of the Alaska plaice catch during the 1960s was likely caught as incidental catch in the yellowfin sole fishery. After the cessation of joint venture fishing operations in 1991, Alaska plaice were harvested exclusively by domestic vessels. Catch by gear type, for 1995 through 2003 is shown in Table 6-8 (because Alaska plaice was not separately defined until 2002, no catch is reported for the years 1995-2001.)

Table 6-8. Catch (mt) of Alaska Plaice in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL								1	0
JIG									0
POT			Fishery was not defined until 2002					0	0
TRW								12,175	9,780
Total								12,176	9,780

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Since implementation of the Magnuson-Stevens Act in 1977, Alaska plaice has generally been lightly fished due primarily to a lack of market demand. However, the 2003 catch of 9,780 mt exceeded the total allowable catch of 9,250 mt. Alaska plaice are grouped with the rock sole, flathead sole, and other flatfish fisheries for seasonal and total annual allowances of prohibited species bycatch. In recent years, this group of fisheries has been closed prior to attainment of the TAC, due to the bycatch of halibut. In addition, a portion of the eastern Bering Sea was closed to these fisheries in 2003 for exceeding the red king crab bycatch allowance.

Substantial amounts of Alaska plaice are discarded in various eastern Bering Sea target fisheries. Retained and discarded catches were reported for Alaska plaice for the first time in 2002. In 2002, 370 mt of the 12,176 mt caught were retained, resulting in a discard rate of 97%. The discarding estimates were produced by using observer estimates of discard rate applied to the "blend" estimate of observer and industry reported retained catch. Examination of the 2002 blend data revealed that much of the discarding could be attributed to the yellowfin sole fishery, primarily from March to early April, and again from August to late September. Substantial rates of discarding also occurred in the rock sole, flathead sole, and Pacific cod fisheries.

6.6.1.5.4 BSAI Arrowtooth Flounder Fishery

Arrowtooth flounder range throughout the BSAI, but their abundance in the Aleutian Islands region is lower than in the eastern Bering Sea. The resource in the eastern Bering Sea and the Aleutians are managed as a single stock, although the stock structure has not been studied. Arrowtooth flounder was managed with Greenland turbot as a species complex until 1985, because of similarities in their life history characteristics, distribution, and exploitation. Greenland turbot were the target species of the fisheries, whereas arrowtooth flounder were caught as incidental catch. Because the stock conditions of the two species have differed markedly in recent years, management, since 1986, has been by individual species.

Catch records of arrowtooth flounder and Greenland turbot were combined during the 1960s. The fisheries for Greenland turbot intensified during the 1970s, and the incidental catch of arrowtooth flounder is assumed to have also increased. In 1974 through 1976, total catches of arrowtooth flounder reached peak levels, ranging from 19,000 mt to 25,000 mt. Catches decreased after implementation of the Magnuson-Stevens Act in 1977, and the resource has remained lightly exploited, with catches averaging 12,300 mt from 1977 through 2003. This decline resulted from catch restrictions placed on the fishery for Greenland turbot and phasing out of the foreign fishery in the U.S. EEZ. Total catch in 2003 was 12,842 mt (well below the 2003 ABC of 112,000 mt). Bottom trawling accounted for 88% of the 2003 catch (Table 6-9).

Table 6-9. Catch (mt) of Arrowtooth Flounder in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	2,212	2,624	2,844	2,551	1,446	1,821	1,554	1,177	1,469
JIG	No data are available until 2003								0
POT	18	18	13	1	24	9	35	168	112
TRW	7,052	12,010	7,197	12,683	9,103	11,098	12,319	10,196	11,261
Total	9,282	14,652	10,054	15,235	10,573	12,928	13,908	11,541	12,842

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Although some targeting of arrowtooth flounder occurs, this species currently has a low perceived commercial value, due to an enzyme that negatively affects flesh quality. The fishery's associated high rate of halibut bycatch, relative to target fisheries for other, similarly valued, flatfish species also contributes to the limited effort observed. Substantial amounts of arrowtooth flounder are discarded in the various trawl and longline target fisheries. The largest discard amounts occur in the Pacific cod, rock sole, "other flatfish", and Greenland turbot fisheries.

6.6.1.5.5 BSIA Flathead Sole Fishery

Flathead sole are managed as a single stock in the BSAI, and were formerly a constituent of the "other flatfish" category. In June 1994, the Council requested the Plan Team to assign a separate ABC for flathead sole in the BSAI, rather than combining flathead sole with other flatfish, as in past assessments. This request was based on a change in the directed fishing standards to allow increased retention of flatfish.

Prior to 1977, catches of *flathead sole* were combined with the species of the "other flatfish" category, which increased from around 25,000 mt in the 1960s to a peak of 52,000 mt in 1971. At least part of this apparent increase was due to better species identification and reporting of catches in the 1970s. After 1971, catches declined to less than 20,000 mt in 1975. Catches from 1977 through 1989 averaged 5,286 mt, and increased to an annual average of 17,700 mt from 1990 through 2002. The resource remains lightly harvested, as the 2003 catch was only 81% of the 2003 TAC of 17,000 mt. Although flathead sole receive a separate ABC and TAC, they are still managed in the same PSC classification as rock sole and "other flatfish", and receive the same apportionments and seasonal allowances of prohibited species catch. In recent years, the flathead sole fishery has been closed prior to attainment of the TAC, due to the bycatch of halibut. Substantial amounts of flathead sole are discarded in various eastern Bering Sea target fisheries. A substantial portion of the discards in 2002 occurred in the Pacific cod, and rock sole fisheries. Table 6-10 shows catch by gear type for 1995 through 2003.

Table 6-10. Catch (mt) of Flathead Sole in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	255	272	347	415	254	295	253	344	373
JIG	No data are available until 2003								0
POT	2	7	0	0	0	1	0	0	0
TRW	14,456	17,065	20,357	23,970	17,588	19,687	17,333	14,764	13,404
Total	14,713	17,344	20,704	24,385	17,842	19,983	17,586	15,108	13,777

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.1.5.6 BSAI Rock Sole Fishery

The northern rock sole is distributed primarily on the eastern Bering Sea continental shelf and in much lesser amounts in the Aleutian Islands region. Rock sole catches increased from an average of 7,000 mt annually from 1963 through 1969, to 30,000 mt between 1970 and 1975. Prior to 1987, the classification of rock sole in the "other flatfish" management category prevented reliable estimates of catch. Catches from 1989 through 2001 have averaged 50,700 mt annually.

Rock sole are important as the target of a high value roe fishery, occurring in February and March, which accounts for the majority of the annual catch. Most of the male rock sole caught in this fishery are discarded. This is primarily so, because the target is roe-bearing fish (mature females), but, in addition, male rock sole are typically very small. The 2002 catch of 41,311 mt was only 18% of the ABC of 225,000 mt (77% of the TAC). The 2003 catch total was 35,290. TACs are usually set relatively low compared to ABCs in this fishery, because of high halibut bycatch and rock sole discard rates. Thus, rock sole remain lightly harvested in the BSAI. During the 2003 fishing season rock sole harvesting was periodically closed in the BSAI, due to bycatch restrictions. Table 6-11 shows catch by gear type for 1995 through 2003.

Table 6-11. Catch (mt) of Rock Sole in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	46	60	36	51	60	31	31	30	36
JIG	No data are available until 2003								0
POT	0	8	2	1	2	1	2	2	7
TRW	54,982	46,859	67,526	33,590	40,449	49,232	29,222	41,299	35,290
Total	55,028	46,927	67,564	33,642	40,511	49,264	29,255	41,331	35,333

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Although female rock sole are highly valued when in spawning condition, large amounts of rock sole—primarily the much smaller males, but also immature females—are discarded in the various Bering Sea trawl target fisheries. From 1987 to 2000, rock sole were discarded in greater amounts than they were retained, although utilization has increased in the past few years. Fisheries with the highest discard rates include the rock sole roe fishery, and the yellowfin sole, flathead sole, and Pacific cod trawl fisheries.

6.6.1.5.7 BSAI "Other Flatfish" Fishery

The BSAI "other flatfish" group has typically included flatfish other than rock sole, yellowfin sole, arrowtooth flounder, and Greenland turbot. Flathead sole were part of the "other flatfish" complex until they were removed in 1995, and Alaska plaice was removed from the complex in 2002, as sufficient biological data exist for these species to construct age-structured population models. In contrast, survey biomass estimates are the principal data source used to assess the remaining members of the complex. Although over a dozen species of flatfish are found in the BSAI area, the "other flatfish" biomass consists primarily of starry flounder, rex sole, longhead dab, and butter sole.

Catch estimates of the miscellaneous species found in the "other flatfish" category were produced by applying the proportional catch, by species, from fishery observer data to estimates of total catch. In recent years, starry flounder and rex sole have accounted for most of the harvest of "other flatfish", contributing fully 85% of the harvest of "other flatfish" in 2003. Table 6-12 summarizes the catch of "other flatfish", by gear type, from 1995 through 2003.

Table 6-12. Catch (mt) of "Other Flatfish" in the BSAI by Gear, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	25	22	32	40	95	132	104	103	86
JIG	No data are available until 2003								0
POT	1	3	1	0	1	1	1	2	2
TRW	20,170	18,554	22,838	15,308	15,156	16,271	9,834	2,465	2,664
Total	20,196	18,579	22,871	15,348	15,252	16,404	9,939	2,570	2,752

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Members of the "other flatfish" category are grouped with Alaska plaice, rock sole, and flathead sole in a single prohibited species classification, with seasonal and total annual allowances of PSC bycatch applied to the classification. In recent years, this group of fisheries has been closed prior to attainment of the TAC, due to the bycatch of halibut.

6.6.1.6 BSAI Rockfish Fisheries

The several rockfish fisheries that occur in the BSAI are managed as separate species or species groups. In this analysis data on rockfish catch are aggregated across all rockfish species and species groups. Therefore, a table of total rockfish catch by gear type, from 1995 through 2003, is provided (Table 6-13).

Table 6-13. Catch (mt) of All Rockfish in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	432	480	421	622	426	640	690	570	411
JIG	No data are available until 2003								0
POT	7	9	4	2	4	9	4	5	12
TRW	16,352	23,465	16,776	14,360	18,562	14,599	15,879	15,150	19,188
Total	16,791	23,954	17,201	14,984	18,992	15,248	16,573	15,725	19,611

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.1.6.1 BSAI Pacific Ocean Perch Fishery

Pacific Ocean perch, and 4 other associated species of rockfish –northern rockfish, rougheye rockfish, shortraker rockfish, and sharpchin rockfish— were managed as a complex from 1979 to 1990. Known as the POP complex, these 5 species were managed as a single stock with a single TAC (total allowable catch). In 1991, the NPFMC separated POP from the other red rockfish, in order to provide protection from possible overfishing. Of the 5 species in the former POP complex, Pacific Ocean perch has historically been the most abundant rockfish and has contributed most to the commercial rockfish catch. Since 2001, Pacific Ocean perch, in the BSAI, have been assessed and managed as a separate stock.

Table 6-14 summarizes the catch of Pacific Ocean Perch by gear from 1995 through 2003.

Table 6-14. Catch (mt) of Pacific Ocean Perch in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	17	2	0	0	0	10	5	3	2
JIG	No data are available until 2003								0
POT	1	1	0	0	0	0	0	0	1
TRW	11,492	15,679	13,465	10,003	12,260	9,018	8,807	10,526	13,909
Total	11,510	15,682	13,465	10,003	12,260	9,028	8,812	10,529	13,912

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Pacific Ocean perch were a highly valued target species for Japanese and Soviet vessels and supported a major trawl fishery throughout the 1960s. Apparently, POP stocks were not productive enough to support such large removals. Catches continued to decline throughout the 1960s and 1970s, reaching their lowest levels in the mid 1980s. With the gradual phase-out of the foreign fishery in the U.S. EEZ, a small joint-venture fishery developed, but was replaced by a domestic fishery by 1990. The domestic fishery primarily consisted of trawl catcher processors producing frozen whole or headed and gutted products. In 1990, the domestic fishery recorded the highest Pacific Ocean perch removals since 1977.

Estimates of retained and discarded POP from the fishery have been available since 1990. The eastern Bering Sea region generally shows a higher discard rate than in the Aleutian Islands region. For the period from 1990 to 2002, the POP discard rate in the eastern Bering Sea averaged about 25%, and the 2002 discard rate was 56%. In contrast, the discard rate from 1990 to 2002, in the Aleutian Islands, averaged about 14%, and the 2002 discard rate was 12%.

There has been little change in the distribution of observed Aleutian Islands POP catch from the foreign and joint venture fisheries (years 1977-1988) and the domestic fishery (years 1990-present) with respect to fishing depth and management area. Management area 541 contributes the largest share of the observed catch in each fishery, with 46% and 41% in the foreign/joint venture and domestic fisheries, respectively. In contrast, area 543 contributed the largest share of the catch in the 2002 fishery, due to the spatial allocation of harvest quotas. Although the catch by management area between the two time periods was similar, variations appeared to occur within each of these periods. For example, area 543 contributed a large share of the catch in the late 1970s foreign fishery, as well as the domestic fishery from the mid-1990s to the present. In the late 1980s to the early 1990s, area 541 contributed a large share of the catch and prompted management changes to spatially allocate POP harvest. Note that the extent to which the patterns of observed catch can be used as a proxy for patterns in total catch is dependent upon the degree to which the observer sampling represents the true fishery. In particular, the proportions of total POP caught that were actually sampled by observers were very low in the foreign fishery, due to a low sampling ratio prior to 1984.

6.6.1.6.2 BSAI Shortraker/Rougheye Rockfish Fishery

In 1991, the Council enacted new regulations that changed the species composition of the POP complex. For the eastern Bering Sea slope region, the POP complex was divided into two subgroups: 1) Pacific Ocean perch, and 2) shortraker, rougheye, sharpchin, and northern rockfishes combined, also known as "other red rockfish." For the Aleutian Islands region, the POP complex was divided into 3 subgroups: 1) Pacific Ocean perch, 2) shortraker/rougheye rockfishes, and 3) sharpchin/northern rockfishes. In 2001, the other red rockfish complex in the eastern Bering Sea was split into two groups: 1) rougheye/shortraker, and 2) sharpchin/northern, matching the complexes used in the Aleutian Islands. Additionally, separate TACs were established for the eastern Bering Sea and Aleutian Islands management areas. These subgroups were established to protect Pacific Ocean perch, shortraker rockfish, and rougheye rockfish (the 3 most valuable commercial species in the assemblage) from possible overfishing. In 2002, sharpchin rockfish were assigned to the "other rockfish" category, leaving only northern rockfish and the shortraker/rougheye complex as members of the "other red rockfish" complex. summarizes the catch of shortraker/rougheye rockfish, by gear type, from 1995 through 2003.

Table 6-15. Catch (mt) of Shortraker/Rougheye Rockfish in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	99	189	96	251	144	231	253	179	131
JIG	No data are available until 2003								0
POT	0	0	0	0	0	0	0	1	2
TRW	459	771	946	408	340	212	492	387	189

Total	558	960	1,042	659	484	443	745	567	322

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

After subtraction of reserves, Amendment 53 allocates 30% of the remaining shortraker/rougheye TAC to non-trawl gear and 70% of the remaining TAC to trawl gear.

As mentioned above, rougheye and shortraker rockfish have been managed in the domestic fishery as part of the “other red rockfish” or “shortraker/rougheye” complexes. Rougheye and shortraker rockfish are relatively high valued species, compared to northern rockfish, accounting for the lower discard rates for the “shortraker/rougheye” complex as compared to the “other red rockfish” complex.

6.6.1.6.3 BSAI Northern Rockfish Fishery

Northern rockfish in the BSAI region have been previously assessed under Tier 5 of Amendment 56 of the BSAI Groundfish FMP, and have relied solely upon recent survey biomass estimates for an estimation of stock size. 2003 marked the initial use of an age-structured model for BSAI northern rockfish. The methodology for this model follows closely that used for BSAI Pacific Ocean perch. The change in assessment methodology results in management recommendations based on Tier 3 criteria of Amendment 56.

Table 6-16 summarizes the catch of northern rockfish by gear type, from 1995 through 2003.

Table 6-16. Catch (mt) of Northern Rockfish in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	5	20	17	53	35	65	138	36	27
JIG	No data are available until 2003								0
POT	0	0	0	0	0	0	1	0	1
TRW	3,867	6,633	1,979	3,620	5,220	4,672	5,991	3,677	4,624
Total	3,872	6,653	1,996	3,673	5,255	4,737	6,130	3,713	4,652

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Since 1991, rockfish management categories in the domestic fishery have also included multiple species. From 1991 to 2000, northern rockfish harvest in the eastern Bering Sea was included in the “other red rockfish” category, whereas harvest of this species in the Aleutian Islands was reported in a “northern/sharpchin” category. In 2001, northern rockfish harvest in the eastern Bering Sea was managed in a “northern/sharpchin” category, matching the species complex in the Aleutian Islands, and the management was combined across the BSAI area. In 2002, sharpchin rockfish was dropped from the complex, because of its sparse presence in reported catches, leaving a single-species management category of northern rockfish.

Northern rockfish catch, prior to 1990, was small, relative to more recent years (with the exception of 1977). Harvest data from 2000 through 2002; indicate that approximately 90% of the BSAI northern rockfish are harvested incidentally in the Atka mackerel fishery, with a large amount of the catch occurring in September in the western Aleutians (area 543). The distribution of northern rockfish harvest in the Aleutian Islands reflects both the spatial regulation of the Atka mackerel fishery and the increased biomass of northern rockfish in the western Aleutian Islands. Northern rockfish are patchily distributed and are harvested in relatively few areas, with important fishing grounds being Petral Bank, Sturdevant Rock, south of Amchitka Island, and in Seguam Pass.

Information on the proportion discarded is generally not available for northern rockfish in those years in which the management categories consisted of multi-species complexes. However, because the catches of sharpchin rockfish are generally rare in both the fishery and stock assessment surveys, the discard information available for the "sharpchin/northern" complex can be interpreted as a good approximation of northern rockfish discards. This management category was used in 2001, in the eastern Bering Sea, and from 1993 through 2001, in the Aleutians Islands. The discard rates are generally above 80%, with the exception of the mid-1990s, when some targeting occurred in the Aleutians Islands. The recent discard rates in the Aleutian Islands have been high, over 97%, in both 2001 and 2002.

6.6.1.6.4 BSAI "Other Rockfish" Fishery

The "other rockfish" complex includes all species of *Sebastes* and *Sebastolobus* spp., other than Pacific Ocean perch and those species in the "other red rockfish" complex (northern rockfish; rougheye rockfish; and shortraker rockfish). This complex is one of the rockfish management groups in the BSAI region. Eight out of twenty-eight species of "other rockfish" have been confirmed or tentatively identified in catches from the eastern BSAI region; thus, these are the only species stocks managed in this complex.

Table 6-17 summarizes the catch of "other rockfish" by gear type, from 1995 through 2003.

Table 6-17. Catch (mt) of "Other Rockfish" in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	311	269	308	318	247	334	294	352	251
JIG	No data are available until 2003								0
POT	6	8	4	2	4	9	3	4	8
TRW	534	382	386	329	742	697	589	560	466
Total	851	659	698	649	993	1,040	886	916	725

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

In recent years, in both the Aleutian Islands and eastern Bering Sea, the bulk of the other rockfish catch has been comprised of light dusky rockfish and shortspine thornyheads. The target fisheries that catch these two species were defined by which species or species group occurred in the greatest abundance, based on the total catch of the haul. During 2001 and 2002, 76% to 80% of the total light dusky rockfish catch (143 mt) in the Aleutian Islands was caught during the Atka mackerel trawl fishery, and 33% to 51% of the total shortspine thornyhead catch was caught using longline gear in hauls in which the target was described as "other fish" (grenadiers and/or skates). During the same years, in the eastern Bering Sea, 50% of the light dusky rockfish incidental catch (10 mt) was found in hauls associated with pollock pelagic trawling. In 2001 and 2002, hauls described as arrowtooth/Kamchatka flounder bottom trawl, caught 46% to 66% of the eastern Bering Sea shortspine thornyhead incidental catch.

On average, 48% of those species in the "other rockfish" category were discarded, in the Aleutian Islands. In the eastern Bering Sea, 37% of those species in the "other rockfish" category were discarded, on average. The difference in discard rates may be due to the difference in species composition. Shortspine thornyheads are a higher priced species than light dusky rockfish, and therefore may be retained at higher rates.

6.6.1.7 BSAI Squid and "Other Species" Fisheries

In the BSAI, squid is considered separately from the "other species" management group, which includes sculpins, skates, sharks, and octopus. There is currently little directed fishing for squid and "other species" in the BSAI. Generally, squid and "other species" are taken incidentally in target fisheries for groundfish. However, these species are considered ecologically important and may have future economic potential; therefore, an aggregate annual quota limits their catch. Directed fishing on one component of the "other species" category, skates, began in the GOA during 2003. While there may be interest in targeting skates elsewhere, the catches within the "other species" category in the BSAI region were apparently still incidental catch in 2002-2003. Smelts were removed from the "other species" group and moved to the forage fish group, beginning in 1999. This change came about through fishery Amendments 36 and 39 to the BSAI and GOA groundfish FMPs, respectively.

Table 6-18 summarizes the catch of squid and "other species", by gear type, from 1995 through 2003.

Table 6-18. Catch (mt) of Squid and "Other Species" in the BSAI by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	11,485	8,792	13,482	14,608	8,899	11,889	13,950	13,215	15,467
JIG	No data are available until 2003								0
OTHR	0	0	0	0	0	0	0	0	0
POT	579	621	387	343	740	814	461	421	404
TRW	10,596	13,194	12,853	11,000	9,439	11,660	12,471	13,444	10,749
Total	22,660	22,607	26,722	25,951	19,078	24,363	26,882	27,080	26,620

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

Squid and "other species" catches, in aggregate, were higher (at 39,000 mt) in 2002 than in any other year between 1997 and 2001. Squid are generally taken incidentally in the midwater trawl pollock fishery but have been the target of Japanese and Republic of Korea trawl fisheries in the past. After reaching 9,000 mt in 1978, total squid catches steadily declined to only a few hundred tons in the period 1987 through 1995. Thus, squid stocks have been comparatively lightly exploited in recent years. The 2002 catch of squid was 1,748 mt and, like the 2001 catch of 1,810 mt, was much closer to the ABC of 1,970 mt than any estimated catch since the 1980s. In the period 1992 through 1998, discard rates of squid by the BSAI groundfish fisheries ranged between 40% and 85%.

Reported catches of "other species" increased during the 1960s and early 1970s and reached a peak of 133,000 mt in 1972. The "other species" catch in that year represented 6% of the total groundfish catch. Since 1990, catches have ranged between 17,000 mt and 33,000 mt, and represented 2% or less of the total groundfish catches from the BSAI. Skates and sculpins constitute the bulk of the "other species" catches, accounting for between 66% and 96% of the estimated totals in 1992-2002.

While skates are caught in almost all fisheries and areas of the Bering Sea shelf, most of the skate catch is in the hook and line fishery for Pacific cod (53% of "other groundfish" caught in 2001 were caught in this fishery), with trawl fisheries for pollock, rock sole, and yellowfin sole also catching significant amounts. Sculpins are also caught in a wide variety of fisheries, but trawl fisheries for yellowfin sole, Pacific cod, pollock, Atka mackerel, and rock sole catch the most. Trawl pollock, and all 3 of the fisheries for Pacific cod (pots, longlines, and trawls), account for almost all of the octopus catch. In addition, there is a small directed fishery for octopus in the Aleutian Islands, and another in the southwestern Bristol Bay region. Most of the shark catch occurs in the mid-water trawl pollock fishery, and in the hook and line fisheries for sablefish, Greenland turbot, and Pacific cod along the outer continental shelf and slope of the Bering Sea. From 1992 through 1998, between 90% and 94% of the "other species" caught were discarded.

The recommended ABC for squid, in the year 2004, is calculated as 0.75 times the average catch from 1978 through 1995, or 1,970 mt; the recommended overfishing level for squid in the year 2004, is calculated as the average catch from 1978 through 1995, or 2,624 mt. The rationale for a Tier 6-based ABC recommendation is that there is no reliable biomass estimate for squid. The recommended ABC for the "other species" complex in the year 2004 is also calculated as 0.75 times the average catch from 1978 through 1995, or 19,320 mt; the recommended overfishing level for the "other species" complex in the year 2004 is calculated as the average catch from 1978 through 1995, or 25,760 mt. The rationale for a Tier 6-based ABC recommendation is that there is no reliable estimate of natural mortality for a species complex containing animals with such extremely diverse life histories as sharks, skates, sculpins, and octopi.

6.6.2 Description of GOA Groundfish Fisheries by Species

As with the description of the BSAI groundfish fisheries, GOA groundfish fisheries descriptions include utilization patterns and trends in each fishery, and that fishery's current status. Catch data are provided by gear type. This description of the GOA groundfish fisheries is drawn from NPFMC (2003b), DiCosimo and Kimball (2001), and groundfish catch statistics obtained from the NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.

6.6.2.1 GOA Pollock Fishery

Pollock in the GOA is managed as a single stock that is separate from the Bering Sea and Aleutian Island pollock stocks. Major exploitable concentrations are found primarily in the Western and Central areas. Pollock are targeted by trawl gear, with 75 trawl vessels participating in the 2003 GOA pollock fishery, all delivering onshore.

The pollock fishery is regulated under the GOA Groundfish FMP. In 1993, the Council apportioned 100% of GOA pollock to the inshore sector. In 1998, trawl gear was prohibited east of 140° W. longitude, and 100% retention was required for pollock in all groundfish fisheries. The Steller Sea Lion Protection Measures, implemented in 2001, establish 4 seasons in the Central and Western GOA, beginning January 20, March 10, August 25, and October 1, with 25% of the TAC allocated to each season. Allocations to management areas 610, 620, and 630 are based on the seasonal biomass distribution, as estimated by groundfish surveys. In addition, a new harvest control rule was implemented that requires a cessation of fishing when spawning biomass declines below 20% of unfished stock biomass. Table 6-19 summarizes the catch of pollock, by gear type, from 1995 through 2003.

Table 6-19. Catch (mt) of Pollock in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	78	60	75	72	150	306	104	98	52
JIG				No data are available until 2003					0
POT	8	8	14	6	5	40	5	4	9
TRW	73,162	50,398	89,803	123,724	93,265	71,531	70,376	50,611	50,418
Total	73,248	50,466	89,892	123,802	93,420	71,877	70,485	50,713	50,479

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.2 GOA Pacific Cod Fishery

GOA Pacific cod are most abundant in the Central area, where large schools are encountered at varying depths. The Pacific cod stock is exploited by a multiple-gear fishery—primarily by trawls, and in lesser amounts by pot, longline, and jig gear. Catches by pot gear have increased in recent years, facilitated in part by comparatively low halibut bycatch rates. A State-water cod fishery, utilizing pot and jig gear, began in 1997, and the guideline harvest level is currently set at no more than 25% of the total Federal Pacific cod TAC in the GOA. The relative percentages, by region change year-to year as harvests increase or decrease according to a stairstep procedure put in place by the State. In 2003, the relative percentages of the total State-water apportionment, by area, were: 25% Western area, 24.25% in the Central area, and 10% in the Eastern area. The total percentage for all areas was equal to 23.5% of the Federal TAC. For trawl fisheries, Pacific cod harvests have been limited by the halibut mortality cap, which sometimes constrains both the timing and magnitude of the harvests.

GOA and BSAI cod stocks are genetically indistinguishable, and tagging studies show that cod move between the Bering Sea and the GOA. However, the magnitude and regularity of such migrations are unknown and the stocks are managed as separate units. The GOA Groundfish FMP controls the fishery through a permit moratorium, limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, bycatch limits and rates, allocations, regulatory areas, quota reserves, record keeping and reporting requirements, and observer monitoring. In 1993, the Council apportioned 90% of GOA Pacific cod to the inshore sector, and 10% to the offshore sector. In 1998, trawl gear was prohibited east of 140° W. longitude (East Yakutat/Southeast Outside subarea) and 100% retention was required for Pacific cod, for all groundfish fisheries. Table 6-20 summarizes the catch of Pacific cod, by gear type, from 1995 through 2003.

Table 6-20. Catch (mt) of Pacific Cod in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	11,131	10,248	11,002	10,041	12,424	11,699	10,062	14,841	9,588
JIG	No data are available until 2003								88
POT	16,047	12,040	9,056	10,510	19,016	17,351	7,170	7,693	12,679
TRW	41,876	45,990	48,414	41,569	37,167	25,442	24,382	19,810	18,783
Total	69,054	68,278	68,472	62,120	68,607	54,492	41,614	42,344	41,138

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.

6.6.2.3 GOA Atka Mackerel Fishery

Atka mackerel are distributed from the east coast of the Kamchatka Peninsula, throughout the Komandorskiye and Aleutian Islands, north to the Pribilof Islands in the eastern Bering Sea, and eastward through the GOA to southeast Alaska. Their center of abundance is in the Aleutian Islands. An Atka mackerel population existed in the GOA, primarily in the Kodiak, Chirikof, and Shumagin areas, and supported a large foreign fishery through the early 1980s. By the mid-1980s, this fishery and presumably the mackerel population had all but disappeared. Recently, Atka mackerel have been detected by the summer trawl surveys only in the Shumagin (Western) area of the GOA. The small population of the Atka mackerel fishery in the Gulf of Alaska suggests that the area may be the edge of the species' range and be populated only during periods when recruitment, possibly as juveniles, from the Aleutian portion of the range is strong. In line with a conservative harvest policy, the Atka mackerel fishery is a bycatch-only fishery. The ABC is set at a level sufficient to satisfy bycatch needs in other fisheries.

Atka mackerel were added to the "other species" category in 1988, due to low abundance, and separated from "other species" in 1994, after 4 years of targeted catch, primarily in the Western Gulf. The GOA Groundfish FMP controls the fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. Table 6-21 summarizes the catch of Atka mackerel, by gear type, from 1995 through 2003.

Table 6-21. Catch (mt) of Atka Mackerel in the GOA by Gear, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	1	0	1	0	1	0	0	1	1
JIG	No data are available until 2003								
POT	1	0	0	0	0	2	1	1	8
TRW	699	1,587	330	317	261	168	75	82	568
Total	701	1,587	331	317	262	170	76	84	577

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.

Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.4 GOA Sablefish Fishery

Sablefish off Alaska are thought to belong to a single population. A combined GOA and BSAI assessment is based on an age-structured model. The GOA sablefish fishery is regulated under the GOA Groundfish FMP. The FMP controls the fishery through permits, an IFQ program, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. The sablefish TAC is allocated among gear types in the GOA management areas (80% of the Western and Central Area and 95% of the Eastern Area TAC to fixed gear; the remaining to trawl gear). Sablefish is on bycatch status year-round for trawl gear. An individual fishing quota (IFQ) program for the fixed gear fishery was implemented in 1995. The season runs from February 29-November 15, concurrent with the halibut IFQ fishery. State fisheries in Prince William Sound, Chatham Strait and Clarence Strait also land sablefish, outside the Federal IFQ program.

Sablefish is the highest valued groundfish resource in the GOA. Sablefish are taken mostly by longline gear in a directed fishery, and as bycatch by trawls. Table 6-22 summarizes the catch of sablefish, by gear type, from 1995 through 2003.

Table 6-22. Catch (mt) of Sablefish in the GOA by Gear, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	16,424	13,895	11,702	11,417	10,540	12,071	10,726	10,551	13,578
JIG	No data are available until 2003								
POT	0	58	1	0	5	5	8	24	0
TRW	2,207	2,023	1,563	1,359	1,683	1,703	1,391	1,909	1,818
Total	18,631	15,976	13,266	12,776	12,228	13,779	12,125	12,484	15,396

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.5 GOA Flatfish Fisheries

6.6.2.5.1 GOA Deep Water Flatfish Fishery

The deep water flatfish group is comprised of Dover sole, Greenland turbot, and deep-sea sole. Dover sole is the primary target species in this assemblage. In 1998, 51 trawlers accounted for nearly all GOA deep water flatfish landings. This fishery is severely constrained by halibut bycatch limits, with catches of generally less than 50% of ABC. In 1998, closures occurred on March 10, April 21, and October 1, to prevent exceeding quarterly halibut bycatch limits. The 2003 deep water flatfish and rex sole fisheries were closed on May 16, and October 15 to prevent exceeding the halibut bycatch limit.

In 1990, the Council divided the flatfish assemblage into 4 categories—“deep water flatfish,” “shallow water flatfish,” flathead sole, and arrowtooth flounder— because of a significant difference in halibut bycatch rates in these directed fisheries. Flathead sole was assigned a separate ABC in 1991, since it overlaps the depth distributions of the both shallow and deep water groups. In the 1996 triennial trawl survey rock sole was split into northern and southern rock sole. Due to overlapping distributions, differential harvesting of the species may occur, requiring separate management in the future. In 1998, trawling was prohibited in the Eastern GOA area, east of 140° W. longitude. The GOA Groundfish FMP controls the fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. Table 6-23 summarizes the catch of deep water flatfish, by gear type, from 1995 through 2003.

Table 6-23. Catch (mt) of Deep Water Flatfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	148	41	38	43	34	59	18	24	17
JIG	No data are available until 2003								0
POT	0	0	0	0	0	41	0	0	0
TRW	2,066	2,153	3,626	2,246	2,252	884	787	534	929
Total	2,214	2,194	3,664	2,289	2,286	984	805	558	946

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.5.2 GOA Rex Sole Fishery

In 1993, rex sole was split out of the deep water management category, because of concerns regarding the Pacific Ocean perch bycatch in this target fishery. In 1998, trawling was prohibited in the Eastern GOA management area, east of 140° W. longitude. The GOA Groundfish FMP controls the fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. The Central GOA area has produced the majority of flatfish catches, with most of the harvest on the continental shelf and slope east of Kodiak Island. Harvests have been constrained by halibut and crab bycatch limits. Table 6-24 summarizes the catch of rex sole, by gear type, from 1995 through 2003.

Table 6-24. Catch (mt) of Rex Sole in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	0	0	0	0	0	0	1	0	3
JIG	No data are available until 2003								0
POT	0	0	0	0	0	0	0	0	0
TRW	4,020	5,944	3,294	2,671	3,059	3,591	2,942	3,017	3,481
Total	4,020	5,944	3,294	2,671	3,059	3,591	2,943	3,017	3,484

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.5.3 GOA Shallow Water Flatfish Fishery

The shallow water flatfish group is primarily comprised of: northern rock sole, southern rock sole, yellowfin sole, starry flounder, butter sole, English sole, Alaska plaice, and sand sole. Rock sole, in the GOA, are most abundant in the Kodiak and Shumagin areas. Although yellowfin sole are only an incidentally caught species in the GOA, they are the second most abundant demersal fish (after pollock) in Cook Inlet, and are also found in Prince William Sound. The flatfish resource has been lightly to moderately harvested. The Central GOA area has produced the majority of flatfish catches, with most of the harvest on the continental shelf and slope east of Kodiak Island. Rock sole is the predominant target species in this assemblage.

The GOA Groundfish FMP controls the fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. In 1998, trawling was prohibited in the Eastern GOA area east of 140° W. longitude. The 2003 shallow-water flatfish fishery was closed on June 19, September 12, and October 15, due to the attainment of the halibut bycatch limit. Table 6-25 summarizes the catch of shallow water flatfish, by gear type, from 1995 through 2003.

Table 6-25. Catch (mt) of Shallow Water Flatfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	49	5	15	64	62	11	10	51	20
JIG			No data are available until 2003						0
POT	2	0	1	19	6	5	5	8	5
TRW	5,379	9,367	7,761	3,485	2,509	6,913	6,148	7,117	4,614
Total	5,430	9,372	7,777	3,568	2,577	6,929	6,163	7,176	4,639

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

GOA Flathead Sole Fishery

Flathead sole are distributed from northern California northward throughout Alaska. The GOA fishery is managed through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. Harvests have been constrained by halibut bycatch limits. Flathead sole was assigned a separate ABC from the deep water complex in 1991, since it overlaps the depth distributions of the both shallow and deep water groups. In 1998, trawling was prohibited in the GOA Eastern area east of 140° W. longitude. Table 6-26 summarizes the catch of flathead sole, by gear type, from 1995 through 2003.

Table 6-26. Catch (mt) of Flathead Sole in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	8	4	0	24	30	4	16	7	2
JIG			No data are available until 2003						0
POT	0	0	0	0	0	0	0	0	0
TRW	2,172	3,072	2,445	1,707	870	1,543	1,895	2,139	2,415
Total	2,180	3,076	2,445	1,731	900	1,547	1,911	2,146	2,417

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003

6.6.2.5.4 GOA Arrowtooth Flounder Fishery

Although arrowtooth flounder are currently the most abundant groundfish species in the Gulf of Alaska, they are presently of limited economic importance. Little to no effort is directed at catching this species, although commercial interest is growing. Arrowtooth are taken as incidental catch by trawl and longline gear.

Arrowtooth flounder were separated from the flatfish assemblage in 1990, and managed under a separate ABC, because of the species' present high abundance and low commercial value. The GOA Groundfish FMP controls the fishery through permits and limited entry, TACs, seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. Table 6-27 summarizes the catch of arrowtooth flounder, by gear type, from 1995 through 2003.

Table 6-27. Catch (mt) of Arrowtooth Flounder in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	1,567	623	632	707	1,310	1,308	858	624	341
JIG			No data are available until 2003						0
POT	10	5	4	1	22	11	4	6	2
TRW	16,851	21,896	15,682	12,296	14,877	22,934	19,101	20,602	29,516
Total	18,428	22,524	16,318	13,004	16,209	24,253	19,963	21,232	29,859

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.6 GOA Rockfish Fisheries

GOA Pacific Ocean Perch Fishery

Pacific Ocean perch are broadly distributed around the Northeast Pacific. For management purposes, the Gulf of Alaska stock is considered separate from those of the Eastern Bering Sea, Aleutian Islands, and British Columbia-California.

Pacific Ocean perch are at low relative abundance, and their harvest is constrained in some areas by halibut bycatch and overfishing concerns for other species taken as bycatch. A rebuilding plan was implemented in 1995, and the stock was considered rebuilt in 1997. Relatively strong recent year-classes appear to have contributed to increased abundance.

The GOA Groundfish FMP regulates this fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements in 1991, and observer monitoring. In 1991, Pacific Ocean perch and shortraker/rougheye rockfish were separated from the slope rockfish assemblage to prevent possible overfishing. A reduction in TACs, to promote stock rebuilding, was successful after 3 years. In 1998, trawling was prohibited east of 140° W. longitude.

The directed trawl fishery opens around July 1, depending on in-season management. Pacific Ocean perch are caught exclusively with trawl gear, and have been taken primarily by catcher processors in a directed fishery, although shore-based trawlers accounted for a significant amount of the catch in the Central area. Table 6-28 summarizes the catch of Pacific Ocean perch, by gear type, from 1995 through 2003.

Table 6-28. Catch (mt) of Pacific Ocean Perch in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	2	3	5	0	0	3	2	4	1
JIG	No data are available until 2003								0
POT	0	0	0	0	0	1	0	0	0
TRW	5,738	8,375	9,527	8,907	10,472	10,153	10,815	11,730	10,861
Total	5,740	8,378	9,532	8,907	10,472	10,157	10,817	11,734	10,862

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.6.1 GOA Shortraker/Rougheye Rockfish Fishery

As with most rockfish, shortraker and rougheye rockfish inhabit waters of the outer continental shelf and continental slope. Shortraker rockfish are consistently most abundant in the Yakutat area, and rougheye rockfish, except during a period 1992 through 1995, are most abundant in the Southeastern area. The GOA Groundfish FMP controls the fishery through permits and limited entry, catch quotas (TACs), seasons, inseason adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting requirements, and observer monitoring. Management actions include: (1) establishment of the management subgroups, which limited harvest of the more desired species, and (2) conservative in-season management practices in which fisheries have sometimes been closed, although substantial unharvested TAC remained. In 1998, trawling was prohibited in the GOA Eastern area east of 140° W. longitude.

Historically, bottom trawls have accounted for nearly all the reported commercial harvest. Since 1993, longline catches have ranged from 30% to 48% of the total Gulf-wide harvest of shortraker/rougheye in the directed fishery and as bycatch in the sablefish and halibut longline fisheries. The entire TAC is needed for bycatch in other directed hook-and-line fisheries. Shortraker rockfish have dominated the commercial catch of this subgroup, especially since 1993. Table 6-29 summarizes the catch of shortraker/rougheye rockfish by gear type from 1995 through 2003.

