UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

SEP 20 2010

To All Interested Government Agencies and Public Groups:

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

TITLE: Environmental Assessment for Amendment 96 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI) and Amendment 87 to the Fishery Management Plan for Groundfish of the Gulf of Alaska to Comply with Annual Catch Limit Requirements and Environmental Assessment for Amendment 95 to the FMP for Groundfish of the BSAI to Manage Skates as a Target Species Category and Regulatory Amendment to Implement Maximum Retainable Amounts for the BSAI Skate Complex (RIN 0648-AY48)

LOCATION: Exclusive Economic Zone off Alaska

SUMMARY: These Environmental Assessments evaluate alternatives for the combined action to manage skates in the BSAI and for the annual catch limits and accountability measures for groundfish management in the BSAI and in the Gulf of Alaska. The action would manage skates separately from the other species complex in the BSAI, would remove the other species category from the FMPs, and would manage the groups in this category as separate groups for setting annual catch limits and for fisheries management. An ecosystem category would be added to the FMPs, which would include prohibited species catch species (e.g., salmon, halibut, and crab) and forage species for which current management practices would remain the same. The amendments also would revise the language in the FMPs to describe the current practices for setting annual catch limits and using accountability measures for managing the fisheries in respect to the annual catch limits.

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The environmental review process led us to conclude that this action will not have a significant impact on the environment. Therefore, an environmental impact statement was not prepared. A copy of the finding of no significant impact (FONSI), including the environmental assessments, is enclosed for your information.

Although NOAA is not soliciting comments on these completed EAs and FONSI, we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the Responsible Official named above.

Sincerely,

for Paul N. Doremus
NOAA NEPA Coordinator

Enclosures

ENVIRONMENTAL ASSESSMENT

for

Amendment 95 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area to Manage Skates as a Target Species Category

and

A Regulatory Amendment to Implement Maximum Retainable Amounts for the BSAI Skate Complex

September 2010

Lead Agency National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Regional Office
Juneau, Alaska

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Abstract: This document contains an Environmental Assessment for (1) a proposed amendment to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (FMP) to move the skate assemblage from the "other species" category to the "target species" category, and (2) proposed amendments to federal regulations at 50 CFR part 679 to revise the list of species in the "other species" category and to specify maximum retainable amounts (MRAs) for skates as a separate quota category. The new MRAs would specify the maximum amount of skates that could be retained while directed fishing for other groundfish species.

An amendment to the fishery management plan is necessary to conserve skate species. Skates currently are included in the "other species" quota category with sharks, sculpins, and octopuses. A single overfishing limit (OFL), acceptable biological catch (ABC), and total allowable catch (TAC) is specified annually for the "other species" category as a whole. The proposed action would require the North Pacific Fishery Management Council to establish separate annual OFL, ABC, and TAC levels for skates as a group or individual skate species, thereby enhancing means to control the harvest of skates in the Bering Sea and Aleutian Islands Management Area (BSAI). The susceptibility of skates to fishing pressure is well documented. While a target fishery has not developed for skates in the BSAI, without the proposed FMP amendment, the potential exists for the entire "other species" TAC to be taken as skates. A similar action to remove skates from the "other species" category in the Gulf of Alaska was approved in 2005.

Three alternatives are examined: (1) no action; (2) move skates from the "other species" category to the "target species" category and revise 50 CFR part 679 to add BSAI skate MRAs equal to those for the "other species" in Table 11, add species codes for BSAI skates in Table 2a, and add a "pollock/Atka mackerel/skates/ 'other species'" category for setting a halibut prohibited species catch limit; and (3) the same action as Alternative 2, except without the MRA adjustment (Preferred Alternative).

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Executive Summary

This Environmental Assessment (EA) provides environmental and socio-economic analyses for two actions in accordance with the National Environmental Policy Act (NEPA). Amendment 95 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (FMP) would move the skate assemblage from the "other species" category to the "target species" category. An associated regulatory amendment to 50 CFR part 679 would revise federal regulations to be consistent with the amended FMP. Amendment 95 is necessary for the management of the groundfish fisheries and the conservation of marine resources, as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act); a regulatory amendment is a required complementary action if the North Pacific Fishery Management Council (Council) recommends separate management for skates in the Bering Sea and Aleutian Islands Management Area (BSAI).

Purpose and Need

The policy objective for this action is to reduce the risk of overfishing and to maintain healthy stocks of skates. Skates currently are included in the "other species" quota category with sharks, sculpins, and octopuses. A single overfishing limit (OFL), acceptable biological catch (ABC), and total allowable catch (TAC) are specified annually for the "other species" category as a whole. A potential problem in the BSAI groundfish fishery is the potential development of a target fishery on skate species that are managed under a single TAC for four very different groups of groundfish species. The susceptibility of skates to fishing pressure is well documented. Management of skates as part of the "other species" category offers minimal protection to individual species or groups. Designating skates as a target species in the FMP will require the Council to annually establish a separate OFL, ABC, and TAC for skates, thereby enhancing means to control the harvest of skates in the BSAI. The establishment of a separate target category for specifications and a separate maximum retainable amount (MRA) for the skate complex will allow better control over the harvest of skates. No target fishery has yet developed for skates in the BSAI, but without the proposed FMP amendment, the potential exists for the entire "other species" TAC to be taken as skates.

A complementary amendment to federal regulations at 50 CFR part 679 would revise the list of species in the "other species" category, remove skates from the calculation of MRAs of "other species," specify the MRAs for skates as a separate category, and specify species code(s) for BSAI skates. The MRA of a species closed to directed fishing is the maximum weight of that species that may be retained onboard a vessel, calculated as a percentage of the weight of the retained catch onboard the vessel of each species open to directed fishing (the basis species). The new MRAs would specify the maximum amount of skates that could be retained while directed fishing for other groundfish species and the maximum amounts of other groundfish closed to directed fishing that could be retained while directed fishing for skates.

Both the FMP amendment and the regulatory amendment are necessary to allow the Council and the Secretary of Commerce to implement more responsive, precautionary management of skates. A similar action to remove skates from the "other species" category in the Gulf of Alaska was approved in 2005.

Environmental Assessment

The EA addresses the statutory requirements of NEPA to predict whether the impacts to the human environment resulting from implementation of Amendment 95 and the regulatory amendment will be "significant," as that term is defined under NEPA. If the predicted impacts from the proposed alternative are found not to be significant, no further analysis is necessary to comply with the requirements of NEPA.

Three alternatives are considered for revising management of BSAI skates in this EA.

Alternative 1 (The No Action Alternative) Skates would continue to be managed as a part of the BSAI "other species" category.

Alternative 2. Move skates from the "other species" category to the "target species" category in the FMP and revise federal regulations at 50 CFR part 679 to list MRAs for BSAI skates equal to MRAs for "other species" in Table 11; to specify species codes for BSAI skates in Table 2a; and to establish a "pollock/Atka mackerel/skates/'other species'" category for setting a halibut prohibited species catch limit.

Alternative 3. (Preferred Alternative) Move skates from the "other species" category to the "target species" category in the FMP and revise federal regulations at 50 CFR part 679 of federal groundfish regulations to specify species codes for BSAI skates in Table 2a and to establish a "pollock/Atka mackerel/skates/ 'other species'" category for setting a halibut prohibited species catch limit.

The EA evaluated alternatives with respect to effects on:

- target species
- "other species"
- the ecosystem
- social and economic consequences

The environmental and socio-economic impacts of Amendment 95 and the regulatory amendment are discussed in the EA. NEPA significance is determined by considering the context in which the action will occur and the intensity of the action. The context in which the action will occur includes the specific resources, ecosystem, and the human environment affected. The intensity of the action includes the type of impact (beneficial versus adverse) and the degree and duration of impact.

The purpose of the proposed action is to give managers more control over skate harvests in the BSAI to reduce the risk of overfishing skates. This action may lead to limits of the gross revenues from foregone harvest of skates in the future in the short run, but may, as a result of protecting the biomass, lead to greater gross revenues from a sustainable fishery. Given the uncertainties about future skate TAC settings, and with respect to industry's valuation of the trade-off between potential short run restrictions and long run sustainability, the significance of socio-economic impacts is difficult to quantify, but is discussed qualitatively in Section 1.5.

The proposed action is limited in scope and likely will not affect most environmental components of the BSAI. The effects discussion is limited to groundfish target species impacts (including skates, "other species," and Pacific cod), Pacific halibut, and social and economic impacts. Alternative 2, which provides more protection to the skate stock biomass, has been given an insignificant designation for effects on skate species. No additional bycatch of groundfish or Pacific halibut is expected to be taken as no target skate fishery is expected to develop as a result of this proposed action. Should a target fishery develop in the future, the effects of increased harvest of "other species," Pacific cod, and Pacific halibut are expected to be insignificant because of harvest limits (target and incidental) already in effect for those fisheries. No foregone target groundfish catch (e.g., Pacific cod) is expected because proposed catch limits for skates are not limiting on those fisheries. Alternative 3 (Preferred Alternative) has the same effects as Alternative 2, except it limits the amount of skates that can be harvested under MRA regulations to less than could be harvested under Alternative 2 and thus provides more precautionary management of BSAI skates.

Under the no action alternative National Marine Fisheries Service (NMFS) does not have the ability to adequately protect BSAI skates from the risk of overfishing. This is particularly problematic since there is great uncertainty about the biology and population dynamics of skates. Skate species have low fecundity and low growth rates, which would lead to slow recoveries if stocks were fished down. While revenues from the fishery would be higher in the short run while the biomass was being driven down, they would be lower in the longer run as a reduced biomass would support a smaller skate fishery. Also, fishing costs might be higher, due to lower catch per unit of effort, if the biomass was fished down. A key tradeoff occurs between the immediate cost of possible constraints on the directed fisheries that catch skates incidentally and the long-term benefits from protection of the stock, with possibly larger harvests and higher revenues in the long run.

1.0 ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) addresses a proposal to modify the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (FMP) by moving skates from the "other species" category to the target category. A related regulatory amendment would list a maximum retainable amount (MRA) of 20 percent for the skate complex in the Bering Sea and Aleutian Islands Management Area (BSAI); add species codes for skates to a table of species codes for catch accounting; and revise the language of a prohibited species category to reflect the new annual catch limit (ACL) classification for skates. The proposed action is intended to enhance conservation of skates in the BSAI and would complement a previous action that separated management of Gulf of Alaska (GOA) skates from the GOA "other species" complex. The action area effectively covers the entire BSAI. The affected human environment includes the natural and physical environment, as well as relevant economic and social conditions.

The National Environmental Policy Act (NEPA) requires an assessment of the biological, social, and economic consequences of fisheries management alternatives. It provides the public with an opportunity to be involved in and influence decision-making on federal actions.

1.1 Purpose and Need

Skates exhibit life history characteristics that make them extremely vulnerable to overexploitation. The susceptibility of skates to fishing pressure, as has occurred on North Atlantic skate populations, has led to analysis of a more precautionary management strategy for this vulnerable group.[1] In response to recommendations from its Non-Target Species Committee, BSAI and GOA Groundfish Plan Teams, and ad hoc working group, the Council developed the following problem statement.

> The observed problem in the BSAI groundfish fishery is the potential development of a target fishery on skate species that are managed under a single TAC for four very different groups of groundfish species. This offers minimal protection to individual species or groups. Moving BSAI skates to its own target category would require separate annual harvest specifications to be set for skates, either as a group or for individual skate species.

The policy objective for this action is to reduce the risk of overfishing and maintain healthy stocks of skates. The establishment of a separate target category for specifications and a separate MRA for the skate complex will facilitate better control over the harvest of skates. The purpose of the EA is to predict whether the impacts to the human environment resulting from setting specifications for skates will be significant. If the predicted impacts from the preferred alternative are insignificant, and that alternative is chosen, no further analysis is necessary to comply with the requirements of NEPA.

Additional problems with current management stems from three concerns:

- Interest in enhancing management of all "other species" groups, and non-target groundfish species;
- Knowledge that skates are relatively long lived, late maturing, and have low fecundity as a group;
- Problems with processors correctly identifying and recording skate species.

Since 1998, NMFS Alaska Fisheries Science Center, the GOA and BSAI Groundfish Plan Teams, Scientific and Statistical Committee (SSC), and the Council have been moving towards revising management of "other species" and non-target groundfish species. A targeted fishery for skates in Western and Central GOA around Kodiak Island developed in 2003, without protective measures in

[1] http://doc.nprb.org/web/research/research%20pubs/510_synopsis.pdf

place. The Council recommended, and the Secretary implemented in 2005, GOA Plan Amendment 63 to manage longnose skates, big skates, and "other" skates in the GOA as separate target categories. In 2008, the Council identified the separation of BSAI skates from the "other species" groundfish category as its next priority in enhancing management of the component groups in the "other species" category, while awaiting revised guidelines for National Standard 1 that would inform the Council in managing all target and non-target species. Those guidelines were published in the *Federal Register* on January 16, 2009 (74 FR 3178).

1.2 Description of Alternatives

In designing the alternatives for this action, the Council intended to keep the MRAs for skates at or near status quo levels, to reduce the economic incentive for vessels to harvest and retain skates as bycatch in other groundfish fisheries. The Council added a third alternative when it became apparent in the initial review of a draft of this analysis that Alternative 2 may lead to increased harvest of skates. Alternative 3 is the same as Alternative 2, except it would not create a separate MRA for skates. The likelihood for a "top off" fishery[2] for skates is lower with the proposed MRA for skates under Alternative 2, but higher for the remaining species under the "other species" groundfish MRA. In general, the development of a "top off" fishery is dependent upon a number of factors, including, but not limited to, accessibility of the species, availability of a buyer, the ex-vessel or wholesale price of the species, storage availability, and the ability to process the species into a marketable product form(s). In addition, the potential for a vessel to "top off" on a specific species varies across vessels. A vessel with the ability to limit incidental catch or the ability to discard low valued fish, while targeting skates, provides more discretion for "topping off" on specific species.

Three alternatives are considered for revising management of skates in the BSAI. These alternatives are described below.

1.2.1 Alternative 1. (The No Action alternative) Skates would continue to be managed as a part of the BSAI "other species" category.

The stocks of fish and marine invertebrates managed under the FMP are identified and described in Section 3.1.2 of the FMP. These stocks are divided into five categories: target species, other species, forage fish species, nonspecified species, and prohibited species. The species managed under each category are listed in Table 3-1 of the FMP. Target species are those species or species groups that support either a single species or mixed species target fishery, are commercially important, and for which sufficient data exist to allow each species or species group to be managed on its own biological merits. A specific TAC is established annually for each target species. "Other species" are described as those species or species groups that currently are of slight economic value and not generally targeted upon, but which have the potential to be targeted on in the future or are important ecosystem components. The category currently includes sculpins, sharks, skates, and octopuses. "Other species" also are described as those species for which insufficient data exist to allow management under separate TACs. Therefore, a single TAC is specified annually for this category as a whole. If any circumstances change that led a species to be placed in a specific stock category in the FMP, an FMP amendment is needed to move that species to a more appropriate stock category.

Regulations at 50 CFR part 679 address management of groundfish in the BSAI. These regulations describe the annual process of specifying OFL, ABC, and TAC levels for the target species and "other species" quota categories. Under § 679.20(a), a TAC must be specified for each "target species" category and the "other species" category. TACs for the target species may be split or combined by the Council to establish new quota categories through the annual specifications process. However, the Council is not authorized under part 679 to split or combine the species in the "other species" category. Before the

[2] "Topping off" is the intentional targeting of an MRA species that is closed to directed fishing.

Council can specify a TAC for a single species or species group within the "other species" category, it first must move this species from the "other species" category to the "target species" category in the FMP. Once a species or species group is categorized as a target species in the FMP and 50 CFR part 679 is revised to reflect this change, the Council must specify a separate OFL, ABC, and TAC for the species or species group in the annual groundfish specifications process, or combine this new target species with some other target species to form a target species group.

"Other species" are defined in 50 CFR part 679 as groundfish species not specified as target species. This definition refers to Tables 10 and 11 to part 679 for more information about "other species." Groundfish managed under the FMP are listed in Table 2a to part 679 and include three categories of skates: big skate (species code 702), longnose skate (701), and other skates (700). Table 10 (GOA) and Table 11 (BSAI) contain the retainable percentages used to calculate the maximum amount of a species that may be retained onboard a vessel, when directed fishing for that species or species group is closed. Although § 679.20(a)(1) states that the species categories are defined in Table 1 of the annual specifications, the species included in the "other species" category in the GOA and the BSAI also are listed in footnotes to Tables 10 and 11.

Under the No Action, or status quo, alternative, management of the "other species" assemblage in the BSAI would be unchanged. Harvest specifications would be set annually, and MRAs would continue to be set as identified under Table 11 to 50 CFR part 679, using the list of species codes provided under Table 2a to 50 CFR part 679. Skates would continue to be at risk of overfishing, if managed under the "other species" assemblage, particularly if a directed fishery were to develop for them. Status quo management also would not allow for management at the species level, as has been proposed for Alaska skates in the BSAI (Ormseth et al. 2008). The risk of overfishing is greater under assemblage management than under separate management of skate stocks, which can occur only when sufficient information is available to manage species (or groups) individually.

1.2.2 Alternative 2. Move skates from the "other species" category to the "target species" category in the FMP and revise federal regulations at 50 CFR part 679 to list MRAs for BSAI skates equal to MRAs for "other species" in Table 11; to specify species codes for BSAI skates in Table 2a; and to establish a "pollock/Atka mackerel/skates/ 'other species'" category for setting a halibut prohibited species catch limit.

Due to legal mandates and limitations on marine resources, fisheries management has historically prioritized the protection and sustainability of economically important target species. In the North Pacific, management of such species consists largely of a quota-based system, where TACs are set and catches are monitored in real time for target groundfish species, while simultaneously obtaining target species life history information and abundance estimates. This is an extensive and complex system, with which NMFS and the Council effectively manage over 20 species and species groups that are the targets of groundfish fisheries. While the catch of non-target species is monitored within this system, NMFS and the Council have generally not managed non-target species as directly (with the notable exception of prohibited species).

Since the initial implementation of the groundfish fishery management plans, NMFS and the Council have increasingly recognized the need to better understand and manage fishery impacts on species not targeted by fisheries. As more emphasis is placed on protecting biodiversity and ecosystem structure and function, managers will be challenged to cultivate a management system that maintains healthy non-target species stocks, protects these species from overfishing, and allows target fisheries on these species to develop only when sufficient information is available to ensure sustainable populations. This will require a substantial investment of additional management resources, because to achieve these objectives such a system must be based on a better understanding of the life history, distribution, and abundance of non-target species, species groups, and assemblages. Considering that there are hundreds of different types of

animals in the non-target species category, some of which are still being described in the scientific literature, this challenge to management appears formidable.

Because fishing non-target species down to unsustainable levels may occur rapidly and recovery can take decades for many species, successful management should be based on the precautionary approach in which measures are implemented proactively, before overfishing occurs. Little information exists regarding the stock structure or status of skate populations in Alaska, or the remaining groups in the "other species" category (shark, sculpin, and octopus). Life history information, however, suggests that long-lived, slow-growing, low fecundity species, such as skates, are easily over-exploited and, once overfished, may take decades to recover. One skate species (thorny skates) in the Atlantic is overfished.

Commercial fisheries that land non-target species differ in various ways: in target species harvested, other incidental species caught, bycatch mortality, geographic location, gear used, season, weather, vessel characteristics, and non-target species present (NMFS 2001). Consequently, each commercial fishery poses different levels of risk for bycatch of non-target species. The level of risk to specific fish populations depends on the life history characteristics of each species and on the level of mortality in the fisheries capturing these species. These issues are further addressed in Section 1.5.1.

The potential for rapid growth in commercial fishing and the potential for over-exploitation in combined state and federally managed fisheries convinced the Alaska Board of Fisheries (Board) to close the directed commercial fishery for sharks and skates and require a Commissioner's permit to target these groups. On behalf of the Board, the Alaska Department of Fish and Game submitted a groundfish proposal to the Council in 1998 for a similar action in the GOA Exclusive Economic Zone (EEZ). The Council initiated an amendment to the GOA and BSAI groundfish fishery management plans at its October 1998 meeting. The Council invoked a precautionary approach to manage these long-living, slow-growing, and low fecundity fishes, and other regional and international efforts to conserve sharks and skates. The GOA groundfish fishery management plan was amended in 2004 to remove skates from the "other species" category. Specifications were set for big skate, longnose skate, and "other" skates, beginning in 2005. In June 2008, the Council prioritized the proposed action, from among other actions concerning numerous non-target species, as the next action to enhance protection of non-target species.

Alternative 2 would build on the State's action to prevent over-exploitation of skates by improving the management of skates. Skates would be moved from the other species category to the target species category to allow for management of skates as a group rather than as in the other species complex. Because skates would be removed from the other species complex, Alternative 2 would include a revision to Table 11 to ensure MRAs specific to skates as a group separate from other species. For managing PSC, the regulations would also be changed to ensure skates continue to be included in the pollock/Atka mackerel/other species category, even though skates would no longer be an other species.

1.2.3 Alternative 3. (Preferred Alternative) Move skates from the "other species" category to the "target species" category in the FMP and revise federal regulations at 50 CFR part 679 of federal groundfish regulations to specify species codes for BSAI skates in Table 2a and to establish a "pollock/Atka mackerel/skates/ 'other species'" category for setting a halibut prohibited species catch limit.

The Council added a third alternative to this analysis after reviewing the draft analysis which identified an unintended consequence of Alternative 2 of allowing increased harvests of BSAI skates. Alternative 3 (Preferred Alternative) would amend the FMP to require ACLs for BSAI skates and make "housekeeping" changes to federal regulations to reflect the change in status of skates from the "other species" category to the "target species" category. Under Alternative 3 NMFS would continue to manage incidental catches of skates under the collective MRA for "other species." Under Alternative 3 a vessel could retain any combination of skates, sculpins, sharks, or octopuses in relation to the retained catch of basis species (species open to directed fishing) onboard at any time as long as the total retained catch of these incidentally taken species did not exceed the limits identified in Table 11 to 50 CFR part 679.

Alternative 3 was chosen as the preferred alternative when the Council and public expressed concern about increasing the amount of BSAI skates (and sculpins, sharks, octopuses, and grenadiers) that could be retained under Alternative 2 if the "other species" groups become managed separately in the future, although their total harvests would be constrained under ACLs. The effect of Alternative 2 would be to allow an amount of BSAI skates to be harvested up to the proposed MRA for skates in addition to the MRA in effect for the remaining "other species" category. The following example (200 mt [metric tons] of groundfish catch) illustrates a potential increase in bycatch amounts of skates and the remaining "other species" under Alternative 2.

*Total amount of retained catch of "other species" = (200 mt basis species * 20 percent) = 40 mt*

A cumulative effect has been identified such that as each species group is broken out as a separate ACL category and each species is assigned a separate MRA of 20 percent of the retained catch of basis species:

Retained catch of each group would be 20 percent of the 200 mt of basis species onboard the vessel, or 40 mt of each group:

Group	**MRA**
Skates	40 mt
Sculpins	40 mt
Sharks	40 mt
Octopuses	40 mt
Total	160 mt
+ Grenadiers	40 mt
Grand Total	200 mt

This example shows that the maximum retained catch of skates, sculpins, sharks, and octopuses would be 40 mt of each group under Alternative 2. Using group level MRAs, commercial groundfish fisheries could retain up to 160 mt of the groups that currently compose the "other species" complex, but no more than 40 mt of each group. An additional 40 mt of grenadiers would be allowed if a future Council action includes them in the FMP; although currently there is no limit to their harvest since they are not in the FMP.

1.2.4 Alternatives Considered but Not Carried Forward

A fourth alternative was considered but not carried forward for further analysis in this EA, because it did not adequately address the problem statement. It would have proposed skate MRAs at levels equal to recent average (2006 through 2008) catches in the groundfish fisheries. This alternative was not developed further, because by setting MRAs at average levels, regulatory discards would still be required on occasion. Additional detail on this rejected alternative is provided in the Regulatory Impact Review for this amendment and Amendment 96 to the FMP and Amendment 87 to the GOA groundfish fishery management plan.

1.3 Affected Environment

This section describes the human environment, including the physical environment, habitat, groundfish life history, marine mammals, seabirds, crab fisheries, a management history, the harvesting sector, the processing sector, and community and social conditions. This action specifically concerns the management of skates as a target fishery and incidental catches managed under MRAs in target groundfish fisheries. A description of the harvest of skates as incidental catch (since there is no directed fishery) and a description of current MRA management are included here.

1.3.1 Bering Sea/Aleutian Islands Environment

Under the Magnuson-Stevens Act (16 USC 1801 *et seq*.), the United States has exclusive fishery management authority over all marine fishery resources found within the EEZ, which extends between three 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 for the marine fisheries 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 BSAI groundfish fisheries in the EEZ off Alaska are managed under the fishery management plan for Groundfish of the BSAI. Actions taken to amend fishery management plans or implement other regulations governing these fisheries must meet the requirements of federal laws and regulations. The action area effectively covers all of the BSAI under U.S. jurisdiction, extending southward to include the waters south of the Aleutian Islands (AI) west of 170°W to the border of the EEZ (Figure 1).

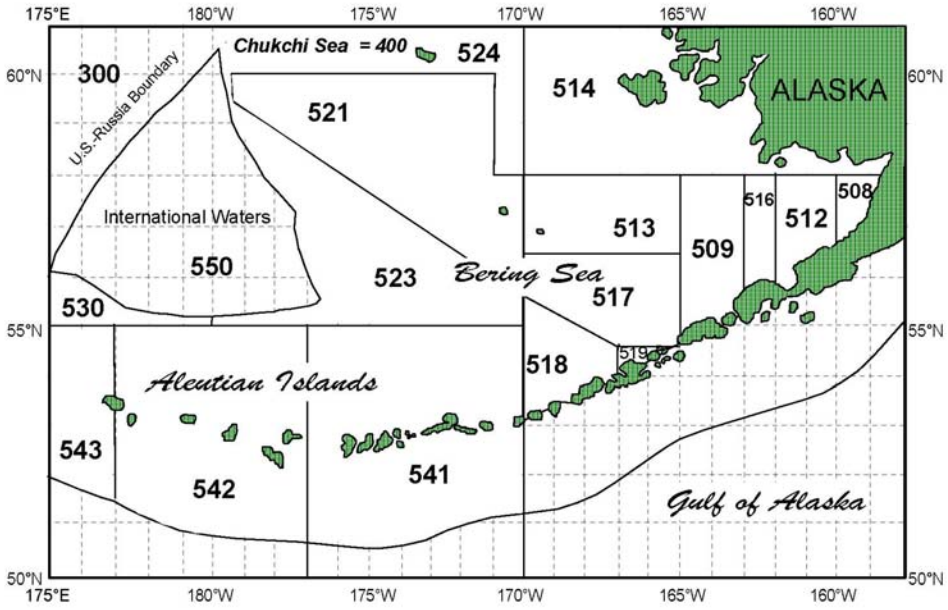

Figure 1 to Part 679--Bering Sea and Aleutian Islands statistical and reporting Areas
a. Map

Fig1.doc
Updated December 15, 1999

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Figure 1 BSAI Management Area

The marine waters of the State of Alaska (State) have been treated as a part of the action area because vessels fishing in federal waters pass through state waters, and because some fishing for federal TACs takes place in state waters.

Detailed descriptions of the fishery may be found in the following reports and are incorporated by reference. Electronic copies of these documents are available at the links provided here.

Alaska Groundfish Programmatic Supplemental Environmental Impact Statement

The implementation of the harvest specifications is a project-level action within the fishery management programs under the GOA and BSAI groundfish fishery management plans. In June 2004, NMFS approved the Alaska Groundfish Programmatic Supplemental Environmental Impact Statement (PSEIS) that disclosed the impacts from alternative groundfish fishery management programs on the human environment (NMFS 2004a). NMFS issued a Record of Decision on August 26, 2004, with the simultaneous approval of Amendments 74 and 81 to the GOA and BSAI fishery management plans, respectively. This decision implemented a policy for the groundfish fisheries management programs that is ecosystem-based and is more precautionary when faced with scientific uncertainty. For more information on the PSEIS, see the Alaska Region website at: http://www.alaskafisheries.noaa.gov/sustainablefisheries/seis/default.htm.

The PSEIS analyzed comprehensive policy-level fishery management plan alternatives that examine all of the major components of the BSAI and GOA fishery management plans at a programmatic level, consistent with the requirements of NEPA. Each alternative contains a policy statement, goals and objectives for that policy statement, and except for Alternative 1 (status quo), a pair of fishery management plan "bookends" that illustrate and frame the range of implementing management measures for the alternative's policy. The PSEIS analyzed five policy-level fishery management plan alternatives for the BSAI and GOA groundfish fisheries. Chapters 2 and 4 of the PSEIS describe the alternatives considered. Alternative 1 represented the status quo BSAI and GOA fishery management plans. Alternative 2 was a policy to maximize fishery production and included two fishery management plans with management measures that reduced restrictions on fishing. Alternative 2 included the status quo, as revised by recent Council actions that had yet to be approved by the Secretary. Alternative 3 included two fishery management plan amendments that modified management measures to continue to balance fishery production with ecosystem protection. Alternative 4 was a policy to restrict fishing to the extent necessary to provide the least impacts on the marine environment. The preferred alternative was a combination of elements from Alternatives 3 and 4.

The PSEIS brought the decision-maker and the public up-to-date on the current state of the human environment (as of 2004), while describing the potential environmental, social, and economic consequences of alternative policy approaches and their corresponding management regimes for management of the groundfish fisheries off Alaska. In doing so, the PSEIS serves as the overarching analytical framework that will be used to define future management policy with a range of potential management actions. Future amendments and actions will logically derive from the chosen policy direction set for the PSEIS's preferred alternative.

As stated in the PSEIS, any specific fishery management plan amendments or regulatory actions proposed in the future will be evaluated by subsequent EAs or environmental impact statements (EISs) that incorporate by reference information from the PSEIS but stand as case-specific NEPA documents and offer more detailed analyses of the specific proposed actions. As a comprehensive foundation for management of the GOA and BSAI groundfish fisheries, the PSEIS functions as a baseline analysis for evaluating subsequent management actions and for incorporation by reference into subsequent EAs and EISs which focus on specific federal actions.

The Community Entity Quota (CEQ) regulations encourage agencies preparing NEPA documents to incorporate by reference the general discussion from a programmatic EIS and concentrate solely on the issues specific to the EIS subsequently prepared. According to the CEQ regulations, whenever a programmatic EIS has been prepared and a subsequent EIS is then prepared on an action included within the entire program or policy, the subsequent EIS shall concentrate on the issues specific to the subsequent

action. The subsequent EIS need only summarize the issues discussed and incorporate discussions in the programmatic EIS by reference (see 40 CFR 1502.20).

The Alaska Groundfish Harvest Specifications EIS offers a detailed analysis of the proposed action, the harvest specifications for skates (NMFS 2007). The harvest specification alternatives derive from the policy established in the preferred alternative in the PSEIS. This EA incorporates by reference information from the PSEIS, when applicable, to focus the analysis on the relevant issues and eliminate repetitive discussions.

Annual Harvest Specification Environmental Assessments

In addition to the PSEIS, EAs have been written to accompany annual harvest specifications since 1991. The 2005 and 2006 harvest specifications (NMFS 2005a) were analyzed in an EA, and a finding of no significant impact was made prior to publication of the specifications. Harvest specification EAs back to 2000 may be found at the NMFS Alaska Region web site at http://www.alaskafisheries.noaa.gov/index/analyses/analyses.asp#top.

Periodic Harvest Specification EIS

The Alaska Groundfish Harvest Specifications EIS (NMFS 2007) replaced the annual EA that accompanied TAC specifications for each new fishing year. This EIS provides decision-makers and the public with an evaluation of the environmental, social, and economic effects of alternative harvest strategies for the federally managed groundfish fisheries in the BSAI and the GOA. It examines alternative harvest strategies that comply with federal regulations, the FMP, the Fishery Management Plan for Groundfish of the GOA, and the Magnuson-Stevens Act. These alternative harvest strategies are applied to the best available scientific information to derive the TAC estimates for the groundfish fisheries. The EIS and supplemental information reports, which review any changes in information since the EIS, are available at http://www.alaskafisheries.noaa.gov/analyses/specs/eis/final.pdf.

TAC-Setting EIS

A Supplemental EIS on the process of TAC setting was completed 1998 (NMFS 1998). The impacts of groundfish fishing over a range of TAC levels were analyzed. The Record of Decision in that action was affirmation of the status quo alternative for TAC-setting which comprised regulations and fishery management plans as they stood in 1997. Impacts to the human environment from the federal groundfish fisheries were displayed in that EIS. Setting TAC under the status quo procedures was not found to be having significant impacts on the issues evaluated.

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

For purposes of analyzing the effects of Amendment 95, the PSEIS (NMFS 2004a) contains the following descriptions that are adopted by reference in this analysis:

- Section 3.9.2.4 contains sector profiles including BSAI trawl (Tables 3.9–1 and 3.9–12) and BSAI longline (Tables 3.9–14, 3.9–15, and 3.9–16).
- Section 3.9.3.2 contains descriptions of the regions and communities involved in the groundfish fisheries, including the Kodiak Island Region on page 3.9–65.
- Section 3.5.3 contains descriptions of "other species" management, trophic interactions, past and present effects analysis, comparative baseline, and cumulative effects analysis.
- Section 3.5.3.4 contains skate life history and distribution, trophic interactions, management, past and present effects analysis, comparative baseline, and cumulative effects analysis. (Tables 3.5–130 through 3.5–136).

GOA Groundfish Fishery Management Plan Amendment 63

The Environmental Assessment/Initial Regulatory Flexibility Analysis for GOA Amendment 63 (NMFS 2004b) analyzed the impacts of two actions: (1) establishing the 2004 harvest specifications for groundfish target species in the groundfish fisheries of the Bering Sea, Aleutian Islands, and GOA fishery management areas; and (2) amending the GOA groundfish fishery management plan to manage skates as a separate species group from the "other species" category. The Council's preferred alternatives included:

Setting TACs that fall within the range of ABCs recommended by the Plan Teams and TACs recommended by the Council. Under this scenario, F is set equal to a constant fraction of maxF_{ABC}. The recommended fractions of maxF_{ABC} may vary among species or stocks, based on other considerations unique to individual species or stocks. This alternative was chosen as the preferred alternative because (1) it takes into account the best and most recent information available regarding the status of the groundfish stocks, public testimony, and socio-economic concerns; (2) it sets all TACs at levels equal to or below ABC levels; (3) it falls within the specified range of optimum yield (OY) for both the BSAI and GOA; and (4) it is consistent with the Endangered Species Act and the National Standards and other requirements of the Magnuson-Stevens Act.

Moving skates from the "other" species category to the target species category in the GOA fishery management plan. The preferred alternative was selected because of the potential of a developing skate fishery in 2004 that would harvest at levels too high for the available skate biomass. This alternative requires NMFS to directly manage the skate group or groups and control directed fishing activities on skates in the GOA.

Detailed descriptions of the social and economic characteristics of the BSAI groundfish fisheries may be found in the following reports:

- The PSEIS (NMFS 2004a) contains detailed fishery descriptions and statistics in Section 3.9, "Social and Economic Conditions."
- The Groundfish Harvest Specifications EIS (NMFS 2007) is updated periodically. The EIS examines alternative harvest strategies that comply with federal regulations, the groundfish fishery management plans, and the Magnuson-Stevens Act. These alternative harvest strategies are applied to the best available scientific information to derive the TAC estimates for the groundfish fisheries. Note that the harvest strategies analyzed therein would apply to BSAI skate specifications also. http://www.alaskafisheries.noaa.gov/analyses/specs/eis/final.pdf
- The Economic Stock Assessment and Fishery Evaluation Report (SAFE Report) is also updated annually. The 2009 edition (Hiatt, et. al, 2009) contains detailed information about economic aspects of the domestic groundfish fishery off Alaska, including figures and tables, and market analyses for the most commercially valuable species. Sixty tables estimate total groundfish catch, groundfish discards and discard rates, prohibited species bycatch and bycatch rates, the ex-vessel value of the groundfish catch, the ex-vessel value of the catch in other Alaska fisheries, the gross product value of the resulting groundfish seafood products, the number and sizes of vessels that participated in the Alaska groundfish fisheries, vessel activity, and employment on at-sea processors. http://www.afsc.noaa.gov/refm/docs/2009/economic.pdf

1.3.2 MRA Regulations and Management Function in BSAI Groundfish Fisheries

MRA regulations establish the calculation method and MRAs for groundfish species that are closed to directed fishing.[3] The MRA is calculated as a percentage of the retained amount of species closed to directed fishing (incidentally caught species) relative to the retained amount of basis species or species

[3] MRAs do not apply to fisheries whose status is (1) "open" because harvest is not limited to bycatch only or (2) "prohibited" because retention is not allowed.

groups open for directed fishing. The target species is called a basis species in regulation. The species closed to directed fishing is the incidental species. All MRA accounting is computed based on round weight equivalent. Amounts that are caught in excess of the MRA percentage must be discarded. Current regulations limit vessels to MRAs at any time during a fishing trip.

50 CFR part 679.2 defines a fishing trip as follows:

(i) With respect to retention requirements of MRA, an operator of a catcher/processor or mothership processor vessel is engaged in a fishing trip from the time the harvesting, receiving, or processing of groundfish is begun or resumed in an area until

(A) The effective date of a notification prohibiting directed fishing in the same area under §679.20 or §679.21;
(B) The offload or transfer of all fish or fish product from that vessel;
(C) The vessel enters or leaves an area where a different directed fishing prohibition applies;
(D) The vessel begins fishing with different type of authorized fishing gear; or
(E) The end of a weekly reporting period, whichever comes first.

MRAs are the primary tool NMFS uses to regulate the catch of species closed to directed fishing. The MRA table (Table 11 to 50 CFR part 679) is a matrix of proportions representing a range of rates of expected or accepted incidental catch of species closed to directed fishing relative to target species. As a management tool MRAs rely on the ability of the vessel operator to selectively catch the target species. The MRA percentages are intended to slow the rate of harvest of a species when insufficient TAC or prohibited species catch (PSC) (halibut, crab, herring, and salmon in the BSAI) amounts are available to support a directed fishery.

NMFS prohibits directed fishing for a species to avoid exceeding a TAC (typically established for conservation reasons), exceeding an amount or percentage of groundfish included in the annual specifications for a gear and species or species group, or exceeding a PSC limit (e.g., halibut limits). When NMFS prohibits directed fishing, retention of the incidentally caught species is allowed up to an amount calculated with the MRA. The MRA table (Table 11 to 50 CFR part 679) shows retainable proportions of incidental species relative to species open to directed fishing. This table displays bycatch species in the columns and species open to directed fishing (basis species) in the rows. Each species open to directed fishing retained on board a vessel would become a basis species from which individual retainable bycatch amounts for the bycatch species would be measured. The individual retainable bycatch amount would be calculated by multiplying the retainable percentage in the appropriate block of the table by the round-weight equivalent of the corresponding basis species. The maximum retainable amount for a given bycatch species would be the sum of all the individual retainable bycatch amounts for the various basis species retained on board the vessel.

Vessel operators calculate the MRA through three basic steps. First, they identify and calculate the round weight of the basis (or target) species onboard. Next, they identify the appropriate fraction from the MRA table, and then multiply that rate against the round weight of the basis species. The calculated MRA is the limit for retention of the incidental species. A vessel will typically discard catch of the incidental species in excess of that amount to avoid violation of current regulations. The catcher/processor vessel operator calculates the MRA at any time for the duration of the fishing trip, often referred to as an "instantaneous" calculation. The shoreside catcher vessel operator calculates the MRA upon returning to port for delivery of retained catch.

When NMFS prohibits directed fishing on a groundfish species, MRAs limits the amount of catch of species on bycatch status occurring in the open directed fisheries. Ideally, the application of an MRA rate slows catch of a species so that harvest can be managed up to the TAC by the end of the year. Beyond management of a TAC to obtain OY, MRA calculations perform two additional functions. First, MRAs limit retention to species' expected or accepted incidental catch rate. Alternately, the MRA functions as a

trip limit for retention of incidental catch of a species. This function allows for limited targeting of a species up to the MRA ("topping off").

For several incidental/basis species combinations, the use of low MRA rates may reduce the incentive for topping off that could occur in the absence of this tool. In these cases, the MRAs represent the expected catch of an incidental species absent deliberate action by the vessel operator to maximize that incidental catch. The requirement to not exceed MRA proportion at any time during a trip limits the vessel operator's ability to maximize catch. This restriction is used to limit total catch of species with low TACs (relative to the species caught in directed fisheries), at greater risk of being caught in excess of the overfishing level, and of high value. Several GOA rockfish species and sablefish meet these criteria.

Current regulations establish a relatively high MRA for some species or species groups. For example, a rate of 35 percent for arrowtooth flounder as an incidental species is applied to open groundfish targets in the GOA.[4] Several directed trawl fisheries incurred high arrowtooth flounder incidental catch rates. The higher MRA allows for increased indirect targeting on arrowtooth flounder. For other species where restricting catch to an incidental rate is not a consideration, regulations establish a default MRA rate of 20 percent. Additional detail can be found in 60 FR 20955 (April 28, 1995).

1.3.3 Biological Environment

Description, Scientific Names, and General Distribution

Skates (family Rajidae) are cartilaginous fishes that feed mostly on smaller fish and crustaceans. These bottom-dwelling animals inhabit the continental shelf to the abyssal zone (Ebert et al. 2007). They are dorso-ventrally depressed animals with large pectoral "wings" attached to the sides of the head, and long, narrow whiplike tails. At least 15 species of skates in three genera, *Raja*, *Bathyraja*, and *Amblyraja,* are distributed throughout the eastern North Pacific and are common from shallow inshore waters to very deep benthic habitats (Eschmeyer et al. 1983; Stevenson et al. 2006). These skates can be divided into two groups, those with a firm "hardnose" (3 species) and those with a flexible "softnose" (11 species).[4]

Table 1 lists the species found in the BSAI.

The biomass of the skate assemblage as a whole has increased since the early 1980s (Figure 2). Because skates as a group are contiguous and found in nearly all habitats, the uncertainty in aggregate skate biomass estimates is rather low, but the uncertainty for individual species (after 1998) is greater (Table 2).

The species within the skate assemblage occupy different habitats and regions within the FMP area (Figure 4). Three habitat areas are distinguished by Ormseth et al. (2008): the eastern Bering Sea (EBS) shelf (< 200 m depth), the EBS slope (> 200 m depth), and the Aleutian Islands (AI) region (all depths) (Figure 4). Within the EBS, the skate species composition varies by depth, and species diversity is generally greatest on the upper continental slope at 250 to 500 m depth. The Alaska skate (*B. parmifera*) is dominant and highly abundant on the EBS shelf, while in each of the other two habitat areas, the skate species composition is far more diverse, especially on the EBS slope (Table 2). The Bering or sandpaper skate (*B. interrupta*) is the next most common species on the EBS shelf, and is distributed on the outer continental shelf.

While skate biomass is much higher on the EBS shelf than on the slope (Figure 3), skate diversity is substantially greater on the EBS slope. The dominant species on the EBS slope is the Aleutian skate (*B. aleutica*). A number of other species are found on the EBS slope in significant numbers, including the Alaska skate, Commander skate (*B. lindbergi*), whiteblotched skate (*B. maculata*), whitebrow skate (*B. minispinosa*), roughtail skate (*B. trachura*), and mud skate (*B. taranetzi*) (Table 2). Two rare species, the deepsea skate (*B. abyssicola*) and roughshoulder skate (*Amblyraja badia*), have only recently been

[4] See http://www.alaskafisheries.noaa.gov/analyses/mra/goa_arrowtooth_mra_frea0309.pdf for proposed MRA's.

reported from EBS slope bottom trawl surveys (Stevenson and Orr 2005). The Okhotsk skate (*B. violacea*) is also occasionally found on the EBS slope.

The skate complex in the AI is quite distinct from the EBS shelf and slope complexes, with different species dominating the biomass, as well as at least one endemic species, the recently described butterfly skate, *Bathyraja mariposa* (Stevenson et al. 2004). In the AI, the most abundant species is the whiteblotched skate, *B. maculata*. The whiteblotched skate is found primarily in the eastern and far western Aleutian Islands. Aleutian and Alaska skates are also common in the AI. The mud skate (*B. taranetzi*) is relatively common in the AI but represents a lower proportion of total biomass because of its smaller body size. We note that the common species formerly known as the Alaska skate in the western Aleutians looks very different from the Alaska skate found on the EBS shelf. The Aleutian Islands type or "leopard skate" (*Bathyraja* sp. cf. *parmifera*) has been confirmed to be a separate species (J. Orr personal communication to O. Ormseth et al. 2008).

Management Unit

Skate species are part of the "other species" management category in the BSAI groundfish fishery management plan. Skate catch is reported as "other species" in aggregate with the catch of sharks, sculpins, and octopuses. Because catch is officially reported within the "other species" category, estimates of skate catch are made independently.

Catch of "other species" is limited by the TAC, which is based on ABC estimates for the four groups that comprise the complex, as determined by the SSC from recommendations from the BSAI Groundfish Plan team and stock assessment authors. Currently skates are taken only as bycatch in fisheries directed at target species in the BSAI, so future catches of skates are more dependent on the distribution and limitations placed on target fisheries than on any harvest level established for this category. This could change if skates were targeted.

Life History and Stock Structure (General)

Skate life cycles are similar to sharks, with relatively low fecundity, slow growth to large body sizes, and dependence of population stability on high survival rates of a few well developed offspring (Moyle and Cech 1996). Sharks and skates in general have been classified as "equilibrium" life history strategists (Winemiller and Rose 1992), with very low intrinsic rates of population increase implying that sustainable harvest is possible only at very low to moderate fishing mortality rates (King and McFarlane 2003). Within this general equilibrium life history strategy, there can still be considerable variability between skate species in terms of life history parameters (Walker and Hislop 1998). While smaller sized species have been observed to be somewhat more productive, large skate species with late maturation (11+ years) are most vulnerable to heavy fishing pressure (Walker and Hislop 1998; Frisk et al. 2001; Frisk et al. 2002). The most extreme cases of overexploitation have been reported in the North Atlantic, where the "common" skate *Dipturus batis* has been extirpated from the Irish Sea (Brander 1981) and much of the North Sea (Walker and Hislop 1998), and the barndoor skate *Dipturus laevis* disappeared from much of its range off New England (Casey and Myers 1998). The relative difference in life history traits between smaller and larger skate species has led to apparent population stability for the aggregated "skate" group in many areas where fisheries occur, and this combined with the common practice of managing skate species within aggregate complexes has masked the decline of individual skate species in European fisheries (Dulvy et al. 2000). A similar situation has occurred off the northeast coast of the United States, where skates are managed as a complex and are the subject of skate wing and lobster bait target fisheries; skates are also taken incidentally in other fisheries (NEFSC 2007). Aggregate skate biomass was relatively stable in the 1970s, but has fluctuated since the early 1980s, with apparent shifts in the relative abundance of individual species (NEFSC 2007). Declines in barndoor skate abundance were concurrent with an increase in the biomass of skates as a group (Sosebee 1998). While barndoor skate biomass is now above minimum threshold levels, winter skates (*Leucoraja ocellata*) and thorny skates

(*Amblyraja radiata*) have become overfished, and smooth skates (*Malacoraja senta*) and little skates (*Leucoraja erinacea*) are in danger of becoming overfished according to the New England Fishery Management Council's definitions, requiring immediate action to reduce mortality and initiate rebuilding of overfished stocks (NEFSC 2007 and http://www.nefmc.org/skates/index.html).

Several recent studies have explored the effects of fishing on a variety of skate species in order to determine which life history traits might indicate the most effective management measures for each species. While full age-structured modeling is difficult for many relatively information-poor species, Leslie matrix models, parameterized with fecundity, age/size at maturity, and longevity, have been applied to identify the life stages most important to population stability. Major life stages include the egg stage, the juvenile stage, and the adult stage (summarized here based on Frisk et al. 2002). All skate species are oviparous (egg-laying), investing considerably more energy per large, well-protected embryo than most commercially exploited teleost groundfish. The large, leathery egg cases incubate for extended periods (several months to over a year) in benthic habitats, exposed to some level of predation and physical damage, until the fully formed juveniles hatch. The juvenile stage lasts from hatching through maturity, several years to over a decade depending on the species. The reproductive adult stage may last several more years to decades depending on the species.

Age and size at maturity and adult size/longevity appear to be more important predictors of resilience to fishing pressure than fecundity or egg survival in the skate populations studied to date. Frisk et al. (2002) estimated that although annual fecundity per female may be on the order of less than 50 eggs per year (extremely low compared with teleost groundfish), there is relatively high survival of eggs due to the high parental investment, and therefore egg survival did not appear to be the most important life history stage contributing to population stability under fishing pressure. Juvenile survival appears to be most important to population stability for most North Sea species studied (Walker and Hislop 1998) and for the small- and intermediate-sized skates from New England (Frisk et al. 2002). For the large and long-lived barndoor skate, adult survival was the most important contributor to population stability (Frisk et al. 2002). Comparisons of length frequencies for surveyed North Sea skates from the mid- and late 1900s led Walker and Hislop (1998, p. 399) to the conclusion that after years of very heavy exploitation "all the breeding females, and a large majority of the juveniles, of *Dipturus batis*, *Leucoraja fullonica* and *R. clavata* have disappeared, whilst the other species have lost only the very largest individuals." Although juvenile and adult survival may have different importance by skate species, all studies found that one metric, adult size, reflected overall sensitivity to fishing. After modeling several New England skate populations, Frisk et al. (2002, p. 582) found "a significant negative, nonlinear association between species total allowable mortality, and species maximum size." This may be an oversimplification of the potential response of skate populations to fishing; in reality it is the interaction of natural mortality, age at maturity, and the selectivity of fisheries which determines a given species' sensitivity to fishing and therefore the total allowable mortality.

Life History and Stock Structure (Alaska-Specific)

Known life history parameters of Alaskan skate species are presented in Zeiner and Wolf (1993) determined age at maturity and maximum age for big skates (*Raja binoculata*) and longnose skates (*R. rhina*) from Monterey Bay, California. The maximum age of California big skates was 11–12 years, with maturity occurring at 8–11 years; estimates of maximum age for California longnose skates were 12–13 years, with maturity occurring at 6–9 years. McFarlane and King (2006) recently completed a study of age, growth, and maturation of big and longnose skates in the waters off British Columbia (BC), finding maximum ages of 26 years for both species, much older than the estimates of Zeiner and Wolf. Age at 50 percent maturity occurs at 6–8 years in BC big skates, and at 7–10 years in BC longnose skates. However, these parameter values may not apply to Alaskan stocks. The Alaska Fisheries Science Center (AFSC) Age and Growth Program has recently reported a maximum observed age of 25 years for the longnose skate in the GOA, significantly higher than that found by Zeiner and Wolf but close to that observed by McFarlane and King (Gburski et al. 2007); the maximum observed age for GOA big skates was 15 years,

closer to Zeiner and Wolf's results for California big skates. The life histories of these two species are reported in more detail in the GOA skate SAFE Report (Ormseth and Matta 2007).

Considerable research has been directed at skates in the Bering Sea within the past few years. A comprehensive study on the age, growth, and reproductive biology of the Alaska skate—the most common skate species on the EBS shelf— investigated maximum age, instantaneous rate of natural mortality, length and age at maturity, growth parameters, annual fecundity, and seasonal reproductive timing (Matta 2006). Hoff (2007) examined skate reproduction and skate nursery habitat of the Alaska skate and the Aleutian skate from the EBS. Vulnerability sources, reproductive cycles, habitat selection criteria, and physical factors controlling reproduction were addressed. Six nursery sites for three different skate species have been described in the EBS, and additional nursery areas likely exist. All sites are located along the shelf-slope interface in approximately 140–360 m of water.

Researchers at the Pacific Shark Research Center (PSRC) at Moss Landing Marine Laboratories are currently investigating age, growth, reproduction, demography, and diet of several Alaskan skates. In cooperation with the Alaska Department of Fish and Game and the AFSC, they have examined more than 5,000 specimens comprising 13 species. Four graduate studies on Alaskan skate species are underway. Theses on roughtail skate and longnose skate were conducted outside of Alaskan waters (Davis 2006 and Robinson 2006). Age determination and validation studies at PSRC seek to obtain essential information on the age at maturity, growth rates, and longevity of seven Alaskan skate species.

Preliminary estimates of maximum ages for Aleutian and Bering skates are 17 and 13 years, respectively (Ebert et al. 2007). Two additional age and growth theses are currently being conducted on mud skate and whitebrow skate. Reproductive studies are also currently ongoing at the PSRC to obtain information on the size at maturity, seasonality, and fecundity of several Alaskan skate species. The reproductive biology of the Aleutian skate, Bering skate, big skate, and longnose skate has been investigated as part of a North Pacific Research Board funded study to assess life history characteristics of Alaskan skate species (Ebert et al. 2007). Reproductive studies are also being conducted on mud and whitebrow skates by graduate students affiliated with the PSRC. The PSRC has also conducted demographic analyses to improve understanding of the population dynamics and vulnerability of these species to fisheries exploitation. Preliminary estimates of annual population growth rates are 25 percent for the Aleutian skate, 36 percent for the Bering skate, 33 percent for the big skate, and 20 percent for the longnose skate (Ebert et al. 2007).

Commercial Fishery

Directed Fishery

There is no directed fishery for skates in the BSAI at present; however, skates support directed fisheries in other parts of the world (Agnew et al. 2000; NE stock assessment 1999; Martin and Zorzi 1993). A directed skate fishery developed in the GOA in 2003. The Council approved Amendment 63 to the GOA groundfish fishery management plan (NMFS 2004b), to move GOA skates from the "other species" groundfish category, to the "target species" category, and set specifications for big skate, longnose skate, and an "other skate" assemblage in 2005. Directed fishing for the newly designated target skates was short-lived, due to a drop in price. The Alaska Board of Fisheries (Board) rejected a proposal in December 2008 to open a year-round directed skate fishery in Prince William Sound in the GOA, but directed staff to work with interested fishermen and buyers to increase fishing opportunities. Continued interest in skates as a potential future target fishery is expected in both the GOA and BSAI.

Bycatch and Discards

Skate catch in the BSAI is officially reported as "other," in aggregate with the catch of sharks, sculpins, and octopuses. Thus, estimates of skate catch must be made independently for each year using observer data, shoreside processor landings data, and processor weekly production report data. The Catch Accounting System (CAS), an improvement over the previous "Blend" system, only reports aggregate

skate catch in the BSAI; species composition of the catch can only be inferred from the observed portion of the catch or from survey species composition.

Skates constitute the bulk of the "other species" catches (e.g., between 51 percent and 78 percent of the estimated totals in 1992–2008) (Table 2). While skates are caught in almost all fisheries and areas of the EBS shelf, most of the skate bycatch is in the hook and line fishery for Pacific cod; trawl fisheries for pollock, rock sole, flathead sole, and yellowfin sole also catch significant amounts (Table 3). Here "bycatch" is interpreted as incidental or unintentional catch, regardless of whether it was retained or discarded. Note that this differs from the Magnuson-Stevens Act definition of "bycatch," which always implies discard. When caught as bycatch, skates may be discarded (and may survive, depending upon catch handling practices), although they are sometimes retained and processed. It is difficult to determine how many skates are actually retained, due to incomplete observer coverage of the fleet. However, between 30 percent and 39 percent of the total observed skate catch was retained during the years 2003 through 2006 (Table 4). More skates were retained in the EBS than the AI, and it appears that species that grow to a larger maximum size (greater than 100 cm total length) are more likely to be retained than smaller-bodied species. For example, while the Aleutian skate, a large-bodied species, made up a relatively small portion of the observed skate catch in 2005 (approximately 2 percent), 31 percent of the Aleutian skates caught were retained. However, Bering skates (a small-bodied species, less than 100 cm total length) were retained less frequently (10 percent in 2005). Larger percentages of Alaska skates and *Raja* species (big and longnose skates) are also retained; all three are relatively large-bodied skates.

Two major fishery gear types, with different size selectivities for skates, operate in the BSAI: trawlers and longliners. Pot gear accounts for less than 0.1 percent of the skate catch. The proportion of the catch, by each fishery gear type, differs by habitat area (note: for years without gear type data, the average proportion of each gear type from 2003 to 2005 was applied). The results were then summed to obtain the total Alaska skate catch for each fishery, across the entire BSAI management area (Table 3).

Historically, skates were almost always recorded as "skate unidentified," with very few exceptions between 1990 and 2002. Species identification of the 2007 catch is shown in Source: North Pacific Groundfish Observer Program database; 2007 data are reported through October 15, 2007, from Ormseth et al. 2008.

Figure 8. Recent observer data indicate that only about 50 percent of skate catch is identified to the species level. This is largely because most skates are caught in longline fisheries, and if the animal drops off the longline as unretained incidental catch, it cannot be identified to species by the observer (approximately 80 percent of longline-caught skates are unidentified, and longline catch accounts for the majority of observed skate catch).