Table 6-29. Catch (mt) of Shortraker/Rougheye Rockfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	701	545	543	831	583	747	1,184	567	574
JIG			No data are available until 2003						0
POT	0	1	0	0	0	2	0	0	0
TRW	1,550	1,115	1,068	905	728	996	791	756	901
Total	2,251	1,661	1,611	1,736	1,311	1,745	1,975	1,323	1,475

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.6.2 GOA Northern Rockfish Fishery

As with most rockfish, northern rockfish are slow growing and long-lived. A declining stock trend and the estimated weakness of recent recruitment, identified by the age structured model, indicate that caution is warranted for management of this stock. The GOA Groundfish FMP regulates the fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, recordkeeping and reporting requirements, and observer monitoring. Management actions include: (1) establishment of the management subgroups, which limited harvest of the more desired species and (2) conservative in-season management practices in which fisheries have sometimes been closed, although substantial unharvested TAC remained. Northern rockfish were separated from the other slope rockfish assemblage in 1993. In 1998, trawling was prohibited in the GOA Eastern area east of 140° W. longitude.

Historically, bottom trawls have accounted for nearly all the commercial harvest. The trawl fishery opens around July 1, depending on in-season management. Table 6-30 summarizes the catch of northern rockfish, by gear type, from 1995 through 2003.

Table 6-30. Catch (mt) of Northern Rockfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	5	1	2	2	1	0	0	1	2
JIG			No data are available until 2003						0
POT	0	1	0	0	0	1	3	1	1
TRW	5,631	3,339	2,944	3,053	5,399	3,324	3,124	3,335	5,341
Total	5,636	3,341	2,946	3,055	5,400	3,325	3,127	3,337	5,344

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.6.3 GOA "Other Slope Rockfish" Fishery

At least 30 rockfish species of the genus *Sebastes* inhabit the Gulf. Since 1988, rockfish have been divided into 3 management assemblages based on their habitat and distribution: slope, pelagic shelf, and demersal shelf rockfish. Slope rockfish are those species that, as adults, inhabit waters of the outer continental shelf and continental slope in depths greater than 150-200 m. In 1991, the slope assemblage was divided into 3 management subgroups: Pacific Ocean perch, shortraker/rougheye rockfish, and all other species of slope rockfish. In 1993, a fourth management subgroup, northern rockfish, was created. These subgroups were established to protect from possible overfishing. Each is now assigned an individual TAC and is profiled separately. Harlequin, sharpchin, redstripe, and silvergrey rockfish are the predominant species caught in the commercial "other slope rockfish" fishery.

The GOA Groundfish FMP controls the fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, recordkeeping and reporting requirements, and observer monitoring. Management actions include: (1) establishment of the management subgroups in 1991, which limited harvest of the more valuable species, and (2) conservative in-season management practices in which fisheries have been closed at times although unharvested TAC remained. In 1998, trawling was prohibited east of 140° W. longitude. In 2001, a separate ABC was set for the West Yakutat area, since a small portion of the GOA Eastern ABC has been taken recently. The directed trawl fishery typically opens on July 1. Between half and 3 quarters of the catch has been discarded since 1993, after northern rockfish were separated out. Harlequin and sharpchin rockfish are small in size and of lower economic value, and there may be less incentive for fishermen to retain these species. Table 6-31 summarizes the catch of other slope rockfish, by gear type, from 1995 through 2003.

Table 6-31. Catch (mt) of Other Slope Rockfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	111	109	136	116	109	152	250	117	435
JIG	No data are available until 2003								15
POT	0	0	1	0	0	0	0	1	2
TRW	1,287	773	1,078	767	678	425	309	657	832
Total	1,398	882	1,215	883	787	577	559	775	1,284

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.6.4 GOA Pelagic Shelf Rockfish Fishery

The pelagic shelf rockfish (PSR) assemblage in the Gulf includes 3 species: dusky, widow, and yellowtail rockfish. This assemblage was separated from slope rockfish in 1988. PSR are defined as those species of *Sebastes* that inhabit waters of the continental shelf of the Gulf, and that typically exhibit a midwater, schooling behavior. Dusky rockfish were separated into "light" and "dark" varieties only in the 1996 and 1999 surveys. Gulfwide, light dusky rockfish is the most important species in the assemblage; dark dusky, widow, and yellowtail rockfish are minor species. Dusky and yellowtail rockfish may be a latent, under-utilized resource in nearshore waters of Southeastern Alaska.

The GOA Groundfish FMP regulates the fishery through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, recordkeeping and reporting requirements, and observer monitoring. Management actions include: (1) establishment of the slope, PSR, and demersal shelf rockfish management subgroups in 1988, which limited harvest of the more desired species, and (2) conservative in-season management practices in which fisheries have sometimes been closed, although substantial TAC remained unharvested. In 1997, black rockfish and blue rockfish were separated into a "nearshore" component of PSR and managed under a separate ABC and TAC in the GOA Central area, where a jig fishery for black rockfish occurs. In 1998, these two species were removed from the FMP, and are now managed by the State of Alaska. In 1998, trawling was prohibited in the GOA Eastern area east of 140° W. longitude.

The directed trawl fishery opens on or about July 1. During the period 1988 through 1995, almost all the PSR trawl catch (>95%) was taken by large, at-sea factory trawlers. Smaller shore-based trawlers began taking a sizeable portion of the catch in the GOA Central area in 1996 and 1997 for delivery to processing plants in Kodiak. Since 1991, PSR have also been harvested by jig and longline gear, mostly near Kodiak and along the south shore of the Kenai Peninsula. Table 6-32 summarizes the catch of pelagic shelf rockfish, by gear type, from 1995 through 2003.

Table 6-32. Catch (mt) of Pelagic Shelf Rockfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	549	462	355	111	40	28	26	32	21
JIG	No data are available until 2003								11
POT	2	0	1	0	2	8	3	2	6
TRW	2,341	1,833	2,273	3,000	4,620	3,695	2,978	3,287	3,011
Total	2,892	2,295	2,629	3,111	4,662	3,731	3,007	3,321	3,049

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.6.5 GOA Demersal Shelf Rockfish Fishery

The demersal shelf rockfishes (DSR) assemblage is comprised of seven species of shallow, nearshore, bottom-dwelling rockfishes: canary rockfish, China rockfish, copper rockfish, quillback rockfish, rosethorn rockfish, tiger rockfish, and yelloweye rockfish. Yelloweye and quillback rockfish account for 90% and 8% of all DSR landings, respectively.

Prior to 1987, this complex was grouped with the "other rockfish" complex in the GOA Groundfish FMP. In 1987, the complex was split into 3 components for management purposes in the eastern Gulf. The DSR assemblage was recognized as an FMP assemblage only east of 137° W. longitude. In 1992, DSR was recognized in East Yakutat and management of DSR extended westward to 140° W. longitude (Southeast Outside). Southeast Outside is comprised of 4 management areas, and DSR are managed jointly by the State of Alaska (ADF&G) and NMFS. Two internal State water subdistricts are managed entirely by ADF&G and are not included in this stock assessment. The GOA Groundfish FMP controls the fishery through permits, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, recordkeeping and reporting requirements, and observer monitoring. DSR were excluded from the Council license limitation program, since the State has initiated an analysis for a separate DSR license limitation program. In 1998, trawling was prohibited in the GOA Eastern area, east of 140° W. longitude.

A directed longline fishery occurs in the Southeast Outside District and the internal waters of Southeast Alaska. Much of the catch occurs as bycatch in the halibut longline fishery. DSR may only be taken in directed fisheries by longline gear; trawl fisheries are limited to bycatch only. Table 6-33 summarizes the catch of demersal shelf rockfish, by gear type, from 1995 through 2003.

Table 6-33. Catch (mt) of Demersal Shelf Rockfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	219	468	403	347	297	286	302	245	273
JIG	No data are available until 2003								25
POT	0	0	0	0	0	0	0	0	0
TRW	0	0	3	0	0	0	0	0	0
Total	219	468	406	347	297	286	302	245	298

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.6.6 GOA Thornyhead Rockfish Fishery

The thornyhead rockfish assemblage consists of two species: shortspine and longspine thornyheads. They inhabit the outer shelf and slope region throughout the northeastern Pacific and Bering Sea. Thornyheads in the GOA have been managed as a single stock since 1980.

The GOA Groundfish FMP controls the fishery through permits and limited entry, catch quotas, seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping and reporting, and observer monitoring. In 1998, trawling was prohibited in the GOA Eastern area east of 140° W. longitude. The TAC is reserved for bycatch in other directed fisheries.

Thornyheads are commonly taken as bycatch by bottom trawl and longline gear. They are one of the most valuable rockfish species, with most of the domestic harvest exported to Japan. The greatest foreign-reported harvest activities for thornyheads in the Gulf occurred during the period 1979 through 1983. In 1985, the U.S. catch surpassed the foreign catch for the first time. U.S. catches peaked in 1989 with a total removal of 3,080 mt. The directed fishery for sablefish harvested the largest amount of thornyheads in 1994-1995, followed by the directed rockfish, rex sole, and "other flatfish" fisheries. Table 6-34 summarizes the catch of thornyhead rockfish, by gear type, from 1995 through 2003.

Table 6-34. Catch (mt) of Thornyhead Rockfish in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	478	525	457	681	488	645	805	549	405
JIG	No data are available until 2003								1
POT	0	1	0	0	0	13	2	0	0
TRW	635	606	784	737	794	649	532	589	797
Total	1,113	1,132	1,241	1,418	1,282	1,307	1,339	1,138	1,203

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003.

6.6.2.7 GOA "Other Groundfish" Fishery

Other groundfish species in the GOA have been managed as a group through 2003, and are caught incidentally to other target fisheries. In 2004, Amendment 63 to the FMP removed skates from the "other species" group and sets separate ABC, OFLs, and TACs for all skates in the Western and Eastern Gulf, as well as for all but big and longnose skates in the Central Gulf. In the Central Gulf, a separate species group for "big and longnose skates" is created in addition to the general "skates" species group. The "big and longnose skates" group in the Central Gulf has a separate ABC and TAC, but is included in the gulfwide OFL for all skates. Skates have historically comprised, on average, at least two-thirds of the catch of "other groundfish." Table 6-35 summarizes the catch of "other groundfish", by gear type, from 1995 through 2003.

Table 6-35. Catch (mt) of "Other Groundfish" in the GOA by Gear Type, 1995-2003

Gear	1995	1996	1997	1998	1999	2000	2001	2002	2003
HAL	1,075	873	900	1,278	1,509	2,522	1,579	1,199	2,741
JIG	No data are available until 2003								0
POT	163	181	336	270	253	376	187	272	419
TRW	2,194	3,424	4,173	2,233	2,096	2,751	3,035	2,569	3,169
Total	3,432	4,478	5,409	3,781	3,858	5,649	4,801	4,040	6,329

Source: NOAA Fisheries Alaska Region Web site at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm.
Note: Except for the Pacific cod fishery, catch data do not separate jig gear from HAL gear until 2003,unless otherwise indicated.

6.6.3 Description of Groundfish Fishery Sectors

The various regulatory alternatives considered could potentially affect a broad array of groundfish fishing vessels. Many of the vessels harvest a combination of fishery resources during their annual or seasonal fishing activities, and therefore the descriptions include harvest of groundfish and non-groundfish harvested off Alaska. Section 6.6.3.1 describes various classes of groundfish catcher vessels that could potentially be affected by the regulatory alternatives considered, while Section 6.6.3.2 describes various classes of groundfish catcher processors that could potentially be affected.

This analysis does not include a description of shoreside and stationary floating processors, because it is unlikely that these facilities will be affected by the proposed action. Most shoreside processors receive and process a wide variety of both groundfish and non-groundfish species. The most notable exceptions are the large Bering Sea surimi/fillet processors, which depend largely on the Bering Sea pollock fishery—a fishery that would not be directly affected by any of the HAPC designation alternatives being considered by the Council.[2] This diversity, in combination with the large fleets that supply these facilities and the large volume of fish that is delivered, make it highly improbable that the potential reduction in the amount of fish delivered to these facilities as a result of the HAPC designation alternatives would have any effect on the economic performance of any inshore stationary floating, onshore, or mothership processor.

To enhance the presentation of vessel ownership information and the linkages between harvesting operations and coastal communities, seven geographic regions are also defined (Table 6-36). Section 6.6.4 provides additional details on the socioeconomic relationship between the fishing industry and communities and regions in Alaska, Washington, and Oregon.

Table 6-36. Geographic Regions

Region Abbreviation	Description
AKAPAI	Alaska Peninsula and Aleutian Islands Region. Includes the Aleutians East Borough and the Aleutians West Census Area.
AKKO	Kodiak Region. Includes the Kodiak Island Borough and other parts of the Kodiak archipelago.
AKSC	Southcentral Alaska Region. Includes Valdez-Cordova Census Area, Kenai Peninsula Borough, Matanuska-Susitna Borough, and Municipality of Anchorage.
AKSE	Southeast Alaska Region. Includes Yakutat Borough, Skagway-Hoonah-Angoon Borough, Haines Borough, City and Borough of Juneau, City and Borough of Sitka, Wrangell-Petersburg Census Area, Prince of Wales-Outer Ketchikan Census Area, and Ketchikan Gateway Borough.
WAIW	Washington Inland Waters Region. All counties bordering Puget Sound and the Strait of Juan de Fuca, including Clallum, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston, and Whatcom.
ORCO	Oregon Coast Region. Counties bordering the northern Oregon coast including Lincoln, Tillamook, and Clatsop.
Other	All other communities in Alaska, Washington, Oregon, and the remaining States.

The description of the vessel classes summarizes catch and ex-vessel revenue information provided by NOAA Fisheries Alaska Fisheries Science Center and NOAA Fisheries Alaska Region. The catch information for catcher vessels is based on ADF&G fish ticket data compiled by the NOAA Fisheries Alaska Fisheries Science Center. The catch information for catcher processors is based on data from the NOAA Fisheries Alaska Region's "blend" system and, after 2002, Groundfish Catch Accounting System (CAS). Fish ticket data may not include all groundfish deliveries made to at-sea processors. Information regarding at-sea deliveries is fully accounted for in the blend and CAS data at the processor level, but data on catches by specific catcher vessels are unavailable.

[2] The most notable exceptions are the large Bering Sea surimi/fillet processors, which depend largely on the Bering Sea pollock fishery—a fishery that, because it is prosecuted exclusively with pelagic trawls, and has historically had an extremely low catch rate of any species other than targeted pollock, should not be directly affected by any of the HAPC designation alternatives being considered by the Council.

The description of the vessel classes also provides revenue information. Revenue information for catcher vessels is taken directly from fish tickets and reflects the payments made to vessels by processors for raw (unprocessed) fish (i.e., ex-vessel value). Because the fish landed by catcher processors is processed, wholesale product value recorded in the ADF&G Commercial Operators Annual Report is used to report the revenues of catcher processors.

The analysis of the economic impacts of the regulatory alternatives considered is presented in terms of changes in wholesale revenue for both catcher vessels and catcher processors. For catcher vessels, the wholesale revenue is calculated using the wholesale product value reported by shoreside processors.

In order to provide a more concise description of the groundfish catch and revenue of harvesting vessels, the vessel descriptions aggregate catches of rockfish into a single group. Similarly, catches of flatfish species are also aggregated (Table 6-37). The vessel descriptions also provide information on non-groundfish catches off Alaska using major non-groundfish species groups.

Table 6-37. Species Groups

Species Group Abbreviation	Species Group Name	Species Included
		Groundfish Species Groups
GFISH	Groundfish	All groundfish managed by the NPFMC
AMCK	Atka Mackerel	Atka Mackerel
FLAT	Flatfish	BSAI flatfish species (yellowfin sole, Greenland turbot, Alaska plaice, arrowtooth flounder, flathead sole, rock sole, other flatfish), and GOA flatfish species (deep water flatfish, rex sole, shallow water flatfish, flathead sole, arrowtooth flounder)
OGRN	Other Groundfish	Squid, skates, and species included in “other groundfish”
PLCK	Pollock	Pollock
PCOD	Pacific Cod	Pacific Cod
ROCK	Rockfish	BSAI rockfish species (Pacific Ocean perch, shortraker/rougheye rockfish, northern rockfish, other rockfish), and GOA rockfish species (Pacific Ocean perch, shortraker/rougheye rockfish, northern rockfish, other slope rockfish, pelagic shelf rockfish, demersal shelf rockfish, and thornyhead rockfish)
SABL	Sablefish	Sablefish
		Non-Groundfish Species Groups
AI CRAB	Aleutian Islands Crab	Golden king crab, red king crab, *C. opilio* tanner crab harvested in the Aleutian Islands
OTH CRAB	Other Crab	King crab, *C. opilio* tanner crab, and dungeness crab harvested outside the Aleutian Islands, included those harvested in state-managed fisheries
HLBT	Halibut	Pacific halibut
OTH SPC	Other Species	Finfish and shellfish not included in any other group, including herring, shrimp, lingcod, tomcod, clams, etc.
SALM	Salmon	All salmon species, including coho, chum, king, pink and sockeye salmon
SCAL	Scallops	Weathervane scallops

6.6.3.1 Groundfish Catcher Vessels

This section describes nine classes of groundfish catcher vessels—5 trawl classes and 4 fixed gear classes—as defined in Table 6-38. These vessel classes are primarily defined by their fishing activities in a given year, type of fishing gear used, and vessel length, although the AFA-eligible catcher vessels are also defined by statute. The vessel classes are described in more detail in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc., 2001) and are used to describe the groundfish fishing fleets in the *Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement* (NMFS 2004a).

The descriptions of specific groundfish catcher vessel classes follow a standard format for ease of comparison. Groundfish fishing activities are described in terms of the number of participating vessels, their catch, and their ex-vessel value by species for the years 1995-2003. In addition, the relative importance of Alaska groundfish and non-groundfish fisheries is discussed. A brief description of typical crew complements on the vessels is provided, together with an overview of the regional locations of the companies or individuals who registered the vessels. The primary source of vessel ownership information used in this analysis is the Commercial Fishing Entry Commission (CFEC) Vessel Registration Database. It is likely that the economic impacts of the proposed regulation on communities will be concentrated in the vessel owners' communities of residence. Tables showing the communities in which vessel owners reside can be found in Appendix A.

Table 6-38. Groundfish Catcher Vessel Classes

Vessel Class	Abbreviation	Description
Bering Sea Pollock Trawl Catcher Vessels ≥ 125 Feet in Length	TCV BSP ≥ 125	Includes all vessels for which trawl catch accounts for more than 15% of total catch value, value of Bering Sea pollock catch is greater than value of catch of all other species combined, vessel length is greater than or equal to 125 ft., and total value of groundfish catch is greater than $5,000. All of these vessels fishing after 1998 are AFA-eligible.
Bering Sea Pollock Trawl Catcher Vessels 60 to 124 Feet in Length	TCV BSP 60-124	Includes all vessels for which trawl catch accounts for more than 15% of total catch value, value of Bering Sea pollock catch is greater than value of catch of all other species combined, vessel length is 60 ft. to 124 ft., and total value of groundfish catch is greater than $5000. All of these vessels fishing after 1998 are AFA-eligible.
Diversified AFA-Eligible Trawl Catcher Vessels	TCV Div. AFA	Includes all vessels that are AFA-eligible for which trawl catch accounts for more than 15% of total catch value, value of Bering Sea pollock catch is less than value of catch of all other species combined, vessel length is greater than or equal to 60 ft., and total value of groundfish catch is greater than $5,000.
Non-AFA Trawl Catcher Vessels	TCV Non-AFA	Includes all vessels that are not AFA-eligible for which trawl catch accounts for more than 15% of total catch value, value of Bering Sea pollock catch is less than value of catch of all other species combined, vessel length is greater than or equal to 60 ft., and total value of groundfish catch is greater than $5,000.
Trawl Catcher Vessels < 60 Feet in Length	TCV < 60	Includes all vessels for which trawl catch accounts for more than 15% of total catch value, vessel length is less than 60 ft., and total value of groundfish catch is greater than $2,500.
Pot Catcher Vessels	PCV	Includes all vessels that are not trawl CVs for which value of pot catch is greater than15% of total catch value, vessel length is greater than or equal to 60 ft., and total value of groundfish catch is greater than $5,000.
Longline Catcher Vessels	LCV	Includes all vessels that are not trawl CVs or pot CVs for which vessel length is greater than or equal to 60 ft. and total value of groundfish catch is greater than $2,000, excluding halibut and state water sablefish.
Fixed Gear Catcher Vessels 33 Feet to 59 Feet in Length	FGCV 33-59	Includes all vessels that are not trawl CVs for which vessel length is 33 to 59 ft., and total value of groundfish catch is greater than $2,000.
Fixed Gear Catcher Vessels ≤32 Feet in	FGCV ≤ 32	Includes all vessels that are not trawl CVs for which vessel length is less than or equal to 32 ft., and total value of groundfish catch is greater than $1,000.

Length

Table 6-39 provides a summary of the estimated retained catch of the groundfish catcher vessel classes based on fish ticket data. Groundfish catches of vessels that did not target groundfish are not included in this table. Detailed catch and revenue information for each vessel class are provided in the descriptions that follow. Information on the geographical distribution of the catch of major target species for each of the groundfish vessel classes for the years 1997-1998 can be found in Sector and Regional Profiles of the North Pacific Groundfish Fisheries 2001 (Northern Economics, Inc. and EDAW, Inc. 2001).

Table 6-39. Catch and Ex-Vessel Revenue of Groundfish Catcher Vessels by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Vessel Class	Retained Catch (1,000 mts)								
TCV BSP ≥ 125	277.11	247.04	271.54	258.67	280.39	294.72	332.33	354.48	364.84
TCV BSP 60-124	227.60	207.69	183.36	158.83	164.80	210.80	280.64	308.79	291.77
TCV Div. AFA	39.75	48.65	61.97	105.29	91.26	80.71	37.64	39.80	57.41
TCV Non-AFA	36.82	40.35	46.38	55.79	50.32	48.80	50.14	42.69	49.11
TCV < 60	19.54	32.90	37.12	37.59	30.79	27.21	35.29	24.33	21.07
PCV	23.38	30.27	23.57	16.71	21.96	30.69	16.47	17.15	24.24
LCV	11.20	9.91	18.12	9.81	5.53	5.06	5.51	7.26	7.44
FGCV 33-59	21.97	21.38	25.34	25.85	26.78	25.47	23.15	26.61	27.81
FGCV ≤ 32	0.70	0.73	1.18	1.14	1.52	1.31	1.81	1.74	2.54
All Groundfish CVs	658.08	638.92	668.56	669.68	673.34	724.78	782.97	822.84	846.23
	Ex-Vessel Revenue ($ Millions)								
TCV BSP ≥ 125	60.62	46.17	61.59	38.31	60.38	75.89	74.46	80.93	72.51
TCV BSP 60-124	52.08	41.62	43.07	25.23	36.50	56.87	66.33	72.60	60.47
TCV Div. AFA	11.54	13.20	18.89	20.53	28.40	28.40	11.20	11.78	17.99
TCV Non-AFA	12.52	12.70	14.90	11.82	16.72	17.28	16.98	11.77	15.02
TCV < 60	7.84	11.39	13.40	10.01	12.88	14.26	12.63	8.90	8.81
PCV	12.50	14.11	11.94	7.94	15.38	23.27	10.34	9.96	18.16
LCV	39.17	31.84	39.73	18.71	18.25	21.77	18.82	18.92	24.46
FGCV 33-59	49.87	46.45	51.11	35.94	42.86	54.59	43.37	46.05	54.05
FGCV ≤ 32	0.97	1.01	0.78	0.68	1.19	1.45	1.36	1.54	1.80
All Groundfish CVs	247.11	218.48	255.41	169.16	232.57	293.79	255.50	262.44	273.27

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all groundfish deliveries made to at-sea processors.

6.6.3.1.1 Bering Sea Pollock Trawl Catcher Vessels ≥ 125 Feet (TCV BSP ≥ 125)

These large vessels are AFA-eligible and rely almost exclusively on pollock harvested in the Bering Sea. In recent years this FMP subarea accounted for more than 98% of the total ex-vessel value of the groundfish landed by this vessel class. Nearly all of the catch of the vessels in this class is delivered to Bering Sea pollock shoreside processors. Table 6-40 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data.

Table 6-40. Participation, Catch, and Ex-vessel Revenue of Bering Sea Pollock Trawl Catcher Vessels ≥ 125 Feet by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	13	10	5	11	9	16	15	15	19
FLAT	26	26	30	28	30	28	25	20	25
OGRN	24	20	27	26	29	28	23	19	25
PCOD	27	26	30	28	30	28	26	25	25
PLCK	29	27	31	28	30	28	26	25	25
ROCK	22	22	24	27	30	18	19	20	25
SABL	18	3	5	9	2	0	12	16	14
Total	29	27	31	28	30	28	26	25	25
					Retained Catch Excluding PSC (mt)				
AMCK	110.70	12.39	0.27	0.96	66.94	0.03	4.96	59.15	286.80
FLAT	5,849.62	3,544.88	15,364.08	682.02	1,873.96	1,892.25	676.14	556.20	625.73
OGRN	101.66	319.71	533.33	311.36	183.33	90.10	709.16	383.80	327.48
PCOD	12,566.90	11,873.59	14,236.06	8,057.92	8,096.89	8,385.66	2,722.95	5,122.39	6,819.30
PLCK	258,267.49	231,179.00	241,093.46	249,134.80	270,108.23	284,353.71	328,161.06	348,233.46	356,673.13
ROCK	155.25	106.53	317.47	482.16	59.33	0.31	52.35	114.26	101.74
SABL	59.22	a	0.14	0.99	a	0.00	5.02	10.81	6.43
Total	277,110.84	247,036.09	271,544.81	258,670.22	280,388.68	294,722.06	332,331.65	354,480.06	364,840.61
					Ex-Vessel Revenue ($)				
AMCK	3,661	683	9	33	3,582	1	164	1,956	8,921
FLAT	924,967	381,786	1,535,045	24,499	185,267	157,126	23,376	18,561	20,746
OGRN	15,116	24,917	20,205	29,800	18,628	2,679	32,871	12,150	31,186
PCOD	4,003,378	3,607,863	4,979,923	2,287,201	3,948,998	5,056,994	1,328,600	2,090,717	3,439,502
PLCK	55,384,183	42,147,216	55,039,655	35,925,645	56,208,664	70,672,814	73,070,423	78,774,259	68,995,500
ROCK	53,123	5,691	16,900	43,997	18,854	9	2,106	12,569	8,256
SABL	234,137	A	11	85	a	0	1,924	21,825	8,960
Total	60,618,565	46,168,157	61,591,748	38,311,259	60,383,993	75,889,624	74,459,465	80,932,038	72,513,072

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all groundfish deliveries made to at-sea processors. To maintain data confidentiality, cells shown with an “a” have been added to ROCK.

Table 6-41 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. The only non-groundfish fisheries of any consequence are the ”other” crab fisheries. Some of these vessels also participate in the summer Pacific whiting fishery off the coasts of Oregon and Washington.

Table 6-41. Participation, Catch, and Ex-vessel Revenue in Groundfish and Non-Groundfish Fisheries of Bering Sea Pollock Trawl Catcher Vessels ≥ 125 Feet, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	29	27	31	28	30	28	26	25	25
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	9	1	10	8	10	4	6	6	6
HLBT	0	0	0	0	0	0	0	0	NA
OTH SPC	5	7	7	14	22	22	20	10	21
SALM	0	0	0	0	1	0	0	1	0
SCAL	0	0	0	0	0	0	0	0	0
Total	29	27	31	28	30	28	26	25	25
					Retained Catch Excluding PSC (mt)				
GFISH	277,110.84	247,036.09	271,544.81	258,670.22	280,388.68	294,722.06	332,331.65	354,480.06	364,840.61
AI CRAB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTH CRAB	416.07	a	482.54	1,010.36	1,241.18	158.45	165.19	170.22	250.80
HLBT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
OTH SPC	4.35	33.85	5.85	1.40	9.78	12.19	6.65	1.09	5.91
SALM	0.00	0.00	0.00	0.00	a	0.00	0.00	a	0.00
SCAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	277,531.25	247,069.94	272,033.20	259,681.99	281,639.64	294,892.70	332,503.49	354,651.37	365,097.32
					Ex-Vessel Revenue ($)				
GFISH	60,618,565	46,168,157	61,591,748	38,311,259	60,383,993	75,889,624	74,459,465	80,932,038	72,513,072
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	2,201,343	a	1,713,811	2,322,007	4,873,142	1,055,154	1,194,520	1,630,742	2,186,298
HLBT	0	0	0	0	0	0	0	0	NA
OTH SPC	1,040	262,517	887	48	2,650	449	248	167	200
SALM	0	0	0	0	a	0	0	a	0
SCAL	0	0	0	0	0	0	0	0	0
Total	62,820,948	46,430,674	63,306,447	40,633,314	65,259,785	76,945,227	75,654,233	82,562,947	74,699,569

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all groundfish deliveries made to at-sea processors. To maintain data confidentiality, cells shown with an "a" have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 were unavailable (NA).

Normally, a vessel in the TCV BSP ≥ 125 class carries 4 to 5 crewmembers (including the skipper) when fishing for pollock and other groundfish. In addition to the fishing crew, one or more people must be responsible for accounting, correspondence, record keeping, and other business requirements. The vessel owner may fill this role or hire a person or firm to complete these tasks.

Table 6-42 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A.

Table 6-42. Count of Bering Sea Pollock Trawl Catcher Vessels ≥ 125' by Region of Residence of Vessel Owners, 95-03

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	0	0	0	0	0	0	0	0
AKKO	0	0	0	0	0	0	0	0	0
AKSC	0	0	0	0	0	0	0	0	0
AKSE	0	0	0	0	0	0	0	0	0
WAIW	25	26	30	27	29	27	25	24	24
ORCO	0	0	0	0	0	0	0	0	0
Other	1	1	1	1	1	1	1	1	1
Total	26	27	31	28	30	28	26	25	25

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.2 Bering Sea Pollock Trawl Catcher Vessels 60 – 124 Feet (TCV BSP 60-124)

These large- or medium-sized vessels are AFA-eligible and rely almost exclusively on pollock harvested in the Bering Sea. Vessels in this class are similar to vessels in the TCV BSP ≥ 125 class. The key difference is that, because of their relatively small fish-hold sizes, many of the vessels in the TCV BSP 60-124 class cannot carry enough pollock to make deliveries to shoreside processors cost-effective. Therefore, many of these vessels deliver their catch to motherships or catcher processors. In 2000, over 42% of the total value of deliveries made by the TCV BSP 60-124 class was generated by at-sea deliveries. Table 6-43 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data. Until recently, reporting of at-sea deliveries on fish tickets was voluntary. Thus, data in the table, particularly for pollock, may be incomplete.

Table 6-43. Participation, Catch, and Ex-vessel Revenue of BS Pollock Trawl CVs 60 – 124' by Groundfish Species, 95-03

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	7	18	6	13	10	14	13	33	37
FLAT	41	36	35	30	31	34	45	42	43
OGRN	33	33	32	28	30	34	45	44	43
PCOD	44	39	39	33	32	34	50	46	43
PLCK	44	40	40	33	33	34	50	46	43
ROCK	30	30	25	28	22	19	32	40	40
SABL	26	13	11	15	7	6	27	36	31
Total	44	40	40	33	33	34	50	46	43
					Retained Catch Excluding PSC (mt)				
AMCK	4.02	40.07	0.43	15.53	20.70	0.03	0.65	125.09	124.30
FLAT	8,097.61	4,422.73	3,832.49	1,200.16	441.74	1,856.16	1,631.30	2,030.83	1,246.33
OGRN	120.98	197.19	136.97	242.99	27.48	80.73	514.69	335.49	290.83
PCOD	25,510.55	24,440.28	23,728.02	13,381.49	8,750.39	13,927.23	10,197.39	14,435.16	11,917.28
PLCK	193,549.27	177,418.08	155,277.78	143,350.38	155,374.90	194,531.02	266,474.95	288,412.35	275,794.51
ROCK	183.01	1,013.45	329.67	597.21	171.92	389.89	1,701.29	3,267.38	2,253.09
SABL	129.73	154.22	51.30	45.60	9.60	17.03	115.32	187.40	139.58
Total	227,595.16	207,686.02	183,356.65	158,833.36	164,796.73	210,802.08	280,635.59	308,793.69	291,765.92
					Ex-Vessel Revenue ($)				
AMCK	133	2,198	14	515	889	1	27	4,137	3,893
FLAT	1,446,650	770,289	518,505	124,428	20,902	187,882	194,022	314,663	113,441
OGRN	9,889	29,242	7,231	22,578	1,434	13,161	20,447	24,951	25,890
PCOD	9,059,266	7,988,651	8,184,843	4,107,244	4,359,543	8,800,362	5,385,622	6,245,786	6,627,233
PLCK	40,964,152	32,055,607	34,041,462	20,764,270	32,059,087	47,760,705	60,205,915	65,079,379	52,933,188
ROCK	60,639	177,356	111,730	88,754	28,521	54,459	192,087	356,797	325,268
SABL	539,362	593,163	210,078	117,831	30,830	53,903	336,848	569,593	438,108
Total	52,080,091	41,616,505	43,073,864	25,225,620	36,501,206	56,870,473	66,334,968	72,595,305	60,467,022

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all deliveries made to at-sea processors.

Table 6-44 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. While there has been some level of participation in non-groundfish fisheries, groundfish is the dominant source of catch and revenue.

Table 6-44. Participation, Catch, and Ex-vessel Revenue in Groundfish and Non-Groundfish Fisheries of Bering Sea Pollock Trawl Catcher Vessels 60 – 124 Feet, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	44	40	40	33	33	34	50	46	43
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	15	8	24	22	22	15	23	22	21
HLBT	3	2	1	1	1	1	3	4	NA
OTH SPC	10	13	13	11	19	28	40	35	41
SALM	2	0	1	1	0	0	0	0	0
SCAL	0	0	0	0	0	0	0	0	0
Total	44	40	40	33	33	34	50	46	43
					Retained Catch Excluding PSC (mt)				
GFISH	227,595.16	207,686.02	183,356.65	158,833.36	164,796.73	210,802.08	280,635.59	308,793.69	291,765.92
AI CRAB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTH CRAB	599.60	175.04	530.01	987.85	1,645.20	388.61	357.24	297.49	444.70
HLBT	a	a	a	a	a	a	a	108.67	NA
OTH SPC	81.92	63.30	28.56	4.55	13.54	21.13	169.80	260.28	52.50
SALM	a	0.00	a	a	0.00	0.00	0.00	0.00	0.00
SCAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	228,276.68	207,924.36	183,915.21	159,825.76	166,455.47	211,211.83	281,162.63	309,460.13	292,263.12
					Ex-Vessel Revenue ($)				
GFISH	52,080,091	41,616,505	43,073,864	25,225,620	36,501,206	56,870,473	66,334,968	72,595,305	60,467,022
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	3,233,783	1,320,974	2,856,512	3,342,554	7,384,103	2,632,782	2,640,727	3,418,754	4,421,370
HLBT	a	a	a	a	a	a	a	531,593	NA
OTH SPC	260,557	273,264	115,102	796	40,290	36,876	487,918	26,663	1,787
SALM	a	0	a	a	0	0	0	0	0
SCAL	0	0	0	0	0	0	0	0	0
Total	55,574,431	43,210,743	46,045,478	28,568,970	43,925,599	59,540,131	69,463,613	76,572,315	64,890,179

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all groundfish deliveries made to at-sea processors. To maintain data confidentiality, cells shown with an "a" have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 are not yet available at the sector level.

4- to 5-person crews, including the skipper, are typical on vessels in the TCV BSP 60-124 class, although it is likely that the AFA has resulted in a reduction in crew size for some vessels. Table 6-45 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A. In 2001, vessels registered by individuals or companies in the Washington Inland Waters Region accounted for about 67% of the class, and Oregon Coast Region residents or companies registered about 22% of the fleet. In recent years, a few vessels have been registered by individuals or companies in Kodiak.

Table 6-45. Count of Bering Sea Pollock Trawl Catcher Vessels 60 – 124 Feet by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	0	0	0	0	0	0	0	0
AKKO	4	2	1	0	0	0	3	4	3
AKSC	1	0	0	0	0	0	0	1	0
AKSE	0	0	0	0	0	0	0	0	0
WAIW	32	31	32	32	29	26	31	26	28
ORCO	10	12	9	3	4	6	13	12	9
Other	2	2	1	1	1	2	3	3	3
Total	49	47	43	36	34	34	50	46	43

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.3 Diversified Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length (TCV Div. AFA)

These are medium-sized vessels that are AFA-eligible but also participate significantly in fisheries other than the Bering Sea pollock fishery. The number of vessels varied between 19 and 34 during the 1992 through 2001 period. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 93% of all ex-vessel value generated by the class came from groundfish fisheries. In addition to Bering Sea pollock, vessels in the TCV Div. AFA class have significant participation in the GOA pollock fisheries and the Pacific cod fisheries in both the BSAI and GOA. Some vessels in the class also participate in the Pacific whiting fishery off the coasts of Oregon and Washington. In recent years, GOA fisheries were more important for this class than BSAI fisheries in terms of ex-vessel value of groundfish retained. Table 6-46 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data. Until recently, reporting of at-sea deliveries on fish tickets was voluntary. Thus, data in the table, particularly for pollock, may be incomplete.

Table 6-46. Participation, Catch, and Ex-vessel Revenue of Diversified Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	3	3	0	9	3	9	1	8	17
FLAT	20	23	28	37	36	33	18	20	26
OGRN	12	16	25	30	34	26	14	17	24
PCOD	26	34	33	43	40	38	20	20	26
PLCK	24	29	31	43	39	39	20	20	26
ROCK	10	17	18	31	31	23	15	10	17
SABL	8	10	14	25	20	19	11	6	16
Total	26	34	33	43	40	39	20	20	26
					Retained Catch Excluding PSC (mt)				
AMCK	a	a		0.57	a	1.35	a	0.79	19.66
FLAT	1,813.50	2,125.53	4,625.39	2,772.92	2,033.22	3,061.40	1,855.77	323.70	826.86
OGRN	57.81	87.34	353.58	144.23	52.55	307.51	282.17	34.87	401.59
PCOD	15,232.94	20,465.31	23,392.18	26,442.78	26,051.57	19,571.37	7,953.87	15,202.22	21,330.23
PLCK	22,480.59	24,602.96	31,452.07	73,485.99	59,908.68	54,103.42	26,209.28	23,687.40	32,995.78
ROCK	87.79	1,165.38	1,901.51	2,241.53	2,995.99	3,463.30	1,283.08	521.90	1,737.03
SABL	81.81	206.98	240.65	202.41	221.03	203.32	57.71	26.76	97.27
Total	39,754.45	48,653.50	61,965.38	105,290.44	91,263.04	80,711.68	37,641.89	39,797.64	57,408.42
					Ex-Vessel Revenue ($)				
AMCK	a	a		19	a	42	a	26	494
FLAT	572,556	649,683	1,287,905	620,591	375,002	694,264	354,251	29,826	120,153
OGRN	12,171	16,122	67,496	8,965	3,860	32,801	15,431	1,531	77,512
PCOD	5,859,865	6,899,735	9,002,440	8,730,160	14,148,796	12,904,795	4,334,291	6,681,467	11,540,496
PLCK	4,702,011	4,603,368	7,270,699	10,317,049	12,642,479	13,626,909	6,190,381	4,928,557	5,683,902
ROCK	52,055	239,770	312,350	367,835	539,122	496,799	145,071	58,899	249,593
SABL	342,582	788,157	945,211	482,685	687,628	646,238	158,920	83,087	314,542
Total	11,541,240	13,196,834	18,886,103	20,527,304	28,396,887	28,401,848	11,198,346	11,783,393	17,986,691

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all groundfish deliveries made to at-sea processors. To maintain data confidentiality, cells shown with an “a” have been added to OGRN.

Table 6-47 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. While groundfish is clearly the dominant fishery for these vessels, crab fisheries outside of the Aleutian Islands have also been important.