In 2005, observers were encouraged to identify skates dropped off longlines to genus, which can be done without retaining the skate; hence in 2005, more than half of the unidentified skates were at least assigned to the genus *Bathyraja*. Of the identified skates, the majority (90 percent) were Alaska skates, as would be expected by their dominance in terms of overall skate biomass in the BSAI. The next most commonly identified species, BSAI-wide, was Aleutian skate, at 6.6 percent of identified catch, followed by Bering skates at 4.3 percent, big skates at 3.6 percent, and whiteblotched at approximately 1.3 percent. It should be noted that the observed skate catch composition may not reflect the true catch composition, possibly due to selective retention of larger species or to a higher likelihood of identifying distinctive species. However, when viewed by area (EBS vs. AI), the majority of identified Aleutian and whiteblotched skates are caught in AI fisheries, and the species composition of the observed catch in the AI is very different from the EBS (Figure 7).

Reporting areas encompassing the EBS outer shelf and upper continental slope experienced high catch rates during 2003 through 2006 (Figure 8). Longline fisheries targeting Pacific cod take much of the incidental skate catch, and they tend to operate on the outer EBS shelf and slope, where skate species diversity is high and where Aleutian skates are more prevalent than Alaska skates. Therefore, it is

possible that the species composition of the catch is not in proportion to the overall species composition (from survey data) across the BSAI. However, depth analysis of the observed catch demonstrates that most of the skate catch occurs at less than 200 m (98 percent).

1.4 Environmental Effects of the Alternatives

An EA is prepared pursuant to NEPA to determine whether an action will result in significant effects on the human environment. An effect on a part of the environment may be either direct or indirect and beneficial or adverse. If the environmental effects of the action are determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact are the final environmental documents required by NEPA. If an analysis concludes that the action is a major federal action that would significantly affect the human environment, an EIS must be prepared.

The environmental impacts generally associated with fishery management actions are effects resulting from interactions with (1) targeted groundfish species, (2) non-specified species, (3) forage species, (4) prohibited species, (5) marine mammals, (6) seabirds, (7) benthic habitat and essential fish habitat, (8) the ecosystem, and (9) the economic and social conditions. The proposed action for Amendment 95 is limited in scope and will likely not affect all environmental components of the BSAI. This action would have no impacts on non-specified species, forage species, prohibited species, marine mammals, seabirds, habitat not previously considered in the Groundfish Harvest Specification EIS (NMFS 2007) because the action is not expected to change when, where, or how any commercial fisheries are conducted in the BSAI. Therefore, this analysis will focus on the environmental components that could potentially be affected by this action: stocks of targeted groundfish; the ecosystem; and the economic and social conditions.

Table 12 shows the potentially affected components. The effects are primarily limited to the "target species" category which may be taken in a skate directed fishery, such as Pacific cod. Overall, fishing practices will not change under this amendment so no effects are expected on the other environmental components. The effects of the alternatives on social and economic conditions are analyzed in sections 1.5, 2, and 3.

1.4.1 Effects on Target Groundfish Fisheries

Analyses are prepared for each target stock, species or species group, and "other species" group in the BSAI and are contained in the annual BSAI SAFE Report. Impacts to the target species stock, species, or species group are predicted to be insignificant for all target fish evaluated under the alternatives, because the alternatives would not be expected to have the following effects:

(1) jeopardize the capacity of the stock to produce maximum sustainable yield on a continuing basis;
(2) alter the genetic sub-population structure such that it jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold;
(3) alter harvest levels such that it jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold;
(4) alter harvest levels or distribution of harvest such that prey availability would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold; or
(5) disturb habitat at a level that would alter spawning or rearing success such that it would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold. See the individual stock assessments in the SAFE Report for additional information and documentation of the assessment process.

Under the status quo, 17 target categories are specified in the BSAI (plus "other species") (Table 6). Nearly all target groundfish fisheries harvest some amount of skates, although the hook-and-line Pacific cod fishery dominates skate bycatch in tonnage (> 14,000 mt), and other hook and line fisheries have the highest rates of skate bycatch per ton of target catch (> 325 kg/mt), during 2003 through 2007 (Tables 16

and 17). These hook and line fisheries harvest skates at an order of magnitude higher than the next highest target category.

Based on whether the Council recommendation for the "other species" TAC would prevent directed fishing harvests and incidental harvests from exceeding the TAC, NMFS determines whether to (1) allow a directed fishery for "other species" or (2) designate the category as bycatch only. Typically, NMFS sets the "other species" category as bycatch only at the start of the fishing year, although this practice could change in accordance with fishing practices. Typically the Council recommends the TAC, so that neither prohibited species status, nor closures of directed fishing are expected to occur. The FMP mandates that species for which TAC has been achieved shall be treated in the same manner as prohibited species; therefore, other species must be returned to the sea with a minimum of injury. Closures are made when inseason information indicates the apportioned TAC has been or soon will be reached, or at the end of the specified season, if the particular TAC has not been taken.

The OFL, ABC, and TAC for the "other species" complex in 2009, are 80,800 mt, 63,700 mt, and 50,000 mt, respectively. The OFL and ABC have been well above catch levels from 2003 through 2008 (Figure 10). Catches of skates and the remaining "other species" have been small relative to those of target species. A sufficient buffer exists between the harvest amount of "other species" and the ABC under the status quo; however Figure 10 shows that the harvest of all "other species" slightly exceeded the TAC in 2004 and 2005. These overages were followed by progressively increased TACs from 2006 through 2008, and slightly lower harvests in 2006 and 2007. Higher TACs allowed target fisheries to continue without being closed. The "other species" TAC is constrained to amounts necessary to support incidental catch in other directed fisheries and by the 2 million mt OY cap for all BSAI groundfish in the target and "other species" categories.

Pacific Cod

The impacts of Alternative 2 and Alternative 3 (Preferred Alternative) on groundfish target species will likely be limited to the Pacific cod longline fishery. Impacts may occur if future Council action under the annual specification process results in a directed fishery that would be allowed for BSAI skates or the remaining "other species" complex. If a directed fishery were allowed for skates in the BSAI, fishermen who target skates would be able to retain Pacific cod and certain groundfish species up to 20 percent of the weight of their retained groundfish harvest, as provided for in 50 CFR 679.20(e) and Table 11 to 50 CFR part 679; Greenland turbot (1 percent), sablefish (1 percent), shortraker/rougheye (2 percent), and aggregate rockfish (5 percent) have lower MRAs specified for them. For example, if the skate TAC were 10,000 mt, fishermen could retain up to 2,000 mt of Pacific cod, in aggregate, if the skate TAC was harvested in full. They could retain even more, if their groundfish catch was not composed purely of skates (because, they could "top off" using other basis species). The additional harvest of Pacific cod would not have a significant impact on Pacific cod stocks, because the harvest is conducted within the MRA limits and is subtracted from the annual TAC specified for Pacific cod. A separate MRA for skates would allow such "topping off." However, the Council could choose to have a separate TAC for skates, but not have a separate MRA for them. This policy decision is discussed under Section 1.6. Any skates caught in excess of the MRA would have to be discarded.

The proposed alternatives would have no effect on target groundfish (e.g., Pacific cod) catches, since incidental skate catches are well below projected annual specifications that would be set for the skate group. Hook-and-line fisheries that target Pacific cod and "other" groundfish may be constrained by the MRA for skates on a trip by trip basis, and any skate harvest that exceeded the MRA would be discarded. Further, Alternative 3 eliminates the potential of a new skate MRA category closing directed groundfish fisheries.

1.4.2 Effect on Skates

Because skates represent a potentially valuable fishery resource, and a potentially vulnerable species group, the Council is considering Alternative 2 and Alternative 3, which would move skates from the "other species" groundfish category and manage them as a new target category. This proposed action would mirror action taken to manage skates in the GOA as a separate target category. In fact, three target categories were created in the GOA in 2004, longnose skate, big skate, and "other" skates. The Council would be required to set specifications for BSAI skates, under Alternative 2. Separate specifications for BSAI Alaska skates and "other" skates are likely to be considered in a separate, future action, if the Council adopts Alternative 2 or Alternative 3. There is a reliable time series for the skate assemblage biomass in both the EBS and AI, and there are also reliable estimates of biomass for each species within the assemblage.

The contribution of each species group to aggregate catch is shown in Table 6. Skate are the majority of "other species" category catch, accounting for more than 70 percent of the 2004 through 2008 catch. Catch of BSAI skates over the last three years has been consistently about 10,000 mt less than the ABC. A wide variety of gear and target combinations take one or more of the constituent species groups. The hook-and-line Pacific cod fishery takes more than half of total catch, with the remainder scattered across a variety of trawl and hook-and-line fisheries. The catch rate (in kilograms per metric ton) shows the rate is high in hook-and-line sablefish and Greenland turbot target fisheries, though the absolute amount caught is very low.

No directed fishery occurs for BSAI skates, although trawl skate bycatch is marketed. The hook-and-line Pacific cod fishery dominates total volume of incidental catch of skates and incidental catch of a relatively high portion of the sculpins, sharks, and octopuses (Tables 18-21). Figure 13 shows that catch of skates has a widespread spatial distribution. Since catch is driven by the hook-and-line Pacific cod fishery, the incidental catch needs for skates would likely increase, as well, if the ABC and/or directed Pacific cod hook-and-line fishery increases. Given that incidental catch is substantially less than the ABC, a directed fishery for skates could be considered. Spatial distribution of skate species in the trawl survey is provided for comparison (Figure 14).

In 2009, the recommended OFL and ABC for BSAI skates, if they were managed separately, would have been 30,100 mt and 25,900 mt, respectively. Skate harvests totaled 15,200 mt in 2008; therefore, no risk of overfishing appears likely to occur under the current management regime. A potential risk of overfishing of BSAI skates remains, however, if a targeted skate fishery were to develop, due to favorable market conditions or changes in species distributions or fishing effort and location. As noted in section 1.3.1, which describes the biology and management of the skate fishery, skates grow and reproduce slowly. If the stocks were fished down, they would not be expected to rebound quickly. Under Alternative 1, which is the no action alternative, no effects are expected beyond those already analyzed in previous NEPA analyses (NMFS 2004a and NMFS 1998).

Alternative 2 and Alternative 3 would give fishery managers more control over skate harvests. These alternatives provide more protection to the stock biomass and have an insignificant effect on skate stocks because it is not expected to jeopardize the capacity of the stock to produce maximum sustainable yield on a continuing basis. Skates are considered ecologically important and may have future economic potential; therefore, an aggregate annual quota may not limit their catch to the appropriate level of sustainable removals. Information on distribution, stock structure, and life history characteristics is extremely limited for skates. The observed bycatch of skates is unlikely to be having a negative effect on abundance at the group level, according to the limited trawl survey data available. However, data limitations are severe, and further investigation is necessary to ensure that all species components are not adversely affected by groundfish fisheries.

Alternatives 2 and 3 would constrain catches to the TAC, ABC, and OFL for skates to levels appropriate for the group, rather than to the cumulative "other species" assemblage. Current incidental catches are

below annual specifications that would be set for the group and are expected to have no effects on a potential target skate fishery, because catches would be allowed up to the annual specifications, and current skate harvests are below this level. Alternative 3 further limits their retention relative to target groundfish fisheries and is more precautionary.

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

As described in Milani (2008), Alaska Department of Fish & Game (ADF&G) manages state-waters fisheries for sablefish and black rockfish in the Aleutian Islands and for Pacific cod in the Aleutian Islands west of 170° W longitude. State waters include all waters within three nautical miles of shore. In March 2000, the Board established vessel length and gear restrictions for vessels fishing Pacific cod and all rockfish in state waters of the central Aleutian Islands, between 175° 30' and 177° W long. The State AI walleye pollock management plan was in place for the first time in 2007. In 2006 and 2007, NMFS issued exempted fishing permits (EFP) allowing vessels to harvest walleye pollock inside of Steller sea lion critical habitat. ADF&G issued commissioner's permits to allow vessels to harvest walleye pollock inside of state waters in accordance with terms of the EFP fishery.

For all other groundfish fisheries that occur within state waters in the BSAI, ADF&G adopts the seasons, bycatch limits, and allowable gear types in effect in the adjacent EEZ and promulgated by NMFS, except where Board regulations take precedent. ADF&G issues a global Emergency Order at the beginning of each year to establish the commercial parallel groundfish seasons, bycatch limits, and gear types for those fisheries not actively managed by the State to coincide with federal regulations of the adjacent EEZ.

Proposed ADF&G harvest limits for skates in Prince William Sound

Inside Waters:	Big skate = 20,000 lb and Longnose skate = 100,000 lb
Outside Waters:	Big skate = 30,000 lb and Longnose skate = 150,000 lb

In December 2008, the Board unanimously rejected a proposal to open a year round fishery for skates in Prince William Sound (PWS). However, the Board supported continued work between ADF&G staff and local fishermen and buyers to develop skate fishing opportunities in PWS on a more limited scale. The State Legislature allocated $50,000 to monitor a commercial fishery, and ADF&G staff has recommended harvest limits in PWS for skates, as identified in the box above.

NMFS In-Season Management staff report that groundfish harvests in state waters reduce the federal TACs, with the exceptions listed below. The Groundfish Plan Teams reviewed the catch accounting system and state groundfish harvests in September 2009 to address any inconsistencies.

None of the proposed alternatives is expected to have an effect on State fisheries for target groundfish (including skates) because it is not likely to change the harvest of groundfish.

1.4.4 Effects on "Other Species"

Skates (15 species), sharks (8 species), sculpins (49 species), and octopuses (8 species) compose the BSAI "other species" category, under the status quo. A list of skate species is presented inTable 1; the remaining species are listed in the BSAI SAFE Report sections for each group. The OFL and ABC for the "other species" assemblage are recommended by the SSC, each year, as the sum of the estimated OFLs and ABCs of the four component groups. The BSAI Groundfish Plan Team and SSC have accepted a tier 3 designation for Alaska skates. That estimate is combined with that from the tier 5 assessment for other skates (Table 8), for a combined OFL and combined ABC for all skates (Table 9). The combined OFL/ABC for skates is further combined with OFL/ABC estimates for sharks, sculpins, and octopuses.

Under Alternative 2 and Alternative 3 (Preferred Alternative), OFL/ABC for the remaining "other species" assemblage would be determined following the same procedure as under Alternative 1, but would exclude skates. The OFL and ABC for skates, as a separate TAC category, and the remaining OFL

and ABC for sharks, sculpins, and octopuses in the "other species" categories, are compared in Table 9. Since skates comprised roughly half of the OFL/ABC for the "other species" category, the remaining species in the category contribute the remaining half, under the revised "other species" category.

Table 8 shows the contributions of the "other species" category constituents to the combined OFL and ABC. With skates removed, sculpins would provide the greatest contribution (e.g., 96 percent in 2008) to the remaining combined OFL and ABC (Table 9).

Figure 17 demonstrates that target fisheries for the revised "other species" assemblage would not be affected, as the total catch of sharks, skates, and sculpins are well below the assemblage ABC. It is not possible to project what the TAC for the remaining "other species" would have been in the past or would be in the future, other than to predict that it would be set at a level below the ABC and that directed fishing for target fisheries would be closed when harvests exceed the ABC.

Should skates be removed from the assemblage, under Alternative 2, directed fisheries for non-pelagic trawl (NPT) yellowfin sole, hook and line Pacific cod, and NPT Pacific cod fisheries have the highest catches of the revised "other species" assemblage, while pot "other" and Pacific cod fisheries, NPT flathead sole, and NPT "other" flatfish fisheries have the highest rates of bycatch of the revised "other species" assemblage. These rates occurred under the status quo; they were masked by higher skate catches and bycatch rates.

Information on distribution, stock structure, and life history characteristics is extremely limited for "other species." It is unlikely that the observed bycatch of "other species" is having a negative effect on abundance at the assemblage level, according to the limited trawl survey data available. However, data limitations are severe, and further investigation is necessary to ensure that all species components are not adversely affected by groundfish fisheries.

The proposed alternatives are expected to benefit the remaining "other species," by limiting the amount of their removal to a level appropriate for the sum of those groups. They are expected to have no effect on the fisheries that harvest the remaining "other species," because they are managed collectively under a cumulative "other species" OFL, ABC, and TAC, which historically has not closed target groundfish fisheries. Alternative 3 is more precautionary because it limits the retention of skates relative to target groundfish fisheries more than Alternative 2. Future plan amendments are intended to manage sharks, sculpins, and octopuses under separate specifications.

1.4.5 Effects on the Ecosystem

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

Fishing has the potential to influence ecosystems in several ways. Certain forage species, such as walleye pollock and Atka mackerel, are at a central position in the food web and their abundance is an indicator of prey availability for many species. Removal of top level predators is another potential effect of fishing, contributing to a "fishing-down the food web" effect. Introduction of non-native species may occur through emptying of ballast water in ships from other regions. These species introductions have the potential to cause large changes in community dynamics. Fishing may alter the amount and flow of energy in an ecosystem by removing energy and altering energetic pathways though the return of discards and fish processing offal back into the sea. The recipients, locations, and forms of this returned biomass may differ from those in an unfished system. Selective removal of species and/or sizes of organisms has the potential to change predator/prey relationships and community structure. Fishing can alter different measures of diversity. Species level diversity, or the number of species, can be altered if fishing

essentially removes a species from the system. Fishing can alter functional or trophic diversity if it selectively removes a structural living habitat group or trophic guild member and changes the evenness with which biomass is distributed among a functional or 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. Fishing gear may alter bottom habitat and damage benthic organisms and communities.

Role of Skates in the Ecosystem

Skates are predators in the BSAI EEZ. Some species are piscivorous (feeding on fishes) while others specialize in benthic invertebrates; additionally, at least three species, deepsea skate, roughtail skate, and longnose skate, are benthophagic (diet includes amphipods, worms) during the juvenile stage but become piscivorous as they grow larger (Ebert 2003, Robinson 2006). Each skate species would occupy a slightly different position in EBS and AI food webs based upon its feeding habits, but in general skates as a group are predators at a relatively high trophic level. For simplicity, the food webs for all skate species are combined in each system (Source: K. Aydin, AFSC, code available upon request. In Ormseth et al. 2008.

Figure 19Figure 18). In the EBS food web, the skate biomass, and therefore the general skate food web position, is dominated by the Alaska skate, which eats primarily pollock (as do most other piscivorous animals in the EBS). The food web indicates that aside from sperm whales, most of the "predators" of EBS skates are fisheries, and that cod and halibut are both predators and prey of skates. The AI food web shows skates with different predators and prey than in the EBS, but still at the same moderately high trophic level. Relative to EBS skates, AI skates display more diet diversity (because the species complex is more diverse than in the Alaska skate-dominated EBS), and have more non-fishery predators including sharks and sea lions. These food webs were derived from mass balance ecosystem models assembling information on the food habits, biomass, productivity and consumption for all major living components in each system (Aydin et al. in review).

The density and mortality patterns for skates also differ greatly between the EBS and AI ecosystems. The biomass density of Alaska skates is much higher in the EBS than in the AI (Figure 7) and we now know they are likely separate species. The density of Alaska skates in the EBS also far exceeds that of all other *Bathyraja* species in any area (Figure 7), but the density of other *Bathyraja* skates is highest in the AI. One simple way to evaluate ecosystem (predation) effects relative to fishing effects is to measure the proportions of overall mortality attributable to each source. The lower panel of Figure 18 distinguishes predation from fishing mortality, and further distinguishes these measured sources of mortality from sources that are not explained within the ecosystem models, which are based on early 1990s fishing and food habits information. While there are many uncertainties in estimating these mortality rates, the results suggest that in the early 1990s fishing mortality exceeded predation mortality for Alaska skates and for other skates in the EBS and AI. Furthermore, predation mortality appeared to be higher for AI skates than for EBS skates, both for Alaska and other skate species in the early 1990s, suggesting that skates experience higher overall mortality in the AI relative to the EBS. One source of uncertainty in these results is that all skate species in all areas were assumed to have the same total mortality rate, which is an oversimplification, but one which is consistent with the assumptions regarding natural mortality rate (the same for all skate species) in this stock assessment.

In comparing fishery catches with predator consumption of skates, fisheries annually removed about 13,000 and 1,000 tons of skates from the EBS and AI, respectively, during the early 1990s (Fritz 1996, 1997). While estimates of predator consumption of skates are perhaps more uncertain than catch estimates, the ecosystem models incorporate uncertainty in partitioning estimated consumption of skates between their major predators in each system. The predators with the highest overall consumption of Alaska skates in the EBS and AI are sperm whales, which account for less than 2 percent of mortality of all skates. They consumed between 500 and 2,500 tons of skates in the EBS annually in the early 1990s.

Consumption of EBS Alaska skates by Pacific halibut and cod are too small to be reliably estimated. Pacific halibut consume very small amounts of other skates in the EBS, according to early 1990s information integrated in ecosystem models. Pinnipeds (Steller sea lions) and sharks also contributed to skate mortality in the AI, averaging less than 50 tons annually. Research on skate nursery areas suggests that gastropod predation on skate egg cases may account for a significant portion of mortality during the embryonic stage, and Pacific cod and Pacific halibut consume substantial numbers of newly hatched juvenile skates within nursery areas.

Information on the diets of skates comes from food habits collections taken in conjunction with EBS and AI trawl surveys. Skate food habits information is more complete for the EBS than for the AI. Over 40 percent of EBS Alaska skate diet measured in the early 1990s was adult pollock, and another 15 percent of the diet was fishery offal, suggesting that Alaska skates are opportunistic piscivores. Eelpouts, rock soles, sandlance, arrowtooth flounder, salmon, and sculpins made up another 25 to 30 percent of Alaska skates' diet, and invertebrate prey made up the remainder of their diet. This diet composition, combined with estimated consumption rates and the high biomass of Alaska skates in the EBS, results in an annual consumption estimate of 200,000 to 350,000 tons of pollock annually. Other EBS skates also consume pollock (45 percent of combined diets), but their lower biomass results in consumption estimates ranging from 20,000 to 70,000 tons of pollock annually. Other skates tend to consume more invertebrates than Alaska skates in the EBS, so estimates of benthic epifaunal consumption due to other skates range up to 50,000 tons annually, higher than those for Alaska skates despite the disparity in biomass between the groups.

Because Alaska skates and all other skates are distributed differently in the EBS, with Alaska skates dominating the shallow shelf areas and the more diverse species complex located on the outer shelf and slope, different ecosystem relationships for skates in these habitats might be expected based on differences in food habits among the species. Similarly, in the AI the unique skate complex has different diet compositions and consumption estimates from those estimated for EBS skates. The skate in the AI are opportunistically piscivorous like its EBS relative, feeding on the common commercial forage fish, Atka mackerel (65 percent of diet) and pollock (14 percent of diet), as well as fishery offal (7 percent of diet). Diets of other skates in the AI are more dominated by benthic invertebrates, especially shrimp (pandalid and non-pandalid total 42 percent of diet), but include more pelagic prey such as juvenile pollock, adult Atka mackerel, adult pollock and squids (totaling 45 percent of diet). Estimated annual consumption of Atka mackerel by AI Alaska skates in the early 1990s ranged from 7,000 to 15,000 tons, while pollock consumption was below 5,000 tons. Shrimp consumption by AI other skates was estimated to range from 4,000 to 15,000 tons annually in the early 1990s, and consumption of pollock ranged from 2,000 to 10,000 tons. Atka mackerel consumption by AI other skates was estimated to be below 5,000 tons annually. The diet composition estimated for AI other skates is likely dominated by the biomass dominant species in that system, whiteblotched skate and Aleutian skate. The diet compositions of both Aleutian and whiteblotched skates in the AI appear to be fairly diverse, and are described in further detail in Yang (2007) along with the diets of big skate, Bering skate, Alaska skate, roughtail skate, and mud skate in the AI.

Examining the trophic relationships of EBS and AI skates provides a context for assessing fishery interactions beyond the direct effect of bycatch mortality. In both areas, the biomass-dominant species of skates feed on commercially important fish species, so it is important for fisheries management to maintain the health of pollock and Atka mackerel stocks in particular to maintain the forage base for skates (as well as for other predators and for human commercial interests).

The proposed alternatives are expected to benefit the ecosystem by limiting the amount of skate harvest to a level appropriate for the group. Alternative 3 has greater positive effects on the ecosystem because it limits the retention of skates relative to target groundfish fisheries more than Alternative 2.

1.5 Socioeconomic Considerations

The use of a benefit/cost framework is the appropriate way to examine the relative merits of the proposed action. When performing a benefit/cost analysis, the objective is to derive conclusions about "net" effects of each alternative under consideration (e.g., net revenue impacts, net welfare changes). However, in the present case, necessary data on costs are not available, making a quantitative net impact analysis impossible.

1.5.1 Description of the Fishery

Section 1.3.1 of the EA lists NEPA documents providing detailed background information on the groundfish fisheries off of Alaska. Detailed descriptions of the social and economic characteristics of the BSAI groundfish fisheries may be found in the following reports:

- NMFS (2004a) contains detailed fishery descriptions and statistics in section 3.9, "Social and Economic Conditions."
- Hiatt et al. (2008) contains 60 tables that summarize a wide range of fishery information through 2007.

1.5.2 Impacts of the Alternatives

The economic impacts of this action on MRAs for BSAI skates also are discussed in the Regulatory Impact Review (RIR) and the draft Initial Regulatory Flexibility Analysis (IRFA) and Regulatory Flexibility Act certification prepared for this action (NPFMC 2009 and NMFS 2010). The impacts on both community development quota (CDQ) fisheries and non-CDQ fisheries will depend largely on decisions made by the Council in future annual specification cycles for setting skate ACLs. The purpose of the proposed action is to enhance the ability of managers to constrain harvests of skates in the BSAI to protect the skate biomass. This action may lead to reductions in the gross revenues from fishing in the short run, but, as a result of protecting the biomass, may lead to greater gross revenues from a sustainable fishery in the longer term. Consideration also must be given to the impacts of the proposed skate MRA on the Pacific cod fisheries in the BSAI

Alternative 1 represents the status quo, with no change to the management of BSAI skates. Status quo groundfish fishing is periodically evaluated in the Groundfish Harvest Specifications EIS (NMFS 2007). The analysis of status quo fishing provided in NMFS (2007) is incorporated by reference. The EIS found that status quo groundfish fishery management does not result in significantly adverse social or economic impacts.

Under Alternative 1, the Council retains the ability to set specifications for BSAI skates under the "other species" assemblage. All of the catch of the "other species" complex is taken incidentally in the directed groundfish fisheries; there is no directed fishery for any of the component groups. The Council has set the "other species" TAC well below the ABC that is set by the SSC, but at a level sufficient to accommodate incidental catch without closing directed fisheries. Thus, in practice, the status quo has not resulted in overfishing of skates; however, if skates continue to be managed under the status quo, the risk of overfishing remains because fishing practices could change unexpectedly, resulting in directed fishing for skates.

Under Alternative 2 and Alternative 3, BSAI skates would be subject to biologically-based ACLs and associated revisions to the regulations would be made. Under ACL management, the Council would restrict the skate TAC to be at or below the ABC that would be determined for the skate complex.[5]

[5] The stock assessment authors have recommended separate OFLs and ABCs for Alaska skates and other skates. The BSAI Plan Team and SSC will consider separate specifications once this FMP amendment has been implemented.

Further, the Council can set the TAC at a level that would allow a directed fishery for skates or restrict harvest to incidental levels at the start of the year. NMFS (2007) estimated earned gross revenue for harvests of BSAI "other species" in 2006, as $2.1 million, attributable to a 26,798 mt catch. This represents approximately $78.36/mt. Using this result, the maximum foregone TAC (assuming that the TAC equals the ABC), between Alternative 1 and Alternatives 2 and 3 would have been 13,271 mt ("other species" ABC) − 7,943 mt (skates ABC), or 5,328 mt (Figure 10), which, all else being equal, translates to an estimated gross revenue of $1.1 million.

The "other species" TAC in 2008 and 2009, was conservatively set at 50,000 mt (below an ABC of 78,100 mt in 2008 and 63,700 mt in 2009), although this is higher than the 5-year average (2003 through 2007) of 30,932 mt. The 2008 and 2009 TACs were raised to reflect incidental harvests, as TAC overages occurred in previous years (Figure 10). This exercise is intended to identify the maximum foregone value under Alternative 1 (assuming that 100 percent of the "other species" TAC was taken as skates in 2009), compared with the maximum skate TAC equal to the ABC for 2009. The maximum amount foregone would be 63,700 mt (2009 "other species" ABC) − 32,000 mt (2009 proposed skates ABC) = 31,700 mt. Using the reported gross revenue of $78.6/mt, this represents potential gross revenues of $2.5 million, in 2009. However, this figure is only 0.1 percent of the total estimated gross revenue of the BSAI groundfish fishery, so that even large changes in the retained catch of "other species" will only have a small impact on industry gross revenues. Given that the "other species" bycatch is frequently not retained, this suggests that it is not currently profitable to harvest the "other species" complex up to a reduced skates' TAC as proposed under Alternative 2 and Alternative 3, let alone to the maximum permissible "other species" TAC.