Table 6-47. Participation, Catch, and Ex-vessel Revenue of Diversified Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length in Groundfish and Non-Groundfish Fisheries, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	26	34	33	43	40	39	20	20	26
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	4	2	7	10	7	10	8	11	5
HLBT	2	3	5	7	4	4	1	1	NA
OTH SPC	1	0	2	16	23	22	11	6	16
SALM	0	0	0	2	0	0	1	0	0
SCAL	0	0	0	0	0	0	0	0	0
Total	26	34	33	43	40	39	20	20	26
					Retained Catch Excluding PSC (mt)				
GFISH	39,754.45	48,653.50	61,965.38	105,290.44	91,263.04	80,711.68	37,641.89	39,797.64	57,408.42
AI CRAB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTH CRAB	a	a	97.90	312.32	246.79	201.32	69.32	172.45	95.68
HLBT	a	a	a	213.05	105.48	101.73	a	a	NA
OTH SPC	262.30	298.82	87.28	8.29	133.31	18.28	50.12	33.97	21.69
SALM	0.00	0.00	0.00	a	0.00	0.00	a	0.00	0.00
SCAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	40,016.74	48,952.32	62,150.56	105,824.11	91,748.61	81,033.01	37,761.33	40,004.07	57,525.80
					Ex-Vessel Revenue ($)				
GFISH	11,541,240	13,196,834	18,886,103	20,527,304	28,396,887	28,401,848	11,198,346	11,783,393	17,986,691
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	a	a	704,701	1,131,695	1,588,230	1,449,595	596,351	1,592,591	843,210
HLBT	a	a	a	518,974	493,184	583,857	a	a	NA
OTH SPC	1,348,408	1,185,286	398,564	3,746	28,182	1,002	29,968	42,845	615
SALM	0	0	0	a	0	0	a	0	0
SCAL	0	0	0	0	0	0	0	0	0
Total	12,889,648	14,382,120	19,989,369	22,181,720	30,506,482	30,436,302	11,824,665	13,418,829	18,830,517

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all groundfish deliveries made to at-sea processors. To maintain data confidentiality, cells shown with an “a” have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 were unavailable (NA).

Four person crews, including the skipper, are typical on vessels in the TCV Div. AFA class. Table 6-48 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A. In 2001, vessels registered by individuals or companies in the Washington Inland Waters Region accounted for 45% of the vessels in this class, while vessels registered by individuals or companies in the Oregon Coast Region accounted for 20%. The percentage of vessels registered by Kodiak residents or companies has declined over the years, but this region still accounted for one-fifth of the fleet in 2001.

Table 6-48. Count of Diversified Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	0	0	0	0	0	0	0	0
AKKO	2	4	5	6	5	5	2	1	2
AKSC	0	1	1	1	1	1	1	0	1
AKSE	0	0	0	0	0	0	0	0	0
WAIW	15	20	15	18	17	19	11	14	12
ORCO	8	7	10	16	15	13	6	7	10
Other	1	2	2	2	2	1	0	0	1
Total	26	34	33	43	40	39	20	22	26

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.4 Non-AFA Trawl Catcher Vessels ≥ 60 Feet in Length (TCV Non-AFA)

These are medium-sized vessels that mainly participate in GOA groundfish fisheries. The annual cycle of operations of vessels in the TCV Non-AFA class differs from that of AFA-eligible trawl catcher vessels. Differences include the reliance of the TCV Non-AFA fleet on the GOA groundfish fishery and the participation of several vessels in the halibut Individual Fishing Quota (IFQ) fishery using longline gear. Because these vessels are longer than 60 ft, they are ineligible to participate in Alaska commercial salmon fisheries with seine gear. The Central GOA has been the most important FMP subarea for the class. The importance of the Bering Sea peaked in 1997. After that year, vessels in the TCV Non-AFA class were unable to fish for BSAI pollock as a result of enactment of the AFA. Table 6-49 shows participation, catch, and revenue in Alaska groundfish fisheries of Non-AFA TCVs.

As with AFA-eligible trawl catcher vessels, pollock is the primary species in terms of retained tonnage for vessels in the TCV Non-AFA class. However, the ex-vessel value of Pacific cod exceeded that of pollock in every year except 1998 and 2001. In 2000, deliveries to Kodiak shoreside processors accounted for 74% of the ex-vessel value of this class, while deliveries to Alaska Peninsula and Aleutian Islands shoreside processors accounted for 11%. Table 6-49 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data.

Table 6-49. Participation, Catch, and Ex-vessel Revenue of Non-AFA Trawl Catcher Vessels ≥ 60 Feet in Length by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	0	1	1	1	2	1	1	13	10
FLAT	30	28	32	36	33	32	36	34	34
OGRN	13	25	29	31	29	27	33	28	33
PCOD	37	33	35	38	36	36	40	35	34
PLCK	34	28	32	38	37	35	38	36	34
ROCK	26	25	30	33	31	29	33	27	29
SABL	20	21	23	24	24	25	28	25	25
Total	37	34	35	38	37	36	40	36	34
					Retained Catch Excluding PSC (mt)				
AMCK		a	a	a	a	a	a	2.25	7.15
FLAT	3,722.38	6,573.97	5,332.84	4,447.24	3,423.30	8,162.17	7,310.43	8,500.03	6,515.33
OGRN	112.86	622.39	644.92	258.53	95.98	471.83	478.54	547.82	1,422.76
PCOD	16,491.40	12,835.76	14,188.85	11,135.45	13,991.23	9,275.89	11,558.09	9,770.07	12,716.40
PLCK	15,980.42	18,389.26	24,339.18	37,051.31	29,465.04	25,302.57	26,575.08	19,051.89	21,933.35
ROCK	345.17	1,614.74	1,652.18	2,693.07	3,108.04	5,231.58	3,961.96	4,576.04	6,140.17
SABL	170.27	313.31	222.64	205.29	237.08	353.09	259.50	238.16	373.92
Total	36,822.50	40,349.43	46,380.61	55,790.90	50,320.67	48,797.14	50,143.60	42,686.27	49,109.09
					Ex-Vessel Revenue ($)				
AMCK		a	a	a	a	a	a	74	8
FLAT	1,277,732	2,397,704	1,904,911	1,322,379	843,385	2,161,397	1,741,284	1,722,190	1,342,178
OGRN	31,073	117,649	117,196	20,414	13,379	67,345	33,499	66,466	480,091
PCOD	6,870,505	4,899,677	6,068,251	3,933,231	8,324,165	6,326,402	6,632,258	4,482,494	7,651,219
PLCK	3,508,258	3,754,060	5,606,930	5,592,268	6,200,015	6,726,757	7,314,958	4,217,901	3,259,048
ROCK	123,110	297,115	287,148	448,507	560,507	807,529	463,386	520,021	1,052,174
SABL	707,673	1,234,454	918,374	507,173	781,495	1,195,509	797,643	763,537	1,237,406
Total	12,518,351	12,700,659	14,902,810	11,823,972	16,722,947	17,284,939	16,983,028	11,772,684	15,022,124

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: Fish ticket data may not include all groundfish deliveries made to at-sea processors. To maintain data confidentiality, cells shown with an “a” have been added to OGRN.

Table 6-50 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. Many TCV Non-AFA vessels participate in the halibut and crab fisheries, but none participate in the Aleutian Island crab fishery. In some years, non-groundfish catches accounted for over 30% of total revenue.

Table 6-50. Participation, Catch, and Ex-vessel Revenue of Non-AFA Trawl Catcher Vessels ≥ 60 Feet in Length in Groundfish and Non-Groundfish Fisheries, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	37	34	35	38	37	36	40	36	34
AI CRAB	0	0	1	0	0	0	0	0	0
OTH CRAB	5	4	3	2	2	3	9	14	1
HLBT	15	17	16	15	13	13	12	13	NA
OTH SPC	6	6	7	17	17	16	29	24	21
SALM	1	0	0	0	0	0	0	0	1
SCAL	0	0	0	0	0	0	0	0	0
Total	37	34	35	38	37	36	40	36	34
					Retained Catch Excluding PSC (mt)				
GFISH	36,822.50	40,349.43	46,380.61	55,790.90	50,320.67	48,797.14	50,143.60	42,686.27	49,109.09
AI CRAB	0.00	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00
OTH CRAB	272.02	293.19	479.01	b	b	b	37.00	14.97	b
HLBT	413.15	404.16	565.03	557.19	598.22	528.48	491.87	608.89	NA
OTH SPC	90.76	217.83	137.15	588.58	48.77	152.24	112.79	89.17	85.23
SALM	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	b
SCAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	37,598.42	41,264.62	47,561.81	56,936.67	50,967.66	49,477.86	50,785.27	43,399.30	49,194.32
					Ex-Vessel Revenue ($)				
GFISH	12,518,351	12,700,659	14,902,810	11,823,972	16,722,947	17,284,939	16,983,028	11,772,684	15,022,124
AI CRAB	0	0	a	0	0	0	0	0	0
OTH CRAB	1,504,104	1,072,368	1,636,507	b	b	b	342,715	134,988	b
HLBT	1,791,879	2,003,320	2,610,929	1,564,663	2,772,252	2,977,708	2,155,434	3,008,718	NA
OTH SPC	42,348	101,020	60,532	665,151	306,880	681,866	4,276	2,933	168,079
SALM	b	0	0	0	0	0	0	0	b
SCAL	0	0	0	0	0	0	0	0	0
Total	15,856,682	15,877,367	19,210,778	14,053,786	19,802,078	20,944,512	19,485,452	14,919,324	15,190,204

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Notes: Fish ticket data may not include all groundfish deliveries made to at-sea processors. To maintain data confidentiality, cells shown with an "a" have been added to OTH CRAB and cells shown with a "b" have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 are not yet available for the sectors used here.

Vessels in the TCV Non-AFA class typically carry a crew of 4, including the skipper. Table 6-51 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A. Between 26% and 39% of the vessels were registered by individuals or companies in Kodiak from 1995 through 2001. Individuals or companies in the Washington Inland Waters Region and Oregon Coast Region accounted for most of the remaining vessels.

Table 6-51. Count of Non-AFA Trawl Catcher Vessels ≥ 60 Feet in Length by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	4	3	3	3	3	3	3	3	2
AKKO	13	12	13	12	11	11	11	11	11
AKSC	1	1	1	1	1	1	1	1	1
AKSE	0	0	0	0	0	0	0	1	0
WAIW	8	9	5	6	6	5	5	5	5
ORCO	3	4	6	6	6	6	6	6	5
Other	9	7	7	11	11	10	12	10	9
Total	38	36	35	39	38	36	38	37	33

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.5 Non-AFA Trawl Catcher Vessels < 60 Feet in Length (TCV < 60)

These are small trawlers that participate in the GOA groundfish fisheries and may also participate in salmon fisheries using purse seine gear. Vessels in the TCV < 60 class are allowed to participate in the State of Alaska commercial seine fisheries for salmon, because they are under the 58-foot length limit. These differ from fixed gear vessels greater than 32 ft and less than 60 ft in that they have larger engines, more electronics, larger fish holds, and the necessary deck gear and nets to operate in the trawl fisheries. While trawl gear is the primary gear used by vessels in this class when fishing for groundfish, many also use pots for Pacific cod and longline gear for sablefish. The number of vessels in this class increased steadily from 1989 through 1993. This increase coincided with the development of domestic shorebased fisheries in the Western and Central GOA FMP subareas. From 1995 through 2003, the number of vessels in the TCV < 60 class remained between 44 and 61. Table 6-52 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data. The table indicates the importance of Pacific cod and pollock to this class. Sablefish is also an important fishery for several of these vessels.

Table 6-52. Participation, Catch, and Ex-vessel Revenue of Non-AFA Trawl Catcher Vessels < 60 Feet in Length by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	0	0	7	2	11	3	0	2	4
FLAT	18	26	40	35	32	32	32	32	33
OGRN	7	28	34	26	18	25	28	18	24
PCOD	53	54	58	54	53	49	56	44	34
PLCK	23	28	43	42	40	42	49	38	29
ROCK	12	23	30	26	22	28	27	23	20
SABL	11	14	15	11	8	9	18	7	9
Total	53	55	59	54	54	52	56	46	34
					Retained Catch Excluding PSC (mt)				
AMCK			0.04	a	27.54	a		a	0.36
FLAT	365.17	1,482.55	1,108.86	682.40	387.74	627.53	967.27	376.68	389.15
OGRN	28.78	90.86	105.30	23.87	43.18	24.51	61.75	14.31	246.00
PCOD	11,841.99	20,863.03	19,954.61	17,734.08	16,262.50	14,359.32	10,200.68	10,233.04	9,363.28
PLCK	6,935.95	9,990.86	15,568.43	18,720.66	13,774.32	11,970.61	23,773.97	13,389.37	10,605.36
ROCK	10.42	122.61	49.52	70.20	15.54	16.06	18.23	96.02	212.65
SABL	362.23	354.91	330.24	355.09	277.00	216.87	267.51	217.95	253.41
Total	19,544.54	32,904.81	37,117.00	37,586.31	30,787.82	27,214.90	35,289.39	24,327.36	21,070.22
					Ex-Vessel Revenue ($)				
AMCK			1	a	1,092	a		a	11
FLAT	157,088	608,177	422,697	215,514	131,951	184,115	169,194	48,555	100,527
OGRN	8,331	24,382	24,119	7,242	16,906	4,913	3,438	1,309	104,209
PCOD	4,728,903	7,236,605	7,567,788	5,851,886	8,554,100	9,502,179	5,205,755	4,696,301	5,532,552
PLCK	1,283,444	1,888,015	3,648,445	2,628,519	2,999,550	3,339,398	6,034,590	3,112,549	1,788,032
ROCK	10,696	30,185	19,381	23,444	14,645	19,878	18,917	35,226	43,718
SABL	1,654,668	1,601,128	1,721,462	1,285,328	1,161,379	1,213,403	1,194,671	1,001,981	1,237,730
GFSH Total	7,843,131	11,388,492	13,403,893	10,011,933	12,879,622	14,263,886	12,626,565	8,895,922	8,806,779

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.

Note: To maintain data confidentiality, cells shown with an “a” have been added to OGRN.

Vessels in the TCV < 60 class participate in multiple fisheries and generally take full advantage of locally available fishery resources. Salmon harvesting is important to the economic viability of most vessels in this class. A significant percentage of the vessels also participate in the sablefish and halibut longline IFQ fisheries. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 55% of all ex-vessel value generated by the class came from groundfish fisheries. The decline in non-groundfish revenues after 1995, was primarily the result of a drop in salmon landings. The Western and Central GOA FMP subareas are by far the most important fishing grounds for the class, accounting for about 90% of the ex-vessel value in 2001. Vessels in the TCV < 60 class are increasingly relying on Alaska Peninsula and Aleutian Islands shoreside processors. In 2000, they received 82% of their gross revenues from these plants, up from 70% in 1998. Processors in Kodiak are becoming less important to the TCV < 60 class, accounting for 34% of the ex-vessel value in 1995, and 6% in 2000. Participation, catch, and ex-vessel revenue in Alaska groundfish and non-groundfish fisheries by TCV < 60 vessels are shown in Table 6-53.

Table 6-53. Participation, Catch, and Ex-vessel Revenue of Non-AFA Trawl Catcher Vessels < 60 Feet in Length in Groundfish and Non-Groundfish Fisheries, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species	Number of Vessels								
GFISH	53	55	59	54	54	52	56	46	34
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	16	10	5	3	1	4	36	8	2
HLBT	25	25	25	25	23	22	23	17	NA
OTH SPC	9	18	19	17	13	14	11	11	12
SALM	42	43	44	39	36	37	33	18	16
SCAL	0	0	0	0	0	0	0	0	0
Total	53	55	59	54	54	52	56	46	34
	Retained Catch Excluding PSC (mt)								
GFISH	19,544.54	32,904.81	37,117.00	37,586.31	30,787.82	27,214.90	35,289.39	24,327.36	21,070.22
AI CRAB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTH CRAB	83.62	43.35	31.10	a	a	19.26	95.53	27.60	a
HLBT	347.47	359.18	539.78	571.15	535.60	505.21	632.53	588.48	NA
OTH SPC	562.38	1,308.09	1,094.44	665.60	878.58	624.58	619.83	932.67	610.87
SALM	15,243.08	6,808.88	4,457.50	8,208.87	11,389.58	4,677.53	6,896.08	3,691.67	3,988.92
SCAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	35,781.10	41,424.32	43,239.82	47,031.94	43,591.58	33,041.48	43,533.36	29,567.78	25,670.00
	Ex-Vessel Revenue ($)								
GFISH	7,843,131	11,388,492	13,403,893	10,011,933	12,879,622	14,263,886	12,626,565	8,895,922	8,806,779
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	656,099	312,789	212,892	a	a	204,177	344,681	327,373	A
HLBT	1,513,127	1,758,323	2,497,009	1,566,865	2,352,857	2,834,738	2,814,278	2,805,854	NA
OTH SPC	334,135	1,035,765	437,384	343,862	636,624	281,019	223,631	336,452	398,488
SALM	10,023,445	3,445,248	3,818,540	5,232,447	7,361,591	3,464,240	2,618,167	1,329,745	988,436
SCAL	0	0	0	0	0	0	0	0	0
Total	20,369,937	17,940,616	20,369,718	17,155,107	23,230,695	21,048,061	18,627,323	13,695,346	10,193,702

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an “a” have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 are not yet available at the sector levels used here.

The crew size on vessels in the TCV < 60 class typically ranges from 3 to 4, including the skipper, depending on the fishery. Table 6-54 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A. About 69% of the vessels were registered by Alaska residents or companies in 2001, and the remaining boats were registered predominantly by individuals or companies in the Washington Inland Waters Region. Individuals or companies in the Alaska Peninsula and Aleutian Islands Region have registered the most vessels in this class during the past decade, with most of the vessels based in King Cove and Sand Point.

Table 6-54. Count of Non-AFA Trawl Catcher Vessels < 60 Feet in Length by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	28	27	27	26	25	24	23	17	12
AKKO	8	8	10	6	4	3	4	3	2
AKSC	3	5	5	5	3	5	4	5	4
AKSE	1	2	2	2	3	3	3	0	0
WAIW	10	11	13	13	12	11	12	10	10
ORCO	0	0	0	0	0	0	0	0	0
Other	3	3	3	4	9	6	10	11	6
Total	53	56	60	56	56	52	56	46	34

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.6 Pot Catcher Vessels (PCV)

This class consists of pot catcher vessels that made more than incidental landings of groundfish—it does not include pot vessels that did not participate in groundfish fisheries during the year in question. While groundfish is a defining feature of the PCV class, the large majority of vessels in the class focuses on crab fisheries and participate in groundfish fisheries only as a secondary activity. The size of this class has varied widely over the years. During the early part of this period, many vessels experimenting with pot fishing for Pacific cod could not make enough money to justify continued participation. In 1995, harvests in the *C. opilio* fishery, which had become the mainstay of the crab fleet, reached the lowest levels in a decade, and crab fishermen sought other fisheries to generate needed revenues. Between 1995 and 2003, participation in groundfish fisheries first declined as *C. opilio* harvests increased in 1997 and 1998, but then sharply increased in 1999. Over the years, however, the vast majority of revenue has come from crab (Table 6-56). Pacific cod has been the most important groundfish species for this class in terms of harvest volume and ex-vessel value. The Bering Sea is the most important fishing area for the PCV class, although areas around Kodiak are also important, and Bering Sea shoreside processors are the largest buyers of PCV harvests. Pacific cod fishing activity focuses off the east end of Kodiak Island and in and around Unimak Island and Unalaska Island. Table 6-55 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data.

Table 6-55. Participation, Catch, and Ex-vessel Revenue of Pot Catcher Vessels by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	0	1	0	1	1	1	3	4	22
FLAT	11	9	10	5	17	42	15	16	28
OGRN	34	33	28	20	50	56	28	28	53
PCOD	106	106	72	65	105	161	85	64	79
PLCK	12	15	15	20	23	51	27	27	26
ROCK	12	17	17	10	15	22	15	11	24
SABL	17	23	13	15	15	20	14	8	22
Total	106	106	72	65	105	161	87	65	84
					Retained Catch Excluding PSC (mt)				
AMCK		a		a	a	a	a	0.06	1.83
FLAT	0.57	27.07	161.22	53.52	4.23	28.35	9.23	77.90	30.26
OGRN	72.47	39.65	47.52	52.30	63.18	56.37	25.47	85.31	129.34
PCOD	22,859.51	29,758.03	23,038.35	16,341.66	21,717.19	30,074.59	16,073.42	16,438.60	23,286.70
PLCK	0.19	44.62	2.17	1.14	1.63	21.08	2.20	7.02	1.69
ROCK	10.31	13.74	15.87	6.94	9.02	19.14	7.04	8.21	13.02
SABL	436.76	384.20	305.31	256.87	164.06	489.98	349.08	534.72	779.08
Total	23,379.81	30,267.32	23,570.42	16,712.43	21,959.31	30,689.50	16,466.44	17,151.82	24,241.91
					Ex-Vessel Revenue ($)				
AMCK		a		a	a	a	a	2	57
FLAT	52	14,289	228,912	30,580	481	8,446	1,065	17,462	9,029
OGRN	47,896	29,812	49,146	40,777	44,879	33,819	5,642	65,840	96,298
PCOD	10,463,662	12,304,569	10,068,518	6,941,014	14,600,907	20,875,897	8,889,987	8,104,746	14,541,920
PLCK	38	19,046	397	125	132	1,352	149	290	128
ROCK	12,522	17,919	19,197	8,952	6,493	19,124	5,779	7,655	11,621
SABL	1,973,976	1,726,259	1,570,456	914,556	723,668	2,334,419	1,439,518	1,760,058	3,496,112
Total	12,498,145	14,111,894	11,936,627	7,936,004	15,376,560	23,273,057	10,342,140	9,956,054	18,155,165

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an "a" have been added to OGRN.

Table 6-56 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. Groundfish is notably less important to the vessel class than is crab. The PCVs have significant catches of "other crab"—primarily king and *C. opilio* crab in the Bering Sea. Some of the vessels in the class have participated in Aleutian Island crab fisheries over the years, and several vessels participate in the IFQ fishery for halibut.

Table 6-56. Participation, Catch, and Ex-vessel Revenue of Pot Catcher Vessels in Groundfish and Non-Groundfish Fisheries, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	106	106	72	65	105	161	87	65	84
AI CRAB	8	3	0	0	4	6	2	10	12
OTH CRAB	94	88	58	54	88	141	79	62	79
HLBT	30	35	24	24	25	34	17	14	NA
OTH SPC	3	2	8	3	13	7	5	6	8
SALM	0	1	2	1	5	2	1	0	1
SCAL	0	0	0	0	0	0	0	0	0
Total	106	106	72	65	105	161	87	65	84
					Retained Catch Excluding PSC (mt)				
GFISH	23,379.81	30,267.32	23,570.42	16,712.43	21,959.31	30,689.50	16,466.44	17,151.82	24,241.91
AI CRAB	602.02	a	0.00	0.00	385.69	457.58	a	173.98	344.94
OTH CRAB	13,261.32	12,840.83	13,141.47	23,186.98	30,109.69	11,116.95	5,465.08	5,788.19	7,212.43
HLBT	996.72	1,113.16	1,241.98	1,255.33	1,411.47	2,248.14	1,162.86	973.03	NA
OTH SPC	b	b	75.61	1.26	3.08	4.78	5.13	2.41	0.79
SALM	0.00	b	c	C	20.33	c	c	0.00	c
SCAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38,239.87	44,221.30	38,029.47	41,156.01	53,889.57	44,516.95	23,099.50	24,089.42	31,800.07
					Ex-Vessel Revenue ($)				
GFISH	12,498,145	14,111,894	11,936,627	7,936,004	15,376,560	23,273,057	10,342,140	9,956,054	18,155,165
AI CRAB	3,385,308	a	0	0	2,638,484	3,512,572	a	1,767,576	2,871,891
OTH CRAB	70,473,532	51,592,092	30,931,126	36,530,620	85,132,901	59,155,792	28,690,579	30,229,722	43,755,747
HLBT	4,273,687	5,279,359	5,740,062	3,491,029	6,381,060	12,530,946	5,097,008	4,750,152	NA
OTH SPC	b	b	96,243	657	4,091	5,457	1,965	1,385	540
SALM	0	b	c	c	14,102	c	c	0	c
SCAL	0	0	0	0	0	0	0	0	0
Total	90,630,671	70,983,345	48,704,058	47,958,310	109,547,198	98,477,824	44,131,692	46,704,890	64,783,343

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an “a” have been added to OTH CRAB, cells shown with a “b” have been added to HLBT, and cells shown with a “c” have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 are not yet available for the sectors used here.

Table 6-57 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A. During the period 1995 through 2003, about half of the vessels in this class were registered by Alaska residents or companies, with most of these being in Kodiak. Most of the remaining vessels were registered by Washington Inland Waters Region residents or companies.

Table 6-57. Count of Pot Catcher Vessels by Region of Residence of Vessel Owners, 1995-2003

	Year								
Region	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	1	2	0	1	2	2	0	0	1
AKKO	22	26	21	23	22	30	19	17	18
AKSC	18	16	11	8	17	23	12	5	8
AKSE	0	0	4	1	2	3	0	2	3
WAIW	47	42	29	26	46	73	40	28	38
ORCO	8	9	6	5	7	11	5	5	5
Other	12	10	8	9	10	18	10	7	11
Total	108	105	79	73	106	160	86	64	84

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.7 Longline Catcher Vessels Greater than or Equal to 60 feet in Length (LCV)

A large majority of the vessels in this class operate solely with longline gear, focusing on relatively high-value groundfish such as sablefish, rockfish, and Pacific cod. LCV also depend heavily on the IFQ halibut fishery. Their operating parameters are influenced primarily by regulations for fixed gear fisheries targeting these species. The reliance of LCVs on groundfish fisheries sets them apart from smaller fixed gear catcher vessels, which are much more likely to operate in Alaska salmon fisheries with multiple gear types. The use of 60 ft as the minimum length for vessels in this class reflects the fact that regulations for State of Alaska salmon fisheries limit participating vessels to 58 ft. Thus, by definition, vessels in the LCV class are generally precluded from operating in Alaska salmon fisheries. The LCVs reliance on longline gear sets them apart from the other large fixed gear vessels that use pots and have crab endorsements under the BSAI Groundfish and Crab Fisheries License Limitation Program. The Eastern and Central GOA FMP subareas are the most important fishing areas for the LCV class. Table 6-58 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data.

Table 6-58. Participation, Catch, and Ex-vessel Revenue of Longline Catcher Vessels, by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	0	0	0	0	0	0	1	1	0
FLAT	29	29	18	15	12	10	14	5	2
OGRN	4	4	5	3	4	2	4	2	4
PCOD	63	38	33	45	48	38	29	28	25
PLCK	3	2	2	4	2	5	5	0	4
ROCK	99	91	86	81	78	65	66	68	64
SABL	112	95	87	83	80	64	68	72	68
Total	127	103	93	96	92	70	72	74	72
					Retained Catch Excluding PSC (mt)				
AMCK	0.00	0.00	0.00	0.00	0.00	0.00	a	b	0.00
FLAT	198.42	220.42	519.39	94.62	58.11	36.77	30.63	8.60	A
OGRN	48.86	15.94	14.44	c	10.77	c	20.99	b	104.82
PCOD	2,585.01	3,104.49	12,117.07	4,585.89	1,062.64	759.72	1,128.73	3,080.26	2,606.27
PLCK	a	a	a	82.29	a	13.28	23.15	0.00	1.23
ROCK	357.63	338.47	229.85	268.79	230.18	244.90	271.75	246.97	218.28
SABL	8,013.48	6,231.09	5,237.04	4,775.77	4,164.57	4,005.40	4,032.22	3,922.54	4,510.11
Total	11,203.40	9,910.42	18,117.80	9,807.37	5,526.28	5,060.08	5,507.47	7,258.37	7,440.71
					Ex-Vessel Revenue ($)				
AMCK	0	0	0	0	0	0	a	b	0
FLAT	117,804	233,602	1,022,586	53,541	33,984	19,917	12,447	2,631	A
OGRN	11,291	3,268	3,093	c	1,434	c	2,528	b	53,177
PCOD	2,125,645	2,791,664	10,967,219	1,227,570	617,712	616,245	535,677	978,244	1,409,098
PLCK	a	a	a	12,971	a	2,349	3,155	0	415
ROCK	552,502	546,705	323,866	360,572	310,304	366,390	365,832	321,423	258,482
SABL	36,362,263	28,263,485	27,410,915	17,050,722	17,288,009	20,763,478	17,902,259	17,619,131	22,743,011
Total	39,169,504	31,838,724	39,727,680	18,705,376	18,251,443	21,768,380	18,821,898	18,921,430	24,464,183

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.

Note: To maintain data confidentiality, cells shown with an “a” have been added to OGRN, and cells shown with a “b” have been added to ROCK, cells shown with a “c” have been added to PLCK.

Table 6-59 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. In most years, about one-third of all ex-vessel value generated by the class comes from groundfish fisheries (mostly sablefish) and half comes from the halibut fishery. Shoreside processors in Southcentral Alaska and Southeast Alaska are important buyers for these vessels, and the importance of processors in Kodiak has increased in recent years.

Table 6-59. Participation, Catch, and Ex-vessel Revenue of Longline Catcher Vessels in Groundfish and Non-Groundfish Fisheries , 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	127	103	93	96	92	70	72	74	72
AI CRAB	5	1	0	0	0	0	2	1	2
OTH CRAB	42	26	23	19	21	9	18	15	14
HLBT	108	94	80	77	71	57	62	66	NA
OTH SPC	29	20	15	19	18	13	13	14	15
SALM	8	7	3	4	4	5	3	5	2
SCAL	0	1	0	0	0	0	0	0	1
Total	127	103	93	96	92	70	72	74	72
					Retained Catch Excluding PSC (mt)				
GFISH	11,203.40	9,910.42	18,117.80	9,807.37	5,526.28	5,060.08	5,507.47	7,258.37	7,440.71
AI CRAB	540.61	a	0.00	0.00	0.00	0.00	a	a	a
OTH CRAB	3,550.58	1,711.76	3,107.33	5,569.14	3,891.41	105.84	483.31	574.43	532.77
HLBT	3,573.35	3,508.16	5,170.15	5,313.01	5,801.36	4,808.16	5,795.55	5,802.65	NA
OTH SPC	21.46	456.26	35.73	6.28	20.69	10.46	83.14	7.38	28.85
SALM	66.34	47,637.93	b	19.11	23.35	45.36	b	6.01	b
SCAL	0.00	b	0.00	0.00	0.00	0.00	0.00	0.00	b
Total	18,955.73	63,224.53	26,431.00	20,714.91	15,263.08	10,029.90	11,869.47	13,648.84	8,002.33
					Ex-Vessel Revenue ($)				
GFISH	39,169,504	31,838,724	39,727,680	18,705,376	18,251,443	21,768,380	18,821,898	18,921,430	24,464,183
AI CRAB	3,061,349	a	0	0	0	0	a	a	a
OTH CRAB	19,270,166	7,047,048	7,620,150	8,853,768	11,003,232	597,952	2,643,908	3,301,542	2,854,928
HLBT	16,429,433	17,712,260	24,946,650	14,709,707	25,728,461	26,934,792	25,128,073	28,324,031	NA
OTH SPC	84,695	963,384	94,823	8,594	56,608	54,182	79,373	22,753	88,517
SALM	128,889	84,838,003	b	48,538	73,499	65,139	b	10,017	b
SCAL	0	b	0	0	0	0	0	0	b
Total	78,144,036	142,399,419	72,389,303	42,325,984	55,113,242	49,420,443	46,673,251	50,579,772	27,407,627

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an "a" have been added to OTH CRAB and cells shown with a "b" have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 are not yet available for the sectors used here.

The LCV class is one of the most labor-intensive of the catcher vessel classes, due to the need to handle each fish individually (although the number of crewmembers has decreased since 1995 with implementation of the IFQ program). LCVs typically carry between 3 and 6 deckhands and a skipper who also works the deck. The actual number of deckhands on LCVs generally depends on the fishery and the experience and productivity of the captain and crew

Table 6-60 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A. About half of the vessels in this class were registered by Alaska residents or companies, and the remaining vessels were registered mainly by individuals or companies in the Washington Inland Waters Region. Southeast Alaska and Southcentral Alaska have had the largest number of vessel owners in this class among the Alaska regions since the late 1980s. The number of owners in Southeast Alaska has been stable over the years compared to the number of owners from other Alaska regions. The percentage of owners in Southcentral Alaska declined in recent years.

Table 6-60. Count of Longline Catcher Vessels by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	1	1	0	1	1	1	1	1	0
AKKO	9	8	7	4	7	1	4	6	7
AKSC	20	17	12	14	8	10	9	11	10
AKSE	29	25	21	20	20	18	16	18	18
WAIW	49	34	34	40	41	29	30	28	25
ORCO	4	3	3	3	2	2	2	1	2
Other	12	13	10	10	11	8	9	8	9
Total	124	101	87	92	90	69	71	73	71

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.8 Fixed Gear Catcher Vessels 33 Feet to 59 Feet in Length (FGCV 33-59)

The FGCV 33-59 vessel class is the largest groundfish vessels class in terms of the number of participating vessels. Vessels in this class employ a mix of gear types, with smaller vessels typically using longline and jig gear, and larger vessels generally employing longline and pot gear. This class was established, because these vessels typically participate in a greater number of fisheries in comparison to smaller fixed gear vessels, and vessels in this class use more gear types than do larger fixed gear vessels. The length of these vessels (< 60 ft) also means they can participate in almost all Alaska salmon fisheries, with the exception of the Bristol Bay fisheries. The Eastern and Central GOA FMP subareas accounted for almost all of the value of groundfish retained by this class. Shoreside processors in Southeast Alaska accounted for much of the ex-vessel value generated by the FGCV 33-59 class. The relative importance of Kodiak processors increased following implementation of the IFQ program in 1995. Table 6-61 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data.

Table 6-61. Participation, Catch, and Ex-vessel Revenue of Fixed Gear Catcher Vessels 33 Feet to 59 Feet in Length by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	0	2	1	0	0	0	0	1	1
FLAT	24	34	26	27	19	22	27	26	26
OGRN	62	88	113	73	46	53	45	36	91
PCOD	354	290	361	346	385	407	340	290	332
PLCK	17	25	65	47	60	71	69	56	54
ROCK	453	452	466	443	420	424	396	349	341
SABL	454	418	406	361	341	340	338	324	303
Total	596	552	568	534	534	576	519	475	508
					Retained Catch Excluding PSC (mt)				
AMCK		a	a	0.00	0.00	0.00	0.00	a	a
FLAT	32.55	1,676.86	210.94	353.57	145.37	114.88	151.94	51.87	33.99
OGRN	85.92	173.55	241.76	174.98	96.29	67.19	91.54	68.15	1,196.31
PCOD	11,226.70	10,094.16	16,085.31	16,649.26	18,980.26	16,706.74	14,680.55	17,897.13	17,578.01
PLCK	11.61	19.78	61.39	60.10	49.40	29.49	35.20	51.78	125.96
ROCK	1,182.27	1,142.93	1,030.86	1,037.53	899.79	1,055.13	1,015.12	960.06	779.92
SABL	9,430.13	8,271.59	7,705.66	7,578.62	6,606.14	7,493.23	7,172.93	7,578.46	8,096.95
Total	21,969.18	21,378.88	25,335.91	25,854.07	26,777.24	25,466.66	23,147.29	26,607.45	27,811.15
					Ex-Vessel Revenue ($)				
AMCK		a	a	0	0	0	0	a	a
FLAT	11,080	936,253	129,219	192,442	83,018	63,584	69,918	20,042	13,754
OGRN	36,527	96,648	151,532	124,957	53,544	47,171	55,324	58,393	592,859
PCOD	5,902,034	5,240,858	8,157,828	7,439,102	13,077,210	13,203,610	9,395,524	9,730,822	11,197,476
PLCK	3,391	4,348	14,141	9,603	10,427	7,417	5,633	9,017	21,006
ROCK	1,597,536	1,633,535	1,563,553	1,504,667	1,458,385	1,619,457	1,472,230	1,527,637	1,277,309
SABL	42,316,188	38,538,719	41,090,883	26,668,849	28,180,976	39,646,540	32,374,004	34,699,706	40,948,668
Total	49,866,758	46,450,360	51,107,156	35,939,620	42,863,560	54,587,779	43,372,633	46,045,617	54,051,071

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an “a” have been added to OGRN.

Table 6-62 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. The activities of this vessel class have focused on salmon, halibut, and higher-priced groundfish, most notably sablefish. In recent years, about one-third of all ex-vessel value generated by the class came from groundfish fisheries, while halibut has contributed an increasing share. Salmon have contributed a smaller share in recent years, because of lower prices and regulatory restrictions in Area M.

Table 6-62. Participation, Catch, and Ex-vessel Revenue of Fixed Gear Catcher Vessels 33 Feet to 59 Feet in Length in Groundfish and Non-Groundfish Fisheries , 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	596	552	568	534	534	576	519	475	508
AI CRAB	0	0	0	0	0	0	0	0	1
OTH CRAB	76	72	75	60	51	53	111	105	81
HLBT	478	458	456	397	407	420	384	356	NA
OTH SPC	299	258	263	201	214	193	173	164	167
SALM	437	359	372	362	367	383	339	281	302
SCAL	0	1	1	0	0	0	0	0	0
Total	596	552	568	534	534	576	519	475	508
					Retained Catch Excluding PSC (mt)				
GFISH	21,969.18	21,378.88	25,335.91	25,854.07	26,777.24	25,466.66	23,147.29	26,607.45	27,811.15
AI CRAB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	a
OTH CRAB	767.15	809.44	650.61	616.04	609.07	507.04	663.52	504.53	566.37
HLBT	4,999.91	5,687.40	7,800.03	8,220.55	9,152.05	9,161.46	9,998.66	10,395.64	NA
OTH SPC	3,537.14	3,994.78	5,901.00	4,204.08	4,704.21	3,428.47	5,446.09	4,302.59	4,435.07
SALM	41,816.99	38,747.89	29,358.96	41,452.14	54,785.78	31,405.68	46,444.14	33,887.59	48,066.61
SCAL	0.00	b	b	0.00	0.00	0.00	0.00	0.00	0.00
Total	73,090.38	70,618.39	69,046.50	80,346.88	96,028.35	69,969.32	85,699.70	75,697.80	80,879.19
					Ex-Vessel Revenue ($)				
GFISH	49,866,758	46,450,360	51,107,156	35,939,620	42,863,560	54,587,779	43,372,633	46,045,617	54,051,071
AI CRAB	0	0	0	0	0	0	0	0	a
OTH CRAB	5,292,985	3,603,162	3,247,123	2,769,422	3,527,464	2,816,248	3,671,087	2,942,511	3,140,811
HLBT	22,525,089	28,529,184	37,614,119	23,950,455	40,782,803	51,451,722	43,920,049	50,621,766	NA
OTH SPC	4,289,378	6,381,422	3,173,203	2,244,320	3,028,209	1,752,848	1,316,883	3,160,687	2,810,661
SALM	30,585,805	20,061,931	21,904,552	26,572,156	38,474,430	25,188,980	23,887,078	13,293,787	16,319,407
SCAL	0	b	b	0	0	0	0	0	0
Total	112,560,015	105,026,061	117,046,153	91,475,973	128,676,465	135,797,578	116,167,729	116,064,367	76,321,950

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an “a” have been added to OTH CRAB and cells shown with a “b” have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 are not yet available for the sectors used here.

While an average crew size for these vessels is about 3 to 4, including the skipper, the actual number of crew for a particular vessel depends on a number of factors such as the type of gear, the presence of automatic baiting machines, the size of the vessel, and the amount of sablefish and halibut IFQ shares owned by the skipper and crew. Table 6-63 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A. About 75% of these vessels were registered by Alaska residents or companies, and most of the remaining boats were from the Washington Inland Waters Region. Individuals or companies in Southeast Alaska have owned the largest number of vessels in this class among the Alaska regions since the late 1980s. There has been a marked decline in participation of vessels from Southcentral and Southeast Alaska, while participation by boats in other Alaska regions has remained relatively stable or increased. The regional differences may be due to the opportunistic nature of participation by small boats in groundfish and other fisheries. Residents of Southcentral and Southeast Alaska have relatively more non-fishing income-generating opportunities than residents of Kodiak and the Alaska Peninsula. If the likelihood of big pay-offs in fishing declines, those individuals that can are more likely to engage in non-fishing occupations. Similar declines are not apparent in the Washington Inland Waters Region and Oregon Coast Region, because it is more likely vessel owners in these regions are full-time fishermen.

Table 6-63. Count of Fixed Gear Catcher Vessels 33 Feet to 59 Feet in Length by Region of Residence of Vessel Owners, 1995-2003

	Year								
Region	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	22	20	23	22	20	24	34	37	48
AKKO	57	49	68	72	69	93	67	63	86
AKSC	149	128	132	121	113	134	117	89	86
AKSE	271	258	254	222	216	201	192	185	179
WAIW	54	55	53	56	55	61	58	57	57
ORCO	4	5	4	5	5	5	3	3	4
Other	43	39	40	47	63	58	48	40	47
Total	600	554	574	545	541	576	519	474	507

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.1.9 Fixed Gear Catcher Vessels ≤ 32 Feet in Length (FGCV ≤ 32)

These vessels constitute a distinct class, because of specific differences when compared to larger fixed gear catcher vessels. Vessels in this class typically were designed for salmon fisheries, and a vessel length of 32 ft is the maximum for the Bristol Bay salmon drift gillnet fishery. While an average crew size for these vessels is about 3, including the skipper, the actual number depends primarily on the size of the vessel. The vessels in this class may use a mix of longline, jig, and sometimes pot gear to harvest halibut and groundfish before or after the salmon season. The number of vessels in the FGCV ≤ 32 class decreased significantly in 1995, at least partly as a result of implementation of the halibut and sablefish longline fishery IFQ program. Non-groundfish species, especially salmon and halibut, generally account for the majority of the fleet's earnings, although catches of high-value groundfish, such as sablefish and Pacific cod, are important to the financial health of many of the vessels. The central GOA FMP subarea is the most important fishing area for this class. In recent years, Kodiak shoreside processors accounted for a larger share of the ex-vessel value of the class, while the importance of Southcentral Alaska processing facilities has diminished. This change has occurred, because of the higher participation of these vessels in the Pacific cod fishery. Table 6-64 shows the participation, catches, and revenues of these vessels in groundfish fisheries based on fish ticket data.

Table 6-64. Participation, Catch, and Ex-vessel Revenue of Fixed Gear Catcher Vessels ≤ 32 Feet in Length by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	0	0	0	0	0	0	0	0	0
FLAT	1	4	3	5	2	2	9	1	4
OGRN	5	10	16	9	4	7	4	3	14
PCOD	40	37	54	43	59	76	50	42	60
PLCK	3	2	9	7	8	6	12	9	10
ROCK	37	37	45	43	45	54	28	29	26
SABL	26	20	14	18	17	19	21	22	22
Total	64	53	66	59	70	92	63	56	77
					Retained Catch Excluding PSC (mt)				
AMCK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLAT	a	4.10	a	40.87	a	a	11.04	a	78.99
OGRN	2.92	7.83	9.18	11.30	91.84	1.61	1.89	178.43	210.28
PCOD	416.61	426.51	917.64	910.38	1,249.01	1,101.78	1,682.49	1,354.81	1,993.13
PLCK	a	a	2.53	3.44	9.81	8.35	11.55	3.38	130.91
ROCK	146.47	147.25	228.18	146.45	94.29	86.35	42.78	75.53	43.30
SABL	134.77	143.89	17.73	24.88	73.95	113.54	55.32	125.90	86.03
Total	700.77	729.58	1,175.25	1,137.33	1,518.90	1,311.63	1,805.07	1,738.05	2,542.65
					Ex-Vessel Revenue ($)				
AMCK	0	0	0	0	0	0	0	0	0
FLAT	a	2,300	a	22,993	a	a	4,916	a	5,188
OGRN	3,539	1,994	3,128	10,510	49,657	704	415	104,081	94,975
PCOD	223,957	236,799	501,064	445,644	734,521	784,381	1,058,290	799,289	1,215,279
PLCK	a	a	567	974	2,146	2,101	2,245	470	5,729
ROCK	134,888	119,671	186,741	117,485	92,660	93,182	44,232	74,499	48,365
SABL	609,670	650,886	92,326	85,107	313,712	570,570	246,712	559,988	432,799
Total	972,053	1,011,650	783,826	682,713	1,192,696	1,450,938	1,356,810	1,538,327	1,802,335

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an “a” have been added to OGRN.

Table 6-65 shows the relative importance of Alaska groundfish and non-groundfish fisheries to vessels in this class. In recent years, groundfish (sablefish, in particular) and halibut have been more important to the class than salmon. The decline of salmon as the primary revenue fishery is generally due to low returns and declining prices of sockeye in Bristol Bay.

Table 6-65. Participation, Catch, and Ex-vessel Revenue of Fixed Gear Catcher Vessels ≤ 32 Feet in Length in Groundfish and Non-Groundfish Fisheries , 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
GFISH	64	53	66	59	70	92	63	56	77
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	6	1	5	1	1	1	4	6	3
HLBT	22	26	30	28	24	28	24	22	NA
OTH SPC	13	12	18	13	8	12	3	9	9
SALM	22	28	28	23	25	39	23	16	26
SCAL	0	0	0	0	0	0	0	0	0
Total	64	53	66	59	70	92	63	56	77
					Retained Catch Excluding PSC (mt)				
GFISH	700.77	729.58	1,175.25	1,137.33	1,518.90	1,311.63	1,805.07	1,738.05	2,542.65
AI CRAB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTH CRAB	19.37	a	36.35	a	a	a	a	2.31	a
HLBT	140.02	169.08	275.93	436.46	433.10	567.55	504.47	483.48	NA
OTH SPC	32.78	63.65	13.08	20.03	5.28	18.71	12.86	98.69	59.30
SALM	831.93	616.68	426.35	255.75	642.28	777.29	419.48	447.64	544.22
SCAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1,724.87	1,578.99	1,926.95	1,849.56	2,599.56	2,675.19	2,741.88	2,770.16	3,146.17
					Ex-Vessel Revenue ($)				
GFISH	972,053	1,011,650	783,826	682,713	1,192,696	1,450,938	1,356,810	1,538,327	1,802,335
AI CRAB	0	0	0	0	0	0	0	0	0
OTH CRAB	121,991	a	181,977	a	a	a	a	25,090	a
HLBT	582,734	827,093	1,287,372	1,225,976	1,938,945	3,187,539	2,123,791	2,372,250	NA
OTH SPC	35,352	87,790	17,284	51,565	24,062	63,426	10,810	44,579	84,463
SALM	1,439,875	961,628	716,869	547,279	1,212,301	1,080,918	411,304	381,454	533,164
SCAL	0	0	0	0	0	0	0	0	0
Total	3,152,006	2,888,161	2,987,328	2,507,534	4,368,004	5,782,821	3,902,714	4,361,699	2,419,963

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an “a” have been added to OTH SPC. Also, catch and revenue data for the halibut fishery for 2003 are not yet available for the sectors used here. (NA).

Table 6-66 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A.

Table 6-66. Count of Fixed Gear Catcher Vessels ≤ 32 Feet in Length by Region of Residence of Vessel Owners, 1995-2003

	Year								
Region	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	8	2	0	1	0	0	0	0	1
AKKO	10	2	1	3	4	5	3	5	4
AKSC	31	18	21	15	15	21	20	14	18
AKSE	13	5	7	4	2	4	2	0	4
WAIW	2	8	9	11	8	15	6	14	9
ORCO	0	0	0	0	0	0	0	0	0
Other	3	6	3	2	16	20	16	12	22
Total	67	41	41	36	45	65	47	45	58

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.2 Groundfish Catcher Processors

This section describes 4 classes of groundfish catcher processor vessels—two trawl classes and two fixed gear classes—as defined in Table 6-67. These vessel classes are primarily defined by their fishing activities in a given year and type of fishing gear used, although the AFA-eligible catcher processors are also defined by statute. The vessel classes are described in more detail in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc., 2001) and are used to describe the groundfish fishing fleets in the *Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement* (NMFS 2004a).

Table 6-67. Groundfish Catcher Processor Classes

Abbreviation	Description
ST/FT-CP	**Surimi Trawl Catcher Processor.** These factory trawlers have the necessary equipment to produce surimi or fillets from pollock and other groundfish. They are generally the largest of all CPs. Vessels with surimi equipment focus almost exclusively on pollock, while vessels that do not have surimi equipment may focus on Pacific cod as well as pollock. Beginning in 1999 this class includes all AFA-qualified catcher processors.
HT-CP	**Head-and-Gut Trawl Catcher Processor.** These factory trawlers do not process more than incidental amount of fillets. Generally, they are limited to headed and gutted products or kirimi. In general, they do not focus their efforts on pollock, opting instead for flatfish, Pacific cod, and Atka mackerel. HT-CP vessels are the smallest of the trawl CPs.
P-CP	**Pot Catcher Processor.** These vessels have been used primarily in the crab fisheries of the North Pacific, but increasingly are participating in the Pacific cod fisheries. They generally use pot gear, but may also use longline gear. They produce whole or headed and gutted groundfish products, some of which may be frozen in brine, rather than blast frozen.
L-CP	**Longline Catcher Processor**. These vessels, also known as freezer longliners, do not trawl or use pot gear, but use longline gear and focus on Pacific cod. Most L-CP vessels are limited to headed and gutted products, and in general are smaller than HT-CP vessels.

As with the catcher vessel class descriptions, the descriptions of specific groundfish catcher processor classes follow a standard format for ease of comparison.

Table 6-68 summarizes the total catch and wholesale revenue of groundfish catcher processor classes. Overall, the data indicate that groundfish catches have generally declined since 1995, but wholesale revenues have increased significantly.

Table 6-68. Catch and Wholesale Revenue of Groundfish Catcher Processors by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Vessel Class					Total Catch (1,000 mts)				
ST/FT-CP	863.14	771.44	723.58	674.37	444.55	507.35	616.96	494.89	504.14
HT-CP	339.38	367.27	381.91	297.94	299.06	330.47	294.19	343.19	342.77
P-CP	4.86	8.04	4.55	3.53	7.57	3.86	5.33	2.83	1.71
L-CP	130.96	122.73	157.85	133.68	122.40	134.78	141.47	124.40	129.22
All Groundfish CPs	1,338.34	1,269.49	1,267.89	1,109.52	873.58	976.46	1,057.95	965.31	977.84
					Wholesale Revenue ($ Millions)				
ST/FT-CP	480.22	383.90	381.16	335.98	346.39	401.99	410.33	509.72	520.48
HT-CP	174.82	197.62	161.30	121.72	138.51	151.50	148.34	370.26	366.82
P-CP	2.93	6.52	3.17	3.35	9.36	4.87	6.01	5.56	3.37
L-CP	89.77	92.95	93.30	108.07	131.05	140.89	125.72	222.73	230.53
All Groundfish CPs	747.74	680.99	638.92	569.11	625.31	699.25	690.40	1,108.27	1,121.20

Source: 1995-2000 blend and wholesale price data compiled by NPFMC, 2001-2003 blend and wholesale price data compiled by NOAA Fisheries Alaska Fisheries Science Center.

6.6.3.2.1 Surimi and Fillet Trawl Catcher Processors (ST/FT-CP)

These large factory trawlers focus almost exclusively on surimi and/or fillet production in the BSAI pollock fisheries. The large size of these vessels also provides room for equipment to produce fishmeal, minced product, and other product forms. Pollock is the primary species harvested by this vessel class, but Pacific cod are also targeted. Some vessels have produced surimi from yellowfin sole. The size of the ST/FT-CP fleet has decreased substantially since 1995. The elimination of excess fishing capacity under the AFA and declining quotas for the offshore class resulting from inshore-offshore allocations were two factors that contributed to this decline. The operational characteristics and activities of these vessels in waters off Alaska are largely determined by the Bering Sea pollock fishing seasons. Table 6-69 shows the participation, catches, and revenues of these vessels in groundfish fisheries.

Table 6-69. Participation, Catch, and Wholesale Revenue of Surimi and Fillet Trawl Catcher Processors by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species				Number of Vessels					
AMCK	25	25	22	22	14	13	16	16	16
FLAT	33	32	29	28	16	15	16	16	16
OTHR	33	32	29	28	16	15	16	16	16
PCOD	33	32	29	28	16	15	16	16	16
PLCK	33	32	29	28	16	15	16	16	16
ROCK	31	32	28	27	16	15	16	16	16
SABL	13	8	11	14	7	12	15	14	10
Total	33	32	29	28	16	15	16	16	16
				Total Catch (1,000 mts)					
AMCK	10.83	9.43	12.58	8.15	0.63	0.00	0.01	0.01	0.23
FLAT	60.86	69.72	64.14	32.88	15.90	14.54	5.51	5.30	6.64
OTHR	3.19	3.44	2.50	1.81	1.09	4.41	1.27	0.76	1.05
PCOD	40.08	33.82	31.37	24.25	13.08	5.52	5.81	3.47	3.74
PLCK	745.03	651.10	610.22	603.09	413.57	482.76	603.87	485.07	491.85
ROCK	2.95	3.74	2.66	4.07	0.28	0.12	0.48	0.28	0.64
SABL	0.20	0.19	0.10	0.12	0.00	0.00	0.01	0.00	0.00
Total	863.14	771.44	723.58	674.37	444.55	507.35	616.96	494.89	504.14
				Wholesale Revenue ($ Millions)					
AMCK	2.61	2.14	2.88	0.82	0.15	0.00	0.00	0.00	0.05
FLAT	22.91	18.99	17.61	6.52	2.38	1.98	0.83	5.27	7.77
OTHR	0.01	0.01	0.01	0.00	0.02	0.01	0.04	0.33	0.42
PCOD	14.99	11.71	15.08	14.52	8.95	4.04	2.37	6.86	7.53
PLCK	437.18	348.37	344.05	312.18	334.88	395.96	407.09	497.21	504.28
ROCK	1.61	1.86	1.10	1.40	0.01	0.00	0.00	0.05	0.43
SABL	0.90	0.82	0.42	0.54	0.00	0.00	0.00	0.01	0.00
Total	480.22	383.90	381.16	335.98	346.39	401.99	410.33	509.72	520.48

Source: 1995-2000 blend and wholesale price data compiled by NPFMC, 2001-2003 blend and wholesale price data compiled by NOAA Fisheries Alaska Fisheries Science Center.

The average crew size of vessels in the ST/FT-CP class is large in comparison to that of other catcher processor classes. The average crew size of FT-CP vessels is approximately 76, while that of ST-CP vessels is about 104. All of the vessels in the ST/FT-CP class are registered by individuals or companies in the Washington Inland Waters Region. Table 6-70 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A.

Table 6-70. Count of Surimi and Fillet Trawl Catcher Processors by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	0	0	0	0	0	0	0	0
AKKO	0	0	0	0	0	0	0	0	0
AKSC	0	0	0	0	0	0	0	0	0
AKSE	0	0	0	0	0	0	0	0	0
WAIW	33	32	29	28	16	15	16	16	16
ORCO	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0
Total	33	32	29	28	16	15	16	16	16

Source: 1995-2000 blend data compiled by NPFMC, 2001-2003 blend data compiled by NOAA Fisheries Alaska Fisheries Science Center, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.2.2 Head-and-Gut Trawl Catcher Processors (HT-CP)

These are large- and medium-sized factory trawlers that primarily produce headed and gutted products. Flatfish species—yellowfin sole and rock sole, in particular—are the primary target species for this class, and Atka mackerel, rockfish, and Pacific cod are important secondary targets. None of the other vessel classes (including catcher vessels) target as many species as the HT-CPs. Loadline regulations (which establish standards for seafood processing on vessels), space constraints, and other factors make the production of surimi and fillets infeasible for head-and-gut catcher processors. Table 6-71 shows the participation, catches, and revenues of these vessels in groundfish fisheries.

Table 6-71. Participation, Catch, and Wholesale Revenue of Head-and-Gut Trawl Catcher Processors by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species	Number of Vessels								
AMCK	21	21	20	20	20	18	15	14	10
FLAT	32	28	28	23	24	24	23	23	24
OTHR	32	28	28	23	24	24	23	23	24
PCOD	32	28	28	23	24	24	23	23	24
PLCK	32	28	28	23	24	24	23	23	24
ROCK	31	27	24	22	22	23	22	22	23
SABL	32	27	23	22	21	22	23	21	21
Total	32	28	28	23	24	24	23	23	24
	Total Catch (1,000 mts)								
AMCK	70.80	95.60	53.42	48.69	55.51	47.23	61.25	41.76	52.59
FLAT	152.54	160.75	221.67	162.55	143.16	182.29	135.12	163.70	161.74
OTHR	6.88	8.13	8.57	8.79	8.33	10.70	9.47	11.55	8.37
PCOD	38.28	31.96	31.76	30.53	28.14	31.15	28.58	34.40	31.79
PLCK	39.88	38.53	38.78	24.32	29.36	31.92	31.08	64.00	57.52
ROCK	29.27	31.09	26.81	22.28	33.52	25.88	27.51	26.18	29.46
SABL	1.74	1.21	0.90	0.78	1.04	1.30	1.16	1.60	1.30
Total	339.38	367.27	381.91	297.94	299.06	330.47	294.19	343.19	342.77
	Wholesale Revenue ($ Millions)								
AMCK	41.65	66.59	33.82	17.54	22.79	19.91	44.58	65.93	77.43
FLAT	88.40	92.50	93.77	63.09	59.14	72.04	54.17	151.31	146.60
OTHR	0.03	0.02	0.07	0.07	0.02	0.17	0.20	1.12	1.83
PCOD	12.85	14.49	12.49	25.96	33.59	38.25	30.34	66.71	61.71
PLCK	4.02	3.23	2.21	4.80	5.25	7.92	9.30	49.24	45.82
ROCK	22.69	17.11	15.91	8.20	14.07	9.87	6.90	26.40	26.97
SABL	5.18	3.69	3.02	2.06	3.65	3.36	2.85	9.55	6.45
Total	174.82	197.62	161.30	121.72	138.51	151.50	148.34	370.26	366.82

Source: 1995-2000 blend and wholesale price data compiled by NPFMC, 2001-2003 blend and wholesale price data compiled by NOAA Fisheries Alaska Fisheries Science Center.

The number of head-and-gut catcher processors decreased from 32, in 1995, to 23 in 2001. The target fisheries of the HT-CP class are usually limited by prohibited species catch limits for halibut or market constraints. Only rarely are these vessels able to catch the entire TAC of the target fisheries available to them. The Bering Sea is clearly the focus of these vessels, but a substantial number also fish in the Aleutian Islands and Western and Central GOA. Relatively few head-and-gut catcher processors fish in the Eastern GOA. The closure of some of the best fishing grounds for the major target species to protect Bering Sea crab and Steller sea lions has adversely affected the cost structure of the head-and-gut catcher processors. In addition, headed and gutted fish harvested by Japanese and Korean vessels, from Russian waters, is increasing competition in the marketplace.

A typical crew of a head-and-gut catcher processor might include a captain, a mate, two engineers (one each for the vessel and processing equipment), a cook/housekeeper, 2 to 3 crewmembers dedicated to the deck, a processing foreman and assistant, and about 25 processing workers. Most head-and-gut catcher processors are registered by individuals or companies in the Washington Inland Waters Region. Only one head-and-gut catcher processor was registered by an Alaska resident, through 2001, with two registered in Alaska in more recent years. Table 6-72 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A.

Table 6-72. Count of Head-and-Gut Trawl Catcher Processors by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	0	0	0	0	0	0	0	0
AKKO	1	1	1	1	1	1	1	2	2
AKSC	0	0	0	0	0	0	0	0	0
AKSE	0	0	0	0	0	0	0	0	0
WAIW	25	23	23	18	19	19	18	17	18
ORCO	1	0	0	0	0	0	0	0	0
Other	3	3	4	4	4	4	4	4	4
Total	30	27	28	23	24	24	23	23	24

Source: 1995-2000 blend data compiled by NPFMC, 2001-2003 blend data compiled by NOAA Fisheries Alaska Fisheries Science Center, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.2.3 Pot Catcher Processors (P-CP)

The crab fisheries in the Bering Sea are the primary fisheries for this class, and groundfish harvest and production are typically secondary activities. When harvesting groundfish, this class principally targets Pacific cod, because this species can be captured in sufficient numbers with pot gear to generate adequate revenues. Headed and gutted products are the primary finished products from this activity by the P-CP class. Some also capture cod for their own subsequent use in the crab fisheries, as a source of high quality bait, and/or supply the demand for bait of other crab vessels. Table 6-73 shows the participation, catches, and revenues of these vessels in groundfish fisheries. Confidentiality restrictions prevent disclosure of catch locations for P-CPs.

Table 6-73. Participation, Catch, and Wholesale Revenue of Pot Catcher Processors by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species				Number of Vessels					
AMCK	6	8	5	4	5	2	3	2	2
FLAT	5	8	6	4	8	7	6	5	1
OTHR	6	9	6	5	9	10	7	5	3
PCOD	6	9	7	5	9	10	6	6	3
PLCK	5	8	6	3	4	5	4	5	3
ROCK	6	8	6	2	7	7	4	2	0
SABL	3	3	0	0	2	1	4	2	0
Total	6	9	7	5	9	10	7	6	3
				Total Catch (1,000 mts)					
AMCK	0.00	0.00	0.00	0.00	0.00	NA	0.02	NA	NA
FLAT	0.02	0.07	0.03	0.08	0.04	0.06	0.19	0.02	NA
OTHR	0.10	0.13	0.04	0.04	0.10	0.07	0.06	0.04	0.03
PCOD	4.74	7.83	4.44	3.41	7.42	3.73	5.01	2.77	1.66
PLCK	0.00	0.01	0.03	0.00	0.01	0.01	0.06	0.01	0.01
ROCK	0.00	0.00	0.00	NA	0.00	0.00	0.00	NA	0.00
SABL	0.00	0.00	0.00	0.00	0.00	NA	0.01	NA	0.00
Total	4.86	8.04	4.55	3.53	7.57	3.86	5.33	2.83	1.71
				Wholesale Revenue ($ Millions)					
AMCK	0.00	0.00	0.00	0.00	0.00	NA	0.01	NA	NA
FLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	NA
OTHR	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.01
PCOD	2.93	6.52	3.16	3.34	9.34	4.87	5.93	5.55	3.35
PLCK	0.00	0.00	0.00	NA	0.00	0.00	0.01	0.01	0.01
ROCK	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	0.00
SABL	0.00	0.00	0.00	0.00	0.01	NA	0.01	NA	0.00
Total	2.93	6.52	3.17	3.35	9.36	4.87	6.01	5.56	3.37

Source: 1995-2000 blend and wholesale price data compiled by NPFMC, 2001-2003 blend and wholesale price data compiled by NOAA Fisheries Alaska Fisheries Science Center.

The success of these vessels in crab fisheries during any given year influences the number of vessels participating in groundfish fisheries. In recent years, relatively low crab harvests and historically high prices for Pacific cod have made the groundfish fisheries relatively more attractive for pot catcher processors.

The vessels in this class typically use a personnel structure similar to that of a catcher vessel. Although a pot catcher processor requires personnel with some expertise in processing activities, it does not usually hire persons who strictly process, as is the case for other catcher processor operations. Rather, crewmembers are usually capable of undertaking both fishing and processing tasks, as well as normal ship operational duties. The average pot catcher processor crew size is about 11. Most pot catcher processors are registered by individuals or companies in the Washington Inland Waters Region. One pot catcher processor has been registered by an individual or company in Kodiak since 1995. Table 6-74 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A.

Table 6-74. Count of Pot Catcher Processors by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	0	0	0	0	0	0	0	0
AKKO	1	1	1	1	1	1	1	1	1
AKSC	0	0	0	0	0	0	0	0	0
AKSE	0	0	0	0	0	0	0	0	0
WAIW	5	8	6	4	7	9	6	4	1
ORCO	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	1	0	1	1	1
Total	6	9	7	5	9	10	8	6	3

Source: 1995-2000 blend data compiled by NPFMC, 2001-2003 blend data compiled by NOAA Fisheries Alaska Fisheries Science Center, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.3.2.4 Longline Catcher Processors (L-CP)

Vessels in this class are restricted to producing whole or headed and gutted products for reasons similar to those described for head-and-gut catcher processors—loadline regulations plus a lack of space to accommodate additional crew and equipment. Pacific cod is the primary target species of longline catcher processors, with sablefish and Greenland turbot as important secondary targets. This class evolved because regulations applying to this gear type provide more fishing days than are available to trawlers. These vessels are able to produce relatively high-value products that compensate for the low catch rates and relatively lower catch volumes associated with longline gear. The BSAI is by far the most important FMP area for the longline L-CP class. Table 6-75 shows the participation, catches, and revenues of these vessels in groundfish fisheries.

Table 6-75. Participation, Catch, and Wholesale Revenue of Longline Catcher Processors by Groundfish Species, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Species					Number of Vessels				
AMCK	19	16	17	15	16	22	30	22	23
FLAT	46	43	42	42	39	41	44	42	41
OTHR	47	43	40	42	39	41	44	42	40
PCOD	46	40	38	39	39	40	42	40	39
PLCK	42	38	37	37	36	40	40	40	39
ROCK	45	40	40	40	38	39	42	38	38
SABL	44	38	38	40	37	37	38	40	36
Total	47	43	42	42	39	41	44	42	41
					Total Catch (1,000 mts)				
AMCK	0.05	0.04	0.04	0.10	0.07	0.15	0.27	0.04	0.02
FLAT	5.71	7.00	8.41	9.61	5.97	7.57	5.40	4.72	4.45
OTHR	11.32	8.84	13.50	14.43	14.16	17.22	15.57	13.49	16.00
PCOD	106.95	100.97	128.66	103.38	95.49	102.07	111.67	97.54	99.59
PLCK	3.36	2.92	4.51	3.31	3.93	4.84	5.96	5.96	6.32
ROCK	0.53	0.64	0.51	0.85	0.63	0.78	0.76	0.52	0.64
SABL	3.03	2.31	2.21	1.99	2.15	2.15	1.84	2.12	2.19
Total	130.96	122.73	157.85	133.68	122.40	134.78	141.47	124.40	129.22
					Wholesale Revenue ($ Millions)				
AMCK	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.01
FLAT	4.42	6.52	7.36	7.97	6.28	7.37	2.20	3.25	3.14
OTHR	0.33	0.25	0.25	0.09	0.20	0.32	0.58	2.76	5.00
PCOD	70.69	74.08	73.98	91.40	113.85	121.55	113.77	193.30	197.38
PLCK	0.50	0.16	0.24	0.70	0.94	1.07	1.57	5.34	5.68
ROCK	1.01	0.72	0.49	0.88	0.67	0.80	0.39	0.37	0.50
SABL	12.83	11.21	10.98	7.03	9.12	9.78	7.17	17.72	18.82
Total	89.77	92.95	93.30	108.07	131.05	140.89	125.72	222.73	230.53

Source: 1995-2000 blend and wholesale price data compiled by NPFMC, 2001-2003 blend and wholesale price data compiled by NOAA Fisheries Alaska Fisheries Science Center.

The L-CP fleet generally begins fishing for Pacific cod on January 1 and continues to April or May. This species is fished again from September 15 to November or December. Most vessels in this class undergo maintenance and repair in the summer months, although several vessels process and custom freeze salmon during this period.

The main employment positions on a longline catcher processor include processing crew, fishing crew, and officers. Large vessels are required to have more licensed officers than are small ones. On smaller vessels, specialized personnel such as the engineer or cook may also have additional crew duties, the processing crew and fishing crew may not be as distinct from one another as they are on larger vessels, and fishing effort must be reduced during processing. A vessel of average size typically has a crew of 15, consisting of 6 fishermen, 6 processors, a skipper, a cook, and an engineer.

The L-CP class is more diverse than other at-sea processing classes in terms of ownership—nearly 25% of the vessels in many years were registered to Alaskan owners. Table 6-76 shows the regions in which the individuals or companies that registered the vessels in this class are located. A table showing the communities in which these individuals or companies are located can be found in Appendix A.

Table 6-76. Count of Longline Catcher Processors by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	1	1	1	1	1	1	1	1	1
AKKO	1	1	1	2	2	2	2	0	0
AKSC	3	3	4	3	3	3	5	2	2
AKSE	3	3	2	4	4	4	4	3	3
WAIW	35	32	33	32	28	30	31	33	32
ORCO	0	0	0	0	0	0	0	0	0
Other	4	3	1	0	1	1	2	3	3
Total	47	43	42	42	39	41	45	42	41

Source: 1995-2000 blend data compiled by NPFMC, 2001-2003 blend data compiled by NOAA Fisheries Alaska Fisheries Science Center, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.4 Description of Non-Groundfish Fisheries

This section describes 4 non-groundfish fisheries that could be potentially affected by the proposed HAPC actions. The 4 potentially affected fisheries are the

- Aleutian Islands golden (brown) king crab and red king crab fisheries;
- Alaska weathervane scallop fishery;
- Pacific halibut fishery; and
- Gulf of Alaska dinglebar troll fishery for lingcod

6.6.4.1 Aleutian Islands Golden (Brown) King Crab and Red King Crab Fisheries

This description of the Aleutian Islands golden (brown) king crab and red king crab fisheries is based on information obtained from NPFMC (2003c) and Granath (2003). The long-term trend in fishing effort in the Aleutian Islands golden (brown) king crab fishery is a decline in the number of vessels registered per season with increasing number of pots registered per vessel. With the legalization of longline gear in 1986, vessels became more specialized in fishing for golden king crabs and were able to more efficiently operate gear. The longline vessels tended to fish in the Aleutian Islands almost exclusively and forego some Bering Sea crab fisheries. Seasons in the golden king crab fisheries last several months. In contrast, seasons shorter than one month characterize the Bristol Bay red king and Bering Sea *C. opilio* fisheries. However, several of the vessels in this class continue to participate in the Bristol Bay red king crab and Adak red king crab fisheries when these fisheries are open.

Until 1996, the Aleutian Islands golden king crab stock was separated into two management areas—Dutch Harbor, and Adak— within the Aleutian Islands Management Area (Area O). Beginning in 1997, Area O was redefined as having western and eastern areas split at 174°W. The initial golden king crab fishery in the new Area O king crab Registration Area occurred in 1996/1997. GHLs of 3.2 million lbs and 2.7 million lbs, respectively, were established for the areas east and west of 174°W. Compared to prior combined Adak and Dutch Harbor Area fisheries, effort and harvest were lower. In 1996/1997, 18 vessels harvested 5.9 million lbs, down from 28 vessels taking 6.9 million lbs in 1995/1996. This reduction in effort is likely due to the departure of vessels for the Bristol Bay red king crab season, which reopened to commercial fishing in 1996, for the first time since 1993.

Effort and harvest have remained relatively stable in the Aleutian Islands east of 174°W, while the fishery west of 174°W has experienced greater variability in catch and effort. Both the eastern and western fleets are composed mostly of catcher vessels. During the 1999/2000 season, there was only one catcher processor in each fleet. As of May 2003, a total of 38 vessel owners had Aleutian Islands golden king crab endorsements (27 with licenses and 11 with interim licenses). Six of the vessels in the western fleet are affiliated with 2 of the shoreside processors, while 3 of the vessels in the eastern fleet are affiliated with 2 of the processors.

The 2003/04 GHL for the Aleutian Islands was set at 5.7 million lbs, with 2.7 million lbs for the area west of 174°W, and 3.0 million lbs for the area east of 174°W. Fifteen vessels participated in the eastern fishery, while fishing effort in the western fishery fluctuated throughout the season from 2 to 6 vessels. High demand for golden king crab resulted in an average ex-vessel price of $3.55 per lb. While the 2004/05 GHL remains unchanged from the 2003/04 level, the ADF&G has noted a continued decline, since 2000, in the catch of sublegal male golden king crabs in the area east of 174°W. The 2003 catch of sublegal males was the lowest in the last 6 years.

The western portion of the Aleutian Islands (Area O) red king crab fishery was closed for the 1996/97 and 1997/98 seasons, due to poor performance and poor signs of recruitment during the 1995/96 season. The eastern portion of the fishery has been closed since 1983. The western portion was reopened for limited exploratory fishing in some areas in 1998/99. Based on the results of the 1998/99 season, the fishery in the western portion was closed in 1999/2000. A cooperative ADF&G-industry pot survey was performed in the Petrel Bank-Semisopochnoi Island area under the provisions of a permit fishery in 2001. Results of those surveys show high densities of legal crabs within limited portions of the surveyed area. Based on results of the 2001 surveys and recommendations from ADF&G and the public, the Alaska Board of Fisheries adopted pot limits, and modified the season opening date. A GHL of 0.5 million pounds was set for the 2002/03 and 2003/04 seasons in the Petrel Bank area.

However, fishery performance and observer data in 2002 and 2003, indicated that harvests in the Petrel Bank area were largely supported by a single aging cohort of crab, and that there is little possibility of new recruitment to the legal size class in the next two years (ADF&G, 2004). In order to ensure the long-term reproductive viability of the stock and to promote rebuilding, the Petrel Bank red king crab fishery will not open in 2004.

Table 6-77 shows the participation, catch, and revenue of various vessels classes in fisheries where crab was the target species (as determined by the species with the greatest weight on the fish ticket) and the area fished was the Aleutian Islands area. These fishing activities are not necessarily directly related to the Aleutian Islands golden (brown) king crab and Petrel Bank red king crab fisheries. Consequently, the harvest amounts reported in the tables may not be consistent with the catches in these fisheries described above. Nonetheless, the data presented in the table indicate the vessels that depend on crab fishing in the Aleutian Islands.

Table 6-77. Participation, Catch, and Ex-Vessel Revenue in the Aleutian Islands Crab Target Fisheries by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Vessel Class					Number of Vessels				
TCV Non-AFA	0	0	1	0	0	0	0	0	0
PCV	8	3	0	0	4	6	2	10	12
LCV	5	1	0	0	0	0	2	1	2
FGCV 33-59	0	0	0	0	0	0	0	0	1
AI crab CV	19	20	13	16	12	11	18	38	33
Salmon CV	2	0	1	0	0	0	0	0	0
Total	34	24	15	16	16	17	22	49	48
					Retained Catch (mt)				
TCV Non-AFA	0.00	0.00	b	0.00	0.00	0.00	0.00	0.00	0.00
PCV	602.07	264.72	0.00	0.00	385.69	457.58	70.06	177.64	402.28
LCV	540.61	a	0.00	0.00	0.00	0.00	a	a	a
FGCV 33-59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	a
AI crab CV	2,882.28	3,433.01	2,553.55	2,470.64	1,927.42	2,244.28	2,932.60	2,562.22	2,460.14
Salmon CV	147.66	0.00	b	0.00	0.00	0.00	0.00	0.00	0.00
Total	4,172.61	3,697.73	2,553.55	2,470.64	2,313.11	2,701.86	3,002.66	2,739.87	2,862.42
					Ex-Vessel Value ($)				
TCV Non-AFA	0	0	b	0	0	0	0	0	0
PCV	3,385,359	1,259,761	0	0	2,638,484	3,512,572	531,533	1,817,347	3,310,982
LCV	3,061,349	a	0	0	0	0	a	a	a
FGCV 33-59	0	0	0	0	0	0	0	0	27,828
AI crab CV	18,055,524	15,725,156	12,620,361	10,302,887	13,185,259	16,694,905	21,050,763	20,313,153	19,783,543
Salmon CV	966,233	0	b	0	0	0	0	0	0
Total	25,468,465	16,984,918	12,620,361	10,302,887	15,823,743	20,207,477	21,582,296	22,130,500	23,122,353

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an "a" have been added to PCV and cells shown with a "b" have been added to AI Crab CV.

Table 6-78 shows the region of residence of the owners of vessels that participated in fisheries where crab was the target species (as determined by the species with the greatest weight on the fish ticket) and the area fished was the Aleutian Islands area. Most of the vessel owners are in the WAIW region. A table showing the communities in which vessel owners are located can be found in Appendix A.

Table 6-78. Count of Vessels in the Aleutian Islands Crab Target Fisheries by Region of Residence of Vessel Owners, 1995-2003

	Year								
Region	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	1	0	0	0	0	0	0	2
AKKO	2	1	1	2	2	2	3	4	3
AKSC	1	0	1	1	1	0	1	2	3
AKSE	0	1	0	0	0	0	0	0	0
WAIW	12	14	8	11	7	7	11	23	18
ORCO	3	2	2	2	2	2	2	3	3
Other	1	1	0	1	0	0	1	4	3
Total	19	20	12	17	12	11	18	36	32

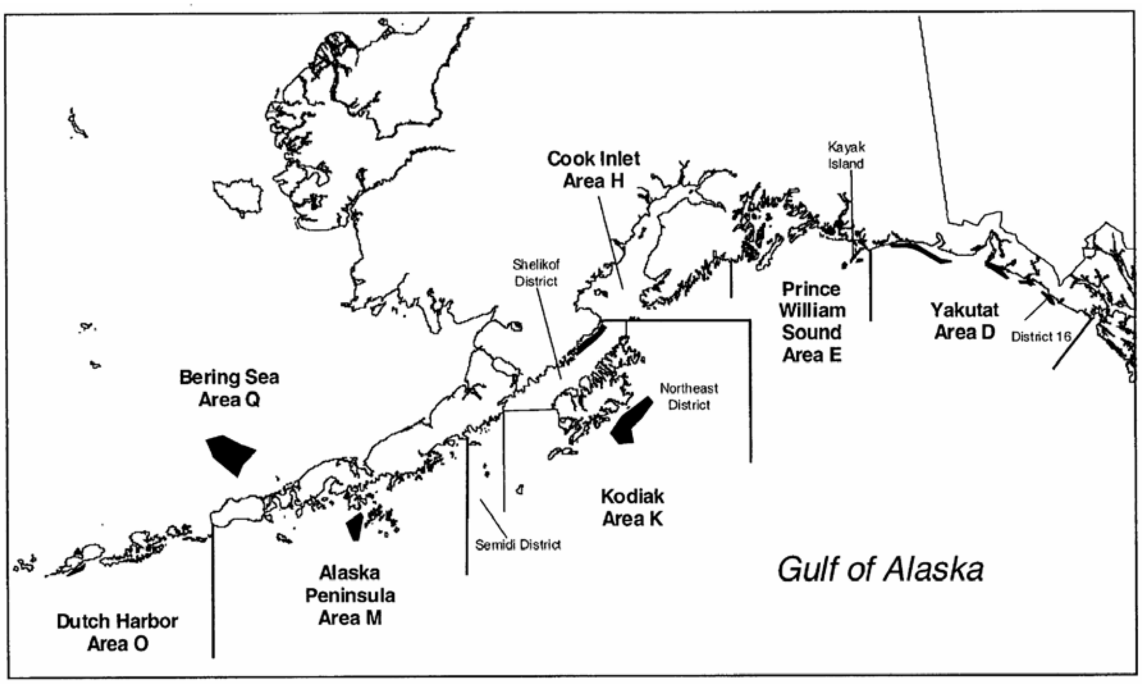
Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.4.2 Alaska Weathervane Scallop Fishery

This description of the Alaska weathervane scallop fishery is based on information obtained from NPFMC (2003d). This vessel class consists of boats that exclusively target scallops using standard New Bedford-style dredge gear. On average, the 15-foot dredges used in registration areas outside of Cook

Inlet weigh roughly 2,600 pounds, while the 6-foot dredge in the Cook Inlet Registration Area weighs roughly 900 pounds. Vessels operating in Cook Inlet are also limited to a single dredge. A license limitation program (LLP) limits participation in Federal waters to nine vessels, while a State vessel moratorium also limits participation in State waters to nine vessels. Only 3 vessels appear on both lists. Thus, there are a total of 15 vessels allowed to operate in State waters, Federal waters, or both. Currently, only 2 of the State vessel moratorium permits are active. The vessels in the Federal fishery consolidated the fleet through a voluntary industry cooperative in May 2000. The formation of the cooperative has lengthened the amount of time over which fishing effort occurs in the fishery. Table 6-79 shows the reduced number of vessels operating in the fishery. The season for all registration areas, except Cook Inlet, is from July 1 through February 15. The season in Cook Inlet is from August 15 to October 31 in the Kamishak District, and from January 1 and December 31 in other districts, as defined by an exploratory permit. Figure 6-1 shows the registration districts for the scallop fishery and the areas in which fishing activity generally occurs.

Figure 6-1. Registration Areas for the Alaska Weathervane Scallop Fishery and Areas of Concentrated Fishing Activity (Shaded Areas)



Source: NPMFC, 2003d

Table 6-79 also shows the retained catch and estimated ex-vessel revenue in the scallop target fishery reported in fish tickets from 1996-2003. Because most of the vessels operating in the fishery are catcher processors, and are required to shuck scallop meats on board, the reported ex-vessel revenue actually represents an approximation of first wholesale value.

Table 6-79. Participation, Catch, and Ex-Vessel Revenue in the Scallop Fishery by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Vessel Class	Number of Vessels								
LCV	0	1	0	0	0	0	0	0	1
FGCV 33-59	0	1	1	0	0	0	0	0	0
Scallop CV	10	7	8	8	10	8	6	6	3
Total	10	9	9	8	10	8	6	6	4
	Retained Catch (mt)								
LCV	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	a
FGCV 33-59	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00
Scallop CV	159.22	330.41	363.96	378.59	380.00	324.00	250.49	223.32	238.82
Total	159.22	330.41	363.96	378.59	380.00	324.00	250.49	223.32	238.82
	Ex-Vessel Value ($)								
LCV	0	a	0	0	0	0	0	0	a
FGCV 33-59	0	a	a	0	0	0	0	0	0
Scallop CV	1,847,667	4,670,516	4,329,672	3,956,042	2,982,067	2,814,997	2,153,876	3,144,253	827,782
Total	1,847,667	4,670,516	4,329,672	3,956,042	2,982,067	2,814,997	2,153,876	3,144,253	827,782

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an "a" have been added to Scallop CVs.