One consequence of the difference between the proposed alternatives compared with the status quo is that directed fisheries in which skates are incidentally caught could be closed to prevent reaching the more restrictive OFL. However, the catch of "other species" has never exceeded the OFL level in the last 30 years, nor is it expected to under the proposed alternatives. Therefore it is unlikely that other groundfish fisheries would be impacted by a closure to prevent overfishing of the skate complex. Based on this discussion, and the comparison to the status quo, Alternatives 2 and 3 are not considered to have significant social and economic impacts.

Two minor changes to the regulations (species codes and PSC categories) also are expected to have no impacts.

Impacts on Groundfish Target Fisheries

The impacts of this amendment on groundfish target species likely would be limited to skates, "other species," and Pacific cod. The majority of the skate incidental take is in the Pacific cod directed fishery. The "other species" management category comprises multiple non-target species groups: sharks, skates, octopuses, and sculpins. "Other species" are considered ecologically important and may have future economic potential; therefore, an aggregate annual quota limits their catch. Information on distribution, stock structure, and life history characteristics is extremely limited for the "other species" groups. There is currently no directed fishing for groups in this category in the BSAI. "Other species" are taken incidentally in target fisheries for groundfish, and aggregate catches of "other species" are tracked inseason by the Alaska Regional Office, NMFS.

Catches of "other species" have been small compared to those of target species. It is unlikely that the observed bycatch of "other species" is having a negative effect on abundance at the group levels, according to the limited trawl survey data available. However, data limitations are severe, and further investigation is necessary to ensure that none of the species components are adversely affected by groundfish fisheries. Furthermore, management will be difficult with the current limited information if target fisheries for sharks and/or skates develop (under the no action alternative).

Impacts on groundfish target species may be lessened under Alternative 2, if a skate MRA is implemented. Groundfish (e.g., Pacific cod) fishermen can take advantage of their skate bycatch to harvest skates against the proposed skate MRA, and sharks, sculpins, and octopuses against the "other species" MRA. Fishermen would be able to retain skates, and remaining "other species," up to 20 percent of the weight of their retained groundfish harvest, while targeting skates and "other species," respectively, as provided for in 50 CFR 679.20(e) and Table 11 to 50 CFR part 679. The additional harvests of skates and "other species" will not have a significant impact on their respective biomasses, because the harvest is conducted within the MRA limits and is subtracted from the annual TACs specified for each. But the Council may wish to set a policy of not increasing the bycatch of these groups, by not setting a separate MRA for skates and leaving the MRAs under status quo management.

On the other hand, impacts on groundfish target species may be increased under Alternative 2 if incidental skate harvests increase to the point at which target groundfish fisheries are closed. The Council added Alternative 3 to this analysis to address this potential impact.

In summary Alternative 2 and Alternative 3 would give fishery managers more control over skate harvests. Under the status quo, groundfish fishermen could conceivably harvest almost the entire "other species" TAC as skates (Figure 20). As noted in section 1.3.3, which described the biology and management of the skate fishery, skates grow and reproduce slowly. If the stocks were fished down, they would not be expected to rebound quickly. No effects are expected beyond those already analyzed in previous NEPA analyses under the no action alternative (NMFS 2004a and NMFS 1998). The proposed alternatives, which provide more protection to the stock biomass, have an insignificant effect on skate stocks, because it is not expected to jeopardize the capacity of the stock to produce maximum sustainable yield on a continuing basis. Alternative 3 is more precautionary than Alternative 2 for the reasons previously identified and is less likely to result in directed fishery closures.

Impacts on Bycatch and Discards

Halibut, salmon, king crab, Tanner crab, and herring are important species in other directed subsistence, commercial, and recreational fisheries. These species have been designated "prohibited species" in the BSAI groundfish fisheries. Groundfish fishing operations are required to operate so as to minimize their interception of prohibited species, and, under most circumstances, must discard prohibited species, if they are taken. In the BSAI, prohibited species are protected by harvest caps and/or the closure of areas to directed groundfish fishing, if high concentrations of the prohibited species are present. Because of the caps or other protection measures, a new specification category for skates and associated MRA should have little impact on catches of prohibited species.

Skates, sharks, sculpins, and octopuses are protected by an aggregate harvest cap and/or closure areas, if excessive amounts of these species are caught. A new specification category for skates should have little impact on catches of prohibited species because skates are not currently targeted. Because the aggregate TAC would be lowered under Alternative 2 and Alternative 3 as a result of skates being removed from the assemblage, potential harvests that could have been taken under a higher TAC (inclusive of skates) would be foregone. The proposed skate MRA under Alternative 2 would benefit those groundfish fisheries that harvest incidental amounts of the remaining "other species," as they could retain separate amounts of skates *and* remaining "other species" against their basis species; however, this additional MRA could close directed fisheries if it is exceeded.

Consumer Effects

Consumer effects of changes in production will be measured by changes in consumers' surplus. The consumers' surplus is a measure of what consumers would be willing to pay to buy a given amount of a product or service at a given price, above that level which they actually must pay. A decrease in quantity supplied and an associated increase in price will reduce consumer welfare, as measured by consumers' surplus. An increase in quantity supplied and a consequent decrease in price will increase consumer

welfare, as measured by consumers' surplus. A decrease in consumers' surplus is not a total loss to society, since some of that decrease is transferred to producers/suppliers (e.g., fishermen) in the form of higher prices. However, this transfer is still a loss to consumers and, if the producer gains accrue to non-U.S. fishermen and processors, there is a net welfare loss to the nation.

For pollock, Pacific cod, and Atka mackerel, for example, the impact on domestic consumers of moderate increases or decreases in production might be fairly modest. Pollock surimi and roe and Atka mackerel were described as being principally sold and consumed overseas. Pacific cod and pollock fillets were described as being sold into domestic markets, in which there were many relatively close substitutes (Hiatt, et. al, 2009). Under these circumstances, consumers would be unlikely to gain or lose much from "moderate" changes in supply.

Passive Use Values

Passive use is also called "non-use" value, because a person need never actually use a resource in order to derive value from it.[6] For example, people enjoy a benefit (which can be measured in economic terms) from simply knowing that some given aspect of the environment exists. Survey research suggests that passive use values can be significant in at least some contexts. Because passive use values pertain to the non-marginal changes in the status of resources, the focus in this discussion is on classes of resources in the GOA and BSAI that have been listed as endangered under the U.S. Endangered Species Act. Under the Act, an endangered species is one that is "...in danger of extinction throughout all or a significant portion of its range..." and not one of certain insects designated as 'pests'." (16 U.S.C. §1532(6)).

Changes in groundfish harvests in the BSAI may affect (largely indirectly) passive use values by affecting the probability of continued existence or recovery of a listed species. At present, four endangered species or classes of endangered or threatened species range into the BSAI management areas: (a) Steller sea lions; (b) seven species of whales; (c) two species of Pacific Northwest salmon; and (d) four species of seabirds.

The mechanisms through which the fisheries might affect endangered species are, in many cases, poorly understood. Models that would relate fishing activity to changes in the probability that a species would become extinct are not available, or do not yet have strong predictive power, and information on the ways in which passive use values would change as these probabilities change is not available.

While not among charismatic megafauna, a category of species with widespread popular appeal and often associated with conservation campaigns (e.g., polar bears, great whales), management of slow growing, long lived, low fecundity species (e.g., skates and sharks) also receive increased levels of scrutiny as these species may not be able to recover to sustainable levels, once they are overfished.

Management and Enforcement Costs

In-season management and enforcement expenses are related to management of ACLs, in complicated ways. An additional quota category may lead to a slight increase in enforcement costs, as it becomes necessary to monitor more openings and closures and to prevent poaching.

Summary

The economic impacts of this action will depend upon decisions made by the Council in the annual specifications process. The effects are primarily limited to the "target species" category for fisheries such as Pacific cod, which may take skates incidentally. Determinations of the TAC for the "other species" complex would be affected by the proposed action because the amount of "other species" harvest depends on which groups are included in the category. Overall, fishing practices are not expected to change under

[6] "Passive use" has also been referred to in the literature as "existence value," because it accounts for the value people place on the mere existence of a resource, even though they never expect to have anything to do with it.

this amendment. The Council can control whether a future directed fishery develops for skates by the level at which it sets the annual TAC.

The proposed alternatives are intended to give managers more control over skate harvests in the BSAI, to constrain harvests, if necessary, and to protect the skate biomass. Alternative 3 would lead to lower skate harvests than Alternative 1 or Alternative 2 and fewer directed fishery closures than Alternative 2. This proposed action may lead to limits on the gross revenues from fishing, in the short run, but, as a result of protecting the biomass, may lead to greater gross revenues from a sustainable fishery in the longer term. Consideration must also be given to the impacts on the Pacific cod fisheries in the BSAI, which take the highest amounts of skates as bycatch (although, well under the harvest specifications in the 2009 SAFE Report). The socioeconomic impacts of the alternatives are not significant.

1.6 Cumulative Effects

NEPA requires that EAs analyze the potential cumulative effects of a proposed action and its alternatives. An EA must consider cumulative effects when determining whether an action significantly affects environmental quality. Cumulative effects are those combined effects on the quality of the human environment that result from the incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7, 1508.25(a), and 1508.25(c)). Cumulative impacts can result from individually minor, but collectively significant, actions over time. The concept behind cumulative effects analysis is to capture the total effect of many actions over time that would be missed by evaluating each action individually.

The potential direct and indirect effects of the BSAI groundfish fisheries on target species are detailed in the Groundfish Harvest Specification EIS (NMFS 2007). Direct effects include fishing mortality, changes in biomass, and spatial and temporal concentration of catch that may lead to a change in the population structure. Indirect effects include the changes in prey availability and changes in habitat suitability. Indirect effects are not anticipated to occur with any of the alternatives analyzed because the proposed action would not change overall fishing practices that indirectly affect prey availability and habitat suitability. To the extent practicable, this analysis incorporates the cumulative effects analysis in the Groundfish Harvest EIS (NMFS 2007).

There are a number of actions that are being considered by the Council that will affect the BSAI groundfish fisheries, including those that incidentally harvest skates.

Manage BSAI Skate Complex as (a) BSAI Alaska Skates and (b) BSAI Other Skates

In the annual specifications process the Council will consider recommendations from its scientific advisors on whether to split the Alaska skate from the BSAI skate assemblage to form two management groups: Alaska skate and "other skates." The purpose of separate specifications is to provide increased protection to rare or endemic species in the EBS slope and AI habitat areas, since the Alaska skate constitutes the bulk of the skate biomass in the EBS shelf habitat area. Ormseth et al. (2008) have shown that the distribution of species differs greatly by habitat areas within the BSAI, and that overall catch is not necessarily in proportion to BSAI-wide biomass due to the distribution of fishing effort. Because it would be difficult to manage skates by habitat area, managing Alaska skates and the other skates complex separately represents a reasonable compromise that increases protection to the species within each ecosystem but maintains a level of management simplicity appropriate to nontarget species categories. In the event that target fisheries develop for individual skate species in the other skates complex, the Council could consider whether target skate species should be further separated from the complex and be managed individually. Note that a new species code would be required in Table 2a to 50 CFR part 679 if the Alaska skate is provided a separate TAC for management.

Alternative 2 proposes to manage MRAs for all skates collectively. As part of the annual specification process, the Council also will determine whether to allow directed fishing for skates in the BSAI or

whether skates should continue to be managed under MRAs until such time as sufficient life history information becomes available to make reasonable species-specific estimates of productivity and/or data collection protocols are developed for the fishery. A regulatory amendment would be required to set separate MRAs for individual skate species only if the Council decides to change the status quo.

Manage "other species" complex as separate squid, octopus, shark, sculpin, and grenadier complexes

The Council has initiated four actions over the next several years to revise management of (1) BSAI and GOA squids; (2) BSAI and GOA octopuses; (3) BSAI and GOA sharks and sculpins; and (4) BSAI and GOA grenadiers. The Council's Non-Target Species Committee and ad hoc working group[7] have been developing alternatives for analyses since 2004 (http://www.alaskafisheries.noaa.gov/npfmc). During its initial review of the draft analysis in June 2009, the Council clarified its intent to retain the status quo for the MRA for the "other species" category as it considers separating management of the remaining groups from the "other species" category. As a result alternatives to revise the "other species" MRA will be not be included in those proposed actions.

Manage Non-Target Species under an Ecosystem Component Category

Revisions to the National Standard 1 guidelines under the Magnuson-Stevens Act added new requirements for ACLs and accountability measures. The Magnuson-Stevens Act requires that all stocks in a fishery management plan be considered "in the fishery" unless specified as ecosystem component (EC) species. The EC classification however is not required but is discretionary. To be considered for possible EC classification, species should, among other considerations, conform to the following criteria:

- Be a non-target species or non-target stock;
- Not be determined to be subject to overfishing, approaching overfished, or overfished;
- Not be likely to become subject to overfishing or overfished, according to the best available information, in the absence of conservation and management measures; and
- Not generally be retained for sale or personal use.

In June 2009, a working group of Plan Team and SSC members and others recommended that the Council amend the groundfish fishery management plans to include an EC category; a report from the AFSC on which vulnerable species could be included in an EC category was released in August 2009. Additional Plan Team and SSC recommendations were made in Fall 2009. The Council has initiated Amendments 96 and 87 to the groundfish fishery management plans to consider moving forage fish, some "other species" groups, and some non-target species into a new EC category.

Groundfish Plan Amendment to Comply with ACL Requirements

Council and Regional Office staff reported to the Council in June 2009 on the need for a housekeeping amendment to the groundfish fishery management plans to augment the fishery management plan text with enhanced descriptions of how the current Council process (via the annual specifications process and SAFE Reports) complies with the National Standard 1 guidelines. Final action is scheduled for no later than April 2010 to meet statutory requirements for compliance with the Magnuson-Stevens Act by January 1, 2011.

Summary

The cumulative effects of Amendment 95 would be similar to those seen for the harvest specifications under target species ("other species" and Pacific cod) and socioeconomic effects. The skate fishery is not likely to have socioeconomic cumulative impacts on the participants in the directed Pacific cod fishery, and in other fisheries where incidental skates harvest is retained. No information is available to quantify

[7] Ad hoc working group is comprised of SSC, Groundfish Plan Team, AFSC scientists, and Alaska Regional Office (AKRO) managers.

potential impacts. The biological impacts are limited by ACLs, PSC management strategies, and in-season groundfish management practices currently in place.

No additional past, present, or reasonably foreseeable cumulative negative impacts on the natural and physical environment have been identified (other than those above) that would accrue from any of the alternatives considered for the proposed action. Cumulatively significant negative impacts on these resources are not anticipated with the proposed action because no negative direct or indirect effects on BSAI resources have been identified.

1.7 Environmental Analysis Conclusions

As stated in section 1.1 of this EA, the intent of Amendment 95 is to reduce the risk of overfishing of BSAI skates. The impacts of Amendment 95 are assessed in section 1.4 of this EA. This proposed action would manage the annual specifications and possibly MRAs for BSAI skates separate from the "other species" category. Annual specifications would be set each year by the Council and MRAs could be set at 20 percent for BSAI skates. This action is intended to promote the goals and objectives of the Magnuson-Stevens Act, the FMP, and other applicable laws.

In addition to the Draft PSEIS and Groundfish Harvest Specification EIS, the significance of impacts of the actions analyzed in this EA were determined through consideration of the following information as required by NEPA and 40 CFR 1508.27:

Context: Amendment 95 applies to the BSAI fisheries only. Any effects of these actions are limited to these areas. The separation of skates in the BSAI groundfish management has societal effects on individuals directly and indirectly participating in the skate and other groundfish fisheries and on those who use the ocean resources. Because this action continues groundfish fisheries in the BSAI into the future and affects the method of managing skates in the BSAI, this action may have impacts on society as a whole or regionally.

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

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 CFR 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ context and intensity criteria, as follows.

(1) *Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?* No. The proposed action would reduce the risk of overfishing and increase the sustainability of BSAI skates because they would be managed under an OFL and ABC that is determined to be more appropriate at the group level. The upper limit for total removals of BSAI skates would be lowered from the maximum ABC determined for the "other species" assemblage to the maximum ABC determined for BSAI skate group. No target fishery occurs for BSAI skates and none is expected in the near future; fewer than 30 percent of harvested skates are retained. The amount of BSAI skates retained in the groundfish fisheries would not increase under a separate MRA, as the total removal of each target species would still be within the TAC levels established for each target species and further constrained by the PSC limits established for Pacific halibut. The impacts of harvest strategies and resulting groundfish TAC amounts were analyzed in the Groundfish Harvest Specifications EIS (NMFS 2007) and were found not to jeopardize the sustainability of any target species. The EA prepared for this action found no additional impacts on targeted species not previously considered in the EIS.

(2) Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species? No. The impacts of harvest strategies and resulting groundfish TAC amounts on non-target species were analyzed in the Groundfish Harvest Specifications EIS (NMFS 2007) and were found not to jeopardize the sustainability of any non-target species. This action does not revise the MRAs for non-target species.

(3) *Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in fishery management plans?* No. Fishing effort targeting BSAI skates is expected to be limited by TACs set substantially lower than the ABC levels. The Essential Fish Habitat Identification and Conservation EIS (NMFS 2005b) found that this level of effort has minor impacts on ocean, coastal, and essential fish habitat (EFH). This proposed action would not have any additional impacts on habitat or EFH.

(4) Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety? No. This action is limited in scope to the management of BSAI skates as a target category and retention of incidentally taken skates in the groundfish fishery in the BSAI. No potential adverse impacts on public health or safety were identified in the EA prepared for this action.

(5) *Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, seabirds, or critical habitat of these species?* No. The proposed action is not expected to result in increased interactions with endangered or threatened species, marine mammals, seabirds, or their critical habitat beyond those identified in previous consultations under section 7 of the Endangered Species Act (ESA).

(6) *Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?* No. Effects of fishing on the marine ecosystem in Alaska are analyzed in detail in the Alaska Groundfish Fisheries PSEIS. Additional impacts on marine ecosystems in Alaska are summarized annually in the Stock Assessment and Fishery Evaluation reports. This action is limited in scope to the management of skates in the BSAI. No potential impacts on biodiversity and/or ecosystem function were identified in the EA.

(7) Are significant social or economic impacts interrelated with natural or physical environmental effects? No. This action would set separate specifications for skates in the BSAI. No significant social or economic impacts of this action were identified in the EA or in the Regulatory Impact Review or Regulatory Flexibility Act analysis.

(8) Are the effects on the quality of the human environment likely to be highly controversial? No. Managing BSAI skates separate from the "other species" assemblage is anticipated to reduce the risk of overfishing of skates; it may result in an increase in the amount of retention of "other species." This action is intended to promote the goals and objectives of the Magnuson-Stevens Act, the FMP, and other applicable laws. No controversial or adverse impacts have been identified as a result of this action.

(9) *Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?* No. The proposed action affects the amount of selected species of groundfish which may be retained in the groundfish fisheries in the BSAI and would have no impacts on historic or cultural resources, park land, prime farmlands, wetlands, or wild and scenic rivers. No additional impacts on ecological critical areas are expected to result from the proposed action.

(10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks? No. The fish species and harvest methods involved, limited harvest amounts, and area of activity where potential effects might occur are well known and do not involve unique or unknown aspects.

(11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts? No. The creation of a TAC for BSAI skates would allow for better protection from potential overfishing for skate species. No additional past, present, or reasonably foreseeable future actions with cumulative impacts have been identified that would accrue from this action.

(12) *Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?* No. The proposed action will have no effect on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or cause loss or destruction of significant scientific, cultural, or historic places. Because this action occurs within 3 nm to 200 nm off the coast of the BSAI, this consideration is not applicable to the proposed action.

(13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species? No. The proposed action will not introduce or spread nonindigenous species into Alaska beyond amounts previously identified because it does not change fishing, processing, or shipping practices that may lead to the introduction of nonindigenous species.

(14) *Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?* No. The proposed action would set a separate TAC for BSAI skates to provide additional protection from the potential to overfish the species when managed as a group with other species. The Council has recommended future action to further remove groups from the "other species" category (Amendments 96 and 87), but this skate action alone is not considered a precedent for setting separate TACs for "other species" groups (sharks, octopuses, sculpins, and possibly grenadiers). The proposed action builds on numerous precedents for managing species and species groups as target categories with their own specifications in the groundfish fisheries off Alaska. For instance, GOA Plan Amendment 63 amended the GOA groundfish fishery management plan to manage skates separate from the GOA "other species" assemblage (they are currently managed under separate specifications for longnose skate, bignose skates, and other skates but under one MRA for all skates.) However, each decision about the appropriate management strategy for the incidental catch of groundfish harvested off Alaska is a separate decision requiring analysis and an adequate rationale. Therefore, this action does not create a precedent that binds NMFS or the Council in future management of other groundfish species.

(15) *Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?* No. The proposed action poses no known violation of federal, state, or local laws and requirements for the protection of the environment.

(16) *Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?* No significant past, present, or reasonably foreseeable future action with cumulative impacts have been identified that would accrue from the proposed action.

2.0 CONSISTENCY WITH APPLICABLE LAW AND POLICY

2.1 Magnuson-Stevens Act

2.1.1 National Standards

Below are the ten National Standards as contained in the Magnuson-Stevens Act (Act), and a brief discussion of the consistency of the proposed alternatives with those National Standards, where applicable.

National Standard 1 - Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery.

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

National Standard 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.

National Standard 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 U.S. 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.

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

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

National Standard 7 - Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

National Standard 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.

National Standard 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.

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

This FMP amendment propose to move BSAI skates, currently caught only as incidental catch to target groundfish fisheries (NS9), from the "other species" complex into the target category and require that ACLs be set for them (NS1). The FMP amendment is intended to reduce the risk of overfishing (NS1) of skates in the BSAI management area (NS3) by managing skates as a target category using information provided in the annual SAFE Report (NS2). Complimentary regulatory amendments would conform fishery regulations with the FMP amendment. One alternative would add an MRA category for BSAI skates, but new information provided in the analysis suggest that the proposed action under Alternative 2

would be counter to the proposed objectives of the action, which is to reduce the risk of overfishing of BSAI skates.

Section 303(a)(9) – Fisheries Impact Statement

Section 303(a)(9) of the Magnuson-Stevens Act requires that any plan or amendment include a fishery impact statement which shall assess and describe the likely effects, if any, of the conservation and management measures on (a) participants in the fisheries and fishing communities affected by the plan or amendment and (b) participants in the fisheries conducted in adjacent areas under the authority of another Regional Council, after consultation with such Regional Council and representatives of those participants taking into account potential impacts on the participants in the fisheries, as well as participants in adjacent fisheries.

The alternatives considered in this analysis and the impacts of these alternatives on participants in the fisheries and fishing communities are described in the EA (section 1.5), the RIR, and the Regulatory Flexibility Act Analysis (NMFS 2010). The proposed alternatives are expected to have little to no effect on more than 200 vessels that participated in recent BSAI groundfish fisheries, only some of which harvest skates, because projected catch limits would not result in fishery closures beyond those analyzed in previous documents, including the Final Programmatic SEIS (NMFS 2004a) and Harvest Specifications EIS (NMFS 2007). Potential impacts to fisheries other than the BSAI groundfish fishery are not anticipated as a result of this action.

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7.0 TABLES

Table 1. Life history and depth distribution information available for BSAI skate species.

Species	Common name	Max obs. length (TL cm)	Max obs. age	Age, length Mature (50 percent)	Feeding mode [2]	N embryos/ egg case [1]	Depth range (m) [9]
Bathyraja abyssicola	deepsea skate	135 (M) [10] 157 (F) [11]	?	110 cm (M) [11] 145 cm (F) [13]	benthophagic; predatory [11]	1 [13]	362-2904
Bathyraja aleutica	Aleutian skate	150 (M) 154 (F) [12]	14 [6]	121 cm (M) 133 cm (F) [12]	predatory	1	15-1602
Bathyraja interrupta	Bering skate (complex?)	83 (M) 82 (F) [12]	19 [6]	67 cm (M) 70 cm (F) [12]	benthophagic	1	26-1050
Bathyraja lindbergi	Commander skate	97 (M) 97 (F) [12]	?	78 cm (M) 85 cm (F) [12]	?	1	126-1193
Bathyraja maculata	whiteblotched skate	120	?	94 cm (M) 99 cm (F) [12]	predatory	1	73-1193
Bathyraja mariposa [3]	butterfly skate	76	?	?	?	1	90-448
Bathyraja minispinosa	whitebrow skate	83 [10]	?	70 cm (M) 66 cm (F) [12]	benthophagic	1	150-1420
Bathyraja parmifera	Alaska skate	118 (M) 119 (F) [4]	15 (M) 17 (F) [4]	9 yrs, 92cm (M) 10 yrs, 93cm(F) [4]	predatory	1	17-392
Bathyraja sp. cf. *parmifera*	"leopard" parmifera	133 (M) 139 (F)	?	?	predatory	?	48-396
Bathyraja taranetzi	mud skate	67 (M) 77 (F) [12]	?	56 cm (M) 63 cm (F) [12]	predatory [13]	1	58-1054
Bathyraja trachura	roughtail skate	91 (M) [14] 89 (F) [11]	20 (M) 17 (F) [14]	13 yrs, 76 cm (M) 14 yrs, 74 cm (F)[14, 12]	benthophagic; predatory [11]	1	213-2550
Bathyraja violacea	Okhotsk skate	73	?	?	benthophagic	1	124-510
Amblyraja badia	roughshoulder skate	95 (M) 99 (F) [11]	?	93 cm (M) [11]	predatory [11]	1 [13]	1061-2322
Raja binoculata	big skate	244	15 [5]	6-8 yrs, 72-90 cm [7]	predatory [8]	1-7	16-402
Raja Rhina	longnose skate	180	25 [5]	7-10 yrs, 65-83 cm [7]	benthophagic; predatory [15]	1	9-1069

From Stevenson et al., (2004) unless otherwise noted: [1] Eschmeyer 1983; [2] Orlov 1998 & 1999 ; [3] Stevenson et al. 2004; [4] Matta 2006; [5] Gburski et al. 2007; [6] Gburski unpub data; [7] McFarlane & King 2006; [8] Wakefield 1984; [9] Stevenson et al. 2006; [10] Mecklenberg et al. 2002; [11] Ebert 2003; [12] Ebert 2005; [13] Ebert unpub data; [14] Davis 2006; [15] Robinson 2006, Ormseth et al. 2008.

Table 2. Species composition of the EBS and AI skate complexes from the most recent AFSC bottom trawl surveys.

Skate species	Common name	2007 EBS shelf		2004 EBS slope		2006 Aleutians	
		bio (t)	Cv	bio (t)	cv	bio (t)	Cv
Bathyraja abyssicola	deepsea	0		164	0.73	0	
Bathyraja aleutica	Aleutian	2,718	0.43	14,987	0.14	6,684	0.23
Bathyraja interrupta	Bering	9,327	0.14	1,953	0.11	186	0.55
Bathyraja lindbergi	Commander	0		4,194	0.15	0	
Bathyraja maculata	whiteblotched	3,234	0.92	3,450	0.16	29,712	0.19
Bathyraja minispinosa	whitebrow	0		1,755	0.20	0	
Bathyraja parmifera	Alaska	457,941	0.07	4,248	0.33	13,484	0.19
Bathyraja taranetzi	mud	0		702	0.20	2,970	0.28
Bathyraja trachura	roughtail	0		1,677	0.12	0	
Bathyraja violacea	Okhotsk	0		8	1.00	0	
Raja binoculata	big	1,804	0.76	0		568	0.72
Raja rhina	longnose	0		0		0	
Rajidae unid	Unidentified skate species	0		19	0.54	605	0.41
Total skate complex		**475,024**	**0.07**	**33,156**	**0.08**	**54,210**	**0.12**

t = tons

Cv = coefficient of variance

Table 2. Time series of "other species" ABC, TAC, OFL and catch (t), with skate catch proportion.

Year	"other species" ABC	"other species" TAC	"other species" OFL	"other species" catch	BSAI skate catch	Skate percent of "other species" catch
1991	28,700	15,000		17,199		
1992	27,200	20,000	27,200	33,075	16,962	51%
1993		22,610		23,851	12,226	51%
1994	27,500	26,390	141,000	24,555	14,223	58%
1995	27,600	20,000	136,000	22,213	14,892	67%
1996	27,600	20,125	137,000	21,440	12,643	59%
1997	25,800	25,800		25,176	17,747	70%
1998	25,800	25,800	134,000	25,531	19,318	76%
1999	32,860	32,860	129,000	20,562	14,080	68%
2000	31,360	31,360	71,500	26,108	18,877	72%
2001	33,600	26,500	69,000	27,178	20,570	76%
2002	39,100	30,825	78,900	28,619	21,279	74%
2003	43,300	32,309	81,100	26,150	19,419	74%
2004	46,810	27,205	81,150	29,637	22,462	76%
2005	53,860	29,000	87,920	29,505	22,982	78%
2006	58,882	29,000	89,404	26,798	19,992	75%
2007	68,800	37,355	91,700	26,668	18,558	70%
*2008	78,100	50,000	104,000	21,340	15,167	71%

Sources: "other species" ABC, TAC, OFL and 1992–2002 "other species" catch from AKRO website.
BSAI skate catch 1992–1996 from Fritz 1996, 1997, 1997–2002 from Gaichas et al. 2004; 2003–2007 "other species" and BSAI skate catch from AKRO CAS; *2008 data current as of 10/3/2008.