Table 6-80 shows the region of residence of the owners of vessels participating in the scallop fishery. A table showing the communities in which vessel owners are located can be found in Appendix A.

Table 6-80. Count of Scallop Catcher Vessels by Region of Residence of Vessel Owners, 1995-2003

Region	Year								
	1995	1996	1997	1998	1999	2000	2001	2002	2003
AKAPAI	0	0	1	1	1	1	1	1	1
AKKO	2	2	2	2	2	1	1	1	1
AKSC	0	1	1	0	3	3	2	3	1
AKSE	1	1	1	1	0	0	0	0	0
WAIW	0	0	0	0	0	0	0	0	0
ORCO	0	0	0	0	0	0	0	0	0
Other	7	3	3	4	4	3	2	1	0
Total	10	7	8	8	10	8	6	6	3

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.4.3 Pacific Halibut Fishery

The Pacific halibut fishery is managed by the International Pacific Halibut Commission, (IPHC), NOAA Fisheries, and the NPFMC. The IPHC assesses stock levels, defines management areas, sets total allowable catches, and monitors the fishing activity on the grounds. The NPFMC recommends broad-based socioeconomic policies for the halibut fishery, while NOAA Fisheries approves and implements the socioeconomic policies recommended by the NPFMC.

Since 1995, the halibut fishery has been managed using individual fishing quotas (IFQs) in which qualified permit holders are allocated a predetermined amount of the overall commercial catch quota. The IFQ policy was developed by the NPFMC, is implemented by NOAA Fisheries, and is monitored by the IPHC. The IPHC sets total harvest levels for several management areas in Alaska, as described at the IPHC Web site: http://www.iphc.washington.edu. General detailed descriptions of the IPHC management areas are as follows:

- Area 2C in the GOA Southeastern Alaska from the border with Canada through Yakutat

- Area 3A in the GOA in Southcentral Alaska from Yakutat to the eastern edge of Kodiak Island
- Area 3A the GOA from western edge of Kodiak Island to the end of the Alaska Peninsula
- Area 4A in the GOA and Bering Sea along the Aleutian Islands
- Area 4B – Area 4e in the Bering Sea north of the Alaska Peninsula and Aleutian Islands

Table 6-81 shows participation and catch over two-year periods in the Alaska halibut fisheries, by management area, as compiled by the IPHC. Area 3A has the greatest level of harvest followed by Area 3B and 2C.

Table 6-81. Participation and Catch in the Halibut Fishery by IPHC Management Area, 1995-2003

	2C	3A	3B	4A	4B	4C	4D	4E	4EE	Total
					Number of Vessels					
1995-1996	1,357	1,369	408	178	95	66	56	121	23	NA
1997-1998	1,130	1,183	391	151	83	65	53	175	66	NA
1999-2000	1,020	1,013	383	153	80	62	48	225	44	NA
2001-2002	893	896	368	148	74	57	44	220	63	NA
Total	1,820	1,817	609	275	156	107	102	390	129	NA
					Landed Catch (mt)					
1995-1996	7,485	16,988	2,937	1,504	1,700	611	612	80	32	31,950
1997-1998	8,810	22,121	8,706	2,724	2,722	1,069	1,099	138	61	47,451
1999-2000	8,230	19,271	12,722	4,164	3,634	1,586	1,705	232	47	51,591
2001-2002	7,588	19,828	14,967	4,498	3,820	1,296	1,584	316	153	54,050
Total	32,113	78,208	39,333	12,891	11,876	4,562	5,000	766	293	185,042

Source: Data compiled by IPHC, August 2004.

Table 6-82 shows participation, catch, and revenue from fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center. Vessels are grouped by the vessel classes reported in earlier sections of the document. Actual catch total may not be consistent with the IPHC total, due to the different aggregation methods used and different programming rules used to build the data files. The large number of different vessel classes that participate in the halibut fishery shows both how important the halibut fishery is and the relative ease of entry into the fishery, even though participants must own individual quotas.

Table 6-82. Participation, Catch, and Ex-Vessel Revenue in the Halibut Fishery by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002
Vessel Class	Number of Vessels							
TCV BSP 60-124	3	2	1	0	1	1	3	3
TCV Div. AFA	2	3	5	7	4	4	1	1
TCV Non-AFA	15	17	17	16	13	13	12	13
TCV < 60	25	24	25	25	23	22	23	17
PCV	31	35	24	24	25	33	17	14
LCV	108	92	80	76	71	57	62	66
FGCV 33-59	478	452	452	393	407	419	383	358
FGCV ≤ 32	23	27	30	28	24	28	24	22
AI crab CV	0	0	0	0	0	0	0	1
Other CV	852	739	788	616	632	624	571	516
Scallop CV	0	1	1	0	1	1	1	1
Halibut CVs	645	682	685	563	622	620	591	618
Total	2,182	2,074	2,108	1,748	1,823	1,822	1,688	1,630
	Retained Catch of All Species (mt)							
TCV BSP 60-124	132.89	94.54	92.61	0.00	109.21	109.76	117.56	230.70
TCV Div. AFA	a	a	a	214.27	a	a	a	a
TCV Non-AFA	402.92	360.56	627.98	485.45	535.39	486.96	461.33	573.74
TCV < 60	334.79	330.45	534.79	554.92	533.06	493.94	632.00	572.24
PCV	967.69	1,101.96	1,296.25	1,242.27	1,441.88	2,245.56	1,129.82	996.58
LCV	2,788.21	2,691.61	4,169.35	4,084.89	5,115.90	4,248.78	5,273.93	5,202.15
FGCV 33-59	4,730.47	5,305.32	7,481.01	7,936.54	9,017.87	9,032.29	9,930.73	10,380.05
FGCV ≤ 32	142.50	171.69	277.28	434.00	443.18	569.60	500.93	479.78
AI crab CV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	a
Other CV	2,834.99	2,981.62	4,120.60	4,061.71	4,457.52	3,342.59	3,556.25	3,329.30
Scallop CV	0.00	a	a	0.00	a	a	a	a
Halibut CVs	1,730.93	2,042.28	3,131.73	3,337.79	4,037.78	3,429.81	4,048.51	5,035.94
Total	14,065.39	15,080.02	21,731.58	22,351.84	25,691.79	23,959.29	25,651.06	26,800.50
	Ex-Vessel Value of All Species ($)							
TCV BSP 60-124	585,567	456,361	416,789	0	501,246	621,110	513,036	1,117,608
TCV Div. AFA	a	a	a	519,720	a	a	a	a
TCV Non-AFA	1,692,188	1,722,709	2,569,333	1,345,062	2,434,958	2,696,612	2,015,250	2,748,856
TCV < 60	1,426,392	1,588,661	2,454,896	1,518,044	2,315,579	2,760,124	2,802,223	2,705,586
PCV	4,067,122	5,213,971	5,939,796	3,414,938	6,391,031	12,333,830	4,791,129	4,759,453
LCV	11,789,067	12,473,700	19,172,740	11,351,617	22,438,269	23,516,851	22,918,881	24,980,275
FGCV 33-59	20,249,388	25,597,476	34,779,946	22,759,839	39,152,714	49,667,415	42,857,829	49,644,905
FGCV ≤ 32	578,565	827,208	1,272,551	1,203,133	1,939,521	3,175,843	2,077,816	2,326,831
AI crab CV	0	0	0	0	0	0	0	a
Other CV	12,166,137	14,348,536	19,198,819	11,612,548	19,403,409	18,550,264	15,597,428	15,826,037
Scallop CV	0	a	a	0	a	a	a	a
Halibut CVs	7,180,759	9,443,879	14,048,643	8,819,273	15,991,494	16,704,242	16,853,805	23,139,778
Total	59,735,185	71,672,501	99,853,512	62,544,174	110,568,220	130,026,290	110,427,398	127,249,330

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004.
Note: To maintain data confidentiality, cells shown with an "a" have been added to TCV BSP 60-124.

Table 6-83 shows the region of residence of the owners of vessels with landings of halibut for the years 1995 through 2003. Vessels owned by Alaska residents far outnumber those owned by residents of other states. A table showing the communities in which vessel owners are located can be found in Appendix A.

Table 6-83. Count of Halibut Catcher Vessels by Region of Residence of Vessel Owners, 1995-2003

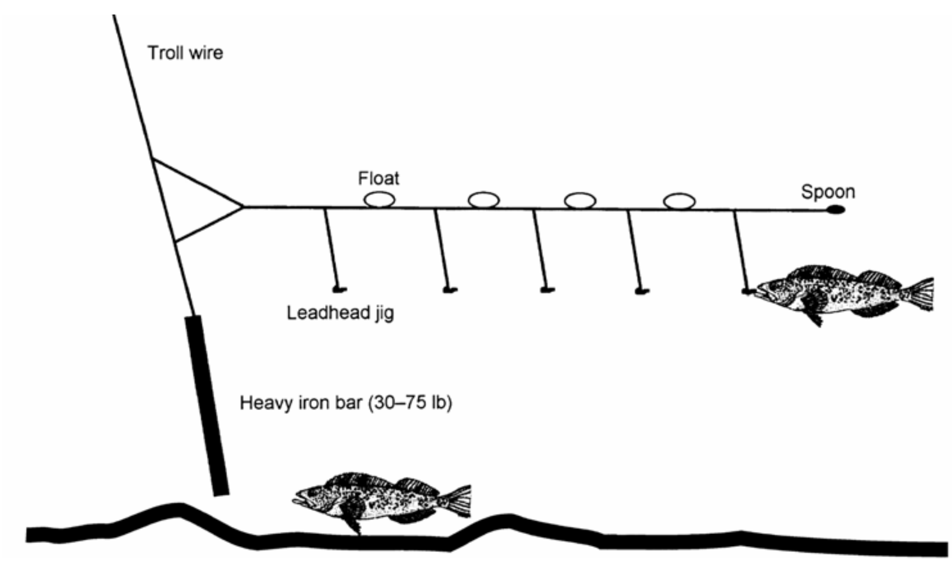
Region	Year							
	1995	1996	1997	1998	1999	2000	2001	2002
AKAPAI	68	72	79	60	64	62	59	59
AKKO	169	178	179	141	154	159	142	142
AKSC	467	417	413	335	346	329	323	294
AKSE	1,002	931	909	756	776	745	681	676
WAIW	166	171	165	146	148	144	130	119
ORCO	23	23	22	23	21	20	15	15
Other	287	282	341	287	314	363	338	325
Total	2,182	2,074	2,108	1,748	1,823	1,822	1,688	1,630

Source: Fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.4.4 Dinglebar Troll Fishery for Lingcod

The GOA dinglebar troll fishery for lingcod is managed by the State of Alaska. Nevertheless, a description of the fishery is included in this analysis, because Option 1 of Alternative 2 under proposed Action 2 would restrict all bottom contract gear, as would Alternative 3 under Action 2. These proposed measures are not specifically limited to “Council-managed” fisheries. According to the Alaska Administrative Code, “Dinglebar troll gear consists of a single line that is retrieved and set with a power or hand-troll gurdy, with a terminally attached weight, from which one or more leaders with one or more lures or baited hook are pulled through the water while a vessel is underway” (5 AAC 28.130(h)). Figure 6-2 is a depiction of a typical dinglebar troll setup. Most of the vessels participating in the directed fishery for lingcod are salmon trollers, under 40 feet in length.

Figure 6-2. A Depiction of Dinglebar Troll Gear



Source: Gordon, 1994.

Information about the lingcod fishery in Southeast Alaska is relatively limited. The fishery was open access and basically unmanaged prior to the 1997 fishing season. Since 1997, ADF&G has managed the fishery using a permit system, but the fishery is still open access—permits are available for a small fee. The fishery is managed with a guideline harvest level, with targeting prohibited after the GHL is taken.

Participation, catch, and revenue in the fishery are shown in Table 6-84. The fishery is centered in the Southeast Alaska community of Sitka, but significant lingcod catches are also made by permit holders from Wrangell and Petersburg. A table showing the communities in which vessel owners are located can be found in Appendix A.

Table 6-84. Participation, Catch, and Ex-Vessel Revenue in the Southeast Alaska Lingcod Fishery, 1997-2002

	1997	1998	1999	2000	2001	2002
Permits Fished	43	29	27	22	20	22
Pounds Caught	317,080	209,939	159,183	205,429	110,822	191,737
Pounds per Permit	7,374	7,239	5,896	9,338	5,541	8,715
Ex-Vessel Revenue ($)	181,474	126,562	128,583	171,290	62,769	138,497
Ex-Vessel Revenue per Permit ($)	4,220	4,364	4,762	7,786	3,138	6,295

Source: Data adapted by Northern Economics, Inc. from CFEC Census Area Reports at http://www.cfec.state.ak.us/GPBYCEN/2003/mnu.htm.

6.6.5 Fishing Dependent Communities

Analysis of community dependency and impacts is guided by National Standard 8 under the Magnuson-Stevens Act, along with associated guidelines. National Standard 8 states the following:

> "Conservation and management measures shall, consistent with the conservation requirements of [the Magnuson-Stevens] Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities and (B) to the extent practicable, minimize adverse economic impacts on such communities" (Sec. 301(a)(8)).

The Magnuson-Stevens Act defines a 'fishing community' as

> "...a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and United States fish processors that are based in such community" (Sec. 3 [16]). NMFS further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)." (63 FR 24235, May 1, 1998)

'Sustained participation' is defined by NMFS as: "...continued access to the fishery within the constraints of the condition of the resource." (63 FR 24235, May 1, 1998). Consistent with National Standard 8, this section first identifies affected regions and communities and then describes and assesses the nature and magnitude of their dependence on and engagement in the fisheries relevant to this analysis.

6.6.5.1 Community and Regional Fishery Dependence

The groundfish vessel fleet potentially affected by the various regulatory alternatives considered is large and widely dispersed among many communities and regions. In addition to harvesting groundfish, many of these vessels also participate in a number of non-groundfish fisheries, some of which may also be directly affected by the regulatory alternatives. Potentially affected non-groundfish fisheries include the Alaska weathervane scallop, Alaska halibut, and Aleutian Islands crab fisheries. Table 6-85 summarizes the fishing activity of vessels participating in fisheries potentially affected by HAPC regulations, broken down by the regions of residence of vessel owners. Catches shown in the table include those in potentially affected fisheries and all other Alaska fisheries in which these vessels participate. Revenues listed in the table include ex-vessel revenues for catcher vessels and wholesale revenues for catcher processors. Tables showing the communities in which vessel owners are located can be found in Appendix A.

Table 6-85. Participation, Catch, and Revenue in Fisheries Potentially Affected by HAPC Regulations by Region of Residence of Vessel Owners, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Alaska Peninsula and Aleutian Islands Region									
Total Number of Vessels	120	130	139	109	107	106	112	111	82
Total Catch (1,000 mts)	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total Revenue ($ Millions)	21.88	14.23	17.06	15.87	21.64	20.73	17.08	15.70	11.85
Kodiak Region									
Total Number of Vessels	237	253	261	243	247	265	224	215	192
Total Catch (1,000 mts)	0.07	0.06	0.07	0.08	0.08	0.07	0.08	0.05	0.05
Total Revenue ($ Millions)	89.16	78.26	77.86	69.98	99.92	93.97	79.06	74.96	52.40
Southcentral Alaska Region									
Total Number of Vessels	559	480	488	396	406	422	381	337	233
Total Catch (1,000 mts)	92.12	88.69	99.04	96.08	96.22	86.07	58.22	55.59	53.37
Total Revenue ($ Millions)	79.94	75.47	80.75	60.85	91.19	93.38	48.37	50.64	25.91
Southeastern Alaska Region									
Total Number of Vessels	1,077	1,029	977	811	828	796	721	713	488
Total Catch (1,000 mts)	63	74	69	67	80	64	75	63	55
Total Revenue ($ Millions)	108.68	110.58	121.58	86.19	112.34	115.41	90.81	95.97	63.09
Washington Inland Waters Region									
Total Number of Vessels	341	326	320	305	323	338	290	267	246
Total Catch (1,000 mts)	2.09	2.00	1.99	1.83	1.61	1.74	1.01	0.92	0.92
Total Revenue ($ Millions)	1,560.05	1,342.67	1,337.32	1,147.23	1,380.52	1,539.58	853.09	1,251.07	1,246.39
Oregon Coast Region									
Total Number of Vessels	46	46	46	48	48	48	42	42	41
Total Catch 1,000 mts)	468	441	463	458	464	517	558	588	600
Total Revenue ($ Millions)	37.18	31.30	33.68	29.27	42.65	43.02	36.46	38.34	36.32
Other Communities in Alaska, the Pacific Northwest and Other States									
Total Number of Vessels	331	324	383	344	402	458	423	394	148
Total Catch (1,000 mts)	0.13	0.16	0.14	0.13	0.14	0.12	0.13	0.16	0.16
Total Revenue ($ Millions)	92.23	147.19	94.60	53.46	122.50	79.90	67.54	109.01	93.95
All Regions									
Total Number of Vessels	2,711	2,588	2,614	2,256	2,361	2,433	2,193	2,079	1,430
Total Catch (1,000 mts)	2.94	2.83	2.84	2.67	2.49	2.61	1.92	1.84	1.85
Total Revenue ($ Millions)	1,989.12	1,799.69	1,762.85	1,462.84	1,870.76	1,986.00	1,192.41	1,635.69	1,529.91

Source: CV data are from fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004. CP data are from 1995-2000 blend data compiled by NPFMC, 2001-2003 blend data compiled by NOAA Fisheries, and CFEC vessel registration data at http://www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm.

6.6.5.2 Community and Regional Socioeconomic Profiles

Regions and communities engaged in and/or dependent upon the fisheries encompassed by this RIR span a large portion of coastal Alaska and include communities in the Pacific Northwest as well. These regions vary considerably in their socioeconomic structure, and include communities of widely varying scales from small, relatively isolated Alaska Native villages to the greater Seattle metropolitan area. The specific geographic footprint of engagement with or dependence upon commercial fishing varies by the specific fishery involved. For example, many communities are engaged in the groundfish fisheries, while the scallop fishery involves few communities in a relatively small area.

Regional socioeconomic profiles specific to the groundfish fisheries are available in a summary prepared by Downs (2003), and a more detailed treatment with individual community profiles may be found in Sector and Regional Profiles of the North Pacific Groundfish Fisheries 2001 (Northern Economics, Inc. and EDAW, Inc. 2001). While directed at groundfish fisheries, both of these documents also contain a considerable amount of information on harvester and processor diversity on a regional basis with respect to crab and halibut fisheries. More detailed information on individual crab fishing communities may be found in the *Draft Environmental Impact Statement for the Bering Sea Aleutian Islands King and Tanner Crab Fisheries, Appendix 3: Social Impact Assessment* (NMFS, 2004c). Information on the regional distribution of the scallop and halibut fisheries may be found in Sections 3.4.1.4.4 and 3.4.2.1.4, respectively, of the EFH EIS (NMFS, 2005). The scallop fishery has few participating entities, and vessel ownership (and landings) within Alaska are tightly concentrated in the Kodiak and Cook Inlet areas. Socioeconomic profiles of these areas are contained within the groundfish regional information. The halibut fishery spans a wide area and involves dozens of communities. While recent socioeconomic profile information is not available at the same level of detail for the overall area encompassed by the halibut fishery as for the groundfish and crab regions and communities, considerable information on the socioeconomic context of key communities is available in both the groundfish and crab sources noted previously.

6.7 Analysis of the Alternatives

As previously noted, data limitations largely preclude a quantitative analysis of the relative economic and socioeconomic impacts of the proposed actions. Data deficiencies include the following:

1. Cost and operating structure of the groundfish, halibut, crab, or scallop (i.e., potentially affected) segments of the industry
2. The linkages between changes in fishing behavior and catch per unit of effort, PSC, and bycatch rates
3. Probable operational adjustments and coping strategies (e.g., effort redeployment patterns) that may be adopted by various elements of the industry in response to one or another of the HAPC designation alternatives
4. Market demand and price responses to supply shocks (e.g., reduced quantities; changes in timing, quality, or product form; etc.)
5. Affiliation and ownership linkages (both horizontal and vertical), which may influence the economic viability of any given operation following a significant structural change in the fishery that is attributable to adoption of a HAPC designation alternative

Therefore, except in the specific case of differential impacts on gross revenues attributable to each of alternatives, the ability to quantitatively distinguish between the effects of the suite of HAPC designation alternatives (and options) is limited within this analysis. With the single exception of gross revenues, the balance of the regulatory impact analysis is primarily limited to characterizing the nature, probable direction, and (in some cases) the likely gross magnitude of economic and operational effects resulting from these alternatives. Impacts have been monetized wherever possible and appropriate.

6.7.1 Confidentiality Restrictions

Federal law specifies that fisheries data collected for Federal fisheries, and the results of analysis of such data, may only be reported to the public when 3 or more operations (e.g., independently owned vessels and/or plants) are included in the reporting category, while State of Alaska confidentiality limits require no fewer than 4 independent entities. This analysis has found that 3 or fewer vessels recorded harvests in ADF&G groundfish/shellfish statistical areas in many years. Thus, the ability of this analysis to report meaningful effects on harvest and revenue has been constrained by confidentiality restrictions. In some instances, it is possible to overcome these restrictions by aggregating multiple years of data. In this analysis, the analysts have determined that so few vessels operated in some of the potentially affected areas that aggregation of years would not prevent an individual with local knowledge from gaining knowledge of confidential operating revenue information. Thus, this analysis has identified data that can be made available and instances where confidentiality prevents inclusion of data. Given this limitation, this analysis has treated the potential effects of the alternatives in a largely qualitative way, while using what data can be made available illustratively.

6.7.2 Methodology

The analysis of each alternative presents potential benefits and costs attributable to the alternative under consideration. These analyses are conducted from the point of view of all citizens of the United States; that is, they seek to address the question: “What is likely to be the net benefit to the Nation?”

The costs and benefits of the HAPC designation alternatives would not be homogeneously distributed across the population. Many of the costs, in particular, may be highly concentrated on particular fishing industry components affected by the different alternatives, on fishing communities dependent on that industry component, and on sectors of the economy that supply goods and services to, or otherwise support, that industry component. Therefore, the analysis also reviews and evaluates the distribution issues of the HAPC designation alternatives. Section 6.8 summarizes these benefits, costs, and distribution impacts across all the alternatives under consideration.

The alternatives discussed in this analysis address concerns that ongoing fishing activity may be adversely modifying specific habitat areas, within HAPCs, that may warrant additional management, because they are ecologically important, stressed, susceptible to adverse effects of fishing and other human activities, and/or rare. The potential benefits associated with the proposed HAPC designations are described in Section 6.7.2.1 and include both use benefits and non-use (passive-use) benefits. The potential costs associated with the proposed HAPC designations are described in Section 6.7.2.2 under seven headings:

1. Revenue at risk
2. Operating costs
3. Costs to consumers
4. Impacts on related fisheries
5. Fishing safety
6. Effects to fishing communities
7. Regulatory and enforcement programs

6.7.2.1 Benefits

As discussed in the EFH EIS (NMFS 2005), the marine ecosystems and associated species that EFH supports may provide a range of benefits to humans. These benefits span a spectrum from use benefits associated with direct physical use or personal consumption of products or services derived from these environmental assets, to benefits accruing to individuals who do not use the assets but who derive value from knowing they are being protected.

The social value of a particular habitat area depends on the area’s characteristics (NMFS 2005). Regulations at 50 CFR 600.815 state that HAPCs are subsets of EFH that have been identified as areas of particular importance based on one or more of the following considerations:

(i) The importance of the ecological function provided by the habitat.

(ii) The extent to which the habitat is sensitive to human-induced environmental degradation.

(iii) Whether, and to what extent, development activities are, or will be, stressing the habitat type.

(iv) The rarity of the habitat type.

In the discussion below the first (ecological function) and fourth (rarity) criteria for assessing a proposed HAPC are shown to be related to the area's use value and non-use value, respectively. The second and third criteria are shown to be indicators of the likelihood that the stream of use and non-use benefits generated by a given habitat area could be diminished, or completely eliminated, by human activities.

6.7.2.1.1 Use Value

In accordance with regulations, the proposed HAPCs considered in this EA/RIR/IRFA were evaluated with regard to the ecological function they provide. According to NMFS (2004d), ecological studies of coral gardens in the Aleutian Islands have yet to be conducted. However, the agency notes that it is likely that these habitat areas serve many important ecological functions:

> Several FMP species, at a variety of life stages, have been observed in coral gardens. Gardens likely provide important structural habitat for many of these species, including refuge for juvenile life stages of several species. The presence of gravid females may indicate that the habitat may provide important breeding or spawning habitat for at least one FMP species. Additionally, these gardens provide an elevated feeding platform for many sessile invertebrates and may provide a source of prey for species of fish that aggregate there. Furthermore, coral gardens may play an important role in meso-scale nutrient cycling, due to the presence of large numbers of filter feeding corals and sponges. (NMFS, 2004d, page 4).

With respect to the proposed HAPCs in the GOA containing high relief corals, NMFS (2004e) indicates that *Primnoa* colonies in these habitat areas likely serve several important ecological functions, including providing important structural habitat for many species, including refuge for juvenile rockfish.

Similarly, NMFS (2004f, page 3) states that the proposed HAPCs associated with seamounts are ecologically significant features:

> Offshore currents transport egg and juvenile life stages of fish species. Some of these are deposited on seamounts, where depth and substrate may be preferred by the particular species. Less migratory species may take residence. Slack water above the seamount summit (as compared to the higher current flank areas) concentrates diurnal migrations of plankton, which then begin to settle and may concentrate fish above and on summit of the seamount.
>
> Seamounts may attract migratory species, such as sablefish, if preferred habitats are present and feeding opportunities exist. Spawning may also occur. Directed fishery research has documented large adult male and gravid female sablefish on Alaska seamounts, while noting the absence of any juvenile sablefish. (This absence is not attributed to selectivity of the research gear, since the same gear has recruited juvenile life stages in similar research effort.) These seamounts may serve as a stepping-stone for a migratory species or a species may establish a resident reproductive stock on the seamount.

The ecological functions provided by the proposed HAPCs indirectly generate use benefits for society by supporting various extractive activities that produce goods and services. In particular, by providing important structural habitat for many FMP species, the proposed HAPCs contribute to the productivity and yield of commercial, recreational, and subsistence fisheries that are of economic, social, and cultural importance.

The proposed HAPCs may also provide important habitat for non-FMP species that have direct use value. It is reported, for example, that Alaska Natives actively seek out and harvest black and red deepsea corals for use in the production of Native art (NMFS, 2005). Moreover, the proposed HAPCs may provide some future consumptive use benefit that is not currently used or even identified. For example, these areas may provide habitat for an unused species of plant or animal that, in the future, may prove to have value to society.

From the standpoint of effects on use value, therefore, the most relevant consideration for distinguishing among the alternatives considered is how the production rates of FMP species and other species in the habitat areas of interest and surrounding environs might potentially benefit. In the case of commercial fisheries, use value can be quantified by translating fish production into revenues using market prices. Current knowledge, however, permits only a highly conditional evaluation of the effects of fishing on general classes of habitat features and allows only broad connections to be drawn between these features and the life history processes of some managed species (NMFS, 2005). Consequently, no quantifiable or even qualitative measure of sustained or increased yield in production or biomass of FMP species or other species is available for this analysis. That is, based upon currently available scientific data and understanding of these fishery and habitat resources, it is not possible to measure any direct use benefits linked to the biological or ecological changes attributable to the proposed HAPCs.

6.7.2.1.2 Non-use Value

The proposed HAPCs considered in this EA/RIR/IRFA were also evaluated with regard to the rarity of the habitat type. With respect to coral gardens in the Aleutian Islands, NMFS (2004d, page 4) states that:

> Garden habitat is uncommon and may be unique to the Aleutian Islands. Prior to its discovery during the 2002 Aleutian submersible surveys coral gardens had not been documented during hundreds of submersible dives conducted by AFSC scientists in Alaskan waters. It has not previously been reported in the North Pacific Ocean and was observed at only 9 of 40 dive locations in the central Aleutian Islands during the 2002 surveys. Coral gardens may be a unique habitat for high latitudes.

In a discussion of the rarity of GOA high relief corals, NMFS (2004e) notes that dense concentrations of *Primnoa* sp. are uncommon, and *Primnoa* sp. corals are patchy in distribution. According to NMFS (2004f), GOA seamounts are also rare features consisting of isolated habitats far from contiguous shelf and slope habitat features.

The rarity of the characteristics of the proposed HAPCs may influence people's perceptions that these areas should be protected irrespective of their use value.[3] This non-use value, also referred to as passive-use or existence value, does not involve personal consumption of derived products or in situ contact; rather, it emanates from the satisfaction of knowing that a particular environmental asset survives in an undisturbed state. It is likely that some people derive pleasure from the contemplation of the unique and

[3] Individuals may also hold a positive non-use value for environmental assets that are not rare – witness the opposition by some members of the public to the gray whale hunt by the Makah people of the Pacific Northwest, despite the fact that NMFS deemed the gray whale stock to be in good condition and capable of withstanding a restricted harvest.

varied life forms existing in the proposed HAPCs and would be willing to pay to preserve the structure and integrity of those biological communities, even if they never directly "experience" them.

From the standpoint of effects on non-use benefits, therefore, the most relevant consideration for distinguishing among the alternatives considered is the degree to which ecosystem health and biodiversity in the habitat areas of interest might potentially benefit. As noted above, however, current knowledge permits only a highly conditional evaluation of the effects of fishing on general classes of habitat features. Moreover, the only widely accepted means of estimating non-use values is by surveying people to find out what they would be willing to pay (or willing to accept, depending upon with whom the implicit property right resides) for any given action that affects a resource for which these values are hypothesized to exist. The EFH EIS (NMFS, 2005) notes that there has been no study published to date concerning the non-use value of EFH in the EEZ off Alaska. Therefore, it is not possible to provide a specific monetary estimate of the non-use value that is hypothesized to be associated with one or another of the proposed alternatives.

While it is not possible at this time to provide an empirical estimate of the total (both use and non-use) social value attributable to protection of the proposed HAPCs, the alternatives to the status quo (i.e., Alternative 1) would be expected to yield an incremental social benefit over the baseline condition (although the net benefit, i.e., the benefits minus the costs, may not necessarily be positive). That is, it is assumed that each of the alternatives yields some additional protection for EFH from fishing gear impacts, compared to the status quo.

6.7.2.1.3 Potential Threats to Use and Non-Use Benefit Stream

Evaluations of the proposed HAPCs considered in this EA/RIR/IRFA indicate that many of the species in these areas are sensitive to human-induced environmental degradation and there is evidence of damage from fishing gear in some areas (NMFS, 2004d, 2004e, 2004f). Submersible observations and fishery bycatch records indicate that *Primnoa* sp. colonies in the GOA are easily damaged or detached from the seafloor if contacted by fishing gear (NMFS, 2004e). According to NMFS (2004e, page 4), "Some derelict longline gear and evidence of damage from that gear was observed from the submersible."

Similarly, many of the species occurring in coral garden habitat in the Aleutian Islands are fragile, long-lived, and slow-growing (NMFS, 2004d). Some species are very susceptible to damage from anything that contacts them and will likely require long periods of time to recover from disturbance. NMFS (2004d, page 4) notes the damage to this habitat by fishing activity:

> [Coral] garden habitat generally consists of high relief bedrock and coarse talus in areas where mobile bottom-contact fishing gear (e.g. otter trawls) is seldom used. There is evidence, however, of disturbance consistent with that caused by longlining and pot longlining. Some derelict longline gear was observed in garden habitat.

Alaska seamount habitats are also sensitive to disturbances from certain human activities, such as the use of bottom-contact fishing gear (NMFS, 2004f). Fishermen have shown limited interest in the named seamounts on NOAA Charts within the EEZ of the Alaska Region for several reasons, including their distance from port and depth. However, these seamounts are within the range of current fishing vessels that use bottom-contact gear.

6.7.2.2 Costs

6.7.2.2.1 Revenue at Risk

Accurate estimates of the change in gross revenues from reduced production associated with the HAPC designation alternatives require information on: 1) the volume of production coming from fishing areas that would be affected by each of the alternatives, for each of the vessel classes; 2) the extent to which each fleet class would re-deploy displaced fishing effort into other fishing areas in an attempt to mitigate the loss of production from the areas directly affected by the HAPC designations; and 3) the relative productivity of the vessel classes in the new areas compared with the HAPC-affected areas.

Currently, it is possible to estimate only the first of these (i.e., the volume of production coming from areas that would no longer be available to fishermen under each of the alternatives). The foregone production, combined with data on historical ex-vessel and/or first wholesale prices, allows estimates of the gross revenues, for each fleet class, potentially placed at risk under the different alternatives. To better place these impacts in a comparable empirical context, an analytical approach is adopted here, in which the question evaluated is expressed as follows: "What would the effects of these alternatives have been, had each, in turn, been in place in the 1995-2003 period?" By posing the analytical question in this way, it is possible to use actual empirical information and official data records on fleet participation, catch composition, production patterns, ex-vessel and first wholesale prices, bycatch quantities, spatial and temporal distribution of effort, and geographical patterns of deliveries to primary processors or transshipping facilities. These revenue at risk calculations represent an upper bound estimate of the potential impact of the alternatives on the gross revenues of different vessel classes. In many cases, it is likely that displaced catch could be made up by shifting effort to another area.

Groundfish Catch-in-Area Dataset

Revenue at risk calculations, used in this analysis, rely on a groundfish catch-in-area (C-I-A) dataset, which varies somewhat from the datasets typically used in analyses of groundfish management actions. Because the proposed HAPC designations apply to small areas of the ocean, it is difficult to find catch data that provide sufficient geographic precision. Currently, only observer data are precise enough to fill the needs of the HAPC analysis, but observer coverage on groundfish vessels is less than 100%. To address this problem, NOAA Fisheries Alaska Region developed a C-I-A dataset for assessing the impacts of the regulatory alternatives on groundfish fisheries. The C-I-A dataset is a compilation of fish tickets, weekly production reports, and observer data. It includes information on groundfish catch by ADF&G groundfish/shellfish statistical area, species, target, vessel identification, gear type, processor identification, total catch, discarded catch, and retained catch. Retained and discarded catch is found by grouping the blend or Catch Accounting System (CAS) data with similar groupings in the C-I-A dataset and taking the ratio of the reported catch and retained catch.

Depending on whether the effects on observed or unobserved vessels were being assessed, this analysis applied the C-I-A dataset using one of the following methodologies for determining the amount of catch that would be restricted under each regulatory alternative:

1) Observed and partially observed vessels: The first step for determining the restricted catch for observed or partially observed vessels was to perform a query on data in the Alaska Fisheries Science Center's Resource Ecology and Fisheries Management Observer Program database (NPAC) to determine the observed catches inside each proposed HAPC for the 1995 through 2003 period. Only the catches of gear types affected by the HAPC alternatives considered were included. A second query was performed to find the total observed catch by ADF&G groundfish/shellfish statistical area and gear type. The percent of catch occurring in a proposed HAPC by ADF&G statistical area was

determined by taking the ratio of the observed catch in a proposed HAPC and the total observed catch by gear type in the statistical area in which the HAPC is located.

2) Unobserved vessels: The restricted catch for unobserved vessels (vessels less than 60 feet in length) was determined by means of a simple area proportionality calculation. For instance, if the proposed HAPC encompassed 35,000 square kilometers and the total size of the ADF&G statistical area was 100,000 square kilometers, the percent of catch restricted by the HAPC was determined to be 35%. This methodology may overestimate or underestimate catch (and revenue) at risk, because catch is not evenly distributed across statistical areas.

The ratios derived from the two methodologies described above were incorporated into the C-I-A dataset by regulatory alternative, gear type, and observed or non-observed vessel class, and multiplied by the retained catch for each alternative. The amount of retained catch by alternative was multiplied by the value per ton of the catch by year, designation (catcher processor, or catcher vessel), region (BSAI or GOA), and species group (rockfish, pollock, Pacific cod, flatfish, Atka mackerel, etc.) to determine the revenue at risk for each proposed HAPC designation.

The C-I-A dataset may not be entirely consistent with previously developed datasets. However, the results allow catches to be linked to specific areas in sufficient detail to assess the effects of the regulatory alternatives by region and vessel class.

Table 6-86 provides a summary of estimated catch and wholesale revenue from the C-I-A dataset for all groundfish catcher vessel classes. Table 6-87 provides similar information for groundfish catcher processors. The data summarized in these tables are used as the baseline against which the catches and revenue at risk inside the proposed HAPCs are calculated and compared.

Table 6-86. Catch and Wholesale Revenue of Groundfish Catcher Vessels Based on the C-I-A Dataset by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Vessel Class	Retained Catch (1,000s mt)								
TCV BSP ≥ 125	275.61	241.96	272.44	256.95	275.44	294.67	332.36	362.26	363.88
TCV BSP 60-124	267.72	249.45	223.43	200.69	203.20	240.83	354.04	415.06	415.47
TCV Div. AFA	126.46	162.77	140.20	197.62	155.77	147.24	73.00	184.67	181.95
TCV Non-AFA	36.26	40.79	41.86	52.33	47.58	44.18	46.73	41.74	46.93
TCV < 60	18.59	30.70	35.58	37.52	29.78	26.23	32.57	21.86	20.07
PCV	21.84	29.24	22.56	16.69	19.85	30.00	16.17	13.80	24.04
LCV	8.98	6.71	5.18	5.08	4.79	4.78	4.80	4.25	4.89
FGCV 33-59	20.98	18.87	24.19	23.62	25.67	24.65	21.97	22.44	27.01
FGCV ≤ 32	0.64	0.66	1.08	1.03	0.79	0.87	1.10	1.10	2.34
Other	2.23	1.90	3.04	2.61	2.20	1.83	3.30	3.43	1.20
All Groundfish CVs	779.32	783.04	769.56	794.13	765.08	815.29	886.04	1,070.61	1,087.77
	Wholesale Revenue ($ millions)								
TCV BSP ≥ 125	188.89	140.55	172.36	103.00	158.46	209.43	216.26	231.92	233.35
TCV BSP 60-124	188.30	151.67	145.30	87.97	119.87	170.18	233.76	274.05	271.53
TCV Div. AFA	90.95	104.88	95.68	114.27	107.66	103.31	52.74	118.26	111.91
TCV Non-AFA	35.16	49.24	33.71	48.45	42.60	38.39	42.68	41.63	47.58
TCV < 60	20.41	42.41	33.45	40.50	33.72	30.72	33.14	25.96	23.73
PCV	22.23	27.69	22.11	15.79	24.41	38.39	20.99	18.83	31.58
LCV	47.64	33.83	31.13	21.73	22.83	22.00	24.79	19.30	22.29
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51
FGCV ≤ 32	1.03	1.42	1.31	1.35	1.14	1.39	1.76	2.17	3.32
Other	3.37	3.34	3.85	3.15	3.22	3.03	4.06	3.02	2.18
All Groundfish CVs	666.78	612.80	607.32	492.01	574.47	682.03	694.62	804.44	825.98

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Table 6-87. Catch and Wholesale Revenue of Groundfish Catcher Processors Based on the C-I-A Dataset by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Vessel Class	Retained Catch (1,000s mt)								
ST/FT-CP	681.30	618.43	586.16	594.41	419.17	492.79	611.95	630.58	511.14
HT-CP	204.43	214.49	221.64	194.28	189.09	209.83	197.61	226.53	201.87
P-CP	2.36	3.96	2.46	1.10	4.87	1.80	3.66	2.80	1.58
L-CP	101.72	99.73	128.76	105.21	92.64	94.55	101.13	119.93	111.95
All Groundfish CPs	989.81	936.61	939.01	895.00	705.78	798.97	914.36	979.86	826.55
	Wholesale Revenue ($ millions)								
ST/FT-CP	435.08	358.84	364.09	311.08	333.88	356.18	409.59	441.93	357.75
HT-CP	162.09	168.40	143.74	112.33	128.52	150.53	135.62	165.32	147.32
P-CP	1.58	2.85	1.45	0.96	5.97	2.18	4.38	2.78	1.54
L-CP	78.06	80.91	86.04	95.99	111.56	116.93	104.32	122.74	114.44
All Groundfish CPs	676.82	611.01	595.31	520.36	579.93	625.82	653.92	732.77	621.05

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Non-Groundfish Data

Revenue at risk calculations for Aleutian Island crab and Alaska weathervane scallops are more straightforward than similar calculations for groundfish, because nearly all crab and scallop vessels have observer coverage. Consequently, the geographically precise observer data are fully consistent with fish ticket data reporting total catch.

Observer data for the Aleutian Island crab fishery and Alaska weathervane scallop fishery were examined by NPFMC staff and ADF&G staff, respectively, to determine whether crab or scallops were harvested in any of the proposed HAPCs (Personal communication, Cathy Coon, NPFMC, August 2004; Personal communication, Gregg Rosencrantz, ADF&G, August 2004). The results of the examinations showed that there has been crab and scallop fishing activity in some of the proposed HAPCs. These results are discussed in the analysis of alternatives presented below.

Pacific halibut catch data are similar to Alaska groundfish catch data in that they are not sufficiently geographically precise to make accurate estimates of the catch in the proposed HAPCs. However, in addition to fish tickets, the IPHC collects and analyzes logbook data from halibut vessels. The logbook data show precise catch locations. While the IPHC maintains strict confidentiality of logbook data, the Commission provided estimates of halibut catch in the proposed HAPCs for two-year periods from 1995 through 2003, as well as catch estimates over a similar period in surrounding areas and in each IPHC management area as a whole (IPHC, 2004).

6.7.2.2.2 Operating Costs

Assuming fishing enterprises are profit maximizing entities, any regulatory action that requires a fishing vessel operator to alter his or her fishing pattern, whether in time or space, is likely to impose additional costs on the operator. For example, vessels that had formerly been able to fish areas closer to shore and in relative proximity to their preferred port of operation could be pushed farther offshore and/or into more remote fishing areas as a result of the HAPC alternatives under consideration. Running to one of the remaining open fishing areas, prospecting for harvestable concentrations of target species, then (depending on operating mode) running back to port with raw catch or product would require increased expenditures of fuel and other consumable inputs, as well as more time on the water (i.e., trips may be longer, and all variable operating costs and wear and tear on equipment and crew would increase). Furthermore, if a HAPC alternative negatively affects, for example, catch-per-unit-effort (CPUE), TAC, or catch share, fixed operating costs (costs that do not change with the level of production such as debt payments, some insurance costs, property taxes, and depreciation) must be distributed across a smaller volume of product output, raising the average fixed cost per unit of production.

Only scattered anecdotal information at the operation level is available on fishing costs (fixed or variable). It is, therefore, impossible to do more than provide a qualitative discussion of the impact of the HAPC alternatives on operating costs. While it is not possible to place a numerical estimate on this factor, it is reasonable to conclude that, on average, total fuel consumption would increase, relative to the status quo under each of the proposed alternatives. This increased fuel use would apply, except in the case of vessels that cease to fish as a result of restrictions, and perhaps in the case of vessels that switch to a different fishery.

The smallest, least mobile vessels could be effectively closed out of some fisheries. Many of the larger operations in the Aleutians and Gulf fishing fleets are highly specialized. Many others, however, rely upon diversification (i.e., fishing a sequential series of different target fisheries over the course of the year) to sustain an economically viable operation. Because these operations are economically dependent on participation in a suite of fisheries, anything that alters their ability to move sequentially from fishery opening to fishery opening places them at economic risk. It may not be possible, under these circumstances, for such an operation to remain economically viable in the long run.

While some vessels may find alternate fisheries in which to participate, many vessels are too small and/or lack sufficient horsepower (and likely insufficient revenues from the fishery from which they are being displaced) to make the requisite gear change. Even if switching fisheries is a viable option, the gear conversion costs may include both cash outlays, as well as foregone fishing revenue attributable to down time to complete the transformation. In addition, recruiting, retaining, and/or retraining a professional fishing crew would impose costs of various types.

6.7.2.2.3 Costs to Consumers

Potential domestic consumer losses resulting from the HAPC alternatives fall into two parts. One part, corresponding to the loss of benefits from fish products that are no longer produced, would be a total loss to society. This is often referred to as a deadweight loss. The second part, corresponding to a reduction in consumer benefits, because consumers have to pay higher prices for the fish they continue to buy, would be offset by a corresponding increase in revenues to industry. While this second part is a loss to consumers, it is not necessarily a loss to society. It is a measure of the benefit that consumers used to enjoy, but that now accrues to industry in the form of increased prices and additional revenues.

The actual loss to society cannot be measured with current information about the fisheries. Estimation would require better empirical information about domestic consumption of the different fish species and products, and information about the responsiveness of consumers to the reduction in the supply (e.g., their willingness and ability to substitute other available sources of protein). Under OMB guidelines, costs incurred by foreign consumers are to be excluded from the net benefit analysis performed in a Regulatory Impact Analysis.

6.7.2.2.4 Fishing Safety

Changes in fishery management regulations that result in vessels, particularly smaller vessels, operating farther offshore appear likely to increase the risk of property loss, injury to crew members, and loss of life. In addition, fishing vessel owners would face economic pressures on their fishing operations if gross revenues decrease and operating costs increase. The resulting decline in profits may induce some vessel operators to try to squeeze longer trips into marginal weather conditions and to defer needed maintenance on vessels and equipment. These changes in fishing behavior and patterns could lead to an increased level of fishing safety risk to vessels and crews, albeit an increase that cannot be empirically estimated, because little is known about factors that might increase risk, or that might offset risk increases, for fishing vessels operating in the EEZ off Alaska.

6.7.2.2.5 Related Fisheries

While AFA sideboard provisions and LLP constraints seek to manage and control transference of effort and capacity across fisheries, they are not absolute barriers to this phenomenon. Should a HAPC alternative induce movement of capacity and effort to other fisheries, costs could be imposed on the operations that currently prosecute these fisheries.

If there are costs on other related fisheries, it is likely that the greatest economic and operational burden would fall upon the smallest, least operationally diversified, and least mobile elements of these fleets. Because these operations are most likely to be home ported in small communities along the GOA coast, the relative magnitude of such displacement on these local and regional economies would be disproportionately greater, as well. Communities have developed around, and invested in facilities and infrastructure to support, these fishery participation patterns.

The extent to which the potential adverse effects of effort and capacity displacement would actually occur cannot be assessed at this time. Nonetheless, they represent potential sources of economic disruption for fish harvesting and processing operations, and the coastal communities dependent upon them.

6.7.2.2.6 Fishing Communities

Many of the communities of coastal Alaska that are adjacent to the GOA are engaged in, and highly dependent upon, the commercial fisheries in the adjacent EEZ. The nature of engagement varies from community to community and from fishery to fishery. Some communities have fish processing facilities, others are homeport to harvest vessels, and many have both processors and harvesters. Some of the larger communities also have relatively well-developed fishing support sectors.

Numerous Alaska communities (including Adak, Chignik, Cordova, Seward, Homer, Sitka, Petersburg, Yakutat, and Kodiak) are most clearly and directly engaged in and dependent upon multiple GOA fisheries. In addition, Seattle, Washington (and the adjacent Puget Sound area) has a substantial and direct involvement in many of these fisheries. Harvest vessels from Oregon, especially from Newport, also account for a significant portion of the total catch in a number of the larger groundfish and crab fisheries.

For the dependent Alaska communities, there are very few economic opportunities available as an alternative to commercial fishing related activities. Indeed, it is this absence of economic opportunity, combined with the ebb and flow of fishery activity, that has historically resulted in a high level of transient, seasonal labor, and an unstable population base in many of the communities with processing facilities.

While not readily amenable to quantitative estimation at present, closure of areas to fishing could further reduce employment and business opportunities, especially in communities with significant investment in onshore processing capacity and fleet services. From firms with direct and obvious linkages to the fisheries, such as maritime equipment purveyors, fuel pier operators, cold storage and bulk cargo transshipping firms, to local hotels, restaurants, bars, grocery stores, and commercial air carriers serving these communities, all could potentially be affected by structural changes in commercial fishing attributable to the HAPC alternatives. Beyond the private class effects, local government jurisdictions may be adversely affected as well. Most of these coastal fishing communities rely heavily upon tax revenues associated with fishing activities, in all its myriad forms, for operating and capital funds (e.g., fish landings taxes, business and property taxes, sales taxes).

6.7.2.2.7 Regulatory and Enforcement Programs

The HAPC alternatives would require increased enforcement of closed areas and gear restrictions. The Coast Guard, however, has consistently reported that it considers all activities to support the commercial fisheries off Alaska as part of a national budget. That is to say, the agency has a long standing commitment to enforce, to the best of its ability, any fishery management measure the Council proposes and the Secretary of Commerce approves, and to do so within existing budgetary and resource constraints. Because Coast Guard resource levels can generally be regarded as fixed within the federal budget cycle, this aspect of the analysis will focus on the type and effectiveness of enforcement support, in lieu of any dollar value, associated with increased enforcement impacts for the various alternatives.

6.7.3 Action 1: Seamounts

Action 1 includes the alternative of maintaining existing regulations and EFH designation (the no-action alternative), and the alternatives of designating, as HAPCs, two alternate sets of named seamounts and restricting Council-managed fishing activities in these habitat areas.

An examination of catch data found no significant Council-managed fishing activity in any of the proposed HAPCs. Therefore, the alternatives to the status quo are unlikely to have the potential to create a significant economic effect on commercial fishing, relative to the status quo, nor are the alternatives likely to have the potential to create a significant effect on consumers, related fisheries, or fishing safety. Similarly, it is not likely that the alternatives to the status quo have the potential to create significant economic effects on fishing communities. It is unknown whether management measures associated with the proposed HAPCs will result in a sustained/increased yield of any FMP species, relative to the status quo, because the linkage between fish productivity rates and these particular habitats is not well understood.

It is assumed that the alternatives to the status quo would help maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities.

Finally, because the alternatives that designate HAPCs will generate regulations prohibiting certain fishing activities, the alternatives likely have the potential to increase management and enforcement costs, relative to the status quo.

A more detailed discussion of each alternative follows.

6.7.3.1 Alternative 1: No action.

Alternative 1 is the no-action alternative (status quo). This alternative is the baseline alternative against which the costs and benefits for action alternatives have been estimated.

Alternative 1 would not provide any additional measures to minimize the effects of fishing on EFH beyond those currently in place or planned as part of other fishery management actions. Human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on sensitive habitat areas. If human activities result in degradation of these habitat areas, non-use benefits associated with the ecosystem health and biodiversity of these areas would decrease.

Based on best available scientific information, existing habitat conservation measures appear sufficient to sustain FMP stocks at present abundance levels. At least in the short term, therefore, the fishing industry would be expected to maintain current levels of earning or even experience higher revenues if the level of fishing activity in the proposed HAPCs increases. In the longer term, Alternative 1 would have unknown effects on revenues for the fishing industry, because relevant cause-and-effect relationships (e.g., linkages between fish productivity rates and habitat) are not well understood.

No significant short-term impacts to operating costs, costs to consumers, related fisheries, safety, fishing communities, or regulatory and enforcement programs are foreseen under Alternative 1. Potential long-term impacts are unknown.

6.7.3.2 Alternative 2: Designate 5 named seamounts in the EEZ off Alaska as HAPCs (Dickens, Giacomini, Patton, Quinn, and Welker) and prohibit all Council-managed bottom-contact fishing within these proposed HAPCs

This alternative designates 5 named seamounts as HAPCs. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future.

In addition to designation, this alternative prohibits all Council-managed bottom-contact fishing within the proposed areas. Gear used in Council-managed bottom-contact fishing includes bottom trawl gear (also referred to as non-pelagic trawl gear), longline gear, and pot gear. Other gears used in Council-managed fisheries (jig gear and pelagic trawl gear) are not included unless they are deployed so as to come in contact with the bottom.

Impacts on Non-Use Value

While it is not possible at this time to provide an empirical estimate of the expected flow of non-use benefits under Alternative 2, it is assumed that this alternative likely has the potential to help maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.

Impacts on Fishing Revenues and Costs

It is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

The C-I-A dataset indicates that little groundfish fishing activity took place in the proposed HAPCs during the 1995 through 2003 period. As seen in Table 6-88, vessels in the FGCV 33-59 class fished in these areas in 1995, 1997, and 2000. An estimate of the revenue at risk for this vessel class is confidential, because fewer than 3 vessels fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs.

Table 6-88. Estimated Groundfish Revenue at Risk under Action 1/Alternative 2 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
FGCV 33-59	1	-	1	-	-	1	-	-	-	1
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
FGCV 33-59	c	-	c	-	-	c	-	-	-	c
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51	65.42
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
FGCV 33-59	c	-	c	-	-	c	-	-	-	c

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

No scallop or halibut fishing activity occurred in the proposed HAPCs during the 1995 through 2003 period (IPHC, 2004; Personal communication, Gregg Rosencrantz, ADF&G, August 2004). The dinglebar troll fishery is not regulated under this alternative, as it is not used for a Council-managed fishery. (This alternative only applies to Council-managed bottom-contact fishing.)

In conclusion, it is likely that Alternative 2 does not have the potential to create significant immediate effects on the gross revenues of any fishing fleet. There is, however, the possibility that, were the proposed HAPC designations and fishing prohibitions not adopted, Council-managed bottom-contact fishing in these habitat areas would increase in the future. Alternative 2 would preclude this opportunity. There is insufficient data on the potential income derived from fishing in these habitat areas to estimate the economic impact of foregone fishing opportunities.

The potential of this alternative to have a significant impact on vessel operating costs is likely minimal, as little fishing activity has occurred in the proposed HAPCs.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities

Because Alternative 2 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.

Impacts on Management and Enforcement

Alternative 2 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount. As a general rule, any regulation that closes a relatively small areas, or differentiates between gear types requires Coast Guard cutters to actively patrol and use relatively more resource intensive enforcement methods. Because the closures found in Alternative 2 require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

6.7.3.3 Alternative 3: Designate 16 named seamounts in the EEZ off Alaska as HAPCs (Bowers, Brown, Chirkikof, Marchand, Dall, Denson, Derickson, Dickins, Giacomini, Kodiak, Odessey, Patton, Quinn, Sirius, Unimak, Welker) and prohibit all Council-managed bottom-contact fishing within these proposed HAPCs

This alternative designates the 5 named seamounts in Alternative 2 as HAPCs, and designates 11 additional named seamounts as HAPCs. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that, because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future.

In addition to designation, Alternative 3 prohibits all Council-managed bottom-contact fishing activities within the proposed HAPCs. Gear used in Council-managed bottom-contact fishing includes bottom trawl gear (also referred to as non-pelagic trawl gear), longline gear, and pot gear. Other gears used in Council-managed fisheries (jig gear and pelagic trawl gear) are not included unless they are deployed so as to come in contact with the bottom.

Impacts on Non-Use Value

While it is not possible at this time to provide an empirical estimate of the expected flow of non-use benefits under Alternative 3, it is assumed that this alternative likely has the potential to help maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.

Impacts on Fishing Revenues and Costs

It is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

The C-I-A dataset indicates that little groundfish fishing activity took place in the proposed HAPCs during the 1995 through 2003 period (Table 6-89). The activity that did occur generated approximately $20,000 in wholesale revenue in 1995, 1996, and 2000, and approximately $10,000 in wholesale revenue from 2001 through 2003. Vessels in the FGCV 33-59 class accounted for most of this fishing activity, but longline catcher vessels and longline catcher processors also fished in the proposed HAPCs. Over the 1995 through 2003 period, the revenue at risk for the FGCV 33-59 class averaged approximately 1/100 of 1% of the total groundfish wholesale revenue for the class. The revenue at risk for the LCV and L-CP classes is even less significant. Given the opportunities of vessels in the FGCV 33-59 class to participate in other fisheries and to harvest groundfish in areas surrounding the proposed HAPCs, and the lack of significant amounts of fishing in these habitat areas in any year, it does not appear that the proposed HAPC designations and fishing prohibitions would significantly affect the future earnings of these vessels. Moreover, it is likely that the estimated revenue at risk during the 1995 through 2003 period was distributed across several vessels. The C-I-A dataset indicates that during that period 20 vessels in the

FGCV 33-59 class fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs.

Table 6-89. Estimated Groundfish Revenue at Risk under Action 1/Alternative 3 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
L-CP	-	-	1	-	-	-	-	-	1	2
LCV	1	-	-	-	-	-	-	-	-	1
FGCV 33-59	3	1	3	3	3	7	1	2	4	20
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
L-CP	-	-	c	-	-	-	-	-	c	c
LCV	c	-	-	-	-	-	-	-	-	c
FGCV 33-59	0.01	c	0.00	0.00	0.00	0.02	c	c	0.01	0.01
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
L-CP	78.06	80.91	86.04	95.99	111.56	116.93	104.32	122.74	114.44	101.221
LCV	47.64	33.83	31.13	21.73	22.83	22.00	24.79	19.30	22.29	27.285
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51	65.420
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
L-CP	-	-	c	-	-	-	-	-	c	c
LCV	c	-	-	-	-	-	-	-	-	c
FGCV 33-59	0.01	c	0.01	0.00	0.01	0.03	c	c	0.01	0.01

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

No scallop or halibut fishing activity occurred in the proposed HAPCs during the 1995 through 2003 period (IPHC, 2004; Personal communication, Gregg Rosencrantz, ADF&G, August 2004). The dinglebar troll fishery is not regulated under this alternative, as it is not a Council-managed fishery. (This alternative only applies to Council-managed bottom-contact fishing.)

In conclusion, it is likely that Alternative 3 does not have the potential to create significant immediate effects on the gross revenues of any fishing fleet. There is, however, the possibility that, were the proposed HAPC designations and fishing prohibitions not adopted, Council-managed bottom-contact fishing in these habitat areas would increase in the future. Alternative 2 would preclude this opportunity. There is insufficient data on the potential income derived from fishing in these habitat areas to estimate the economic impact of foregone fishing opportunities.

The potential of this alternative to have a significant impact on vessel operating costs is likely minimal, as little fishing activity has occurred in the proposed HAPCs.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities

Because Alternative 3 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.

Impacts on Management and Enforcement

Alternative 3 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount. As a general rule, any regulation that closes relatively small areas, or differentiates between gear types requires Coast Guard cutters to actively patrol and use relatively more resource intensive enforcement methods. Because the closures found in Alternative 3 require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

6.7.4 Action 2: GOA Corals

Action 2 includes the alternative of maintaining existing regulations and EFH designation (the no-action alternative), and the alternatives of designating as HAPCs various sets of high-relief coral sites in the GOA and restricting fishing activities in those habitat areas.

An examination of catch data revealed no significant fishing activity in any of the proposed HAPCs. Therefore, the alternatives to the status quo are unlikely to have the potential to create a significant adverse economic effect on commercial fishing, relative to the status quo, nor are the alternatives likely to have the potential to create a significant effect on consumers, related fisheries, or fishing safety. Similarly, it is not likely that the alternatives to the status quo have the potential to create significant economic effects on fishing communities. It is unknown whether management measures associated with the proposed HAPCs will result in a sustained/increased yield of any FMP species, relative to the status quo, because the linkage between fish productivity rates and these particular habitats is not well understood.

It is assumed that the alternatives to the status quo would help maintain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities.

Finally, because the alternatives that designate HAPCs will generate regulations prohibiting certain fishing activities, the alternatives likely have the potential to increase management and enforcement costs, relative to the status quo.

A more detailed discussion of each alternative follows.

6.7.4.1 Alternative 1: No action.

Alternative 1 is the no-action alternative (status quo). This alternative is the baseline alternative against which the costs and benefits for action alternatives have been estimated.

Alternative 1 would not provide any additional measures to minimize the effects of fishing on the proposed HAPCs, beyond those currently in place or planned as part of other fishery management actions. Human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on sensitive habitat areas. If human activities result in degradation of these habitat areas, non-use benefits associated with the ecosystem health and biodiversity of these areas would decrease.

Based on best available scientific information, existing habitat conservation measures appear sufficient to sustain FMP stocks at present abundance levels. At least in the short term, therefore, the fishing industry would be expected to maintain current levels of earning, or even experience higher revenues if the level of fishing activity in the proposed HAPCs increases. In the longer term, Alternative 1 would have unknown effects on revenues for the fishing industry , because relevant cause-and-effect relationships (e.g., linkages between fish productivity rates and habitat) are not well understood.

No significant short-term impacts to operating costs, costs to consumers, related fisheries, safety, fishing communities, or regulatory and enforcement programs are foreseen under Alternative 1. Potential long-term impacts are unknown.

6.7.4.2 Alternative 2: Designate 3 sites along the continental slope at Sanak Island, Albatross, and Middleton Island as HAPCs and close sites to either bottom-contact with mobile gear or bottom trawling for 5 years

This alternative designates 3 coral sites in the GOA along the continental slope at Sanak Island, Albatross, and Middleton Island as HAPCs. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future. In addition to designation, this alternative includes two options that restrict the use of certain commercial fishing gear in the proposed HAPCs. The two options are as follows:

Option 1: Close sites to bottom-contact with mobile gear (BCMG) for 5 years. BCMG include bottom trawl gear, pelagic trawl gear if it is fished so as to contact the bottom, and dinglebar troll gear. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the 3 sites that are high-relief deep-water corals. The portion of these sites that are in fact high-relief coral sites should remain closed to BCMG after the 5 years and the portion of the areas that are not high relief coral sites should re-open to BCMG after the 5 years.

Option 2: Close sites to bottom trawling for 5 years. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the 3 sites that are high-relief deep-water corals. The portion of these sites that are, in fact, high-relief coral sites should remain closed to bottom trawling after the 5 years and the portion of the areas that are not high relief coral sites should re-open to trawling after the 5 years.

A major difference between the two options is that Option 1 prohibits not only bottom trawl gear (also referred to as non-pelagic trawl gear) as defined in regulations, but also restricts the use of pelagic trawl and jig gear if they are deployed so as to come in contact with the bottom. Option 2 only restricts the use of bottom trawl gear. The data available for this analysis do not distinguish between pelagic trawl gear that contacts the bottom and pelagic trawl gear that does not. To be conservative (i.e., more likely to overstate impacts than understate them), this analysis assumes that all catch reported as “pelagic gear” is equivalent to bottom trawling.

Impacts on Non-Use Value

While it is not possible at this time to provide an empirical estimate of the expected non-use benefits under Alternative 2, it is assumed that this alternative likely has the potential to help maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1. Option 1, because it includes a wider spectrum of gears, likely has a greater potential to help maintain the stream of non-use benefits than does Option 2.

Impacts on Fishing Revenues and Costs

It is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

Based on information in the C-I-A dataset, some groundfish fishing activity occurred in the proposed HAPCs during the 1995 through 2003 period, with Pacific cod being the primary target. As shown in Table 6-90, activity is limited primarily to trawl vessel classes. Overall, the activity generated less than $600,000 in gross wholesale revenue in an average year. This value represents approximately 5/100^{ths} of

1% of the total wholesale revenues generated by these vessel classes in groundfish fisheries in an average year.

The economic effects of this alternative are larger for those trawl vessels that have a greater dependence on GOA fisheries. In particular, the annual average revenue at risk is highest for the TCV Non-AFA and TCV < 60' classes. The revenue at risk for TCV non-AFA vessels is slightly less than $3/10^{ths}$ of 1% of total groundfish wholesale revenue in an average year, while the revenue at risk for TCV < 60' vessels is slightly more than 1% of total groundfish wholesale revenue in an average year.

The fishing activity of vessels in the TCV Non-AFA class within the proposed HAPCs varied over the 1995 through 2003 period—in 2002, the revenue at risk was estimated to be less than $2/10^{ths}$ of 1% of total groundfish wholesale revenue, while in 2003, revenue at risk was estimated to be $1/100^{th}$ of 1%. Based on the number of active vessels in this class in 2002 (36 as seen in Table 6-49), the average vessel in this class generated over $325,000 in wholesale revenue in 2002. If the entire 2002 catch in the proposed HAPCs was made by a single vessel, the value of that catch would have been slightly more than 50% of the average wholesale revenue of vessels in this class. However, the C-I-A dataset indicates that, during the 1995 through 2003 period, 35 vessels in the TCV Non-AFA class fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs. Moreover, the other fishing opportunities for vessels in the TCV Non-AFA class, including the possibility of fishing in areas surrounding the proposed HAPCs, suggest that this alternative would not likely have the potential to create a significant impact on the future earnings of these vessels.

The fishing activity of vessels in the TCV < 60' class in the proposed HAPCs increased in 2001 and 2002, but dropped off in 2003. In 2001, fishing activity in the proposed HAPCs accounted for over 2% of the total gross wholesale revenue for the class, while in 2002, fishing activity in the proposed HAPCs accounted for over 3% of total revenue. In 2002, the TCV < 60' class consisted of about 46 vessels (Table 6-52), and, thus, the level of revenue at risk in 2002 was 1.5 times the 2002 average gross wholesale revenue ($560,000) of these vessels. While a 2% to 3% revenue loss may not be significant for the class as a whole, it is possible that the revenue at risk for some individual vessels in the class could be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue at risk during the 1995 through 2003 period was distributed across several vessels. The C-I-A dataset indicates that 30 vessels in the TCV < 60 class fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs during that period (Table 6-90).

The dinglebar troll fishery is not affected by Alternative 2 at this time because the fishery is limited to waters off Southeastern Alaska, while the proposed HAPCs are in the waters off Southcentral Alaska (Personal communication, Scott Miller, NOAA Fisheries Alaska Region, August 2004).

With respect to the scallop fishery, 77 scallop hauls were made in September 1994 in the ADF&G groundfish/shellfish statistical area containing the Albatross coral sites, but there has been no fishing activity in the area since then (Personal communication, Gregg Rosencrantz, ADF&G, August 2004). In his personal communication, Rosencrantz also indicates that there was one haul in August 1997, and seven hauls in October 1999, in the statistical area containing the Sanak coral site. According to Rosencrantz, the economic impact on the scallop fishery of closing these statistical areas would be negligible. Based on this information, it can be concluded that this alternative does not likely have the potential to create a significant impact on the scallop fishery.

Table 6-90. Estimated Groundfish Revenue at Risk under Action 2/Alternative 2 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
ST/FT-CP	2	6	2	-	-	-	-	-	-	6
HT-CP	20	16	17	14	15	9	10	10	11	34
TCV BSP ≥ 125	5	-	2	-	-	-	-	-	-	6
TCV BSP 60-124	19	1	8	1	1	2	4	7	1	30
TCV Div. AFA	11	4	7	8	11	1	1	2	1	31
TCV Non-AFA	15	14	11	15	8	10	10	10	6	35
TCV < 60	8	9	6	9	11	8	20	15	5	30
FGCV 33-59	-	-	-	-	-	1	-	-	-	1
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
ST/FT-CP	c	0.01	c	-	-	-	-	-	-	0.00
HT-CP	0.10	0.03	0.05	0.02	0.06	0.03	0.01	0.08	0.09	0.05
TCV BSP ≥ 125	0.01	-	c	-	-	-	-	-	-	0.01
TCV BSP 60-124	0.27	c	0.01	c	c	c	0.04	0.09	c	0.05
TCV Div. AFA	0.27	0.00	0.00	0.04	0.07	c	c	c	c	0.04
TCV Non-AFA	0.09	0.12	0.03	0.17	0.21	0.07	0.12	0.18	0.01	0.11
TCV < 60	0.19	0.16	0.10	0.38	0.23	0.18	0.68	0.87	0.10	0.32
FGCV 33-59	-	-	-	-	-	c	-	0.00	0.00	0.00
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
ST/FT-CP	435.08	358.84	364.09	311.08	333.88	356.18	409.59	441.93	357.75	374.27
HT-CP	162.09	168.40	143.74	112.33	128.52	150.53	135.62	165.32	147.32	145.99
TCV BSP ≥ 125	188.89	140.55	172.36	103.00	158.46	209.43	216.26	231.92	233.35	183.80
TCV BSP 60-124	188.30	151.67	145.30	87.97	119.87	170.18	233.76	274.05	271.53	182.52
TCV Div. AFA	90.95	104.88	95.68	114.27	107.66	103.31	52.74	118.26	111.91	99.96
TCV Non-AFA	35.16	49.24	33.71	48.45	42.60	38.39	42.68	41.63	47.58	42.16
TCV < 60	20.41	42.41	33.45	40.50	33.72	30.72	33.14	25.96	23.73	31.56
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51	65.42
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
ST/FT-CP	c	0.00	c	-	-	-	-	-	-	0.00
HT-CP	0.06	0.02	0.03	0.02	0.05	0.02	0.00	0.05	0.06	0.04
TCV BSP ≥ 125	0.00	-	c	-	-	-	-	-	-	0.01
TCV BSP 60-124	0.14	c	0.01	c	c	c	0.02	0.03	c	0.03
TCV Div. AFA	0.29	0.00	0.00	0.04	0.06	c	c	c	c	0.04
TCV Non-AFA	0.27	0.24	0.10	0.35	0.49	0.19	0.29	0.43	0.03	0.27
TCV < 60	0.91	0.37	0.30	0.94	0.68	0.58	2.05	3.37	0.44	1.02
FGCV 33-59	-	-	-	-	-	c	-	0.01	0.01	0.00

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A “-“ in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A “c” in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

The IPHC (2004) documented longline fishing activity in the 3 Central Gulf proposed HAPCs. However, because this alternative only prohibits activities of mobile gears, the halibut fishery would not be affected.

In conclusion, it is likely that Alternative 2 does not have the potential to create significant short-term effects on the gross revenues of any fishing fleet. There is, however, the possibility that, were the proposed HAPC designations and fishing prohibitions not adopted, fishing with BCMG or bottom trawls in these habitat areas would increase in the future. Alternative 2 would preclude the opportunity to fish with one of these gears.

This alternative has the potential to cause some fishing vessel operators to alter their fishing patterns, and, therefore, the operating revenue and costs of these vessels could change. However, given the estimated relatively low level of revenue-at-risk under this alternative, the economic incentive for an operator to alter their fishing patterns would likely be quite small.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities
Because Alternative 2 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1.

Similarly, there are not likely to be adverse effects on communities , because of the low level of revenue at risk under this alternative. Moreover, the C-I-A dataset indicates that the economic effects would likely be distributed across several communities. For example, the owners of the vessels in the TCV < 60 class that fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs, during the 1995 through 2003 period, are located in at least ten different communities, while at least 20 different communities are represented by the owners of vessels in the TCV Non-AFA class that fished in the statistical areas containing the proposed HAPCs.

Impacts on Management and Enforcement
Alternative 2 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount. As a general rule of thumb, any regulation that closes relatively small areas, or differentiates between gear types, requires Coast Guard cutters to actively patrol and use relatively more resource intensive enforcement methods. Because the closures found in Alternative 2 require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

6.7.4.3 Alternative 3: Designate 4 areas at Cape Ommaney, Fairweather grounds NW, and Fairweather grounds SW, as HAPCs. Prohibit bottom-contact gear within 5 smaller areas inside these HAPCs.

This alternative designates 5 coral sites in the GOA off Southeastern Alaska as HAPCs. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that, because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future.

In addition to designation, this alternative specifies two options. Option 1 would prohibit all Council-managed bottom-contact gear within 5 smaller areas inside these HAPCs. Bottom-contact gear is defined as gear used in Council-managed bottom-contact fishing and includes bottom trawl gear (also referred to as non-pelagic trawl gear), longline gear (hook and line), and pot gear. Other gears used in Council-managed fisheries (jig gear and pelagic trawl gear) are not included unless they are deployed so as to come in contact with the bottom.

Option 2 would prohibit bottom trawl gear within 5 areas inside the HAPCs, while designating the remainder of each of the 4 HAPCs in this alternative as priority areas for hook and line gear impact research. It is important to note, however, that each of the HAPCs proposed in this alternative, as well as the 5 smaller areas within these HAPCs, are contained in the area covered by the current Southeast outside trawl closure (50 CFR 679.7(b)(1)). As a result, Option 2 would impose no additional impact on the fishing industry as bottom trawling in these areas is currently prohibited. However, Option 2, if adopted, would provide additional protection for the 5 areas within these HAPCs, and would presumably remain in place should the current all trawl closure be amended or rescinded in the future. Thus, Option 2 is currently a “non-binding” option and will not be analyzed further.

Impacts on Non-Use Value

While it is not possible at this time to provide an empirical estimate of the expected non-use benefits under Alternative 3, it is assumed that this alternative likely has the potential to enhance non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.

Impacts on Fishing Revenues and Costs

It cannot be definitively shown this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1. The linkages between fish productivity rates and habitat require further study to establish firm connections.

Alternative 3 does not likely have the potential to create significant effects on groundfish fisheries as a whole, because the groundfish fisheries in the waters off Southeastern Alaska are small compared to those in more westerly areas of the GOA, and fishing with trawl gear in the waters off Southeastern Alaska is already prohibited under existing regulations. The C-I-A dataset indicates that groundfish longline fishing activity occurred in the proposed HAPCs during the 1995 through 2003 period—primarily for sablefish. As shown in Table 6-91, the fishing activity was largely conducted by vessels in the L-CP, LCV, FGCV 33 – 59, and FGCV ≤ 32 classes. Overall, the activity in the HAPCs generated approximately $20,000 in wholesale revenue in an average year during the 1995 through 2003 period. In an average year only 3/100^{ths} of 1% of the total groundfish wholesale revenue could be considered "revenue at risk" under this alternative.[4]

[4] This analysis includes fishing activity that occurred within a proposed HAPC in Dixon Entrance. The Dixon Entrance HAPC was removed from the alternative by Council action in December of 2004. Thus, this analysis is a slight overestimate of potential impacts. This overestimate of potential effects on revenue is found to be insignificant. Thus, reanalysis that excludes the Dixon Entrance HAPC is not necessary to show that this alternative has insignificant potential effects on revenue.

Table 6-91. Estimated Groundfish Revenue at Risk under Action 2/Alternative 3 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
L-CP	-	-	-	-	1	-	-	2	-	2
TCV < 60	-	2	1	1	1	-	-	-	-	3
LCV	-	1	-	-	2	-	-	-	-	2
FGCV 33-59	80	102	103	101	100	91	101	96	94	274
FGCV ≤ 32	-	1	-	-	-	-	-	2	2	4
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
L-CP	-	-	-	-	c	-	-	c	-	c
TCV < 60	-	c	c	c	c	-	-	-	-	c
LCV	-	c	-	-	c	-	-	-	-	c
FGCV 33-59	0.02	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.02	0.01
FGCV ≤ 32	-	c	-	-	-	-	-	c	c	c
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
L-CP	78.06	80.91	86.04	95.99	111.56	116.93	104.32	122.74	114.44	101.22
TCV < 60	20.41	42.41	33.45	40.50	33.72	30.72	33.14	25.96	23.73	31.56
LCV	47.64	33.83	31.13	21.73	22.83	22.00	24.79	19.30	22.29	27.28
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51	65.42
FGCV ≤ 32	1.03	1.42	1.31	1.35	1.14	1.39	1.76	2.17	3.32	1.65
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
L-CP	-	-	-	-	c	-	-	c	-	c
TCV < 60	-	c	c	c	c	-	-	-	-	c
LCV	-	c	-	-	c	-	-	-	-	c
FGCV 33-59	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02
FGCV ≤ 32	-	c	-	-	-	-	-	c	c	c

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

The IPHC (2004) indicates that the log books of fewer than 5 halibut vessels show any fishing activity in the proposed HAPCs during the 1995 through 2003 period. Given that this number is small compared to the 1,820 vessels that harvested halibut in Area 2C (Table 6-81) over the same period, it is unlikely that this alternative has the potential to create a significant economic effect on the halibut fishery in the waters off Southeastern Alaska.

No scallop fishing occurred in the proposed HAPCs in the 1995 through 2003 period (Personal communication, Gregg Rosencrantz, ADF&G, August 2004). Although the dinglebar troll fishery is located in the waters off Southeastern Alaska, dinglebar troll gear is not included in the definition of bottom-contact gear. Therefore, its use would not be restricted under this alternative.

In conclusion, it is likely that Alternative 3 does not have the potential to create significant immediate effects on the gross revenues of any fishing fleet. There is, however, the possibility that, were the proposed HAPC designations and fishing prohibitions not adopted, fishing with bottom-contact gear in these habitat areas would increase in the future. Alternative 3 would preclude this opportunity. There is insufficient data on the potential income derived from fishing in these habitat areas to estimate the economic impact of foregone future growth opportunities.

The potential of this alternative to have a significant impact on vessel operating costs is likely minimal, as little fishing activity has occurred in the proposed HAPCs.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities
Because Alternative 3 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.

Impacts on Management and Enforcement
Alternative 3 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount. As a general rule, any regulation that closes relatively small areas, or differentiates between gear types, requires Coast Guard cutters to actively patrol and use relatively more resource intensive enforcement measures. Because the closures found in Alternative 3 require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

6.7.4.4 Alternative 4: Adopt all HAPCs specified in Alternatives 2 and 3 with the same boundaries and management measures

Alternative 4 combines Alternatives 2 and 3, and, therefore, the effects of Alternative 4 would be the sum of the effects of those two alternatives. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that, because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future.

Impacts on Non-Use Value
While it is not possible at this time to provide an empirical estimate of the expected non-use benefits under Alternative 4, it is assumed that this alternative likely has the potential to help maintain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities , relative to Alternative 1. This alternative, because it includes all the proposed HAPCs and fishing restrictions of Alternatives 2 and 3, likely has a greater potential to maintain the stream of non-use benefits than does either one of those two alternatives alone.

Impacts on Fishing Revenues and Costs
As with Alternatives 2 and 3, it is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

Table 6-92. Estimated Groundfish Revenue at Risk under Action 2/Alternative 4 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
ST/FT-CP	2	6	2	-	-	-	-	-	-	6
HT-CP	20	16	17	14	15	9	10	10	11	34
L-CP	-	-	-	-	1	-	-	2	-	2
TCV BSP >= 125	5	-	2	-	-	-	-	-	-	6
TCV BSP 60-124	19	1	8	1	1	2	4	7	1	30
TCV Div. AFA	11	4	7	8	11	1	1	2	1	31
TCV Non-AFA	15	14	11	15	8	10	10	10	6	35
TCV < 60	8	11	7	10	12	8	20	15	5	32
LCV	-	1	-	-	2	1	-	-	-	3
FGCV 33-59	80	102	103	101	100	91	101	98	94	276
FGCV ≤ 32	-	1	-	-	-	-	-	2	2	4

	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
ST/FT-CP	c	0.01	c	-	-	-	-	-	-	0.00
HT-CP	0.10	0.03	0.05	0.02	0.06	0.03	0.01	0.08	0.09	0.05
L-CP	-	-	-	-	c	-	-	c	-	c
TCV BSP >= 125	0.01	-	c	-	-	-	-	-	-	0.01
TCV BSP 60-124	0.27	c	0.01	c	c	c	0.04	0.09	c	0.05
TCV Div. AFA	0.27	0.00	0.00	0.04	0.07	c	c	c	c	0.04
TCV Non-AFA	0.09	0.12	0.03	0.17	0.21	0.07	0.12	0.18	0.01	0.11
TCV < 60	0.19	0.16	0.10	0.38	0.23	0.18	0.68	0.87	0.10	0.32
LCV	-	c	-	-	c	c	-	-	-	c
FGCV 33-59	0.02	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.02	0.01
FGCV ≤ 32	-	c	-	-	-	-	-	c	c	c
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
ST/FT-CP	435.08	358.84	364.09	311.08	333.88	356.18	409.59	441.93	357.75	374.269
HT-CP	162.09	168.40	143.74	112.33	128.52	150.53	135.62	165.32	147.32	145.99
L-CP	78.06	80.91	86.04	95.99	111.56	116.93	104.32	122.74	114.44	101.22
TCV BSP >= 125	188.89	140.55	172.36	103.00	158.46	209.43	216.26	231.92	233.35	183.80
TCV BSP 60-124	188.30	151.67	145.30	87.97	119.87	170.18	233.76	274.05	271.53	182.52
TCV Div. AFA	90.95	104.88	95.68	114.27	107.66	103.31	52.74	118.26	111.91	99.96
TCV Non-AFA	35.16	49.24	33.71	48.45	42.60	38.39	42.68	41.63	47.58	42.16
TCV < 60	20.41	42.41	33.45	40.50	33.72	30.72	33.14	25.96	23.73	31.56
LCV	47.64	33.83	31.13	21.73	22.83	22.00	24.79	19.30	22.29	27.28
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51	65.42
FGCV ≤ 32	1.03	1.42	1.31	1.35	1.14	1.39	1.76	2.17	3.32	1.65
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
ST/FT-CP	c	0.00	c	-	-	-	-	-	-	0.00
HT-CP	0.06	0.02	0.03	0.02	0.05	0.02	0.00	0.05	0.06	0.04
L-CP	-	-	-	-	c	-	-	c	-	c
TCV BSP >= 125	0.00	-	c	-	-	-	-	-	-	0.01
TCV BSP 60-124	0.14	c	0.01	c	c	c	0.02	0.03	c	0.03
TCV Div. AFA	0.29	0.00	0.00	0.04	0.06	c	c	c	c	0.04
TCV Non-AFA	0.27	0.24	0.10	0.35	0.49	0.19	0.29	0.43	0.03	0.27
TCV < 60	0.91	0.38	0.30	0.94	0.68	0.58	2.05	3.37	0.44	1.02
LCV	-	c	-	-	c	c	-	-	-	c
FGCV 33-59	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.03	0.02
FGCV ≤ 32	-	c	-	-	-	-	-	c	c	c

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004. Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

As shown in Table 6-92, the revenue at risk under Alternative 4 is equal to the sum of the revenues at risk under Alternatives 2 and 3. Only the TCV < 60 and FGCV 33-59 classes are affected under both Alternative 2 and Alternative 3. However, as was the case under each alternative separately, the combined revenue at risk for these two vessel classes under Alternative 4 would be minimal. While the revenue loss may not be significant for either of these two classes as a whole, it is possible that the revenue at risk for some individual vessels in these classes would be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas.