Table 3. Estimated catch (t) of all skate species combined by target fishery (upper) and reporting area (lower) 2003–2008.

region	target	2003	2004	2005	2006	2007	*2008
EBS	Atka	20	35	22	8	26	7
	P cod	14,954	18,000	18,975	14,459	12,713	8,867
	flatfish	3,085	2,613	2,546	3,220	3,462	2,891
	pollock	471	843	731	1,306	1,299	2,381
	rockfish	11	6	4	3	3	1
	sablefish	2	2	2	13	18	9
	other target	220	91	25	26	56	57
	EBS total	**18,764**	**21,591**	**22,305**	**19,034**	**17,578**	**14,213**
AI	Atka	74	108	118	133	127	97
	P cod	200	486	406	417	633	284
	flatfish	254	247	100	188	100	493
	pel pollock	0	0	0	<1	<1	<1
	rockfish	61	16	26	22	69	51
	sablefish	55	8	24	108	38	25
	other target	11	6	3	89	13	3
	AI total	**655**	**871**	**677**	**958**	**980**	**953**

area	area	2003	2004	2005	2006	2007	*2008
EBS	508	0	<1	0	0	0	0
	509	2,009	2,170	3,226	3,335	3,572	2,670
	512	25	205	15	0	0	1
	513	2,785	2,883	4,007	2,663	2,353	1,674
	514	281	67	196	221	445	64
	516	132	417	239	252	395	281
	517	3,038	3,046	3,656	2,389	2,148	1,869
	518	25	7	3	8	1	389
	519	199	139	103	65	106	91
	521	8,948	10,310	8,467	8,334	7,088	5,733
	523	307	323	244	279	334	178
	524	1,016	2,025	2,149	1,490	1,136	1,264
	EBS total	**18,764**	**21,591**	**22,305**	**19,034**	**17,578**	**14,213**
AI	541	302	472	472	562	327	363
	542	234	260	124	329	391	430
	543	118	139	82	67	263	160
	AI total	**655**	**871**	**677**	**958**	**980**	**953**

Source: AKRO CAS.
*2008 data complete as of October 3, 2008.

Table 4. Observed skate catch and percent retained by species, and by region, 2003–2007.

Species	2003		2004		2005		2006		2007	
	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained
Alaska	1,179	49%	4,373	36%	4,125	39%	4,956	36%	4,076	32%
Aleutian	71	28%	264	36%	304	31%	154	43%	119	28%
Bathyraja UnID	58	77%	77	8%	6,319	37%	4,586	29%	3,233	23%
Bering	43	27%	233	12%	197	10%	128	17%	79	21%
Big	26	60%	131	27%	165	19%	179	27%	84	46%
Commander	2	1%	15	18%	26	5%	16	5%	21	16%
Longnose	1	32%	15	42%	5	44%	2	48%		0%
Mud			29	7%	22	4%	6	20%	13	7%
Raja UnID					10	4%				0%
Roughtail			5	8%	2	2%	5	12%	2	3%
Skate UnID	13,024	38%	8,822	27%	3,853	28%	2,819	26%	510	14%
Whiteblotched	9	1%	153	21%	58	24%	92	28%	39	28%
Whitebrow			5	31%	7	7%	3	22%	2	21%
Other	2	1%	0	2%	0	100%	0	67%	2	14%
Total	**14,416**	**39%**	**14,123**	**30%**	**15,092**	**34%**	**12,947**	**31%**	**8,181**	**27%**

Region	2003		2004		2005		2006		2007	
	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained	Obs Catch (t)	% Retained
AI	437	18%	590	21%	463	17%	690	21%	406	34%
EBS	13,978	39%	13,533	30%	14,629	35%	12,258	32%	7,775	27%
Total	14,416	39%	14,123	30%	15,092	34%	12,947	31%	8,181	27%

Source: North Pacific Groundfish Observer Program database.
*2007 reported as of October 15, 2007 (not a complete year).

Table 5. Groundfish target categories in Bering Sea/Aleutian Islands.

Pollock
Pacific Cod
Sablefish
Yellowfin Sole
Northern Rock Sole
Greenland Turbot
Arrowtooth Flounder
Flathead Sole
Other Flatfish
Alaska Plaice
Pacific Ocean Perch
Northern Rockfish
Shortraker Rockfish
Blackspotted/Rougheye Rockfish
Other Rockfish
Atka Mackerel
Squid

Table 6. Catch and percentage catch by species by year for BSAI "other species" category.

Species Group	Catch by Year in metric tons					Percent Catch by Year				
	2004	2005	2006	2007	2008	2004	2005	2006	2007	2008
Skates	22,462	22,982	19,992	18,558	15,167	76%	78%	75%	70%	71%
Sharks	514	414	672	330	176	2%	1%	3%	1%	1%
Sculpins	6,145	5,770	5,799	7,600	5,913	21%	20%	22%	28%	28%
Octopuses	321	330	325	180	84	1%	1%	1%	1%	0%
Total	29,442	29,496	26,788	26,668	29,442	100%	100%	100%	100%	100%

Table 7. Species group by tier for "other species" category in the GOA and BSAI.

Species Group	Tier
Skates	3 (Alaska skate) and 5 (other skates)
Sharks	6
Sculpins	5
Octopuses	6

Table 8. 2009 OFLs and ABCs resulting from removal of skates from the "other species" complex.

TAC category	OFL	ABC
Skates	38,300	32,000
Remaining "other species"		
Sharks	596	447
Sculpins	41,600	31,000
Octopuses	311	233
Total Remaining "'other species"'	42,507	31,680

Table 9. Relative catch of BSAI sharks, sculpins, and octopuses 2004–2008.

Species Group	Percent Catch by Year				
	2004	2005	2006	2007	2008
Sharks	7%	6%	10%	4%	3%
Sculpins	88%	89%	85%	94%	96%
Octopuses	5%	5%	5%	2%	1%
Totals	100%	100%	100%	100%	100%

Table 10. ESA-listed marine mammals and seabirds in the BSAI.

Common Name	Scientific Name	ESA Status
Blue Whale	*Balaenoptera musculus*	Endangered
Bowhead Whale[1]	*Balaena mysticetus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Northern Right Whale[3]	*Balaena glacialis*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Steller Sea Lion	*Eumetopias jubatus*	Endangered [2]
Chinook Salmon (Lower Columbia R.)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Upper Willamette R.)	*Oncorhynchus tshawytscha*	Threatened
Steller's Eider [4]	*Polysticta stelleri*	Threatened
Short-tailed Albatross [4]	*Phoebastria albatrus*	Endangered
Spectacled Eider[4]	*Somateria fischeri*	Threatened
Kittlitz's Murrelet[4]	*Brachyramphus brevirostris*	Candidate
Northern Sea Otter[4]	*Enhydra lutris*	Candidate
Polar Bear[4,5]	*Ursus maritimus*	Proposed threatened

[1] The bowhead whale is present in the Bering Sea area only.
[2] Steller sea lion are listed as endangered west of Cape Suckling.
[3] NMFS designated critical habitat for the northern right whale on July 6, 2006 (71 FR 38277).
[4] The Steller's eider, short-tailed albatross, spectacled eider, Kittlitz's murrelet, polar bear, and Northern sea otter are species under the jurisdiction of the USFWS. For the bird species, critical habitat has been established for the Steller's eider (66 FR 8850, February 2, 2001) and for the spectacled eider (66 FR 9146, February 6, 2001). The Kittlitz's murrelet has been proposed as a candidate species by the USFWS (69 FR 24875, May 4, 2004).
[5] Proposed to be listed as threatened, January 9, 2007, by USFWS (72 FR 1064).

Table 11. Other marine mammals in the BSAI.

Common Name	Scientific Name
Beluga Whale	*Delphinapterus leucas*
Minke Whale	*Balaenoptera acutorostrata*
Killer Whale	*Orcinus orca*
Dall's Porpoise	*Phocoenoides dalli*
Harbor Porpoise	*Phocoena phocoena*
Pacific White-sided Dolphin	*Lagenorhynchus obliquidens*
Beaked Whales	*Berardius bairdii* and *Mesoplodon* spp.
Northern Fur Seal	*Callorhinus ursinus*
Pacific Harbor Seal	*Phoca vitulina*
Pacific Walrus	*Odobenus rosmarus divergens*
Northern Elephant Seal	*Mirounga angustirostris*
Bearded Seal	*Erignathus barbatus*
Spotted Seal	*Phoca largha*
Ringed Seal	*Phoca hispida*
Ribbon Seal	*Phoca fasciata*

Table 12. Resources potentially affected by Alternatives 1, 2, and 3.

	Potentially Affected Component							
Alternative	Physical	Benthic Comm.	Ground fish	Marine Mammals	Seabirds	Non specified Species	Prohibited Species	Socio economic
1. No Action	N	N	**Y**	N	N	N	N	**Y**
2 and 3. Separate Skates from "other species" category	N	N	**Y**	N	N	N	N	**Y**

N = no impact anticipated by the alternative on the component.
Y = an impact is possible if the alternative is implemented.

Table 13. Retention rates of species in the "other species" complex for 2007.

	Retention Rate (%)
Species Group	**BSAI**
Skates	27%
Sculpins	6
Sharks	4
Octopuses (2006)	70% pot; 36-41% trawl

Table 14. Catch (mt) of "other species" and skates and the proportion of "other species" catch that is attributed to skates in the BSAI, 2000–2008 repeated table?

Year	Skate	"other species"	Skate as a % of "other species"
2000	18,877	26,108	72%
2001	20,570	27,178	76%
2002	21,279	28,619	74%
2003	19,419	26,150	74%
2004	22,462	29,637	76%
2005	22,982	29,505	78%
2006	19,992	26,798	75%
2007	18,558	26,668	70%
2008	21,538	29,307	73%

Source: Catch accounting

Table 15. Estimated incidental catch (mt) of skates by target, 2003–2008 repeated table?

Target Fishery	2003	2004	2005	2006	2007	2008
Pacific Cod	15,154	18,486	19,382	14,876	13,347	14,349
Yellowfin Sole	1,540	596	942	1,147	1,405	1,301
Flathead Sole	628	1,207	847	849	841	666
Rock Sole	551	509	423	916	1,000	565
Pollock	471	843	731	1,306	1,299	2,741
"other species"	231	98	28	115	*	*
Greenland Turbot	221	136	168	121	168	58
Arrowtooth Flounder	106	65	129	280	81	299
Atka Mackerel	94	143	140	141	153	181
Rockfish	73	22	29	25	72	64
Sablefish	57	11	26	121	56	40
Other Flatfish	27	78	43	7	*	*

Source: Catch Accounting
*Concealed for confidentiality

Table 16. Estimated incidental catch (mt) by gear and harvest sector, 2003–2008.

	Hook-and-line			Trawl		
Year	CP	CV	Total	CP	CV	Total
2003	14,073	120	14,193	4,497	729	5,225
2004	17,351	33	17,385	4,512	565	5,077
2005	18,932	9	18,941	3,512	529	4,041
2006	13,746	8	13,754	5,324	914	6,238
2007	11,135		11,135	6,350	1,072	7,423
2008	14,013	1,215	15,228	4,565	1,745	6,310

Source: Catch Accounting

Table 17. Incidental catch rate for BSAI skates by target, 2003–2008 (skate catch in target fishery [mt]/catch of all groundfish species in target fishery [mt]).

Target	2003	2004	2005	2006	2007	2008	Average
Pacific cod	6.02%	6.97%	7.97%	6.70%	6.48%	8.06%	7.00%
Pollock	0.03%	0.06%	0.05%	0.09%	0.10%	0.28%	0.09%
Yellowfin sole	1.41%	0.60%	0.78%	0.95%	0.95%	0.71%	0.89%
Arrowtooth flounder	3.88%	1.84%	2.29%	5.12%	4.15%	1.79%	2.67%
Flathead sole	3.33%	4.23%	3.62%	4.15%	3.99%	2.36%	3.58%
Atka mackerel	0.15%	0.22%	0.20%	0.20%	0.22%	0.27%	0.21%
Greenland Turbot	7.56%	6.81%	7.96%	6.83%	9.72%	3.77%	7.23%
Rocksole	1.48%	1.08%	1.02%	1.90%	2.34%	0.86%	1.40%
Sablefish	2.28%	0.57%	1.16%	5.61%	2.24%	2.12%	2.36%
Rockfish	0.54%	0.21%	0.35%	0.25%	0.47%	0.39%	0.38%

Source: Catch Accounting

Table 18. Incidental catch rate for BSAI skates by target, 2003–2008 (skate catch in target fishery [mt]/catch of target species in target fishery [mt]).

Target	2003	2004	2005	2006	2007	2008	Average
Pacific cod	7.88%	9.70%	10.55%	8.77%	8.65%	9.86%	9.23%
Pollock	0.03%	0.06%	0.05%	0.09%	0.10%	0.29%	0.09%
Yellowfin sole	2.24%	0.91%	1.14%	1.36%	1.30%	1.00%	1.28%
Arrowtooth flounder	8.41%	4.04%	5.79%	11.01%	10.29%	2.56%	4.77%
Flathead sole	9.65%	12.52%	9.16%	11.07%	11.64%	5.79%	9.73%
Atka mackerel	0.18%	0.27%	0.24%	0.24%	0.27%	0.33%	0.25%
Greenland Turbot	12.51%	10.93%	10.84%	10.01%	15.28%	7.44%	11.40%
Rocksole	2.91%	2.09%	2.54%	4.55%	4.71%	1.60%	2.90%
Sablefish	4.08%	0.73%	1.34%	7.20%	2.79%	2.68%	3.12%
Rockfish	0.65%	0.24%	0.42%	0.28%	0.51%	0.51%	0.45%

Source: Catch Accounting

Table 19. Incidental catch rate for BSAI "other species" (without skates) by target, 2003–2008 (skate catch in target fishery [mt]/catch of target species in target fishery [mt]).

Target	2003	2004	2005	2006	2007	2008	Average
Pacific cod	0.01%	0.02%	0.05%	0.03%	0.01%	0.05%	0.03%
Pollock	0.02%	0.02%	0.02%	0.05%	0.03%	0.04%	0.03%
Yellowfin sole	1.33%	1.02%	0.99%	0.98%	1.75%	1.58%	1.32%
Arrowtooth flounder	1.00%	1.82%	2.00%	1.37%	1.58%	0.51%	1.09%
Flathead sole	1.98%	2.14%	2.35%	2.50%	1.44%	2.25%	2.12%
Atka mackerel	0.47%	0.86%	0.62%	0.73%	0.90%	0.71%	0.72%
Greenland Turbot	0.65%	0.37%	0.16%	0.21%	-0.69%	0.22%	0.21%
Rocksole	1.24%	0.64%	1.18%	1.43%	1.89%	1.70%	1.37%
Sablefish	1.05%	0.33%	0.20%	0.18%	0.39%	0.14%	0.40%
Rockfish	0.42%	0.49%	0.42%	0.47%	0.44%	0.47%	0.45%

Source: Catch Accounting

Table 20. Incidental catch rate for BSAI "other species" (without skates) by target, 2003–2008 (skate catch in target fishery [mt]/catch of target species in target fishery [mt]).

Target	2003	2004	2005	2006	2007	2008	Average
Pacific cod	0.01%	0.03%	0.06%	0.04%	0.02%	0.06%	0.04%
Pollock	0.02%	0.02%	0.02%	0.05%	0.03%	0.04%	0.03%
Yellowfin sole	2.11%	1.54%	1.45%	1.41%	2.40%	2.21%	1.91%
Arrowtooth flounder	2.16%	3.98%	5.07%	2.94%	3.92%	0.72%	1.96%
Flathead sole	5.75%	6.34%	5.94%	6.67%	4.20%	5.51%	5.76%
Atka mackerel	0.57%	1.04%	0.73%	0.86%	1.09%	0.85%	0.86%
Greenland Turbot	1.07%	0.59%	0.22%	0.31%	-1.09%	0.43%	0.33%
Rocksole	2.45%	1.24%	2.92%	3.42%	3.80%	3.17%	2.83%
Sablefish	1.88%	0.42%	0.23%	0.23%	0.49%	0.17%	0.53%
Rockfish	0.50%	0.57%	0.50%	0.54%	0.48%	0.61%	0.53%

Source: Catch Accounting

8.0 Figures

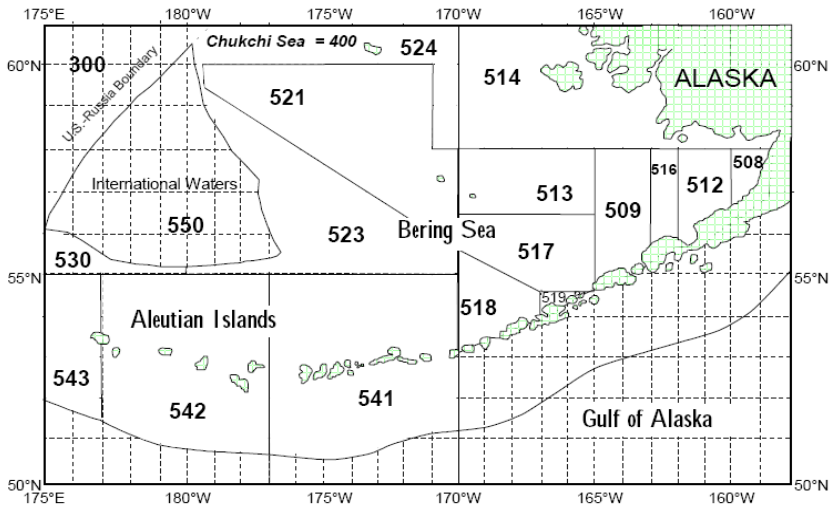


Figure 2. Bering Sea and Aleutian Islands statistical and reporting areas.

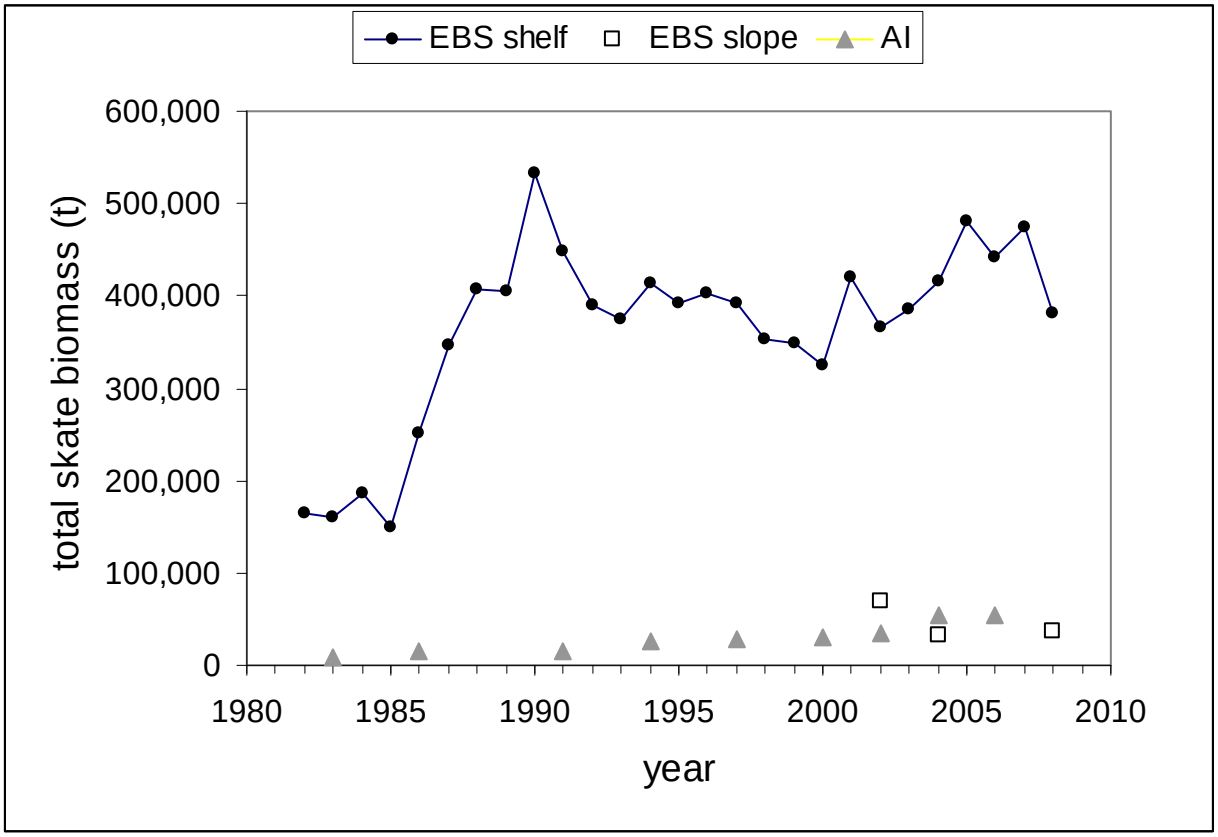
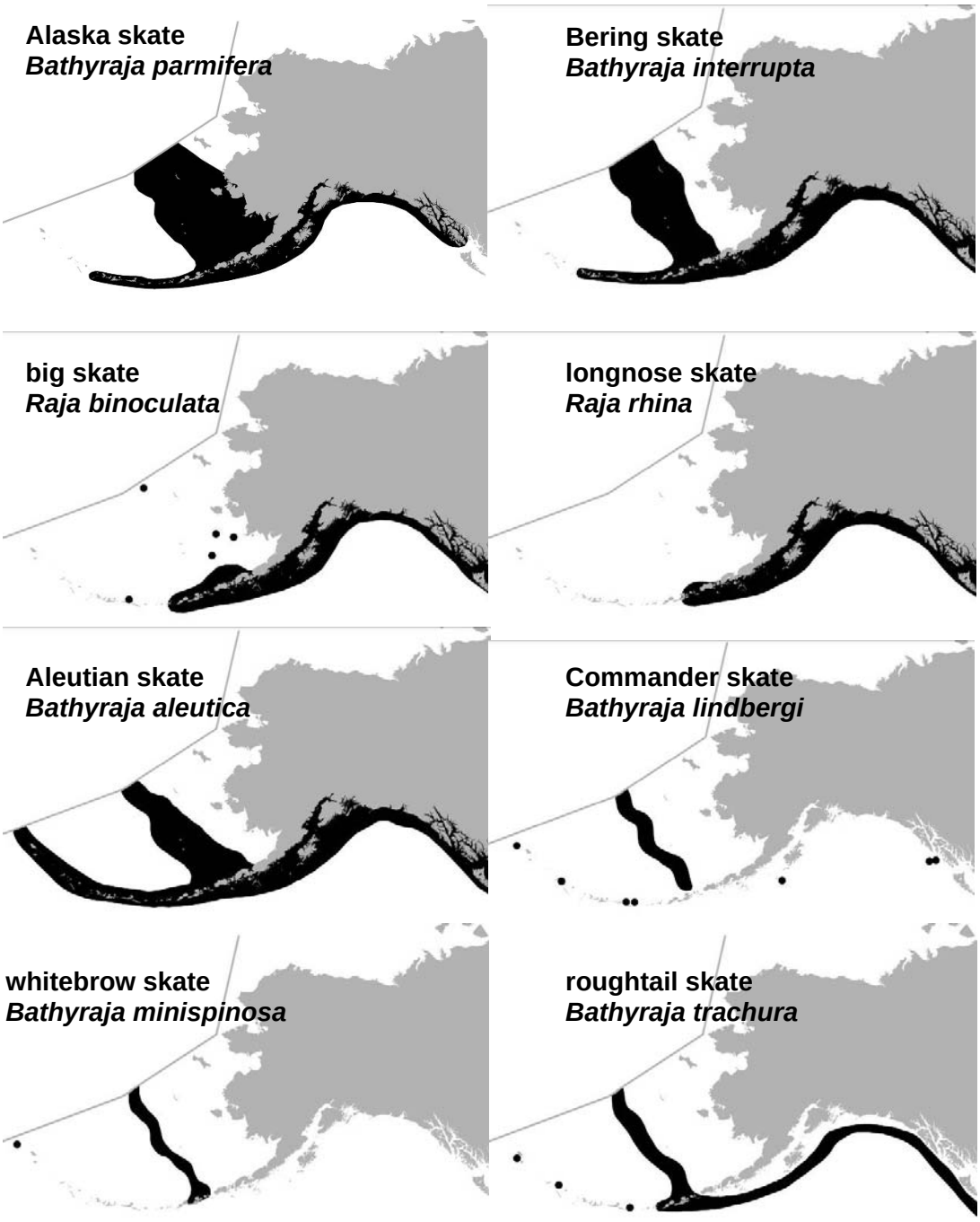
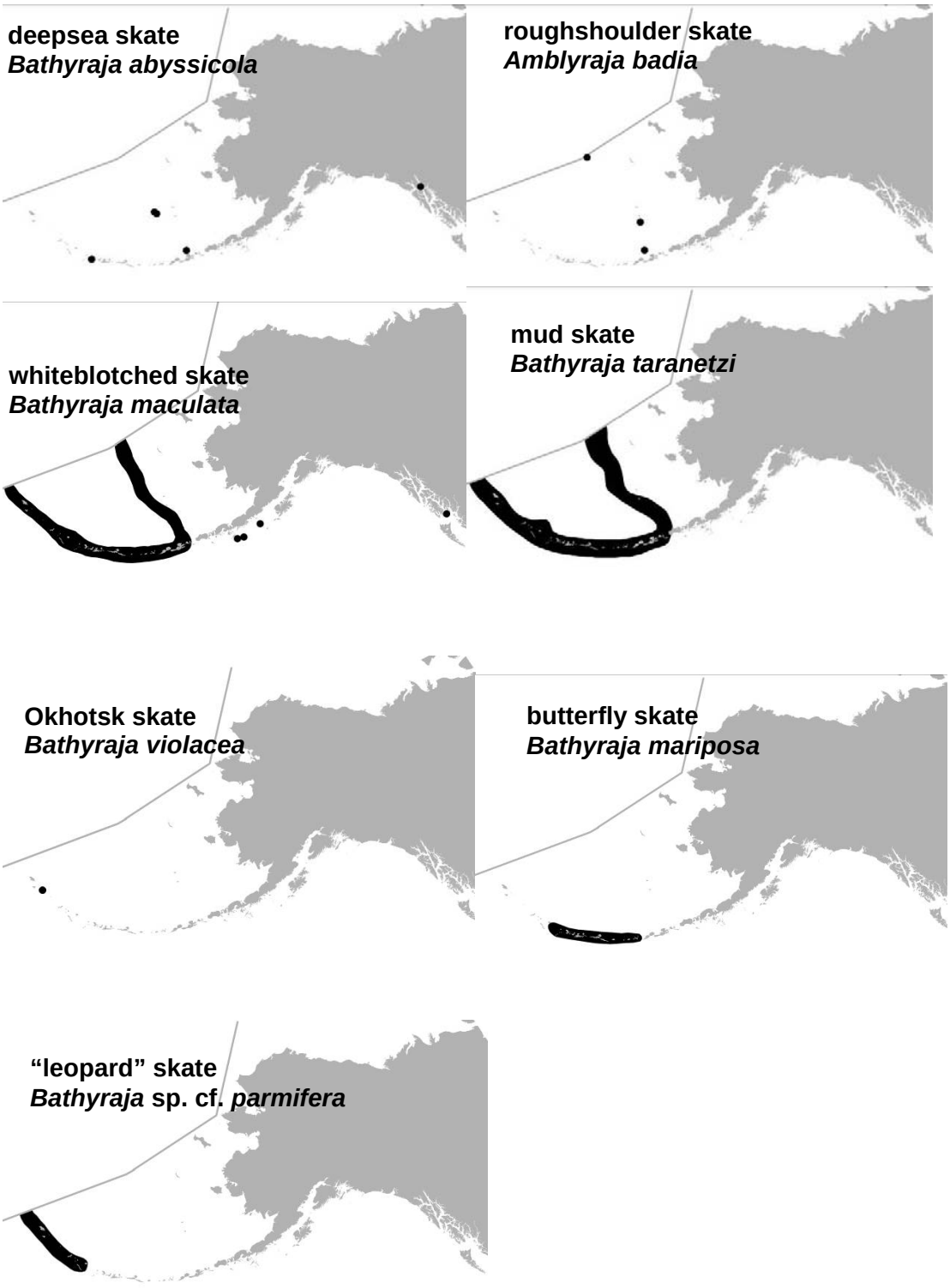


Figure 3. Aggregated skate biomass (metric tons) estimated from RACE bottom trawl surveys in each of the three major habitat areas (1982–2008).



Source: Stevenson et al. 2007 in Ormseth et al. 2008.

Figure 4. Distribution of skate species in Alaskan waters.



Source: Stevenson et al. 2007 in Ormseth et al. 2008.

Figure 4. Distribution of skate species in Alaskan waters—Continued.

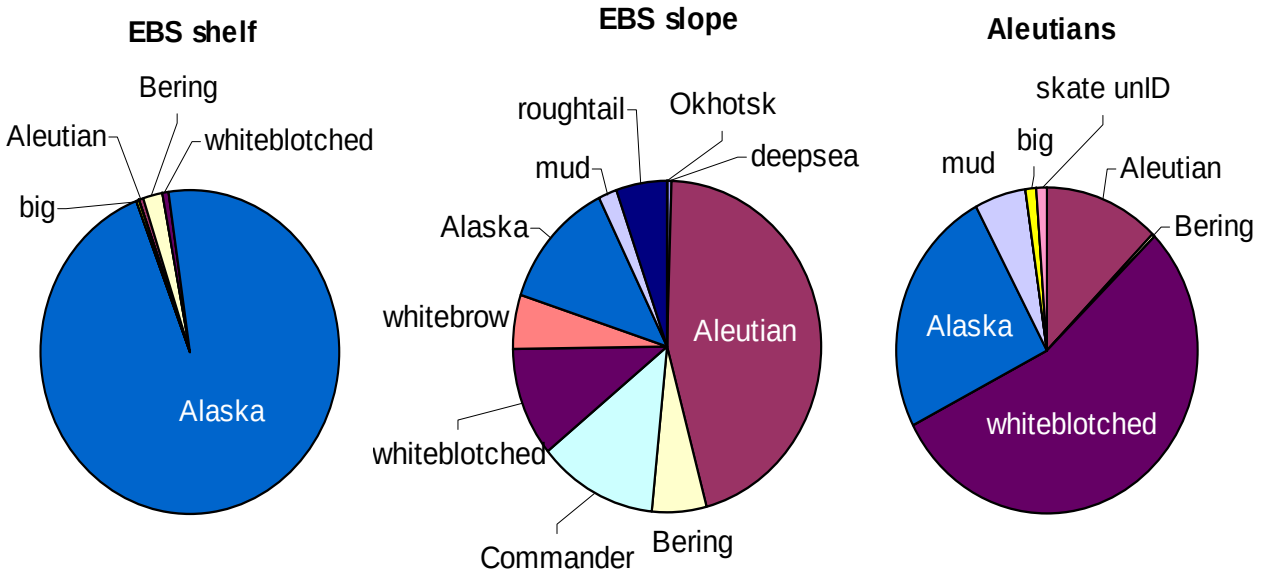
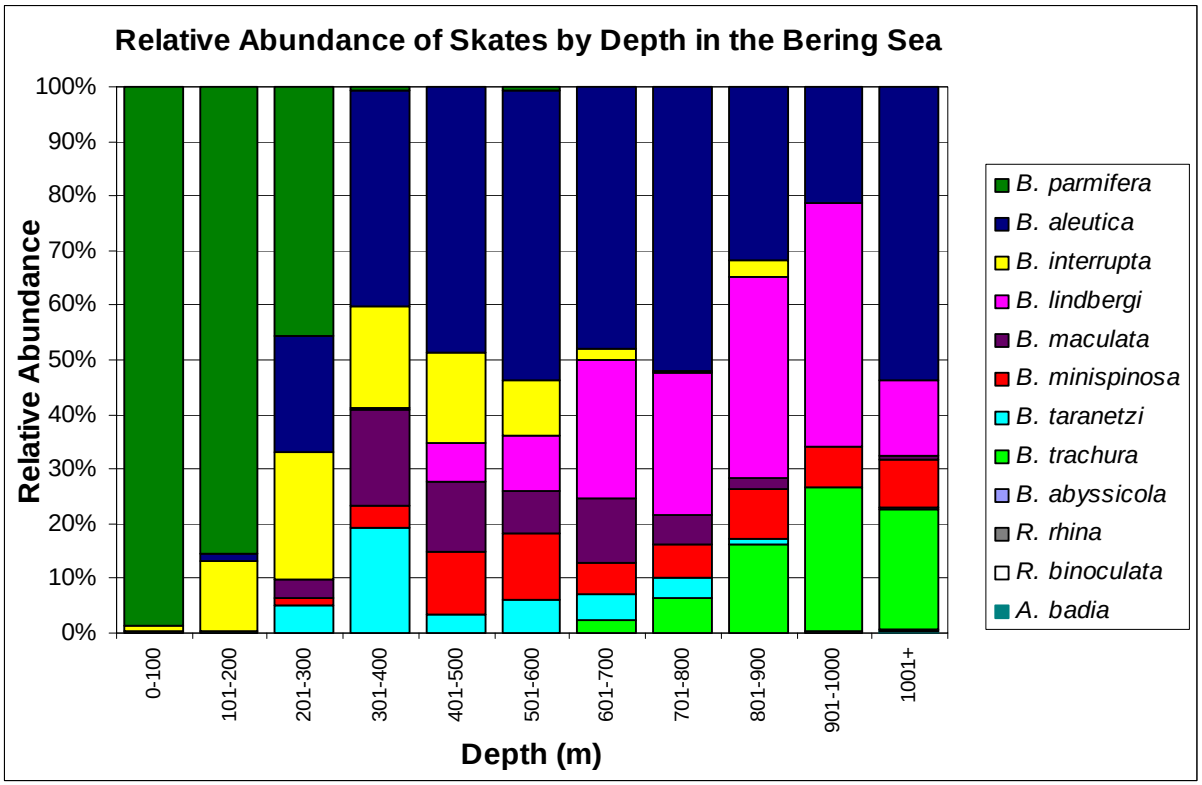


Figure 5. Skate species composition (by weight) by habitat area. (Source: Ormseth et al. 2008.)



Source: Stevenson et al. 2006 in Ormseth et al. 2008.

Figure 6. Relative abundance of skate species in the EBS by depth.

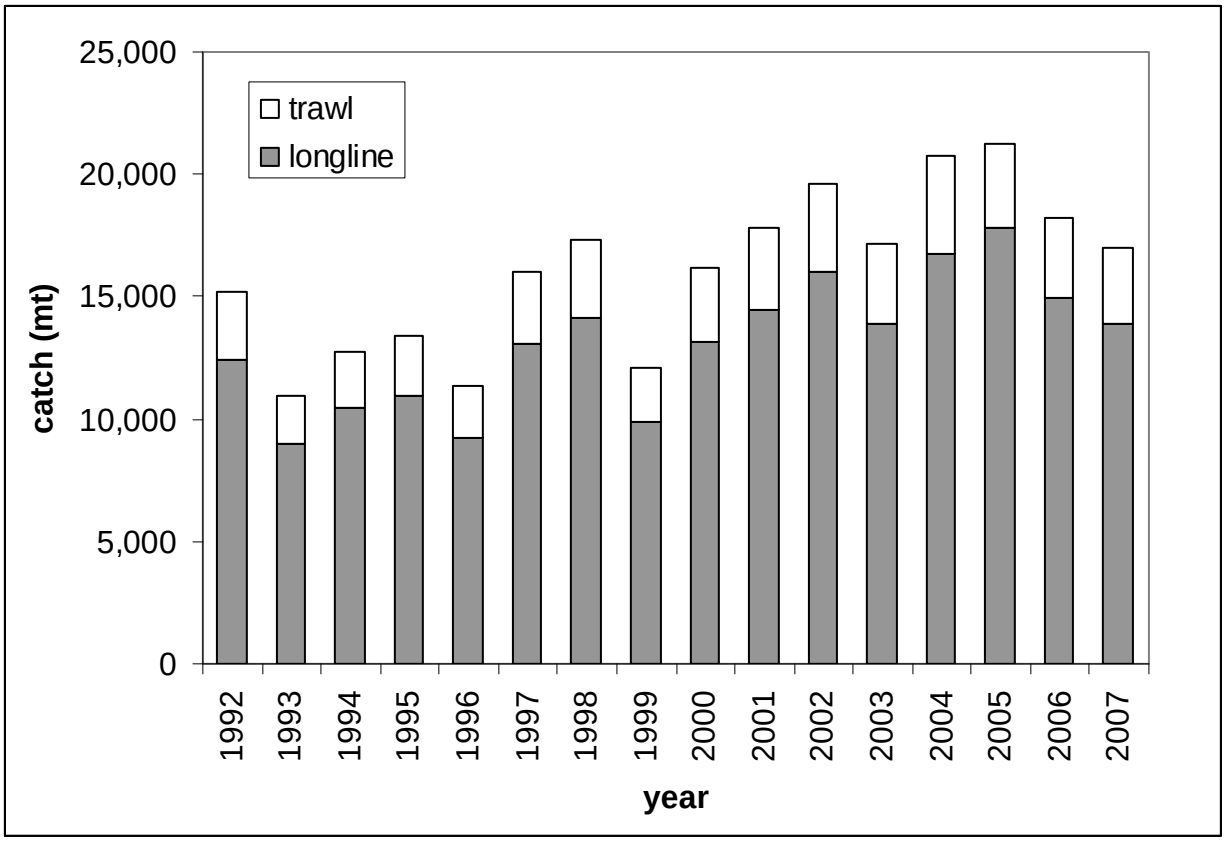
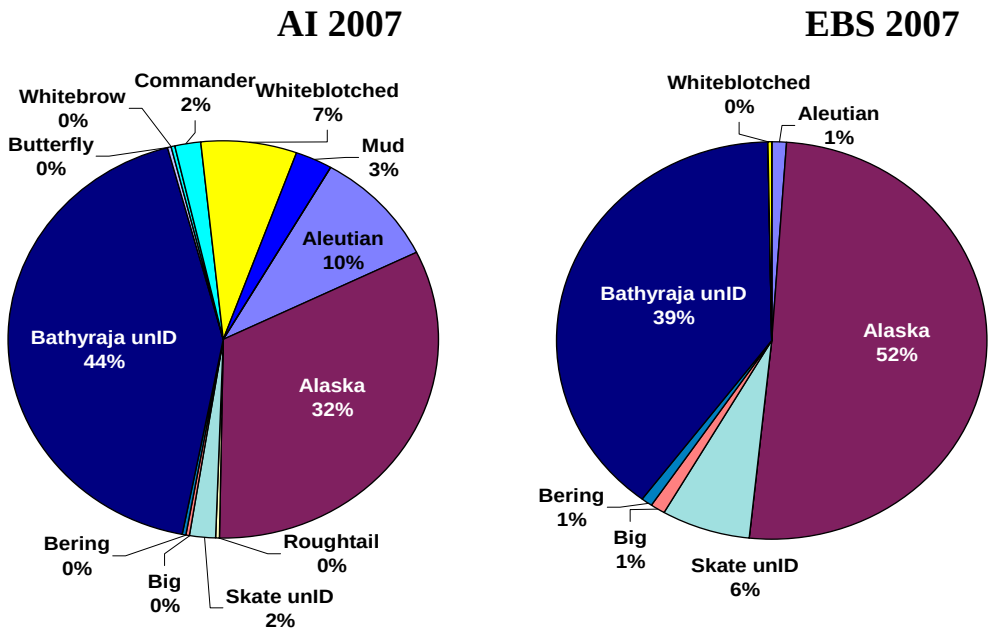
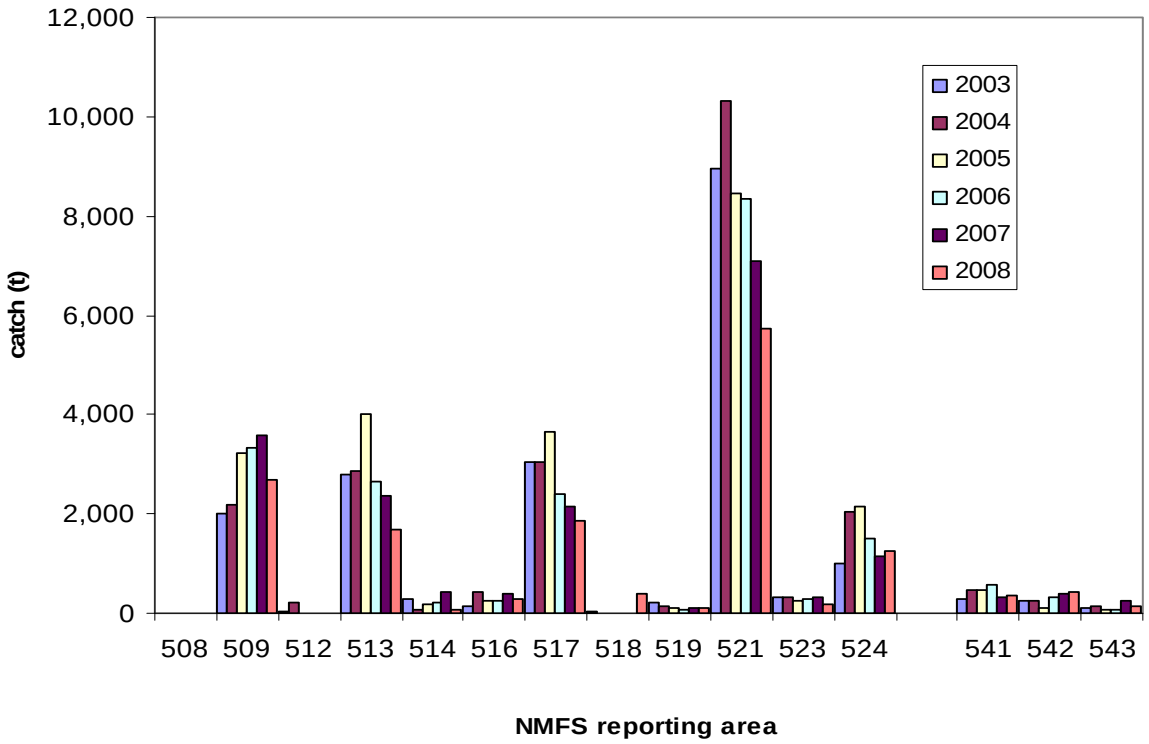


Figure 7. Estimated catch of Alaska skates (t) in the BSAI from 1992 to 2007. Data were obtained from the Blend system and AKRO CAS.



Source: North Pacific Groundfish Observer Program database; 2007 data are reported through October 15, 2007, from Ormseth et al. 2008.

Figure 8. Identification of observed incidentally caught skates in AI (left) and EBS (right) groundfish fisheries in 2007.



Source: AKRO CAS, from Ormseth et al. 2008.

Figure 9 Total skate catch (all species combined) by FMP reporting area for both the EBS and the AI, 2003–2008.

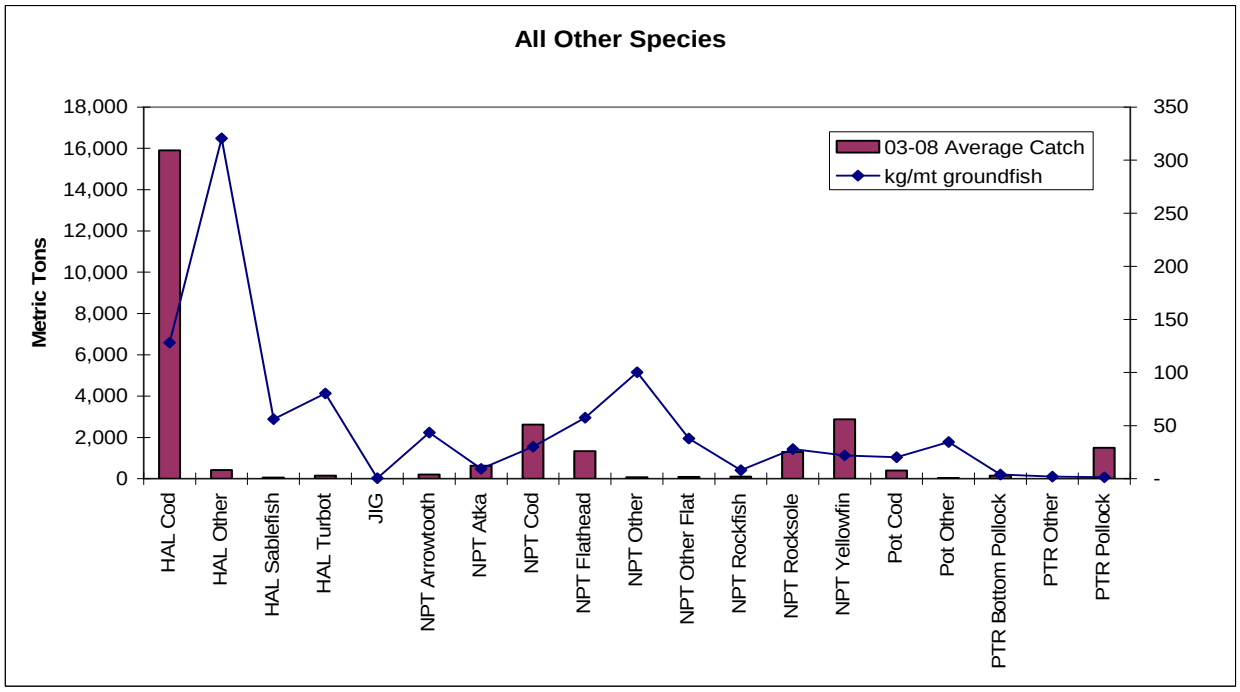


Figure 10. Average catch (kg) of BSAI "other species" (2003–2008) by target fishery and gear type (mt).

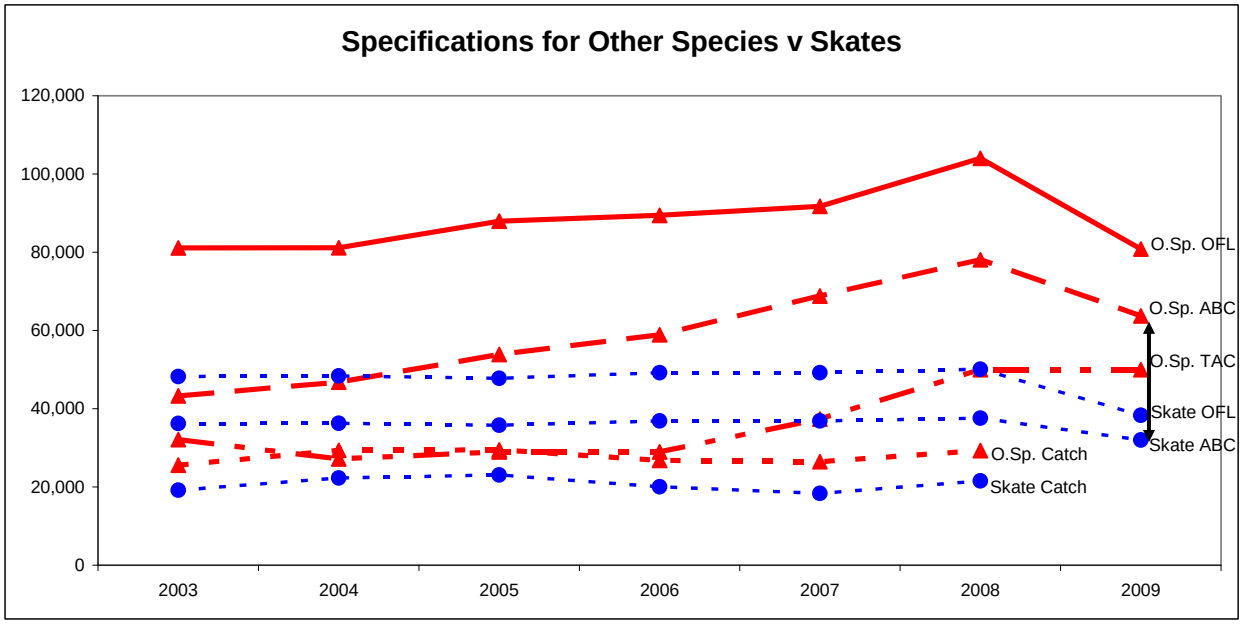


Figure 11. Total catch (mt) by year (2003–2008) for BSAI "other species."

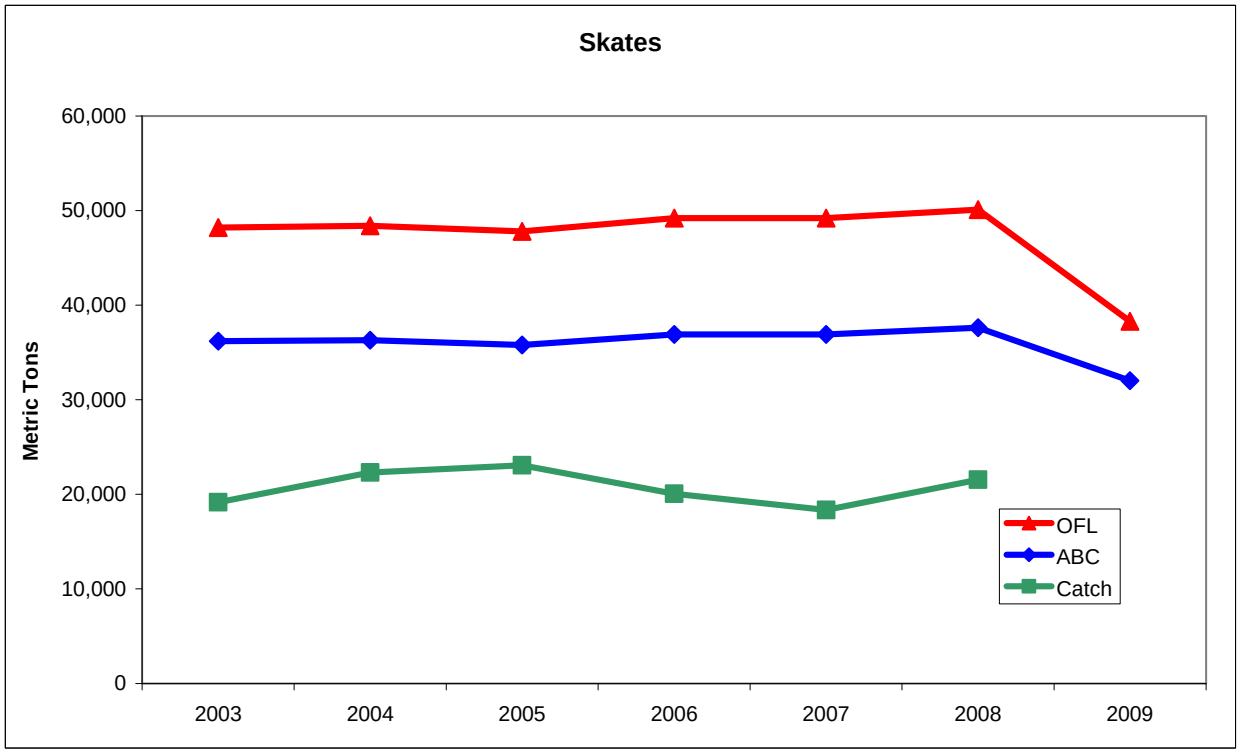


Figure 12. Total catch (mt) by year (2003–2008) for BSAI skates.

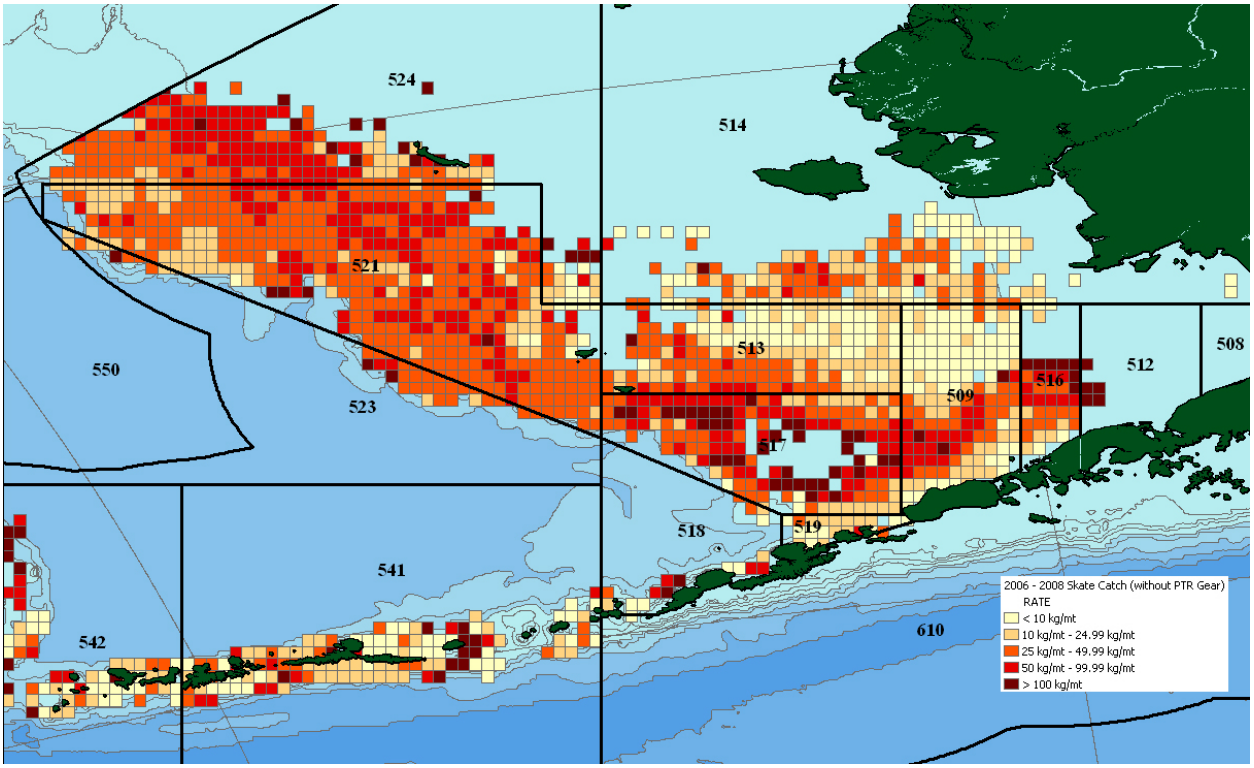


Figure 13. BSAI skates catch density (kg/mt groundfish) 2006–2008.

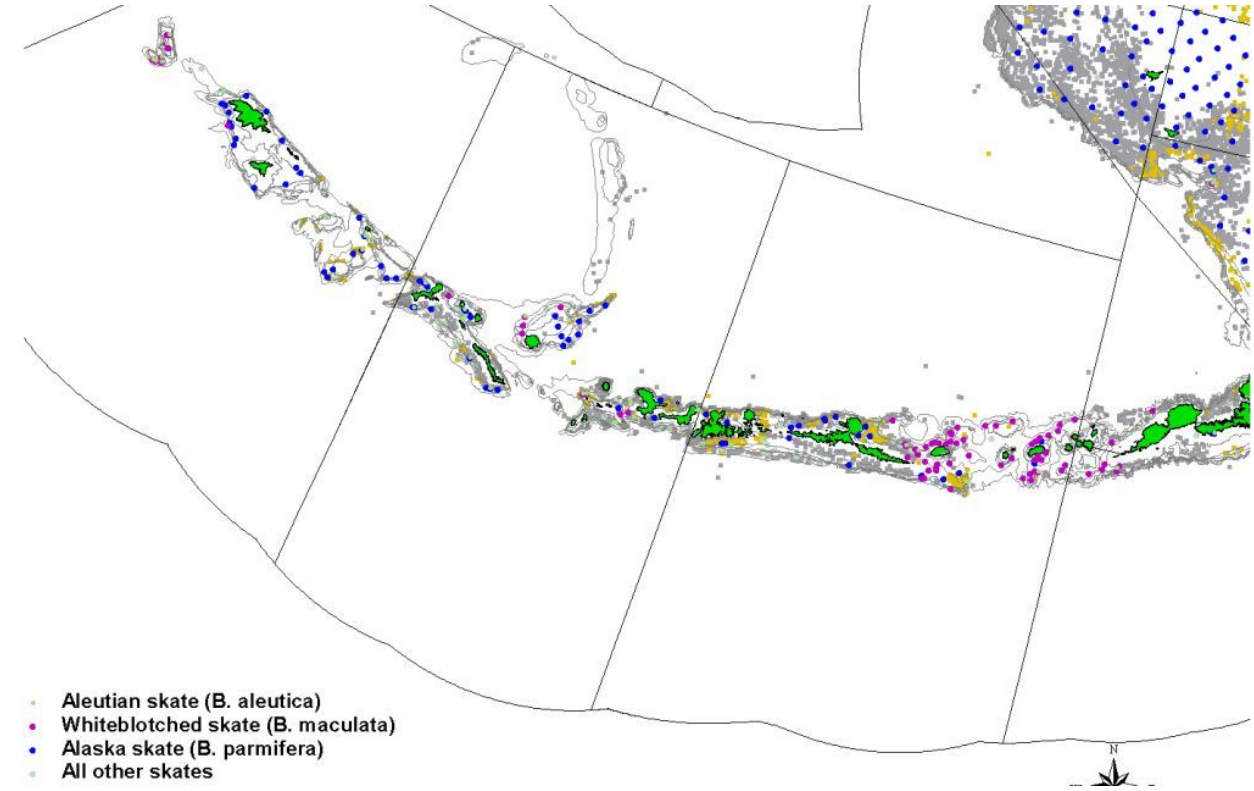


Figure 14(a). Skate distribution in the AI from NMFS bottom trawl surveys.