As with Alternatives 2 and 3, Alternative 4 is not likely to have the potential to create a significant economic effect on the Alaska weathervane scallop fishery, Pacific halibut fishery, or dinglebar troll fishery for lingcod.

This alternative has the potential to cause some fishing vessel operators to alter their fishing patterns, and, therefore, the operating costs of these vessels could increase. However, given the low levels of revenue at risk under this alternative, the potential increase in operating costs would likely be small.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities
Because Alternative 4 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not likely to have the potential to create a significant impact on consumers, on related fisheries, or on fishing safety, relative to Alternative 1.

As with Alternatives 2 and 3, there are not likely to be adverse effects on communities under Alternative 4, because of the low level of revenue at risk for fishing fleets, and because the economic effects of the alternative would be distributed across several communities.

Impacts on Management and Enforcement
As with Alternatives 2 and 3, this alternative likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount.

6.7.5 Action 3: Aleutian Islands Corals

Action 3 includes the alternative of maintaining existing regulations and EFH designation (the no-action alternative), and the alternatives of designating as HAPCs alternate sets of coral garden sites in the Aleutian Islands and restricting fishing activities in these habitat areas.

An examination of catch data found no significant Council-managed fishing activity in any of the proposed HAPCs. Therefore, the alternatives to the status quo are unlikely to have the potential to create a significant economic effect on commercial fishing, relative to the status quo, nor are the alternatives likely to have the potential to create a significant effect on consumers, related fisheries, or fishing safety. Similarly, it is not likely that the alternatives to the status quo have the potential to create significant economic effects on fishing communities. It is unknown whether management measures associated with the proposed HAPCs will result in a sustained/increased yield of any FMP species, relative to the status quo, because the linkage between fish productivity rates and these particular habitats is not well understood.

It is assumed that the alternatives to the status quo would help maintain any non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities.

Finally, because the alternatives that designate HAPCs will generate regulations prohibiting certain fishing activities, the alternatives likely have the potential to increase management and enforcement costs, relative to the status quo.

A more detailed discussion of each alternative follows.

6.7.5.1 Alternative 1: No action.

Alternative 1 is the no-action alternative (status quo). This alternative is the baseline alternative against which the costs and benefits of the action alternatives have been estimated.

Alternative 1 would not provide any additional measures to minimize the effects of fishing on the proposed HAPCs, beyond those currently in place or planned as part of other fishery management actions. Human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on sensitive habitat areas. If human activities result in degradation of these habitat areas, non-use benefits associated with the ecosystem health and biodiversity of these areas would decrease.

Based on the best available scientific information, existing habitat conservation measures appear sufficient to sustain FMP stocks at present abundance levels. At least in the short term, therefore, the fishing industry would be expected to maintain current levels of earning, or even experience higher revenues if the level of fishing activity in the proposed HAPCs increases. In the longer term, Alternative 1 would have unknown effects on revenues for the fishing industry, because relevant cause-and-effect relationships (e.g., linkages between fish productivity rates and habitat) are not well understood.

No significant short-term impacts to operating costs, costs to consumers, related fisheries, safety, fishing communities, or regulatory and enforcement programs are foreseen under Alternative 1. Potential long-term impacts are unknown.

6.7.5.2 Alternative 2: Adopt 6 coral garden sites within the Aleutian Islands (Adak Canyon, Cape Moffett, Bobrof Island, Semisopochnoi Island, Great Sitkin, Ulak Island) as HAPCs and implement fishing restrictions in these areas

This alternative would designate 6 coral sites in the Aleutian Islands as HAPCs. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that, because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has some potential to affect fishery regulations and fishing activity in the future.

In addition to designation, this alternative restricts the use of bottom-contact gear in the proposed HAPCs as follows:

1. Adak Canyon: Accept the bottom-contact gear closure defined within staff's hybrid (two-tier approach), increase the designation-only portion of the boundary to include the entire AMCC and MCA proposals.
2. Cape Moffett: Modify the hybrid proposal boundaries for no bottom-contact gear as follows: The square would be split into two triangles from SW to NE, the right (SE/S) side of the square would be open to fishing (with a HAPC designation), the other side (NW) would be closed to bottom-contact gear. The designation-only areas of the hybrid would remain the same.
3. Bobrof Island: Utilize the boundaries of the NMFS proposal, adjusted on the northern extent of the island (per public comment in notebooks) to define the no bottom-contact gear areas. The designation-only area of the hybrid would remain the same.
4. Semisopochnoi Island: Utilize the original NMFS proposal and management measures of no bottom-contact gear for analysis. The designation-only area from the hybrid proposal would remain the same.
5. Great Sitkin: Utilize the boundaries of the NMFS proposal and management measures of no bottom-contact gear for analysis. The designation area would be from the hybrid proposal.
6. Ulak Island: Utilize the boundaries of the NMFS proposal and management measures of no bottom-contact gear for analysis. The designation area would be from the hybrid proposal.

Bottom-contact gear is defined as gear used in Council-managed bottom-contact fishing and includes bottom trawl gear (also referred to as non-pelagic trawl gear), longline gear, and pot gear. Other gears used in Council-managed fisheries (jig gear and pelagic trawl gear) are not included unless they are deployed so as to come in contact with the bottom.

Impacts on Non-Use Value
While it is not possible at this time to provide an empirical estimate of the expected non-use benefits under Alternative 2, it is assumed that this alternative likely has the potential to maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.

Impacts on Fishing Revenues and Costs
It is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

The economic effects of this alternative on groundfish fisheries as a whole would be relatively small, as the groundfish fisheries in the Aleutian Islands are small compared to those in the Bering Sea, or the Western and Central Gulf, Furthermore, directed fishing for pollock in the Aleutians has been closed since 2000, to protect Steller sea lions and their habitat. The C-I-A dataset indicates that 12 classes of groundfish vessels fished in the proposed HAPCs during the 1995 through 2003 period (Table 6-93). The most consistent activity was by vessels in the L-CP class; however, the revenue at risk for this class never exceeded $25,000 in any given year. Vessels in the FGCV 33-59 class showed increased fishing activity in the proposed HAPCs, and in 2002, they generated about $30,000 in gross wholesale revenue from these areas—an amount equal to 4/100^{ths} of 1% of the total groundfish gross wholesale revenue generated by the class. Over all vessel classes, Pacific cod accounted for about 33% of the wholesale revenue at risk, while sablefish accounted for about 64%.

While the revenue loss under this alternative would not likely be significant for any class, as a whole, it is possible that the revenue at risk for some individual vessels, particularly those in the FGCV 33-59 class, would be significant. However, it is probable that the revenue at risk could be mitigated by fishing in remaining open areas. Moreover, it is likely that the estimated revenue at risk during the 1995 through 2003 period was distributed across several vessels. The C-I-A dataset indicates that during that period 32 vessels in the FGCV 33-59 class and 34 vessels in the L-CP class fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs (Table 6-93).

Table 6-93. Estimated Groundfish Revenue at Risk under Action 3/Alternative 2 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
ST/FT-CP	2	2	1	6	2	1	1	1	-	8
HT-CP	-	-	-	3	1	4	2	1	-	7
L-CP	13	8	9	12	11	13	8	6	5	34
TCV BSP >= 125	-	-	-	2	2	1	-	-	1	6
TCV BSP 60-124	-	-	1	2	-	-	-	1	1	5
TCV Div. AFA	-	-	-	-	2	3	2	-	-	4
TCV Non-AFA	1	-	-	-	1	1	-	-	1	3
TCV < 60	-	-	-	-	1	1	1	5	4	10
PCV	-	-	1	1	1	2	1	1	1	4
LCV	7	6	5	4	2	3	3	3	1	17
FGCV 33-59	-	2	4	3	7	11	12	9	12	32
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
ST/FT-CP	c	c	c	0.01	c	c	C	c	-	0.00
HT-CP	-	-	-	0.00	c	0.00	0.00	c	-	0.00
L-CP	0.01	0.02	0.02	0.02	0.02	0.02	C	0.01	0.00	0.01
TCV BSP >= 125	-	-	-	c	c	c	-	-	c	c
TCV BSP 60-124	-	-	c	c	-	-	-	c	c	c
TCV Div. AFA	-	-	-	-	c	0.00	C	-	-	0.00
TCV Non-AFA	c	-	-	-	c	c	-	-	c	c
TCV < 60	-	-	-	-	c	c	C	0.00	0.01	0.00
PCV	-	-	c	c	c	c	C	c	c	c
LCV	0.00	0.00	0.00	0.00	c	0.00	0.00	0.00	c	0.00
FGCV 33-59	-	c	0.00	0.00	0.01	0.02	0.01	0.03	0.02	0.01
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
ST/FT-CP	435.08	358.84	364.09	311.08	333.88	356.18	409.59	441.93	357.75	374.27
HT-CP	162.09	168.40	143.74	112.33	128.52	150.53	135.62	165.32	147.32	145.99
L-CP	78.06	80.91	86.04	95.99	111.56	116.93	104.32	122.74	114.44	101.22
TCV BSP >= 125	188.89	140.55	172.36	103.00	158.46	209.43	216.26	231.92	233.35	183.80
TCV BSP 60-124	188.30	151.67	145.30	87.97	119.87	170.18	233.76	274.05	271.53	182.52
TCV Div. AFA	90.95	104.88	95.68	114.27	107.66	103.31	52.74	118.26	111.91	99.96
TCV Non-AFA	35.16	49.24	33.71	48.45	42.60	38.39	42.68	41.63	47.58	42.16
TCV < 60	20.41	42.41	33.45	40.50	33.72	30.72	33.14	25.96	23.73	31.56
PCV	22.23	27.69	22.11	15.79	24.41	38.39	20.99	18.83	31.58	24.67
LCV	47.64	33.83	31.13	21.73	22.83	22.00	24.79	19.30	22.29	27.28
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51	65.42
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
ST/FT-CP	c	c	c	0.00	c	c	C	c	-	0.00
HT-CP	-	-	-	0.00	c	0.00	0.00	c	-	0.00
L-CP	0.02	0.03	0.02	0.02	0.02	0.02	C	0.01	0.00	0.01
TCV BSP >= 125	-	-	-	c	c	c	-	-	c	c
TCV BSP 60-124	-	-	c	c	-	-	-	c	c	c
TCV Div. AFA	-	-	-	-	c	0.00	C	-	-	0.00
TCV Non-AFA	c	-	-	-	c	c	-	-	c	c
TCV < 60	-	-	-	-	c	c	C	0.01	0.03	0.01
PCV	-	-	c	c	c	c	C	c	c	c
LCV	0.00	0.01	0.00	0.02	c	0.01	0.00	0.01	c	0.01
FGCV 33-59	-	c	0.00	0.00	0.01	0.03	0.02	0.04	0.02	0.02

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

The waters around the Aleutian Islands are an important area for halibut fishing. Table 6-94 shows total halibut fishing activity in 4 of the proposed HAPCs (Adak Canyon, Bobrof Island, Ulak Island, and

Semisopochnoi Island) based on logbook and fish ticket data from 1995 though 2002. (Annual data were not provided by the IPHC; fishing activity in Great Sitkin and Cape Moffett cannot be presented, because of IPHC data confidentiality restrictions). The table also shows halibut fishing activity in the statistical areas surrounding the proposed HAPCs and in the entire IPHC management area (Area 4B) containing the proposed HAPCs. While fish ticket data are comprehensive, in terms of recording catch, they are not sufficiently geographically precise to make accurate estimates of the catch in the proposed HAPCs. Logbook data, on the other hand, are not comprehensive in terms of recording catch, but they show precise catch locations.

Table 6-94. Estimated Total Halibut Fishing Activity from 1995 though 2002 in 4 of the Proposed HAPCs Based on Logbook and Fish Ticket Data

	Logbook Data				Fish Ticket Data			
Proposed HAPC	Catch Range in HAPC (1,000 lbs)	Number of Vessels in HAPC	Catch in Adjacent Statistical Areas (1,000 lbs)	Number of Vessels in Adjacent Statistical Areas	Catch in Adjacent Statistical Areas (1,000 lbs)	Number of Vessels in Adjacent Statistical Areas	Catch in IPHC Area 4B (1,000 lbs)	Number of Vessels in IPHC Area 4B
Adak Canyon	125 - 150	18	889	54	1,253	69	26,183	156
Bobrof Island	175 - 200	28	743	48	1,043	56	26,183	156
Ulak Island	100 - 125	18	1,455	44	2,093	53	26,183	156
Semisopochnoi Island	300 - 325	11	830	17	1,216	19	26,183	156

Source: Data compiled by IPHC, August 2004.
Note: The fishing activity in the Adak Canyon, Bobrof Island, and Semisopochnoi Island proposed HAPCs represents the activity that occurred in the entire area of each proposed HAPC, not just the area where gear restrictions would apply.

Assuming logbook data presented in Table 6-94 are representative of the halibut fishery as a whole, these data can be extrapolated to provide a more accurate estimate of the fishing activity that occurred in 4 of the proposed HAPCs.[5] An upper bound estimate of the total catch in the 4 proposed HAPCs is 1,148,056 lbs, or about 4.4% of the total catch in Area 4B. This figure represents an upper bound estimate of the revenue at risk under this alternative (assuming that catch in Great Sitkin and Cape Moffett was negligible). While a 4.4% revenue loss may not be significant for the halibut fleet as a whole, it is possible that the revenue at risk for some individual vessels would be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas.

Table 6-95. Estimated Total Halibut Fishing Activity from 1995 though 2002 in 4 of the Proposed HAPCs, Adjacent Statistical Areas, and IPHC Management Area 4B Based on Extrapolated Logbook Data

Proposed HAPC	Number of Vessels in HAPC	Catch Range in HAPC (1,000 lbs)	Upper Bound Estimate of Catch in HAPC as a Percent of Catch in Adjacent Statistical Areas	Upper Bound Estimate of Catch in HAPC as a Percent of Catch in IPHC Area 4B
Adak Canyon	23	176,211 - 211,453	16.9	0.8
Bobrof Island	33	245,812 - 280,928	26.9	1.1
Ulak Island	22	143,803 - 179,753	8.6	0.7
Semisopochnoi Island	12	439,313 - 475,922	39.1	1.8
Total	At least 33	1,005,138 - 1,148,056	20.5	4.4

Source: Adapted from data compiled by IPHC, August 2004.

An estimate of the revenue at risk can also be calculated for the golden king crab fishery in the Western Aleutian Islands (west of 172° E. longitude) and the red king crab fishery in the Petrel Bank area of the

[5] According to the IPHC (2004), useable logbook data are collected from a high percentage of halibut vessels. The Commission routinely uses this data to estimate catch, deadloss, stock abundance, etc.

Western Aleutians. Table 6-96 and Table 6-97 show the golden and red king crab fishing activity in the proposed HAPCs during the 1998 through 2003 period, based on observer data. The tables also show the activity in the entire fishery during the same period, based on observer and fish ticket data (the red king crab fishery in the Petrel Bank area was closed from 1998 through 2001; the fishery was open in 2002 and 2003, but will not be open in 2004). Approximately 8% of the effort and catch in the Western Aleutian Islands golden king crab fishery occurred in the proposed HAPCs. While an 8% revenue loss may not be significant for the crab fleet as a whole, it is possible that the revenue at risk for some individual vessels would be significant. However, it is probable that some or all of the revenue at risk could be mitigated by fishing in open areas.

About 20% of the effort and catch in the Petrel Bank red king crab fishery occurred in the proposed HAPCs when the fishery was open from 2001 through 2003. A 20% revenue loss would be significant for the Petrel Bank red king crab fleet as a whole, as well as for individual vessels. However, the Petrel Bank red king crab fishery is not expected to be open in the near future, due to concerns of low king crab abundance in the Petrel Bank area. Fishery performance and observer data indicate that recent harvests were largely supported by a single, aging cohort of crab, and that there is little possibility of new recruitment to the legal size class in the next two years (ADF&G, 2004).

Table 6-96. Estimated Golden King Crab Fishing Activity in the Proposed HAPCs and Entire Western Aleutian Islands Fishery Based on Observer and Fish Ticket Data, 1998-2003

	Observer Data				Fish Ticket Data		
	Activity in Proposed HAPCs		Activity in W. Aleutian Islands Fishery		Activity in W. Aleutian Islands Fishery		
Year	Pot Lifts (no.)	Catch (no.)	Pot Lifts (no.)	Catch (no.)	Vessels (no.)	Pot Lifts (no.)	Catch (no.)
1998	165	2,050	1,111	13,554	8	86,811	569,550
1999	287	1,923	3,505	22,783	3	35,920	409,531
2000	253	1,978	3,636	29,088	15	101,040	676,558
2001	245	2,352	3,709	28,930	12	101,239	705,613
2002	216	1,608	2,185	18,791	10	105,219	684,631
2003	240	1,269	3,036	27,628	5	95,581	664,915

Source: Personal Communication, David Barnard, ADF&G, September 2004; Granath et al., 2004.

Table 6-97. Estimated Red King Crab Fishing Activity in the Proposed HAPCs and Entire Petrel Bank Fishery Based on Observer and Fish Ticket Data, 1998-2003

	Observer Data				Fish Ticket Data		
	Activity in Proposed HAPCs		Activity in Petrel Banks Fishery		Activity in Petrel Bank Fishery		
Year	Pot Lifts (no.)	Catch (no.)	Pot Lifts (no.)	Catch (no.)	Vessels (no.)	Pot Lifts (no.)	Catch (no.)
1998			---- fishery closed ----				
1999			---- fishery closed ----				
2000			---- fishery closed ----				
2001			---- fishery closed ----				
2002	56	1,030	596	8,284	4	700	22,080
2003	237	2,726	932	9,320	33	3,782	68,300

Source: Personal Communication, David Barnard, ADF&G, September 2004; Granath et al., 2004.

No scallop fishing occurred in the proposed HAPCs in the 1995 through 2003 period (Personal communication, Gregg Rosencrantz, ADF&G, August 2004). No fishing with dinglebar troll gear for lingcod has been reported in the Aleutian Islands.

In conclusion, it is likely that Alternative 2 does not have the potential to create significant immediate effects on the gross revenues of any fishing fleet. There is, however, the possibility that, were the proposed HAPC designations and fishing prohibitions not adopted, fishing with bottom-contact gear in these habitat areas would increase in the future. Alternative 2 would preclude this opportunity. There is insufficient data on the potential income derived from fishing in these habitat areas to estimate the economic impact of foregone fishing opportunities.

This alternative has the potential to cause some fishing vessel operators to alter their fishing patterns; therefore, the operating costs of these vessels could possibly increase. However, given the low level of revenue at risk under this alternative, the potential increase in operating costs would likely be small.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities
Because Alternative 2 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1.

Similarly, there are not likely to be adverse effects on communities, because of the low level of revenue at risk under this alternative. Moreover, the C-I-A dataset indicates that the economic effects would likely be distributed across several communities. For example, the owners of the vessels in the FGCV 33-59 class that fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs during the 1995 through 2003 period are located in at least 19 different communities, while at least 15 different communities are represented by the owners of vessels in the L-CP class that fished in the ADF&G statistical areas containing the proposed HAPCs.

Impacts on Management and Enforcement
Alternative 2 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount. As a general rule, any regulation that closes relatively small areas, or differentiates between gear types requires Coast Guard cutters to actively patrol and use relatively more resource intensive enforcement methods. Because the closures found in Alternative 2, require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

6.7.5.3 Alternative 3: Adopt the hybrid area for Bowers Ridge as a HAPC and prohibit bottom-contact with mobile gear within the HAPC

This alternative designates an area along Bowers Ridge in the Aleutian Islands as a HAPC. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that, because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future.

In addition to designation, this alternative prohibits bottom-contact with mobile gear (BCMG) within the proposed HAPC. BCMG includes bottom trawl gear, pelagic trawl gear if it is fished so as to contact the bottom, and dinglebar troll gear.

Impacts on Non-Use Value
While it is not possible at this time to provide an empirical estimate of the expected non-use benefits under Alternative 3, it is assumed that this alternative likely has the potential to maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.

Impacts on Fishing Revenues and Costs

It is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

The C-I-A dataset indicates that 3 classes of groundfish vessels fished in the proposed HAPCs during the 1995 through 2003 period (Table 6-98). The most consistent activity was by vessels in the HT-CP class; however, the revenue at risk for this class never exceeded $27,000 in any given year. At its highest level (2002), the revenue at risk for HT-CPs was approximately 2/100ths of 1% of the total groundfish gross wholesale revenue of the vessel class.

Table 6-98. Estimated Groundfish Revenue at Risk under Action 3/Alternative 3 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
ST/FT-CP	2	3	2	1	1	-	-	-	-	7
HT-CP	7	7	2	3	8	9	9	9	10	13
TCV BSP 60-124	-	-	-	1	-	-	-	-	-	1
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
ST/FT-CP	c	0.00	c	c	c	-	-	-	-	0.00
HT-CP	0.00	0.00	c	0.00	0.00	0.01	0.01	0.03	0.01	0.01
TCV BSP 60-124	-	-	-	c	-	-	-	-	-	c
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
ST/FT-CP	435.08	358.84	364.09	311.08	333.88	356.18	409.59	441.93	357.75	374.269
HT-CP	162.09	168.40	143.74	112.33	128.52	150.53	135.62	165.32	147.32	145.987
TCV BSP 60-124	188.30	151.67	145.30	87.97	119.87	170.18	233.76	274.05	271.53	182.515
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
ST/FT-CP	c	0.00	c	c	c	-	-	-	-	0.00
HT-CP	0.00	0.00	c	0.00	0.00	0.00	0.01	0.02	0.00	0.00
TCV BSP 60-124	-	-	-	c	-	-	-	-	-	c

Source: C-I-A dataset, compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

No scallop fishing occurred in the proposed HAPCs in the 1995 through 2003 period (Personal communication, Gregg Rosencrantz, ADF&G, August 2004). No fishing with dinglebar troll gear for lingcod has been reported in the Aleutian Islands.

A small level of crab and halibut fishing occurred in the proposed HAPCs during the 1995 through 2003 period (IPHC, 2004; Personal Communication, David Barnard, ADF&G, September 2004), but, because longline and pot gear are not restricted under this alternative, there would be no economic impact on the crab or halibut fisheries.

In conclusion, it is likely that Alternative 3 does not have the potential to create significant immediate effects on the gross revenues of any fishing fleet. There is, however, the possibility that, were the proposed HAPC designations and fishing prohibitions not adopted, fishing with bottom-contact gear in these habitat areas would increase in the future. Alternative 2 would preclude this hypothetical growth. There is insufficient data on the potential income derived from fishing in these habitat areas to estimate the economic impact on "potential" future fishing expansion in these areas.

The potential of this alternative to have a significant impact on vessel operating costs is likely minimal, as little fishing activity has occurred historically in the proposed HAPC.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities
Because Alternative 3 is unlikely to significantly affect the revenues or costs in any commercial fishery, it is not likely to have a significant effect on consumers, nor on related fisheries, nor on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.

Impacts on Management and Enforcement
Alternative 3 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount. As a general rule, any regulation that closes relatively small areas, or differentiates between gear types, requires Coast Guard cutters to actively patrol and use relatively more resource intensive enforcement methods. Because the closures found in Alternative 3 require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

6.7.5.4 Alternative 4: Adopt 4 sites in the Aleutian Islands (South Amlia/Atka, Kanaga Volcano, Kanaga Island and Tanaga Islands) as HAPCs with two options for gear restrictions

This alternative designates 4 sites in the Aleutian Islands as HAPCs. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have the potential to create a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that, because an area has been designated as a HAPC, future actions, policies, and regulations will need to recognize the area, and these actions, policies, and regulations will need to be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future. In addition to designation, this alternative includes two options, as follows:

Option 1: Close sites to bottom-contact with mobile gear (BCMG) for 5 years. BCMG includes bottom trawl gear, pelagic trawl gear if it is fished so as to contact the bottom, and dinglebar troll gear. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the sites that are high-relief deep-water corals. The portion of these sites that are in fact high-relief coral sites should remain closed to BCMG after the 5 years and the portion of the areas that are not high relief coral sites should re-open to BCMG after the 5 years.

Option 2: Close sites to bottom trawling for 5 years. During the 5 years, these sites would be prioritized for undersea mapping to identify the portion of the sites that are high-relief deep-water corals. The portion of these sites that are in fact high-relief coral sites should remain closed to bottom trawling after the 5 years and the portion of the areas that are not high relief coral sites should re-open to trawling after the 5 years.

A major difference between the two options is that Option 1 prohibits not only bottom trawl gear (also referred to as non-pelagic trawl gear) as defined in regulations, but also restricts the use of pelagic trawl and jig gear if they are deployed so as to come in contact with the bottom. Option 2 only restricts the use of bottom trawl gear. The data available for this analysis do not distinguish between pelagic trawl gear that contacts the bottom and pelagic trawl gear that does not. To be conservative (i.e., more likely to overstate impacts than understate them), this analysis assumes that all catch reported as "pelagic gear" is equivalent to bottom trawling.

Impacts on Non-Use Value
While it is not possible at this time to provide an empirical estimate of the expected flow of non-use benefits under Alternative 2, it is assumed that this alternative likely has the potential to help maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1. Option 1, because

it includes a wider spectrum of gears, likely has a greater potential to help maintain the stream of non-use benefits than does Option 2.

Impacts on Fishing Revenues and Costs

It is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

The C-I-A dataset indicates that 6 classes of groundfish vessels fished in the proposed HAPCs during the 1995 through 2003 period (Table 6-99). Prior to 1999, the most important species caught in the proposed HAPCs was pollock, but after that year Pacific cod and Atka mackerel accounted for most of the wholesale revenue.[6] The most consistent fishing activity in the proposed HAPCs was by vessels in the HT-CP class—they fished in the proposed HAPCs each year, with a peak in activity in 2001. The fishing activity of the ST/FT-CP and TCV BSP ≥ 125 classes in the proposed HAPCs declined over the 1995 through 2003 period probably due to the closure of the Aleutian Islands pollock fishery. Activity in the proposed HAPCs by the TCV < 60 class was limited to 2001 and 2002. As shown in Table 6-99, revenue at risk as a percent of total groundfish wholesale revenue did not exceed $1/10^{th}$ of 1% for any groundfish vessel class during the 1995 through 2003 period.

Table 6-99. Estimated Groundfish Revenue at Risk under Action 3/Alternative 4 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
ST/FT-CP	14	14	11	9	3	-	1	1	-	27
HT-CP	7	8	3	6	8	6	6	6	7	15
TCV BSP >= 125	4	8	5	1	-	2	3	4	2	19
TCV BSP 60-124	1	2	7	3	1	5	3	4	4	22
TCV Div. AFA	-	3	-	-	1	2	1	1	2	8
TCV < 60	-	-	-	-	-	-	1	2	-	2
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
ST/FT-CP	0.08	0.04	0.02	0.01	0.00	-	c	c	-	0.02
HT-CP	0.02	0.03	0.01	0.02	0.01	0.01	0.06	0.03	0.02	0.02
TCV BSP >= 125	0.02	0.03	0.02	c	-	c	0.00	0.01	c	0.01
TCV BSP 60-124	c	c	0.00	0.00	c	0.01	0.01	0.01	0.01	0.00
TCV Div. AFA	-	0.00	-	-	c	c	c	c	c	0.00
TCV < 60	-	-	-	-	-	-	c	c	-	c
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
ST/FT-CP	435.08	358.84	364.09	311.08	333.88	356.18	409.59	441.93	357.75	374.27
HT-CP	162.09	168.40	143.74	112.33	128.52	150.53	135.62	165.32	147.32	145.99
TCV BSP >= 125	188.89	140.55	172.36	103.00	158.46	209.43	216.26	231.92	233.35	183.80
TCV BSP 60-124	188.30	151.67	145.30	87.97	119.87	170.18	233.76	274.05	271.53	182.52
TCV Div. AFA	90.95	104.88	95.68	114.27	107.66	103.31	52.74	118.26	111.91	99.96
TCV < 60	20.41	42.41	33.45	40.50	33.72	30.72	33.14	25.96	23.73	31.56
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
ST/FT-CP	0.02	0.01	0.01	0.00	0.00	-	c	c	-	0.00
HT-CP	0.01	0.01	0.00	0.02	0.01	0.01	0.04	0.02	0.02	0.02
TCV BSP >= 125	0.01	0.02	0.01	c	-	c	0.00	0.01	c	0.01
TCV BSP 60-124	c	c	0.00	0.01	c	0.00	0.00	0.00	0.00	0.00
TCV Div. AFA	-	0.00	-	-	c	c	c	c	c	0.00
TCV < 60	-	-	-	-	-	-	c	c	-	c

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

[6] No pelagic trawling has been reported in the proposed HAPCs since 1998.

No scallop fishing occurred in the proposed HAPCs in the 1995 through 2003 period (Personal communication, Gregg Rosencrantz, ADF&G, August 2004). No fishing with dinglebar troll gear for lingcod has been reported in the Aleutian Islands.

A small level of crab and halibut fishing occurred in the proposed HAPCs during the 1995 through 2003 period (IPHC, 2004; Personal Communication, David Barnard, ADF&G, September 2004), but, because longline and pot gear are not restricted under this alternative, there would be no economic impact on the crab or halibut fisheries.

In conclusion, it is unlikely that Alternative 2 has the potential to create significant immediate effects on the gross revenues of any fishing fleet. There is, however, the possibility that, were the proposed HAPC designations and fishing prohibitions not adopted, fishing with BCMG or bottom trawls in these habitat areas would increase in the future. Alternative 2 would preclude the opportunity to fish with one of these gears. There is insufficient data on the potential income derived from fishing in these habitat areas to estimate the economic impact of foregone fishing opportunities.

The potential of this alternative to have a significant impact on vessel operating costs is likely minimal, as little fishing activity has occurred in the proposed HAPCs.

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities

Because Alternative 4 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.

Impacts on Management and Enforcement

Alternative 4 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount. As a general rule, any regulation that closes a relatively small areas, or differentiates between gear types requires Coast Guard cutters to actively patrol and use relatively more resource intensive enforcement methods. Because the closures found in Alternative 4 require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

6.7.5.5 Alternative 5: Adopt all HAPCs specified in Alternatives 2, 3, and 4 with the same boundaries and management measures.

Alternative 5 combines Alternatives 2, 3, and 4, and, therefore, the effects of Alternative 5 would be the sum of the effects of those 3 alternatives. It can be argued that simply designating an area as a HAPC—without other regulatory actions (e.g., restricting fishing activity)—does not have a significant immediate impact on any use or non-use benefit stream. However, it can also be argued that, because an area has been designated as a HAPC, future actions, policies, and regulations will need be assessed to determine their potential impacts on any HAPC. Thus, a HAPC designation has the potential to affect fishery regulations and fishing activity in the future.

Impacts on Non-Use Value

While it is not possible at this time to provide an empirical estimate of the expected non-use benefits under Alternative 5, it is assumed that this alternative likely has the potential to maintain the flow of non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas, by reducing the potential adverse effects of fishing activities, relative to Alternative 1. This alternative, because it includes all the proposed HAPCs and fishing restrictions of Alternatives 2, 3, and 4, likely has a greater potential to sustain the stream of non-use benefits than does any one of those 3 alternatives alone.

Impacts on Fishing Revenues and Costs

As with Alternatives 2, 3, and 4, it is uncertain if this alternative would result in sustained/increased yield of any FMP species, relative to Alternative 1, because the linkages between fish productivity rates and habitat are not well understood.

As shown in Table 6-100, the revenue at risk under Alternative 5 is equal to the sum of the revenue at risk under Alternatives 2, 3, and 4. The C-I-A dataset indicates that 11 of the 13 groundfish vessel classes described in this analysis fished in the proposed HAPCs during the 1995 through 2003 period—only the P-CP and FGCV ≤ 32 classes did not fish in these areas. However, among those classes for which data can be reported, only for the TCV < 60 class does the potential revenue at risk approach 1/10th of 1% of the its total groundfish gross wholesale value. It is unlikely that this revenue loss would be significant even if the loss were incurred by a single vessel. The C-I-A dataset indicates that during the 1995 through 2003 period ten vessels in the TCV < 60 class fished in the ADF&G groundfish/shellfish statistical areas containing the proposed HAPCs (Table 6-100).

Table 6-100. Estimated Groundfish Revenue at Risk under Action 3/Alternative 5 by Vessel Class, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	1995-2003
Vessel Class	Number of Vessels Fishing in the ADF&G Statistical Areas Containing the Proposed HAPCs									Total
ST/FT-CP	16	16	13	10	5	1	1	1	-	28
HT-CP	10	11	5	8	10	12	11	11	11	18
L-CP	13	8	9	12	11	13	8	6	5	34
TCV BSP >= 125	4	8	5	3	2	2	3	4	2	21
TCV BSP 60-124	1	2	7	5	1	5	3	5	4	24
TCV Div. AFA	-	3	-	-	3	4	2	1	2	9
TCV Non-AFA	1	-	-	-	1	1	-	-	1	3
TCV < 60	-	-	-	-	1	1	1	6	4	10
PCV	-	-	1	1	1	2	1	1	1	4
LCV	7	6	5	4	2	3	3	3	1	17
FGCV 33-59	-	2	4	3	7	11	12	9	12	32
	Wholesale Revenue at Risk under Alternative 5 ($ Millions)									Average
ST/FT-CP	0.08	0.04	0.02	0.02	0.00	c	c	c	-	0.02
HT-CP	0.02	0.03	0.01	0.03	0.02	0.02	0.07	0.06	0.03	0.03
L-CP	0.01	0.02	0.02	0.02	0.02	0.02	0.00	0.01	0.00	0.01
TCV BSP >= 125	0.02	0.03	0.02	0.00	c	c	0.00	0.01	c	0.01
TCV BSP 60-124	c	c	0.00	0.01	c	0.01	0.01	0.01	0.01	0.00
TCV Div. AFA	-	0.00	-	-	0.00	0.00	c	c	c	0.00
TCV Non-AFA	c	-	-	-	c	c	-	-	c	c
TCV < 60	-	-	-	-	-	c	c	0.01	0.01	0.01
PCV	-	-	c	c	c	c	c	c	c	c
LCV	0.00	0.00	0.00	0.00	c	0.00	0.00	0.00	c	0.00
FGCV 33-59	-	-	c	c	0.01	0.02	0.00	0.00	0.00	0.00
	Status Quo Total Groundfish Wholesale Revenue ($ Millions)									Average
ST/FT-CP	435.08	358.84	364.09	311.08	333.88	356.18	409.59	441.93	357.75	374.269
HT-CP	162.09	168.40	143.74	112.33	128.52	150.53	135.62	165.32	147.32	145.987
L-CP	78.06	80.91	86.04	95.99	111.56	116.93	104.32	122.74	114.44	101.221
TCV BSP >= 125	188.89	140.55	172.36	103.00	158.46	209.43	216.26	231.92	233.35	183.803
TCV BSP 60-124	188.30	151.67	145.30	87.97	119.87	170.18	233.76	274.05	271.53	182.515
TCV Div. AFA	90.95	104.88	95.68	114.27	107.66	103.31	52.74	118.26	111.91	99.962
TCV Non-AFA	35.16	49.24	33.71	48.45	42.60	38.39	42.68	41.63	47.58	42.158
TCV < 60	20.41	42.41	33.45	40.50	33.72	30.72	33.14	25.96	23.73	31.560
PCV	22.23	27.69	22.11	15.79	24.41	38.39	20.99	18.83	31.58	24.669
LCV	47.64	33.83	31.13	21.73	22.83	22.00	24.79	19.30	22.29	27.285
FGCV 33-59	68.81	57.76	68.42	55.79	60.57	65.19	64.43	69.29	78.51	65.420
	Revenue at Risk as a Percent of Status Quo Total Groundfish Wholesale Revenue									Average
ST/FT-CP	0.02	0.01	0.01	0.01	0.00	c	c	c	-	0.01
HT-CP	0.01	0.02	0.00	0.02	0.01	0.01	0.05	0.03	0.02	0.02
L-CP	0.01	0.03	0.02	0.02	0.02	0.02	0.00	0.01	0.00	0.01
TCV BSP >= 125	0.01	0.02	0.01	0.00	c	c	0.00	0.01	c	0.01
TCV BSP 60-124	c	c	0.00	0.01	c	0.00	0.00	0.00	0.00	0.00
TCV Div. AFA	-	0.00	-	-	0.00	0.00	c	c	c	0.00
TCV Non-AFA	c	-	-	-	c	c	-	-	c	c
TCV < 60	-	-	-	-	-	c	c	0.05	0.03	0.02
PCV	-	-	c	c	c	c	c	c	c	c
LCV	0.00	0.01	0.00	0.02	c	0.01	0.00	0.01	c	0.01
FGCV 33-59	-	-	c	c	0.01	0.03	0.00	0.00	0.00	0.00

Source: C-I-A dataset compiled by NOAA Fisheries Alaska Region using vessel class definitions developed by Northern Economics, Inc., September 2004.

Notes: A "-" in a cell indicates that the vessel class had no activity in the proposed HAPCs in that year. A "c" in a cell indicates that fewer than 3 vessels fished in the ADF&G statistical area(s) containing the proposed HAPCs, and, therefore, the revenue at risk estimates are confidential. If a vessel class is not listed in the table then it had no activity in the proposed HAPCs during the 1995-2003 period.

Only Alternative 2 is likely to have the potential to create a significant economic effect on the halibut fishery. As indicated in the analysis of Alternative 2, an upper bound estimate of the total catch in the 4 proposed HAPCs is 1,148,056 lbs, or about 4.4% of the total catch in Area 4B. This figure represents an upper bound estimate of the revenue at risk under this alternative (assuming that catch in Great Sitkin and Cape Moffett was negligible). While a 4.4% revenue loss may not be significant for the halibut fleet as a whole, it is possible that the revenue at risk for some individual vessels would be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas.

Similarly, only Alternative 2 is likely to have the potential to create a significant economic effect on the golden king crab fishery in the Western Aleutian Islands and red king crab fishery in the Petrel Bank area. As indicated in the analysis of Alternative 2, approximately 8% of the effort and catch in the Western Aleutian Islands golden king crab fishery occurred in the proposed HAPCs. While an 8% revenue loss may not be significant for the crab fleet as a whole, it is possible that the revenue at risk for some individual vessels would be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas. About 20% of the effort and catch in the Petrel Bank red king crab fishery occurred in the proposed HAPCs. A 20% revenue loss would be significant for the Petrel Bank red king crab fleet, as a whole, as well as for individual vessels. However, the Petrel Bank red king crab fishery is not expected to be open in the near future, due to concerns of low king crab abundance in the Petrel Bank area.

As with Alternatives 2, 3, and 4, Alternative 5 is not likely to have the potential to create a significant economic effect on the Alaska weathervane scallop fishery, or dinglebar troll fishery for lingcod.

This alternative has the potential to cause some fishing vessel operators to alter their fishing patterns, and, therefore, the operating costs of these vessels could be impacted. However, given the low level of revenue at risk under this alternative, the potential increase in operating costs would likely be small

Impacts on Consumers, Related Fisheries, Fishing Safety, and Communities
Because Alternative 5 is unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, it is not expected to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1.

As with Alternatives 2, 3, and 4, there are not likely to be adverse effects on communities under Alternative 5, because of the low level of revenue at risk for fishing fleets, and, because the economic effects of the alternative would be distributed across several communities.

Impacts on Management and Enforcement
As with Alternatives 2, 3, and 4, Alternative 5 likely has the potential to increase management and enforcement costs, although it is not possible to estimate by what amount.