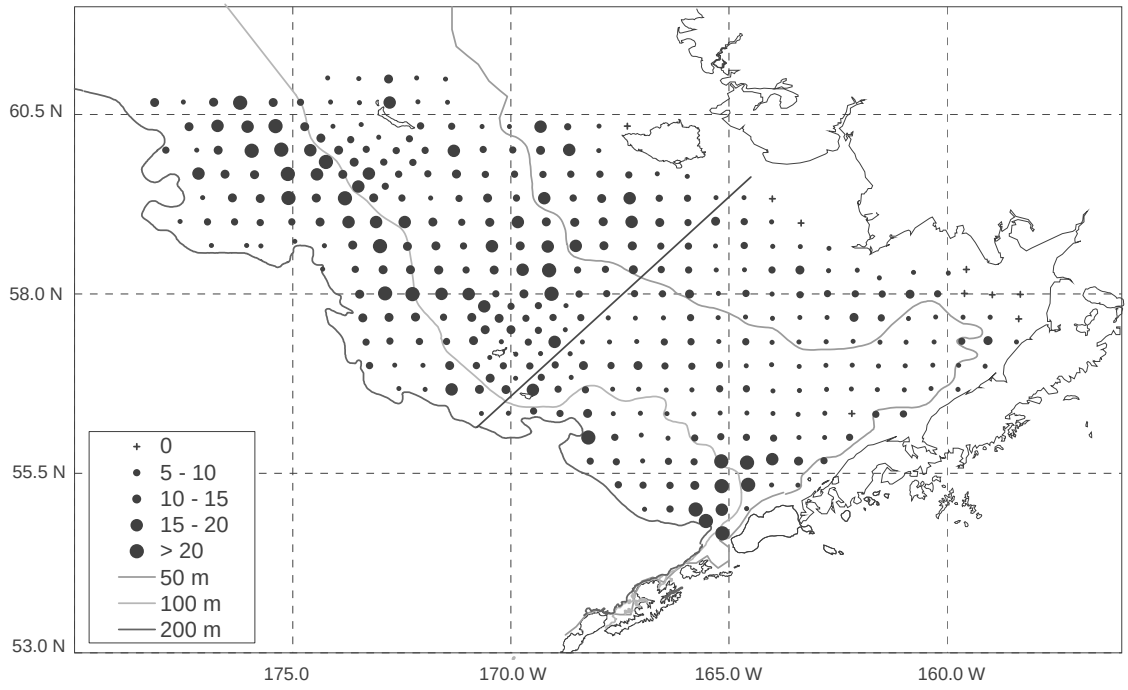


Figure 15(b). Alaska skate distribution from 2001–2004 RACE Bering Sea Groundfish Surveys (kg/ha for each station).

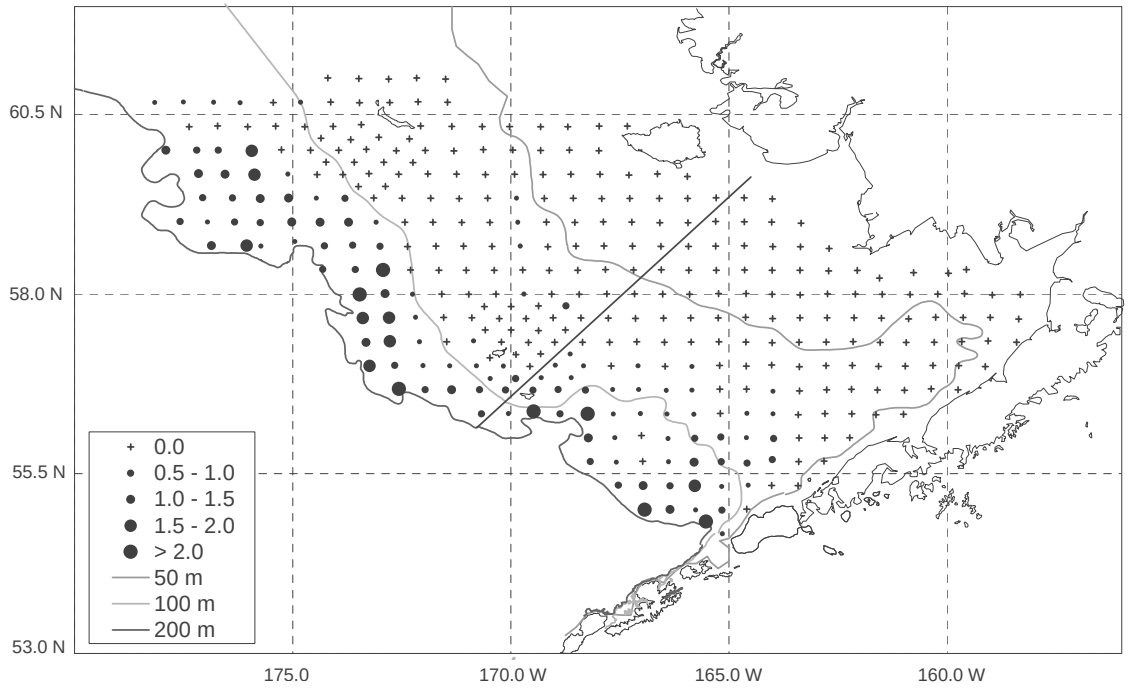


Figure 16(c). Bering skate distribution from 2001–2004 RACE Bering Sea Groundfish Surveys (kg/ha for each station).

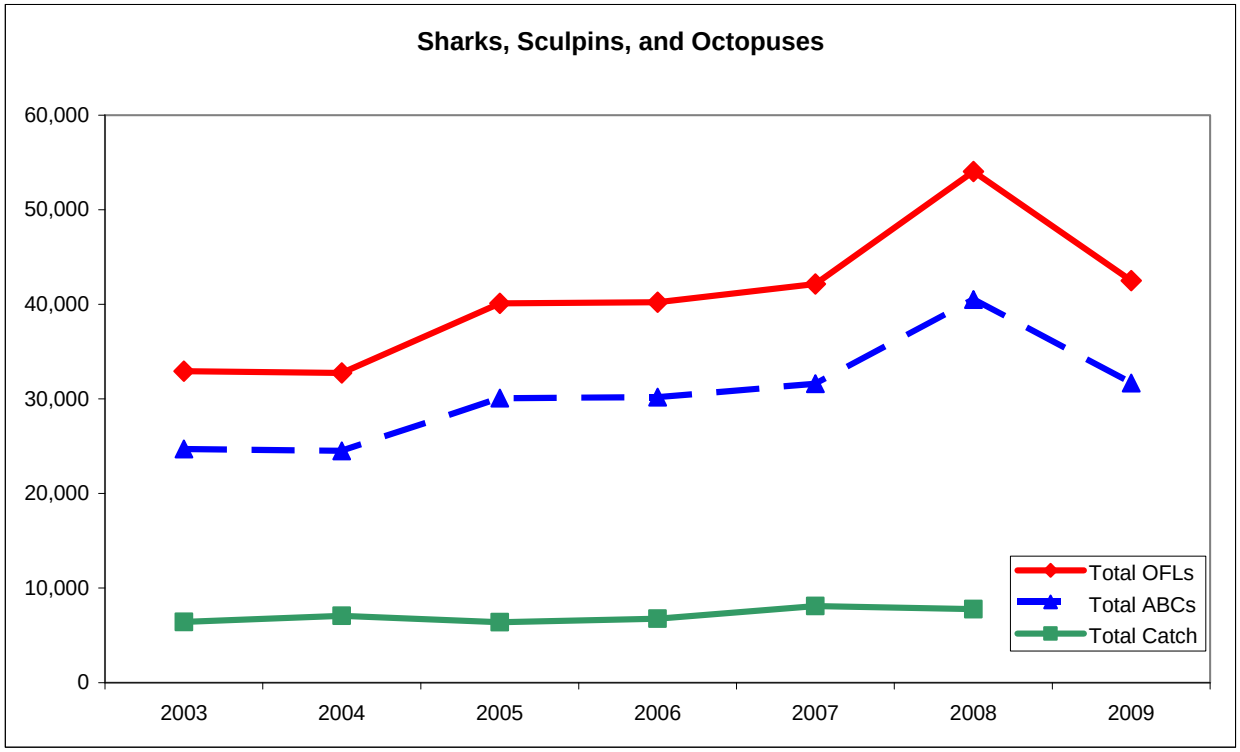


Figure 17. Total catch (mt) by year (2003–2008) for remaining BSAI "other species."

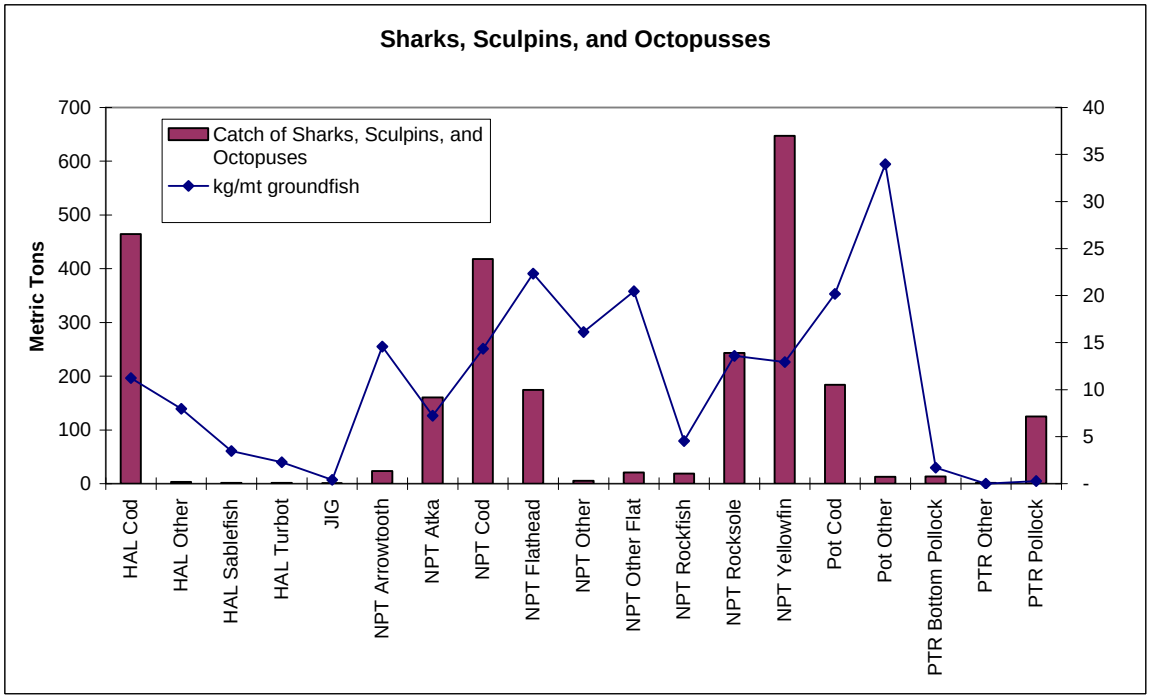
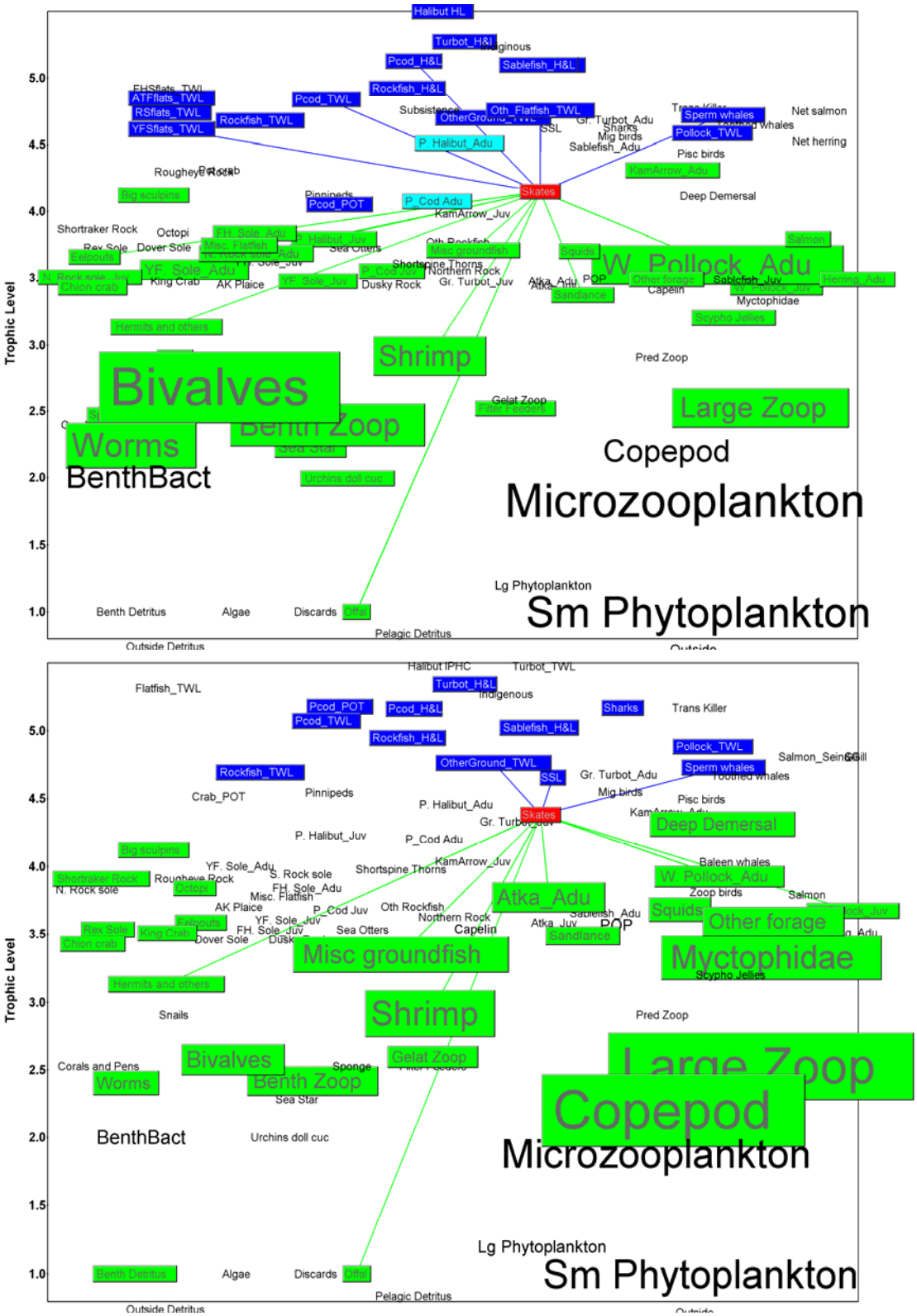


Figure 18. Average catch (kg) of remaining "other species" (2003–2008) by target fishery and gear type (mt).



Source: K. Aydin, AFSC, code available upon request. In Ormseth et al. 2008.

Figure 19. EBS (upper panel) and AI (lower panel) skate food webs derived from mass balance ecosystem models, with skate species aggregated in each area.

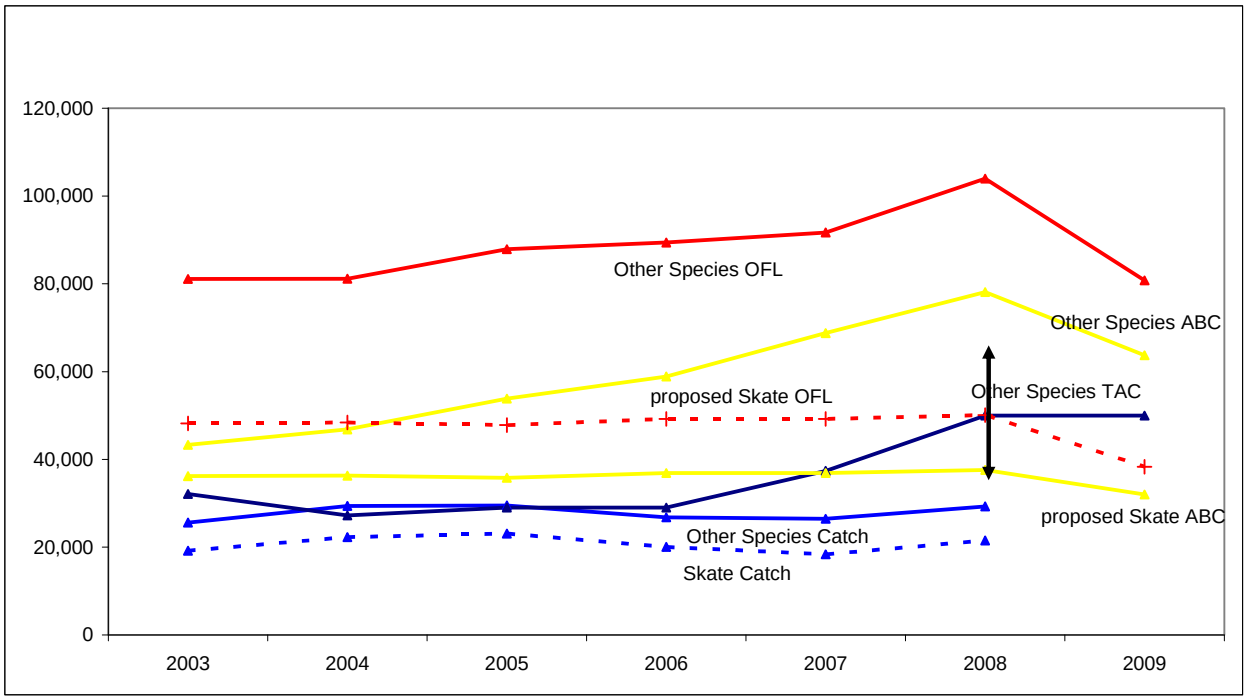


Figure 20. Comparison between proposed skate specifications and "other species" specifications in mt (2003–2009). (2009 TAC projection for BSAI skates was not available.)

9.0 APPENDIX 1. Proposed Revisions to the BSAI Retainable Percentages from Table 11 to Part 679

BASIS SPECIES		INCIDENTAL CATCH SPECIES															
Code	Species	Pollock	Pacific cod	Atka mackerel	Alaska plaice	Arrow -tooth	Yellow fin sole	Other flatfish[2]	Rock sole	Flathead sole	Green land turbot	Sable fish[1]	Short raker/ rougheye	Aggre gated rockfish[6]	Squid	Aggregated forage fish[7]	Aggregated "other species"[4]
110	Pacific cod	20	na[5]	20	20	35	20	20	20	20	1	1	2	5	20	2	20
121	Arrowtooth	0	0	0	0	na	0	0	0	0	0	0	0	0	0	2	0
122	Flathead sole	20	20	20	35	35	35	35	35	na	35	15	7	15	20	2	20
123	Rock sole	20	20	20	35	35	35	35	na	35	1	1	2	15	20	2	20
127	Yellowfin sole	20	20	20	35	35	na	35	35	35	1	1	2	5	20	2	20
133	Alaska plaice	20	20	20	na	35	35	35	35	35	1	1	2	5	20	2	20
134	Greenland turbot	20	20	20	20	35	20	20	20	20	na	15	7	15	20	2	20
136	Northern	20	20	20	20	35	20	20	20	20	35	15	7	15	20	2	20
141	Pacific ocean perch	20	20	20	20	35	20	20	20	20	35	15	7	15	20	2	20
152/ 151	Shortraker/ Rougheye	20	20	20	20	35	20	20	20	20	35	15	na	5	20	2	20
193	Atka mackerel	20	20	na	20	35	20	20	20	20	1	1	2	5	20	2	20
270	Pollock	Na	20	20	20	35	20	20	20	20	1	1	2	5	20	2	20
710	Sablefish[1]	20	20	20	20	35	20	20	20	20	35	na	7	15	20	2	20
875	Squid	20	20	20	20	35	20	20	20	20	1	1	2	5	na	2	20
Other flatfish[2]		20	20	20	35	35	35	na	35	35	1	1	2	5	20	20	20
Other rockfish[3]		20	20	20	20	35	20	20	20	20	35	15	7	15	20	20	20
Skates		20	20	20	20	35	20	20	20	20	1	1	2	5	20	20	20
"other species"[4]		20	20	20	20	35	20	20	20	20	1	1	2	5	20	na	na
Aggregated amount non-groundfish species[8]		20	20	20	20	35	20	20	20	20	1	1	2	5	20	20	20

[1] Sablefish: for fixed gear restrictions, see § 679.7(f)(3)(ii) and (f)(11).
[2] Other flatfish includes all flatfish species, except for Pacific halibut (a prohibited species), flathead sole, Greenland turbot, rock sole, yellowfin sole, Alaska plaice, and arrowtooth flounder.
[3] Other rockfish includes all "rockfish" as defined at § 679.2, except for Pacific ocean perch; and northern, shortraker, and rougheye rockfish.
[4] Aggregated "other species" includes skates, sculpins, sharks, and octopuses. Forage fish, as defined at Table 2c to this part are not included in the "other species" category.
[5] na = not applicable
[6] Aggregated rockfish includes all "rockfish" as defined at § 679.2, except shortraker and rougheye rockfish.
[7] Forage fish are defined at Table 2c to this part.
[8] All legally retained species of fish and shellfish, including CDQ halibut and IFQ halibut that are not listed as FMP groundfish in Tables 2a and 2c to this part.

10.0 APPENDIX 2. Table 2a to Part 679 – Species Codes: FMP Groundfish

Species Description	Code
Atka mackerel (greenling)	193
Flatfish, miscellaneous (flatfish species without separate codes)	120
FLOUNDER	
Alaska plaice	133
Arrowtooth and/or Kamchatka	121
Starry	129
Octopus, North Pacific	870
Pacific cod	110
Pollock	270
ROCKFISH	
Aurora (*Sebastes aurora*)	185
Black (BSAI) (*S. melanops*)	142
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Jdicosimo: 4-10
Mbrown: 4-7-10, stripped out RIR and IRFA, other minor edits
Gaberle: 4/10, technical edits
Cjernigan: 6/15/10

ENVIRONMENTAL ASSESSMENT

for

Amendment 96 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and Amendment 87 to the Fishery Management Plan for Groundfish of the Gulf of Alaska to Comply with Annual Catch Limit Requirements

September 2010

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Abstract: This document contains an Environmental Assessment for Amendment 96 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands (BSAI) Management Area and Amendment 87 to the FMP for Groundfish of the Gulf of Alaska (GOA). This action is necessary to comply with requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to prevent overfishing, achieve optimum yield, and to comply with statutory requirements for annual catch limits (ACLs) and accountability measures (AMs). Species and species groups must be identified in the fishery for which ACLs and AMs would be required. An ecosystem component (EC) may also be included in the FMPs for species and species groups that are not (1) targeted for harvest, (2) likely to become overfished or subject to overfishing, and (3) generally retained for sale or personal use.

The effect of the proposed action is to amend the BSAI and GOA groundfish FMPs to identify (1) target groundfish stocks in the fishery, (2) forage fish species either in the fishery or in the ecosystem component category, (3) prohibited species in the EC category, and (4) non-specified species outside of the FMPs. The analysis considers three alternatives. Alternative 1 is the No Action alternative. Alternative 2 would (1) manage target species "in the fishery"; (2) eliminate the "other species" category and manage (GOA) squids, (BSAI and GOA) sculpins, (BSAI and GOA) sharks, and (BSAI and GOA) octopuses separately "in the fishery"; (3) manage prohibited species and forage fish in an ecosystem component category; and (4) remove the non-specified species category from the FMPs. Alternative 3 is the same as Alternative 2, except forage fish would be managed "in the fishery." The Council selected Alternative 2 as its Preferred Alternative to best meet its objectives to address the problem statement (i.e., meet the requirements of the MSA). Insufficient data is available to identify essential fish habitat or ACLs for the forage fish complex, which would be required under Alternative 3. A description of housekeeping amendments to the FMPs and a Regulatory Impact Review to amend federal regulations for consistency with the FMPs are addressed in appendices.

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) provides environmental and socio-economic analyses for a proposed action in accordance with the National Environmental Policy Act (NEPA). Amendment 96 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands (BSAI) Management Area and Amendment 87 to the FMP for Groundfish of the Gulf of Alaska (GOA) are necessary for the groundfish FMPs to conform to the revised National Standard 1 guidelines and the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

While the North Pacific Fishery Management Council's (Council's) groundfish annual harvest specification process generally complies with the guidelines for National Standard 1, some amendments to the groundfish FMPs are required to improve the description of the harvest specifications process in the FMPs and document compliance with annual catch limits (ACL) and accountability measures (AM) requirements; however, such minor technical amendments to the FMP texts are categorically excluded from NEPA (see Appendix 1 for more information). Such changes to the FMP have no effect on the human environment and are considered minor technical changes to the FMP.

One basic change to the FMPs that is included in this EA requires the identification of stocks in the fishery for the purpose of setting ACLs and AMs; stocks in the fishery must have ACLs and AMs specified for them, either individually or in aggregate. The Council proposes to eliminate the "other species" category, and list its component groups in the fishery. The guidelines allow the identification of a new ecosystem category (EC), within which stocks would not be subject to ACL and AM requirements. The Council proposes to list prohibited species in this new EC category while retaining the current management regime for them; in effect the only change would be to exclude them from requirements to implement ACLs and AMs by moving them under an EC category "umbrella," since prohibited species currently are not subject to ACLs and AMs. The Council proposes to list the forage fish category (1) in the fishery, where forage fish would be subject to ACLs and AMs or (2) in the EC category, where they would not be subject to ACLs and AMs, but would retain their current management regime. The Council also proposes to remove reference to non-specified species from the FMP because these species are too poorly understood to set ACLs and AMs or to develop a management regime. As species or groups are understood sufficiently the Council will consider moving them into the FMP, either in the fishery or the EC category; for example, the Council has initiated an analysis that will consider listing grenadiers (currently a non-specified species) either in the fishery or in the EC category.

This action is necessary to comply with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks, achieve optimum yield, and to comply with statutory requirements for ACLs and AMs. Species and species groups must be identified "in the fishery" for which ACLs and AMs would be required. An ecosystem component category may also be included in the FMPs for species and species groups that are not targeted for harvest, or likely to become overfished or subject to overfishing, and are not generally retained for sale or personal use. Proposed FMP amendment text will document compliance with ACL and AM requirements through the harvest specification process. These must be addressed by the statutory deadline of the start of the 2011 groundfish fisheries. To ensure the implementing regulations are consistent with the language in the FMPs regarding the "other species" category, minor regulatory amendments also would be part of this action, as further described in the Regulatory Impact Review (RIR) in Appendix B.

The EA addresses the statutory requirements of NEPA to predict whether the impacts to the human environment resulting from implementation of Amendments 96 and 87 will be "significant," as that term is defined under NEPA. If the predicted impacts from the selected action are found not to be significant, no further analysis is necessary to comply with the requirements of NEPA.

Three alternatives are analyzed for revising the BSAI and GOA groundfish FMPs in this EA.

Alternative 1. No action

Alternative 2. (*Preferred*) Revise the groundfish FMPs to comply with requirements to set annual catch limits and accountability measures

Eliminate the "other species" category and manage (GOA) squids, (BSAI and GOA) sculpins, (BSAI and GOA) sharks, and (BSAI and GOA) octopus separately in the "target species" category.

Target species are "in the fishery."

Prohibited species and forage fish are in the ecosystem component category.

Non-specified species are removed from the FMPs.

Alternative 3. Revise the Groundfish FMPs to comply with requirements to set annual catch limits and accountability measures

Eliminate the "other species" category and manage (GOA) squids, (BSAI and GOA) sculpins, (BSAI and GOA) sharks, and (BSAI and GOA) octopus separately in the "target species" category.

Target species and forage fish are in "the fishery."

Prohibited species are in the ecosystem component category.

Non-specified species are removed from the FMPs.

Under the no action alternative the groundfish FMPs soon would be out of compliance with the MSA and revised National Standard 1 guidelines. Currently the National Marine Fisheries Service (NMFS) and the Council do not have the ability to separately protect sharks, sculpins, octopuses, and GOA squids from the risk of overharvesting, as these species are managed as a complex under the "other species" category. While the Council may set a conservative total allowable catch (TAC) for the other species assemblage, harvest of one group could compose the entire TAC for the assemblage. This is particularly problematic since the biomass and population dynamics of the other species groups are uncertain. Shark species have low fecundity and low growth rates, which would lead to slow recoveries if stocks were fished down. Biomass estimates for squid and octopuses are uncertain due to their life history characteristics, which result in their being not well surveyed by bottom trawls. Sculpins are abundant and biomass is well estimated; however, their abundance masks potential overharvesting of less abundant species (i.e., sharks) managed with them collectively under the other species assemblage.