6.8 Summary of Benefits and Costs of the Alternatives

Until the industry has an opportunity to adjust fishing patterns and behavior in accordance with the new regulations, it is unlikely that even the industry members themselves can fully anticipate the size and distribution of effects of the HAPC alternatives considered. However, the analyses presented above provide qualitative and, where possible, some quantitative estimates of the benefits and costs of the measures considered by the Council. For example, it was possible to estimate the gross revenue placed at risk under each alternative. While gross measures are not suggested here to be equivalent to, nor necessarily even good proxies for, net effects, they can be used to gain insights into the expected nature and likely distribution of impacts that may be expected to emerge from implementation of each of the competing alternatives. Lacking the data necessary to derive empirical net results, and with the legal and administrative obligation to use the best available quantitative and qualitative information to draw informed conclusions about the potential net National effects of adopting one or another of the proposed actions, the foregoing analysis makes a good-faith effort to meet these requirements.

The relative differences in costs and benefits between the individual alternatives, to the degree that they could be meaningfully distinguished, are provided in summary tables for the principal cost and benefit categories treated in greater detail above for each alternative (Table 6-101, Table 6-102, and Table 6-103). In addition, Table 6-104 compares the benefits and costs of the "all-inclusive" alternatives in the 3 actions (Alternative 3 in Action 1; Alternative 4 in Action 2; and Alternative 5 in Action 3).

6.8.1 Council Final Action

After consideration of this analysis (EA/RIR/IRFA) and hearing public testimony on the HAPC analysis, the Council took final action in February of 2005. In doing so, the Council chose from among the alternatives to establish HAPCs that best meet their stated goals and objectives while minimizing, to the extent practicable, adverse effects on the fishing industry. The Council chose Alternative 3 from each of the 3 Actions. The potential effects of each of these alternatives has been discussed in detail in the analysis of alternatives presented above and are summarized in table 6-104 below. However, for clarity, a summary of effects of each of these alternatives on groundfish gross revenues is presented here as well. All 3 alternatives chosen by the Council have identical effects on all other categories of impacts. Thus, other effects are summarized for all 3 alternatives following the groundfish revenue effects discussion.

Table 6-101. Summary of Costs and Benefits for the Alternatives in Action 1

Impact Type	Action 1 Alternative 1 (No Action)	Alternative 2	Alternative 3
Use Value	Baseline Alternative -- Based on best available scientific information, existing habitat conservation measures appear sufficient to sustain FMP stocks at present abundance levels. Because some information (e.g., linkages between fish productivity rates and habitat) is not well understood, uncertainties remain.	It is uncertain whether either of these alternatives would result in increased yield of any FMP species. All other use values under these alternatives are also unknown.	
Non-Use Value	Human activities, including fishing and non-fishing activities would proceed without explicit consideration of potential adverse effects on sensitive habitat areas (i.e., HAPCs). Consequently, non-use benefits associated with the ecosystem health and biodiversity of these areas could decrease.	Both alternatives likely have the potential to sustain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.	
Groundfish Gross Wholesale Revenue at Risk [shows 1) vessel classes that fished in the ADF&G statistical areas containing the proposed HAPCs during the 1995-2003 period, with gear that would be restricted; and 2) estimated 'revenue at risk' as a percentage of total groundfish gross wholesale revenue]	Baseline (i.e., no revenue at risk)	FGCV 33-59: confidential	FGCV 33-59: ≈ 0.01% L-CP: confidential LCV: confidential It is probable that the revenue at risk could be mitigated by fishing in remaining open areas. Moreover, it is likely that the estimated revenue at risk in the FGCV 33-59 class is distributed across several vessels.
Non-Groundfish Catch at Risk	Baseline (i.e., no catch at risk)	No impact. No Council-managed bottom-contact fishing for non-groundfish occurred in the proposed HAPCs during the 1995-2003 period.	
Vessel Operating Costs	Baseline	The potential of either alternative to have a significant impact on vessel operating costs is likely minimal, because little fishing activity has occurred in the proposed HAPCs.	
Costs to Consumers	Baseline.	Because these alternatives are unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, they are not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, adverse effects on communities are not likely.	
Impacts on Related Fisheries	Baseline		
Fishing Safety	Baseline		
Effects to Fishing Communities	Baseline		
Regulatory and Enforcement Programs	Baseline	Management and enforcement costs have the potential to increase under these alternatives, although it is not possible to estimate by what amount. Generally, any regulation that differentiates between gear types requires more resources to enforce.	

Table 6-102. Summary of Costs and Benefits for the Alternatives in Action 2

	Action 2			
Impact Type	**Alternative 1 (No Action)**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Use Value	Baseline Alternative -- Based on best available scientific information, existing habitat conservation measures appear sufficient to sustain FMP stocks at present abundance levels. Because some information (e.g., linkages between fish productivity rates and habitat) is not well understood, uncertainties remain.	It is uncertain whether any of these alternatives would result in increased yield of any FMP species. All other use values under these alternatives are also unknown.		
Non-Use Value	Human activities, including fishing and non-fishing activities would proceed without explicit consideration of potential adverse effects on sensitive habitat areas (HAPCs). Consequently, non-use benefits associated with the ecosystem health and biodiversity of these areas could decrease.	All alternatives likely have the potential to sustain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.		
Groundfish Gross Wholesale Revenue at Risk [shows 1) vessel classes that fished in the ADF&G statistical areas containing the proposed HAPCs during the 1995-2003 period with gear that would be restricted; and 2) their estimated revenue at risk as a percentage of their total groundfish gross wholesale revenue]	Baseline (i.e., no revenue at risk)	ST/FT-CP: < 0.01% HT-CP: ≈ 0.04% TCV BSP ≥ 125: ≈ 0.01% TCV BSP 60-124: ≈ 0.03% TCV Div. AFA: ≈ 0.04% TCV Non-AFA: ≈ 0.27% TCV < 60: ≈ 1.02% FGCV 33-59: < 0.01% It is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue at risk in the TCV Non-AFA and TCV < 60 classes is distributed across several vessels.	L-CP: confidential TCV: confidential LCV: confidential FGCV 33-59: ≈ 0.02% FGCV ≤ 32: ≈ 0.01%	ST/FT-CP: < 0.01% HT-CP: ≈ 0.04% L-CP: confidential TCV BSP ≥ 125: ≈ 0.01% TCV BSP 60-124: ≈ 0.03% TCV Div. AFA: ≈ 0.04% TCV Non-AFA: ≈ 0.27% TCV < 60: ≈ 1.02% LCV: confidential FGCV 33-59: ≈ 0.02% FGCV ≤ 32: ≈ 0.01% It is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue at risk in the TCV Non-AFA and TCV < 60 classes is distributed across several vessels.
Non-Groundfish Catch at Risk	Baseline (i.e., no catch at risk)	No fishing for non-groundfish with BCMG or bottom trawl gear occurred in the proposed HAPCs during the 1995-2003 period.	No fishing for non-groundfish with bottom-contact gear occurred in the proposed HAPCs during the 1995-2003 period.	No fishing for non-groundfish with BCMG, bottom trawl gear, or bottom-contact gear occurred in the proposed HAPCs during the 1995-

Impact Type	Action 2 Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4
				2003 period.
Vessel Operating Costs	Baseline	Given the low level of revenue-at-risk under these alternatives, the potential increase in operating costs would likely be small		
Costs to Consumers	Baseline.	Because these alternatives are unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, they are not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.		
Impacts on Related Fisheries	Baseline.			
Fishing Safety	Baseline.			
Effects to Fishing Communities	Baseline.			
Regulatory and Enforcement Programs	Baseline.	Management and enforcement costs have the potential to increase under these alternatives, although it is not possible to estimate by what amount. Generally, any regulation that differentiates between gear types requires more resources to enforce.		

Table 6-103. Summary of Costs and Benefits for the Alternatives in Action 3

	Action 3				
Impact Type	**Alternative 1 (No Action)**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Use Value	Baseline -- Based on best available scientific information, existing habitat conservation measures appear sufficient to sustain FMP stocks at present abundance levels. Because some information (e.g., linkages between fish productivity rates and habitat) is not well understood, uncertainties remain.	It is uncertain whether any of these alternatives would result in increased yield of any FMP species. All other use values under these alternatives are also unknown.			
Non-Use Value	Human activities, including fishing and non-fishing activities would proceed without explicit consideration of potential adverse effects on sensitive habitat areas (HAPCs). Consequently, non-use benefits associated with the ecosystem health and biodiversity of these areas could decrease.	All alternatives likely have the potential to sustain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.			
Groundfish Wholesale Revenue at Risk [shows 1) vessel classes that fished in the ADF&G statistical areas containing the proposed HAPCs during the 1995-2003 period with gear that would be restricted; and 2) their estimated revenue at risk as a percentage of their total groundfish wholesale revenue]	Baseline (i.e., no revenue at risk)	ST/FT-CP: < 0.01% HT-CP: < 0.01% L-CP: ≈ 0.01% TCV BSP ≥ 125: confidential TCV BSP 60-124: confidential TCV Div. AFA: < 0.01% TCV Non-AFA: confidential TCV < 60: ≈ 0.01% PCV: confidential LCV: ≈ 0.01% FGCV 33-59: ≈ 0.02% It is probable that the revenue at risk could be mitigated by fishing in open	ST/FT-CP: < 0.01% HT-CP: < 0.01% TCV BSP 60-124: < 0.01%	ST/FT-CP: < 0.01% HT-CP: ≈ 0.02% TCV BSP ≤ 125: ≈ 0.01% TCV BSP 60-124: confidential TCV Div. AFA: < 0.01% TCV < 60: ≈ 0.01%	ST/FT-CP: ≈ 0.01% HT-CP: ≈ 0.02% L-CP: ≈ 0.01% TCV BSP ≥ 125: ≈ 0.01% TCV BSP 60-124: < 0.01% TCV Div. AFA: < 0.01% TCV Non-AFA: confidential TCV < 60: ≈ 0.02% PCV: confidential LCV: ≈ 0.01% FGCV 33-59: ≈ 0.02% It is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue

Impact Type	Action 3 Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		areas. Moreover, it is likely that the estimated revenue at risk in the L-CP and FGCV 33-59 classes is distributed across several vessels.			at risk in the L-CP and FGCV 33-59 classes is distributed across several vessels.
Non-Groundfish Catch at Risk	Baseline (i.e., no catch at risk)	The catch (revenue) at risk for some individual vessels in the halibut, Western Aleutian Islands golden king crab, and Petrel Bank area red king crab fisheries may be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas.	No fishing for non-groundfish with BCMG occurred in the proposed HAPCs during the 1995-2003 period.	No fishing for non-groundfish with BCMG or bottom trawl gear occurred in the proposed HAPCs during the 1995-2003 period.	The catch (revenue) at risk for some individual vessels in the halibut, Western Aleutian Islands golden king crab, and Petrel Bank area red king crab fisheries may be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas.
Vessel Operating Costs	Baseline	Given the low level of revenue at risk under these alternatives, the potential increase in operating costs would likely be small.			
Costs to Consumers	Baseline	Because these alternatives are unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, they are not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.			
Impacts on Related Fisheries	Baseline				
Fishing Safety	Baseline.				
Effects to Fishing Communities	Baseline				
Regulatory and Enforcement Programs	Baseline	Management and enforcement costs have the potential to increase under these alternatives, although it is not possible to estimate by what amount. Generally, any regulation that differentiates between gear types requires more resources to enforce.			

Table 6-104. Summary of Costs and Benefits for the "All-Inclusive" Alternatives in All Actions

Impact Type	Alternative 1 (No Action)	Action 1-Alternative 3	Action 2-Alternative 4	Action 3-Alternative 5	All Actions Combined
Use Value	Baseline-- Based on best available scientific information, existing habitat conservation measures appear sufficient to sustain FMP stocks at present abundance levels. Because some information (e.g., linkages between fish productivity rates and habitat) is not well understood, uncertainties remain.	It is uncertain whether any of these alternatives would result in increased yield of any FMP species. All other use values under these alternatives are also unknown.			
Non-Use Value	Human activities, including fishing and non-fishing activities would proceed without explicit consideration of potential adverse effects on sensitive habitat areas (HAPCs). Consequently, non-use benefits associated with the ecosystem health and biodiversity of these areas could decrease.	All alternatives likely have the potential to sustain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities, relative to Alternative 1.			
Groundfish Gross Wholesale Revenue at Risk [shows 1) vessel classes that fished in the ADF&G statistical areas containing the proposed HAPCs during the 1995-2003 period with gear that would be restricted; and 2) their estimated revenue at risk as a percentage of their total groundfish	Baseline (i.e., no revenue at risk).	FGCV 33-59: ≈ 0.01% L-CP: confidential LCV: confidential It is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue at risk in the FGCV 33-59 class is distributed across several vessels.	ST/FT-CP: < 0.01% HT-CP: ≈ 0.04% L-CP: confidential TCV BSP ≥ 125: ≈ 0.01% TCV BSP 60-124: ≈ 0.03% TCV Div. AFA: ≈ 0.04% TCV Non-AFA: ≈ 0.27% TCV < 60: ≈ 1.02% LCV: confidential FGCV 33-59: ≈ 0.02% FGCV ≤ 32: ≈ 0.01% It is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue at risk in the TCV Non-AFA and TCV < 60 classes is	ST/FT-CP: ≈ 0.01% HT-CP: ≈ 0.02% L-CP: ≈ 0.01% TCV BSP ≥ 125: ≈ 0.01% TCV BSP 60-124: < 0.01% TCV Div. AFA: < 0.01% TCV Non-AFA: confidential TCV < 60: ≈ 0.02% PCV: confidential LCV: ≈ 0.01% FGCV 33-59: ≈ 0.02% It is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue at risk in the L-CP and FGCV 33-59 classes is distributed	ST/FT-CP: ≈ 0.01 HT-CP: ≈ 0.06 L-CP: ≈ 0.01 TCV BSP ≤ 125: ≈ 0.01 TCV BSP 60-124: ≈ 0.03 TCV Div. AFA: ≈ 0.04 TCV Non-AFA: ≈ 0.27 TCV < 60: ≈ 1.04 PCV: confidential LCV: ≈ 0.04 FGCV 33-59: ≈ 0.04 FGCV ≤ 32: ≈ 0.01 It is probable that the revenue at risk could be mitigated by fishing in open areas. Moreover, it is likely that the estimated revenue at risk in the TCV Non-AFA,

Impact Type	Alternative 1 (No Action)	Action 1-Alternative 3	Action 2-Alternative 4	Action 3-Alternative 5	All Actions Combined
wholesale revenue]			distributed across several vessels.	across several vessels.	TCV < 60, L-CP, and FGCV 33-59 classes is distributed across several vessels.
Non-Groundfish Catch at Risk	Baseline (i.e., no catch at risk)	No Council-managed bottom-contact fishing for non-groundfish occurred in the proposed HAPCs during the 1995-2003 period.	No fishing for non-groundfish with BCMG, bottom trawl gear, or bottom-contact gear occurred in the proposed HAPCs during the 1995-2003 period.	The catch (revenue) at risk for some individual vessels in the halibut, Western Aleutian Islands golden king crab, and Petrel Bank area red king crab fisheries may be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas.	The catch (revenue) at risk for some individual vessels in the halibut, Western Aleutian Islands golden king crab, and Petrel Bank area red king crab fisheries may be significant. However, it is probable that the revenue at risk could be mitigated by fishing in open areas.
Vessel Operating Costs	Baseline	Given the low level of revenue at risk under these alternatives, the potential increase in operating costs would likely be small			
Costs to Consumers	Baseline	Because these alternatives are unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, they are not likely to have a significant effect on consumers, on related fisheries, or on fishing safety, relative to Alternative 1. Similarly, there are not likely to be adverse effects on communities.			
Impacts on Related Fisheries	Baseline				
Fishing Safety	Baseline.				
Effects to Fishing Communities	Baseline				
Regulatory and Enforcement Programs	Baseline	Management and enforcement costs have the potential to increase under these alternatives, although it is not possible to estimate by what amount. Generally, any regulation that differentiates between gear types requires more resources to enforce.			

Effects on Groundfish Gross Revenue

Action 1: Seamounts. Alternative 3: Designate 16 named seamounts in the EEZ off Alaska as HAPC, and prohibit all bottom contact fishing by Council managed fisheries on these seamounts.

Groundfish gross revenue at risk under this alternative is approximately 0.01% in the FGCV 33-59 sector and is confidential in the L-CP and L-CV sectors. No other groundfish sectors are affected. It is probable that fishing in remaining open areas could mitigate the revenue at risk. Moreover, it is likely that the estimated revenue at risk in the FGCV 33-59 class is distributed across several vessels.

Action 2: GOA Corals. Alternative 3: Designate 3 areas in Southeast Alaska (in the vicinity of Cape Ommaney, Fairweather grounds NW, and Fairweather grounds SW) as HAPC. Bottom contact gear would be prohibited in several subareas within the HAPC designated areas

Groundfish gross revenue at risk under this alternative is approximately 0.02% and 0.01% in the FGCV 33-59 and FGCV ≤ 32 sectors respectively. While some revenue may be put at risk in the L-CP, TCV, and LCV sectors, this data is confidential. No other groundfish sectors are affected. This alternative does not affect non-groundfish catch because no Council-managed bottom-contact fishing for non-groundfish occurred in the proposed HAPCs in this alternative during the 1995-2003 period.

Action 3: AI Corals. Alternative 3: Designate an area of Bowers Ridge as HAPC, and prohibit bottom contact mobile gear (BCMG) including pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contacts the bottom (including dinglebar gear)

Groundfish gross revenue at risk under this alternative is less than 0.01% in each of the ST/FT-CP, HT-CP, and TCV BSP 60-124 sectors. No other groundfish sectors are affected. This alternative does not affect non-groundfish catch because no fishing with bottom-contact mobile gear (BCMG) occurred in the proposed HAPCs in this alternative during the 1995-2003 period.

Other Effects:

It is uncertain whether these alternatives would result in increased yield of any FMP species. All other use values under these alternatives are also unknown. These alternatives likely have the potential to sustain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities.

These alternatives do not affect non-groundfish catch because no Council-managed fishing, with affected gear types, for non-groundfish occurred in the proposed HAPCs in these alternatives during the 1995-2003 period. The potential of these alternatives to have a significant impact on vessel operating costs is likely minimal, because little fishing activity has occurred in the proposed HAPCs in these alternatives. Because these alternatives are unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, they are not likely to have a significant effect on consumers, on related fisheries, or on fishing safety. Similarly, adverse effects on communities are not likely. However, management and enforcement costs have the potential to increase under this alternative, although it is not possible to estimate by what amount. Generally, any regulation that differentiates between gear types requires more resources to enforce.

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7.0 INITIAL REGULATORY FLEXIBILITY ACT ANALYSIS

7.1 Introduction

When an agency proposes regulations, the Regulatory Flexibility Act (RFA) (5 U.S.C. § 601-612) requires the agency to prepare and make available for public comment an initial regulatory flexibility analysis (IRFA) that describes the impact of the proposed rule on small businesses, small nonprofit entities, and small government entities. The IRFA is to aid the agency in considering all reasonable regulatory alternatives that would minimize the economic impact on the small entities to which the proposed rule applies.

The level of detail and sophistication of the analysis should reflect the significance of the impact on small entities. Under 5 U.S.C., Section 603(b) of the RFA, each IRFA is required to address:

1. A description of the reasons why action by the agency is being considered;
2. A succinct statement of the objectives of, and the legal basis for, the proposed rule;
3. A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;
4. 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;
5. An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;
6. A description of any significant alternatives to the proposed rule that accomplish the stated objectives of applicable statutes and that minimize any significant economic impact of the proposed rule on small entities.

If a proposed rule is not expected to have a significant adverse impact on a substantial number of small entities, the RFA allows an agency to so certify the rule, in lieu of preparing an IRFA. NMFS examined in as much detail as practical, the potential impact of the proposed rule on a class-by-class basis. However, unavailable or inadequate data leaves a high degree of uncertainty surrounding both the numbers of entities that will be subject to the proposed rule and the characteristics of any impacts on particular entities. Therefore, to ensure a broad consideration of impacts on small entities, NMFS has prepared this IRFA without first making the threshold determination whether the proposed rule could be certified as not having a significant economic impact on a substantial number of small entities.

7.2 Reasons for Considering the Proposed Action

In Section 2 of the Magnuson-Stevens Fishery Conservation and Management Act, Congress recognized that one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Congress adopted specific requirements for FMPs to identify EFH and minimize to the extent practicable any adverse effects of fishing on EFH. In the regulations implementing the EFH provisions of the Magnuson-Stevens Act, NMFS encourages Councils to identify types or areas of habitat within EFH as HAPCs (50 CFR 600.815(a)(8)). HAPCs provide a mechanism to acknowledge areas where more is known about the ecological function and/or vulnerability of EFH, and to highlight priority areas within EFH for conservation and management.

HAPCs and associated management measures considered by the Council would provide additional habitat protection and further minimize potential adverse effects of fishing on EFH. Such actions are consistent with the EFH EIS, because they address potential impacts that are discussed in the EIS, even though the EIS indicates new management measures may not be required under the Magnuson-Stevens Act to reduce those impacts. In effect, through its evaluation of HAPCs, the Council is considering new measures that would be precautionary.

The need for this action also stems from a May 2003 joint stipulation and order approved by the U.S. District Court for the District of Columbia. That agreement reflected the Council's commitment to consider new HAPCs as part of the response to the AOC v. Daley litigation that challenged whether Council FMPs minimize, to the extent practicable, the adverse effects of fishing on EFH. Under the agreement, final regulations implementing any new HAPC designations and any associated management measures must be promulgated no later than August 13, 2006.

7.3 Objectives and Legal Basis of the Proposed Rule

7.3.1 Objectives of the Proposed Rule

The objective of this action is to determine whether and how to amend the Council's FMPs to identify and manage site-specific HAPCs. HAPCs identified as a result of this EA/RIR/IRFA would provide additional habitat protection and further minimize potential adverse effects of fishing on EFH. The HAPCs would be subsets of EFH that are particularly important to the long-term productivity of one or more managed species, or that are particularly vulnerable to degradation. The Council may identify HAPCs based on one or more of 4 considerations listed in the EFH regulations: ecological importance, sensitivity, stress from development activities, and rarity of the habitat type. The Council required that each HAPC site should meet at least two of those considerations, with one being rarity.

The Council established a process for considering potential new HAPCs, which is documented in Appendix J of the EFH EIS (NMFS 2005). While many types of habitat may be worth considering as HAPCs, the Council determined that concrete and realistic priorities should be set to move forward expeditiously with the designation and possible protection of HAPCs. The Council decided that the initial HAPC proposal cycle should focus on two priorities:

1 Seamounts in the EEZ, named on NOAA charts, that provide important habitat for managed species

2 Largely undisturbed, high relief, long lived hard coral beds, with particular emphasis on those located in the Aleutian Islands, which provide habitat for life stages of rockfish, or other important managed species that include the following features:

   a) sites must have likely or documented presence of FMP rockfish species

   b) sites must be largely undisturbed and occur outside core fishing areas

Coral areas were selected as a Council HAPC priority, because they may be linked with rockfish and other FMP species. Additionally, areas of high density "gardens" of corals, sponges, and other sedentary invertebrates were recently documented for the first time in the North Pacific Ocean and appear to be particularly sensitive to bottom disturbance. Some deep sea corals are fragile, long-lived, and slow growing organisms that provide habitat for fish and may be susceptible to human induced degradation or stress.

Seamounts were selected as a Council HAPC priority, because they may serve as unique ecosystems. Some FMP species on seamounts may be endemic (exclusive to a particular place) and vulnerable to stress caused by human induced activities. The purpose of this priority is to protect seamounts from potential disturbance from fishing activities, and therefore to ensure the continued productivity of these habitats for managed species.

If the Council identifies HAPCs that include State waters, the Council will relay its concerns to the Alaska Board of Fisheries to suggest appropriate protection of HAPCs under State jurisdiction.

7.3.2 Legal Basis of the Proposed Rule

Under the Magnuson-Stevens Act, the United States has exclusive fishery management authority over all marine fishery resources found within the EEZ, which extends 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 (Secretary) and in the Regional Councils. In the Alaska Region, the Council has the responsibility for preparing FMPs for the marine fisheries it finds that require conservation and management and for submitting their recommendations to the Secretary. Upon approval by the Secretary, NMFS is charged with carrying out the federal mandates of the Department of Commerce with regard to marine and anadromous fish. The groundfish fisheries in the EEZ off Alaska are managed under the FMP for the Groundfish Fisheries of the GOA and the FMP for the Groundfish Fisheries of the BSAI. The crab fisheries in the EEZ off Alaska are managed under the FMP for the Crab Fisheries of the BSAI. The scallop fisheries in the EEZ off Alaska are managed under the FMP for the Scallop Fisheries of Alaska. The halibut fishery is managed by the International Pacific Halibut Commission (IPHC), which was established by a Convention between the governments of Canada and the United States. The IPHC's mandate is research on and management of the stocks of Pacific halibut within the Convention waters of both nations.

Actions taken to amend FMPs or implement other regulations governing these fisheries must meet the requirements of federal laws and regulations. In addition to the Magnuson-Stevens Act, the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Executive Order 12866, and the RFA.

7.4 Description and Number of Small Entities to which the Proposed Rule will Apply

7.4.1 Definition of a Small Entity

The RFA recognizes and defines 3 kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) small government jurisdictions.

<u>Small businesses</u>. 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 businesses 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.

7.4.2 Estimated Number of Small Entities to which Proposed Rule Applies

Federal courts and Congress have indicated that a RFA analysis should be limited to small entities directly regulated by the proposed regulation. As such, small entities to which the proposed rule will not apply are not considered in this analysis. The entities that would be directly regulated by the proposed action are those businesses that use certain gear types to harvest groundfish, halibut, crab, scallops, and other fishery resources in the waters off of Alaska. The proposed action would not apply to any small governmental jurisdiction or small organization, as defined by the RFA.

Incomplete vessel ownership and affiliation information makes the determination of the number of regulated entities difficult. In recognition of this difficulty, this analysis describes the number of regulated entities for the year 2002, (the most recent year for which complete data are available) in terms of a range (Table 7-1). These upper and lower bound estimates are based on the information sources described below. It is estimated that the proposed rule would directly regulate to between 1,834 and 2,042 entities. Of these regulated entities, it is estimated that between 1,800 and 1,969 are small entities. The total number of fishing vessels affiliated with these entities is estimated to be 2,166.

Table 7-1. Upper and Lower Bound Estimates of the Number of Regulated Entities, 2002

	Number of Vessels	Number of Entities	Number Large Entities	Number of Small Entities
Lower Bound	2,166	1,834	34	1,800
Upper Bound	2,166	2,042	74	1,969

Source: Estimates developed by Northern Economics, Inc. based on fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004; Catch Accounting System data compiled by NOAA Fisheries Alaska Region, August 2004; 2004 AFA Permit lists at www.fakr.noaa.gov/ram; CFEC vessel registration data at www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm; and Northern Economics, Inc. (2002, 2004).

The upper bound estimate assumed that no affiliations exist among vessels other than those that have been previously determined to exist by NOAA Fisheries. NOAA Fisheries, in consultation with SBA, determined that all vessels participating in an AFA fishing cooperative are affiliated with all other vessels in that cooperative, and, in the case of catcher vessels, with the processing facilities involved in the cooperative (Personal communication, Lewis Queirolo, NOAA Fisheries Alaska Region, September, 2004).

The lower bound estimate is based on a more inclusive set of assumptions. In addition to the affiliations previously determined to exist by NOAA Fisheries, the lower bound estimate assumed that vessels owned by individuals or companies listing the same name, phone number, or address in CFEC vessel license application forms are affiliated with the same entity. The lower bound estimate also incorporated vessel ownership information previously prepared for the NPFMC by Northern Economics, Inc. (2002, 2004). Further, all vessels associated with AFA fishing cooperatives were assumed to be affiliated, constituting a single aggregate entity for RFA purposes.

The determination of whether an entity is small according to SBA small business thresholds was based on estimates of the total gross revenue derived from Alaska fisheries. Wholesale revenue was used for catcher processors, while ex-vessel revenue was used for catcher vessels. If entities included both catcher processors and catcher vessels, wholesale and ex-vessel revenue were summed.

Table 7-2 shows lower and upper bound estimates of the number of regulated entities targeting groundfish in 2002, by vessel class. Vessels that made only incidental landings of groundfish were not included. It is estimated that the proposed rule would apply to between 712 and 827 entities targeting groundfish. Of these regulated entities, it is estimated that between 678 and 754 are small entities.

Table 7-2. Upper and Lower Bound Estimates of the Number of Regulated Entities Targeting Groundfish by Vessel Class, 2002

Class	Number of Vessels	Number of Entities Lower Bound	Number of Entities Upper Bound	Number of Large Entities Lower Bound	Number of Large Entities Upper Bound	Number of Small Entities Lower Bound	Number of Small Entities Upper Bound
ST/FT-CP	16	1	1	1	1	0	0
HT-CP	23	10	23	10	22	0	1
P-CP	6	5	6	4	0	1	6
L-CP	42	19	42	14	32	5	10
TCV BSP ≥ 125	25	1	6	1	6	0	0
TCV BSP 60-124	46	1	6	1	6	0	0
TCV Div. AFA	20	1	6	1	6	0	0
TCV Non-AFA	36	29	36	10	9	19	27
TCV < 60	46	44	46	5	2	39	44
PCV	65	45	65	4	0	41	65
LCV	74	72	74	3	2	69	72
FGCV 33-59	475	462	475	2	0	460	475
FGCV ≤ 32	56	55	56	0	0	55	56
All	1,004	712	827	34	73	678	754

Source: Estimates developed by Northern Economics, Inc. based on fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004; Catch Accounting System data compiled by NOAA Fisheries Alaska Region, August 2004; 2004 AFA Permit lists at www.fakr.noaa.gov/ram; CFEC vessel registration data at www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm; and Northern Economics, Inc. (2002, 2004).

Table 7-3 shows lower and upper bound estimates of the number of regulated entities in federally-managed crab fisheries in 2002, by vessel class. It is estimated that the proposed rule would apply to between 86 and 136 entities. Of these regulated entities, it is estimated that between 77 and 128 are small entities.

Table 7-3. Upper and Lower Bound Estimates of the Number of Regulated Entities in Federally-Managed Crab Fisheries by Vessel Class, 2002

Class	Number of Vessels	Number of Entities Lower Bound	Number of Entities Upper Bound	Number of Large Entities Lower Bound	Number of Large Entities Upper Bound	Number of Small Entities Lower Bound	Number of Small Entities Upper Bound
P-CP	6	5	5	4	0	1	5
L-CP	3	2	2	2	2	0	0
TCV BSP ≥ 125	25	1	4	1	4	0	0
TCV BSP 60-124	46	1	5	1	5	0	0
TCV Div. AFA	20	1	4	1	4	0	0
TCV Non-AFA	1	1	1	0	0	1	1
TCV < 60	2	2	2	0	0	2	2
PCV	59	39	59	4	0	35	59
LCV	9	7	8	1	0	6	8
Other CV	74	43	60	6	3	37	58
All	297	86	136	9	9	77	128

Source: Estimates developed by Northern Economics, Inc. based on fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004; Catch Accounting System data compiled by NOAA Fisheries Alaska Region, August 2004; 2004 AFA Permit lists at www.fakr.noaa.gov/ram; CFEC vessel registration data at www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm; and Northern Economics, Inc. (2002, 2004).

Table 7-4 shows lower and upper bound estimates of the number of regulated entities in the halibut fishery in 2002, by vessel class. It is estimated that the proposed rule would directly regulate to between 1,545 and 1,629 entities. Of these regulated entities, it is estimated that between 1,535 and 1,616 are small entities.

Table 7-4. Upper and Lower Bound Estimates of the Number of Regulated Entities in the Halibut Fishery by Vessel Class, 2002

Class	Number of Vessels	Number of Entities Lower Bound	Number of Entities Upper Bound	Number of Large Entities Lower Bound	Number of Large Entities Upper Bound	Number of Small Entities Lower Bound	Number of Small Entities Upper Bound
P-CP	1	1	1	0	0	1	1
L-CP	20	6	10	3	7	3	3
TCV BSP 60-124	46	1	3	1	3	0	0
TCV Div. AFA	20	1	1	1	1	0	0
TCV Non-AFA	14	12	13	2	1	10	12
TCV < 60	18	17	17	3	2	14	15
PCV	33	13	14	3	0	10	14
LCV	66	64	66	1	0	63	66
FGCV 33-59	360	351	358	1	0	350	358
FGCV ≤ 32	22	21	22	0	0	21	22
Other CVs	1,153	1,090	1,136	4	8	1,086	1,129
All	1,822	1,545	1,629	10	14	1,535	1,616

Source: Estimates developed by Northern Economics, Inc. based on fish ticket data compiled by NOAA Fisheries Alaska Fisheries Science Center, August 2004; Catch Accounting System data compiled by NOAA Fisheries Alaska Region, August 2004; 2004 AFA Permit lists at www.fakr.noaa.gov/ram; CFEC vessel registration data at www.cfec.state.ak.us/mnu_Pmt_Vess_Recs.htm; and Northern Economics, Inc. (2002, 2004).

Based on the gross ex-vessel[7] revenue in the entire scallop fishery and the numbers of participating vessels, it appears that the nine vessels involved in this fishery could, if taken individually, be considered small entities. However, 6 vessel operators coordinate fishing effort through means of membership in a cooperative, allowing some boats to fish, while others in the co-op do not. Revenues are then distributed among the cooperative members. In this way, the members are able to exploit operational and economic efficiencies that, absent this affiliation, they could not capture. As a result, however, under SBA rules their "combined" gross receipts is the appropriate measure to be compared to the $3.5 million threshold criterion. In this case, the members of the scallop cooperative would not qualify as small entities, for RFA purposes.

There are insufficient data with which to precisely determine the number of small entities in the dinglebar troll fishery; however, given the small size (less than 40 ft) of most of the vessels in this fishery, it is likely that the majority of the 22 vessel operators that had permits to participate in the fishery in 2002, were small, for RFA purposes.

7.4.3 Impacts on Directly Regulated Small Entities

After consideration of this analysis (EA/RIR/IRFA) and hearing public testimony on the HAPC analysis, the Council took final action in February of 2005. In doing so, the Council chose from among the alternatives to establish HAPCs that best meet their stated goals and objectives while minimizing, to the extent practicable, adverse effects on the fishing industry. The Council chose Alternative 3 from each of the 3 Actions. The potential effects of each of these alternatives has been discussed in detail in the analysis of alternatives presented in RIR section 6.7 and is summarized in table 6-104.

Additionally, the effects of the specific alternatives chosen by the council are further summarized in section 6.8.1 of the RIR. That summary is reproduced here. The reader may find it helpful to review the

[7] Scallops are processed on board the vessel and delivered ex-vessel as shucked meats. Little, if any, additional processing is required. Thus, ex-vessel revenue is a close approximation of first wholesale revenue in this case.

extensive description of the fishery, including definition of the fishing sector abbreviations used here, contained in section 6.6 of the RIR.

All 3 alternatives chosen by the Council have identical effects on all categories of impacts other than groundfish revenues. Thus, other effects are summarized for all 3 alternatives following the groundfish revenue effects discussions for each alternative.

Effects on Groundfish Gross Revenue

Action 1: Seamounts. Alternative 3: Designate 16 named seamounts in the EEZ off Alaska as HAPC, and prohibit all bottom contact fishing by Council managed fisheries on these seamounts.

Groundfish gross revenue at risk under this alternative is approximately 0.01% in the FGCV 33-59 sector and is confidential in the L-CP and L-CV sectors. No other groundfish sectors are affected. It is probable that fishing in remaining open areas could mitigate the revenue at risk. Moreover, it is likely that the estimated revenue at risk in the FGCV 33-59 class is distributed across several vessels.

Action 2: GOA Corals. Alternative 3: Designate 3 areas in Southeast Alaska (in the vicinity of Cape Ommaney, Fairweather grounds NW, and Fairweather grounds SW) as HAPC. Bottom contact gear would be prohibited in several subareas within the HAPC designated areas

Groundfish gross revenue at risk under this alternative is approximately 0.02% and 0.01% in the FGCV 33-59 and FGCV ≤ 32 sectors respectively. While some revenue may be put at risk in the L-CP, TCV, and LCV sectors, this data is confidential. No other groundfish sectors are affected. This alternative does not affect non-groundfish catch because no Council-managed bottom-contact fishing for non-groundfish occurred in the proposed HAPCs in this alternative during the 1995-2003 period.

Action 3: AI Corals. Alternative 3: Designate an area of Bowers Ridge as HAPC, and prohibit bottom contact mobile gear (BCMG) including pelagic trawls that contact the bottom, non-pelagic trawls, dredges, and troll gear that contacts the bottom (including dinglebar gear)

Groundfish gross revenue at risk under this alternative is less than 0.01% in each of the ST/FT-CP, HT-CP, and TCV BSP 60-124 sectors. No other groundfish sectors are affected. This alternative does not affect non-groundfish catch because no fishing with bottom-contact mobile gear (BCMG) occurred in the proposed HAPCs in this alternative during the 1995-2003 period.

Other Effects:

It is uncertain whether these alternatives would result in increased yield of any FMP species. All other use values under these alternatives are also unknown. These alternatives likely have the potential to sustain non-use benefits associated with the ecosystem health and biodiversity of sensitive habitat areas by reducing the potential adverse effects of fishing activities.

These alternatives do not affect non-groundfish catch because no Council-managed fishing, with affected gear types, for non-groundfish occurred in the proposed HAPCs in these alternatives during the 1995-2003 period. The potential of these alternatives to have a significant impact on vessel operating costs is likely minimal, because little fishing activity has occurred in the proposed HAPCs in these alternatives. Because these alternatives are unlikely to have the potential to significantly affect the revenues or costs in any commercial fishery, they are not likely to have a significant effect on consumers, on related fisheries, or on fishing safety. Similarly, adverse effects on communities are not likely. However, management and enforcement costs have the potential to increase under this alternative, although it is not possible to estimate by what amount. Generally, any regulation that differentiates between gear types requires more resources to enforce.

7.5 Description of the Projected Reporting, Record Keeping and Other Compliance Requirements of the Proposed Rule

The proposed rule does not directly mandate "reporting" or "record keeping" within the meaning of the Paperwork Reduction Act. However, the proposed rule contains compliance requirements not subject to the Paperwork Reduction Act. Specifically, the regulation prohibits the use of certain types of fishing gear in habitat areas designated as HAPCs.

Of those vessels that are directly regulated, only a small fraction would incur compliance costs as a result of the proposed rule, because the amount of fishing activity in the proposed HAPCs has been low. The revenue at risk calculations provided in Section 6.7 of this EA/RIR/IRFA represent upper bound estimates of the potential impact of the alternatives on the gross revenues of different vessel classes. In many cases, it is likely that displaced catch could be made up, by shifting effort to another area. Given the low level of revenue at risk under the proposed rule, the potential increase in vessel operating costs would also likely be small. On this basis, the proposed rule is not be expected to have the potential to adversely affect the cash flow or profitability of any small entities.

7.6 Identification of Relevant Federal Rules that may Duplicate, Overlap or Conflict with the Proposed Rule

This analysis did not uncover any Federal rules that duplicate, overlap, or conflict with the proposed rule.

7.7 Description of Significant Alternatives to the Proposed Rule

An IRFA must consider all significant alternatives that accomplish the stated objectives of the action, consistent with applicable statutes, and simultaneously minimize any significant economic impacts of the proposed rule on small entities. "Significant alternatives" are those with potentially lesser impacts on small entities (versus large-scale entities) as a whole. The kinds of alternatives that are possible will vary based on the particular regulatory objective and the characteristics of the regulated industry. However, section 603(c) of the RFA gives agencies some alternatives that they must consider at a minimum

1. Establishment of different compliance or reporting requirements for small entities or timetables that take into account the resources available to small entities.
2. Clarification, consolidation, or simplification of compliance and reporting requirements for small entities.
3. Use of performance rather than design standards.
4. Exemption for certain or all small entities from coverage of the rule, in whole or in part.

The alternatives analyzed in this EA/RIR/IRFA are described in detail in Section 2.3 of the EA and are briefly described in Section 6.5 of the RIR. The Council took final action to choose from among these alternatives in February of 2005. In doing so, the Council chose to establish HAPCs that best meet their stated goals and objectives while minimizing, to the extent practicable, adverse effects on the fishing industry. The RIR for this action analyzes potential economic impacts of the suite of available alternatives and contains a summary of the effects of the chosen alternatives in section 6.8.1, which is also included in this IRFA under section 7.4.3 above. The alternatives by the Council do not contain explicit provisions in regard to mitigating the potential adverse effects of the alternatives on small entities. However, the economic effects that may accrue to small entities in the fishery have been found to be small and can likely be mitigated by fishing areas that remain open.

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