Revenues from the groundfish fisheries could be higher under the status quo compared to the action alternatives in the short run if the biomass of sharks, for example, was being driven down due to overharvesting by target fisheries in which they are incidentally caught. Revenues could be lower in the longer run if a reduced biomass required lower TACs. Also, fishing costs may be higher, due to lower catch per unit of effort if the biomass(es) was fished down. A key tradeoff could occur between the immediate cost of possible constraints on the directed groundfish fisheries that catch these groups incidentally and the long-term benefits from their protection, with possibly larger harvests of those groups and higher revenues in the long run.

The analysis identified no potential impacts in target categories that incidentally harvested sculpins; this is partly due to this group being managed under Tier 5, instead of average historical catches under Tier 6 for the remaining groups. Some target categories may be impacted by the alternatives for sharks, octopuses, and GOA squids. The analysis found that 2008 and 2009 harvests of individual groups would not have exceeded a 2009 overfishing level (OFL) or acceptable biological catch (ABC) of any of the seven groups, if those specifications had been in place that year; however, each of these groups had at least one year when catch exceeded one of these benchmarks between 2005 and 2007. Thus it can not be predicted whether proposed group level specifications would impact target fisheries in the future, given the

fluctuations in incidental catches and potential for voluntary measures to reduce these harvests by the fishing fleets. Overall, it is unknown whether fishing practices would change significantly under Amendments 96 and 87. The Council can control whether a future directed fishery develops for the groups by the level at which it sets the annual TACs.

The purpose of the proposed action is to comply with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks, achieve optimum yield, and to comply with statutory requirements for ACLs and AMs. The Preferred Alternative and Alternative 3 may lead to short-term reductions in gross revenues due to foregone harvest of BSAI and GOA sharks, BSAI and GOA sculpins, BSAI and GOA octopuses, and GOA squids, and all directed fisheries that encounter these species incidentally, but in the long run may lead to greater gross revenues, as a result of protecting the biomasses of the other species groups. Given the uncertainties about future TACs for squid, shark, sculpin, and octopus, and with respect to industry's valuation of the tradeoff between potential short-run restrictions and long-run sustainability, the socio-economic impacts are difficult to quantify, but are discussed qualitatively in section 1.5.

The alternatives are limited in scope and are likely to have limited effects on most environmental components of the BSAI and GOA. The effects discussion includes more in-depth discussion on biological, social, and economic impacts on groundfish target species, prohibited species, forage fish species, and non-specified species; and limited discussion for seabirds, marine mammals, habitat, and ecosystem effects. No significant cumulative effects were identified.

Alternatives 2 (Preferred Alternative) and 3, which provide more protection to the biomasses of the groups than the status quo, have been given an insignificant designation for environmental effects. No additional bycatch of groundfish, prohibited species, forage fish, or non-specified species is expected to be taken as additional target fisheries are not expected to develop as a result of this Preferred Alternative. Should a target fishery develop in the future, the effects of increased harvests of these species are expected to be insignificant because catch limits (target and incidental) are already in effect for those fisheries in which they are harvested. It is unknown whether foregone target groundfish catch (e.g., Pacific cod) would be expected because proposed catch limits for squids, sharks, sculpins, and octopuses were not determined to be limiting on those fisheries in 2008 or 2009; although some instances were found from 2005 to 2007 in a theoretical example. The Preferred Alternative and Alternative 3 would limit the amount of sharks, sculpins, octopuses, and squids that can be harvested under individual ACLs; however, they would continue to be managed under collective other species maximum retainable amount (MRA), forage fish MRAs, and prohibited species catch (PSC) limit regulations.

Additional elements under both the Alternative 2 (Preferred Alternative) and Alternative 3 include (1) maintaining the entire regulatory structure (unchanged) for prohibited species but listing them under a new "umbrella" management category for ecosystem components; and 2) removing non-specified species from the FMPs.

Alternative 3 differs from Alternative 2 only in proposed management of forage fish. Alternative 2 would maintain the entire regulatory structure (unchanged) for forage fish species but list them, along with prohibited species, under an ecosystem component category "umbrella." Under Alternative 3, forage fish species would be subject to ACLs and AMs. Alternative 3 would maintain requirements to designate essential fish habitat (EFH) and for EFH consultation on federal actions that may adversely affect EFH; however, the analysis identifies that EFH has not been determined for forage fish due to a paucity of life history information upon which to base such a designation. The impacts of the alternatives on EFH for forage fish are not significant. Alternatives 1 and 3 may have a future beneficial impact on forage fish as NMFS will be required to review information regarding forage fish EFH every 5 years; once information becomes available, NMFS may designate EFH for forage fish. Any benefit is not likely significant, as

EFH for the other species group is extensive and is likely to overlap with any forage fish EFH; therefore *de facto* EFH consultation may already occur for forage fish habitat.

The Preferred Alternative and Alternative 3 are likely to have beneficial effects for marine mammals, seabirds, and the ecosystem compared to Alternative 1 as species in the other species group would be managed at the level of the separate groups, reducing the potential for overfishing. Many marine mammals and seabirds are dependent on species that are currently managed in the other species group. Protection of these potential prey species would be beneficial to the ecosystem, especially in maintaining predator–prey relationships. The beneficial effect is not likely to be significant as there is no evidence currently of overfishing the species in the "other species" category, and the impacts are not likely to be seen at population levels for seabirds and marine mammals.

The effects of the Preferred Alternative and Alternative 3 on marine mammals, seabirds, the ecosystem, and habitat differ only in whether forage fish are placed in the fishery or not. As described above, Alternatives 1 and 3 may provide a potential benefit to the protection of forage fish EFH at some time in the future when sufficient information has been collected with which to define EFH for forage fish. Any protection of forage fish EFH may lead to a modest beneficial effect for these species and that part of the ecosystem that depends on forage fish.

The following summarizes Council comments during its determination of the Preferred Alternative (Alternative 2) for this action. The Preferred Alternative would replace the other species assemblage with ACL management at the group level for sharks, sculpins, (GOA) squids, and octopuses because the assemblage does not conform to the guidance for National Standard 1, which recommends that stocks with similar life histories may be managed under assemblages and that management of stocks with dissimilar life histories should not be managed under an assemblage.

The Council distinguished between this action to require the process for setting ACLs and AMs in the groundfish FMPs and the annual harvest specification process for setting ACLs that occurs under a separate rulemaking action. In its Preferred Alternative, the Council determined that the EA references Groundfish Plan Team and Scientific and Statistical Committee (SSC) recommendations for 2010 OFLs and ABCs that were used to determine the other species assemblage OFLs and ABCs to inform the Council and the public of the potential effects of the Preferred Alternative, but this action defers the determination of harvest specifications to the annual specifications process that would follow Secretarial approval of these FMP amendments. The biological benchmarks included herein are intended as informative rather than proscriptive. Efforts continue to enhance stock assessments for sharks, sculpins, squids, and octopuses in anticipation of Secretarial approval of the Preferred Alternative.

The Preferred Alternative would classify the prohibited species assemblage and the forage fish assemblage as ecosystem component species. Forage fish are not likely to become subject to overfishing or overfished in the absence of conservation and management measures. The EA includes the conclusions of a preliminary vulnerability analysis for indicator forage fish stocks for which there is sufficient available information to reliably assess productivity and susceptibility to the groundfish fishery (i.e., capelin and eulachon). Due to the relatively high productivity of these stocks and their relatively low susceptibility to the fishery, the analysis concludes that these stocks are not likely to become subject to overfishing. In addition, forage fish species will continue to be subject to conservation and management measures as implemented in federal regulations, even with the group placed in the ecosystem component category. Forage fish are not generally retained for sale or personal use in the groundfish fisheries. Current regulations (1) prohibit participants in the groundfish fisheries from directed fishing for forage fish (50 CFR 679.20(i)(3)); (2) limit the retention of forage fish to no more than 2% of the weight of retained target species; and (3) restrict the sale, barter or trade of forage fish (50 CFR 679.20(i)(5)).

Further, it is appropriate to continue with existing efforts to conserve and manage forage fish given their classification as ecosystem component species. Forage fish play an important role in the food web and conserving forage fish stocks will benefit target groundfish stocks, as well as marine mammals and seabirds, which are dependent on forage fish as prey. Forage fish are preyed upon by many species that are targeted by the groundfish fisheries. The juvenile stages of pollock, Pacific cod and many other groundfish species prey on euphausiids, such as krill. The conservation of forage fish populations is, therefore, important to the health and productivity of the ecosystem in the Bering Sea, Aleutian Islands, and Gulf of Alaska, and to the health and productivity of the target stocks. Measures that limit the fishing mortality and incidental catch of forage fish benefit the target stocks and their habitat, and are appropriate for the conservation and management of the target stocks in the fishery.

Prohibited Species are not generally retained for sale or personal use in the groundfish fishery and are not likely to be subject to overfishing or to become overfished in the absence of conservation and management measures. Current regulations (1) prohibit retention of prohibited species by the groundfish fleet, with limited exceptions (50 CFR 679.21(b)); manage prohibited species for which there are fisheries in federal waters (crab, salmon, halibut) under other authorities (Crab FMP, Salmon FMP, and the International Pacific Halibut Commission) that would suffice to prevent overfishing, without the need for any new conservation and management measures under the Groundfish FMPs. It is appropriate to continue to establish catch limits for these species under their respective FMPs or other management authorities.

A retrospective analysis of past shark and octopus harvest compared to the 2010 ABCs and OFLs showed that potential harvests of these species may exceed OFLs without NMFS inseason management to control incidental catch. If the TACs for these groups are insufficient to support a directed fishery, the harvest of sharks and octopuses would be limited to a maximum retainable amount of the target species. If closing directed fishing for sharks and octopuses is not sufficient to prevent reaching the ABC and OFL for these groups, NMFS inseason management would use observed catch, fish ticket, and vessel monitoring system data to determine the most effective actions to prevent overfishing. Controlling incidental harvests of BSAI and GOA octopuses would likely require closing areas of high octopus retention to Pacific cod pot gear vessels. BSAI and GOA shark incidental harvest would likely be constrained by restricting harvesting locations for hook-and-line sablefish and Pacific cod fisheries and the trawl pollock fishery. Because BSAI and GOA octopus are directly fished and sold, estimated as decreased revenue is $110,000 to $155,000 based on the retrospective harvest and inseason management scenarios in the analysis. Increased costs may occur if operations have to travel further to reach alternative fishing grounds, or if they must fish in areas with lower catch-per-unit of effort (and thus incur increased costs of fishing effort to catch the same amount of fish). Decreased revenues may occur if increased travel or fishing time requirements makes it impossible to catch the same amount of fish in the time available. Decreased revenues also may occur if shifts in fishing activity also make it harder to deliver a quality product.

In summary, the Council selected its Preferred Alternative to manage (1) target stocks in the fishery; (2) sharks, sculpins, (GOA) squids, and octopuses separately in the fishery, with ACLs to be set under annual rulemakings in the future); (3) forage fish, which provide a critical component of the food web for target groundfish, other groundfish, marine mammals and seabirds as an important aspect of ecosystem-based management of Alaska groundfish fisheries, whose regulatory restrictions would continue unchanged under the ecosystem component category; and (4) prohibited species under their respective FMPs or other management authorities under the ecosystem component category.

1.0 ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) provides environmental and socio-economic analyses for a proposed action in accordance with the National Environmental Policy Act (NEPA). The NEPA requires an assessment of the biological, social, and economic consequences of fisheries management alternatives. It provides the public with an opportunity to be involved in and influence decision-making on federal actions. Amendment 96 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area and Amendment 87 to the FMP for Groundfish of the Gulf of Alaska are necessary for the groundfish FMPs to conform to revised National Standard 1 (NS1) guidelines and the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

1.1 Background

Magnuson-Stevens Fishery Conservation and Management Act

The MSA serves as the chief authority for fisheries management in the U.S. Exclusive Economic Zone (EEZ). Section 301(b) of the MSA requires that "The Secretary shall establish advisory guidelines (which shall not have the force and effect of law), based on the national standards, to assist in the development of fishery management plans." Guidelines for the national standards are codified in subpart D of 50 CFR part 600. The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA), which was signed into law on January 12, 2007, included new requirements intended to strengthen existing provisions to prevent and end overfishing and rebuild fisheries. Therefore, NMFS proposed revisions to the NS1 guidelines at 50 CFR 600.310, to integrate these new requirements with existing provisions related to overfishing, rebuilding overfished stocks, and achieving optimum yield. On January 16, 2009, NMFS issued final guidelines for NS1 of the MSA (74 FR 3178).

The MSA, as amended by MSRA, requires that each Regional Council develops ACLs "for each of its managed fisheries" (see MSA section 302(h)(6)) and that each FMP have a mechanism for specifying ACLs "at a level such that overfishing does not occur in the fishery" (see MSA section 303(a)(15)). Consistent with these sections of the MSA, the NS1 guidelines provide that ACLs and AMs are needed for each "fishery" under federal FMP management, unless covered by a statutory exception. The MSA defines "fishery" broadly, and this definition did not change with the passage of the MSRA. A "fishery" is "one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational and economic characteristics," and "any fishing for such stocks" (see MSA section 3(13) and 50 CFR 600.10). The term "fishery" can mean different things in different contexts. For example, when dealing with biological concepts such as determining a status of overfishing or overfished, the NS1 guidelines generally apply at the "stock or stock complex" level (See, e.g., 50 CFR 600.310(e)(1) and (e)(2) [defining maximum sustainable yield (MSY) and "overfishing" with regard to "stock or stock complex"] and 50 CFR 600.305(c)(12) [explaining that "stock or stock complex" is used as a synonym for "fishery" in NS 1 guidelines]). In other instances, such as managing a fishery for optimum yield (OY), the term "fishery" may be viewed more broadly (see 50 CFR 600.310(e)(3)(i)(A) [referring to the establishment of OY at the "fishery" level as a possible alternative to the "stock or stock complex" level]).

Given the broad definition of "fishery," the Regional Councils have had, and continue to have, considerable discretion in defining the "fishery" under FMPs. Some FMPs include only one or a few stocks whereas others include several or hundreds of species. The primary reasons why stocks are included in FMPs are because people seek to harvest them for sale or personal use (i.e., the fish are the target of fishing activity), or they are caught incidentally in the pursuit of harvesting one or more other stocks and could experience overfishing or become overfished without conservation and management measures. These reasons are consistent with the stated purposes of the MSA, which include the

preparation and implementation of FMPs "which will achieve and maintain, on a continuing basis, the optimum yield from each fishery" (see MSA section 2(b)(4)). OY is defined as the amount of fish that, among other things will provide "the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems" (see MSA section 3(33)).

While the focus of FMPs has been on stocks managed for OY, some FMPs have included other stocks in recent years in an effort to incorporate ecosystem approaches to management. Congress acknowledged this increased attention to ecosystem approaches in the "Findings" section of the MSA (see MSA section 2(a)(11) [acknowledging that a number of Regional Councils "have demonstrated significant progress in integrating ecosystem considerations" under existing authorities of the MSA]). In addition, the MSRA added a new section, section 303(b)(12), that provides that an FMP may "include management measures in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations."

NMFS encourages ecosystem approaches to fishery management and recommends clarification of what constitutes the "fishery." As such, NMFS guidance pertaining to "stocks in the fishery" and "ecosystem component" (EC) species are described in detail below. The Regional Councils have the discretion to determine, on a case-by-case basis, whether changes in their stock classifications under current FMPs are needed.

The MSRA established new requirements intended to strengthen existing provisions, including ACLs and AMs, to end and prevent overfishing. Section 303(a)(15) was added to the MSA and requires each FMP to "establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability." ACLs and AMs are required by fishing year 2010 if overfishing is occurring in a fishery, and they are required for all other fisheries by fishing year 2011. All fisheries must have ACL and AM mechanisms and actual ACLs by the fishing year 2011.

North Pacific Fishery Management Council

The Council has been in the process of revising the groundfish FMPs to address management of non-target species since 1998. At that time Alaska Department of Fish and Game (ADF&G) submitted a proposal to the Council to manage sharks and skates in a complementary approach to that of the Alaska Board of Fisheries (Board), which had closed directed fishing for these species and required a Commissioner's permit for directed fishing for these species. The Council began developing a revised management approach to sharks and skates, which was expanded to the entire "other species" category, and, later to all non-target species following recommendations from its SSC. The Council's efforts ultimately were subsumed into this analysis.

Between 1998 and 2008, the Council undertook a stepwise process for addressing management of non-target species. In 2005, skates were removed from the GOA other species assemblage and are managed under separate TACs for big, longnose, and 'other' skates. In 2008, the TAC for the GOA other species assemblage was revised from an inflexible formula (5 percent of the combined TACs of all groundfish species not in the other species complex) to allow the Council to set a lower TAC for the other species assemblage, if appropriate. The Council separated skates from the other species assemblage in the BSAI in 2009. In 2008, the Council adopted separate action plans for setting separate specifications for sharks, sculpins, octopuses, GOA squids, and grenadiers (currently a non-specified species group), and managing squids or octopuses under the EC category.

The Council's Non-Target Species Committee has been active since 2003 in the development of the other species management actions, as described above, and in more comprehensive approaches to manage non-

target species. The more comprehensive processes were tabled pending final rulemaking on ACLs and AMs. Those efforts are now included in this action.

The Council adopted its final action plan in December 2009 to amend the groundfish FMPs, which include a number of "housekeeping" amendments to the FMP texts, based on recommendations from the committee. The current specification process outlined in the FMPs meet the requirements of the MSA and NS1 guidelines, but that process needs to be incorporated better into the text of the FMPs. These amendments to the FMP texts have no effect on the human environment and are considered administrative changes to the FMP.

The two groundfish FMPs include a suite of catch limits for individual groundfish stocks and stock complexes. These catch limits include an overfishing limit (OFL), an allowable biological catch limit (ABC), and a total allowable catch limit (TAC); where TAC $\leq$ ABC < OFL. The OFL and ABC are set by the SSC, and the TAC is set by the Council. The OFL and ABC determination incorporates a tier system for addressing scientific uncertainty. The ABC for groundfish stocks will be established as the ACL for that stock under these amendments, and TAC is a target set not to exceed the ABC. In-season AMs are geared both to prevent the TAC from being exceeded (e.g., directed fishing closures) and to respond if the TAC is exceeded (e.g., prohibition of retention).

While the Council's groundfish annual harvest specification process generally complies with the guidelines for NS1, some amendments to the groundfish FMPs are required to address deficiencies in the FMPs and document compliance with ACL and AM requirements through the harvest specification process; however, these amendments to the FMPs are categorically excluded from NEPA (see Appendix 1 for more information).

One basic change to the FMPs that is included in this EA requires the identification of stocks in the fishery for the purpose of setting ACLs and AMs; any stocks in the fishery must have ACLs and AMs specified for them. The Council proposes to eliminate the "other species" category, and list its component groups in the fishery. The guidelines allow the identification of a new EC category, within which stocks would not be subject to ACL and AM requirements. The Council proposes to list "prohibited species" in this new EC category and retain their current management regime; the intent would be to exclude them in the groundfish FMPs from requirements to implement ACLs and AMs because the stocks are not at risk of overfishing under existing management and most are primarily managed under other federal authorities. The Council proposes to list the forage fish category (1) in the fishery, where they would be subject to ACLs and AMs or (2) in the EC category, where they would not be subject to them, but in which they would retain their current management regime. The Council also proposes to remove reference to non-specified species from the FMPs because these species are too poorly understood to set ACLs and AMs or to develop a management regime for them. As species or groups are understood sufficiently the Council has expressed its interest to consider moving them into the FMPs, either in the fishery or the EC category. The Council has initiated an analysis that will consider listing grenadiers (currently a non-specified species) in the groundfish FMPs, either in the fishery or in the EC category.

1.2 Purpose and Need

This action is necessary to facilitate compliance with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks, achieve optimum yield, and to comply with statutory requirements for ACLs and AMs. The proposed action is intended to enhance conservation of other species stocks in the BSAI and GOA and comply with the MSA. The action area covers the entire BSAI and GOA. The affected human environment includes the natural and physical environment, as well as relevant economic and social conditions.

The Council adopted the following problem statement for this action in February 2010.

This proposed action is necessary to comply with statutory requirements for ACLs and AMs to end and prevent overfishing, while achieving optimum yield. ACLs and AMs are required for all species and species groups that are identified as being in "the fishery." An EC category may also be included in the FMPs for species and species groups that are not targeted for harvest, are not likely to become overfished or subject to overfishing, and are not generally retained for sale or personal use. The text of the groundfish FMPs also could benefit from amendments to better document compliance with ACL and AM requirements through the harvest specification process.

The problem in the BSAI and GOA groundfish fisheries is that the other species stock assemblage no longer complies with the MSA and revised NS1 guidelines, which advises that species with dissimilar life history characteristics may not be managed under the same stock assemblage. The potential for development of target fisheries on shark, sculpin, octopus, and squid, which are currently managed in aggregate under a single ACL, may require action to conserve those stocks. Setting species or species group ACLs requires amendments to the respective groundfish FMPs.

The policy objective for this action is to reduce the risk of overfishing and maintain healthy stocks of groundfish. The establishment of separate specifications for sharks, sculpins, octopuses, and GOA squids will facilitate better control over the harvest of those groups. The purpose of the EA is to predict whether the impacts to the human environment resulting from setting separate specifications for sharks, sculpins, octopuses, and GOA squids will be significant. If the predicted impacts from the Preferred Alternative are insignificant, and that alternative is chosen, no further analysis is necessary to comply with NEPA.

1.3 Description of Alternatives

The Council considered recommendations of its Groundfish Plan Teams, SSC, Advisory Panel, Non-Target Species Committee, NOAA and Council staffs, and stakeholders in its design of proposed alternatives for this action. Through its deliberations, the Council considered various combinations of placing target and groups in the "other species" category, the prohibited species category, the forage fish category, and the non-specified category. Three FMP categories were considered: (1) in the fishery; (2) in a new ecosystem component category; or (3) removed from the FMPs.

Table 1 summarizes questions and answers regarding the potential actions the Council must, should, and could adopt for analysis, which is based on questions posed by the Non-Target Species Committee and answered by NOAA/NMFS and Council staffs.

After scoping the range of management issues related to revising the groundfish FMPs to conform to revised NS1 guidelines, the Council selected three alternatives for analysis, which are listed below. Six additional alternatives were considered by the Council but were not carried forward in this analysis. The Council plans to consider additional management issues in a trailing plan or regulatory amendment analysis.

Alternative 1. No action

Alternative 2. (*Preferred*) Revise the groundfish FMPs to comply with requirements to set annual catch limits and accountability measures

Eliminate the "other species" category and manage (GOA) squids, (BSAI and GOA) sculpins, (BSAI and GOA) sharks, and (BSAI and GOA) octopus separately in the "target species" category.

Target species are in "the fishery."

Prohibited species and forage fish are in the ecosystem component category.

Non-specified species are removed from the FMPs.

Alternative 3. Revise the groundfish FMPs to comply with requirements to set annual catch limits and accountability measures

Eliminate the "other species" category and manage (GOA) squids, (BSAI and GOA) sculpins, (BSAI and GOA) sharks, and (BSAI and GOA) octopus separately in the "target species" category.

Target species and forage fish are in "the fishery."

Prohibited species are in the ecosystem component category.

Non-specified species are removed from the FMPs.

1.3.1 Alternative 1. (The No Action Alternative)

The stocks of fish and marine invertebrates managed under the FMPs are identified and described in section 3.1.2 of the FMPs. These stocks are divided into five categories: target species, other species, forage fish species, nonspecified species, and prohibited species. The species and assemblages managed under each category are listed in Table 8 and Table 9.

Under this alternative, regulations affecting management of the other species assemblage in the BSAI and GOA for the purpose of setting annual catch limits would remain unchanged. Harvest specifications would be set annually for the assemblage(s) as defined in the respective FMP and Stock Assessment and Fishery Evaluation (SAFE) Reports. Regulations affecting management of the other species assemblage in the BSAI and GOA for the purpose of MRAs and PSCs also would remain unchanged. The component groups of the assemblage however, would continue to be at risk of overharvesting under the status quo, particularly if a directed fishery were to develop for them. Status quo management also would not allow for management at the species level. The risk of overharvesting component groups of the other species complex is potentially greater under the status quo than under either of the proposed alternatives.

Under this alternative, regulations affecting management of the prohibited species, forage fish, and non-specified species categories in the BSAI and GOA also would remain unchanged.

1.3.2 Alternative 2. (*Preferred*) Revise the Groundfish FMPs to Comply with Requirements to Set Annual Catch Limits and Accountability Measures

- **Eliminate the "other species" category and manage (BSAI and GOA) sculpins, (BSAI and GOA) sharks, (BSAI and GOA) octopus, and (GOA) squid separately in the "target species" category.**
- **Target species are "in the fishery."**
- **Prohibited species and forage fish are in the ecosystem component category.**
- **Non-specified species are removed from the FMPs.**

Section 303(a)(2) of the MSA requires that an FMP contain, among other things, a description of the species of fish involved in the fishery. FMPs include target stocks and may also include nontarget species or stocks. All stocks that are listed in an FMP or FMP amendment are considered to be in the fishery unless they are identified as EC species through an FMP amendment process.

Stocks in a fishery include: target stocks; nontarget stocks that are retained for sale or personal use; and non-target stocks that are not retained for sale or personal use and that are either determined to be subject to overfishing, approaching overfished, or overfished, or could become so, according to the best available information, without conservation and management measures. Stocks in a fishery may be grouped into stock complexes, as appropriate. Requirements for reference points and management measures for these stocks are described throughout the NS1 guidelines.

"Target stocks" are stocks that fishers seek to catch for sale or personal use, including "economic discards" as defined under MSA section 3(9). "Non-target species" and "nontarget stocks" are fish caught incidentally during the pursuit of target stocks in a fishery, including "regulatory discards" as defined under MSA section 3(38). They may or may not be retained for sale or personal use. Non-target species may be included in a fishery and, if so, they should be identified at the stock level. Some non-target species may be identified in an FMP as ecosystem component (EC) species or stocks. "EC species" generally are not retained for any purpose, although *de minimis* amounts might occasionally be retained.

As a default, all stocks currently identified in an FMP would be considered stocks "in the fishery" unless otherwise designated. Stocks in the fishery would include (1) target stocks (i.e., stocks that fishers seek to catch for sale or personal use, including "economic discards" as defined under MSA section 3(9)), (2) non-target stocks that are retained for sale or personal use, and (3) non-target stocks that are not retained for sale or personal use and that are either determined to be subject to overfishing, approaching overfished, or overfished, or could become so, according to the best scientific information available, without conservation and management measures. Stocks and stock complexes in the fishery should have quantitative status determination criteria (SDC), MSY, ABC, ACL, and annual catch target (collectively called "reference points") and AMs, although some stocks in the fishery may not require ACLs and AMs if they are covered by a statutory exception. Under the Preferred Alternative and Alternative 3, all stocks in the fishery are identified as target species.

An ACL is the level of annual catch of a stock or stock complex that serves as the basis for invoking AMs. ACL cannot exceed the ABC. The Council sets ABC below the OFL to account for scientific uncertainty in calculating the OFL and sets ACL not to exceed the ABC to account for management uncertainty in controlling a fishery's actual catch. ABC will equal the ACL.

The relationships between the above terms can be summarized as OFL >ABC≥ACL (Figure 2). Because a primary goal of the MSA, and management responsibility of NMFS and the Regional Councils, is to end and prevent overfishing rather than account for it after it occurs, NMFS recommended that ABC be less than (not simply less than or equal to) OFL, to address scientific uncertainty in the estimate of OFL.

Accountability Measures Another major aspect of the revised NS1 guidelines is the inclusion of guidance on AMs. AMs are management controls implemented for stocks such that exceeding the ACL or sector-ACL is prevented, where possible, and corrected or mitigated if it occurs (see 50 CFR 600.310(g)). AMs include (1) those that are applied inseason and designed to prevent the ACL from being reached; (2) measures applied after the fishing year that are designed to address the operational issue that caused the ACL overage, ensuring it does not happen in subsequent fishing years, and, as necessary, address any biological harm to the stock; and (3) those based on multi-year average data which are still reviewed and applied annually (see discussion below). AMs should address and minimize both the frequency of overages and the magnitude of an overage. AMs should be designed so that if an ACL is exceeded, specific adjustments are effective in the next fishing year, or as soon as possible, with explanation of why more timely adjustment is not possible. If timely inseason fishery catch data are available for a stock, Regional Councils should ensure their FMPs contain inseason closure authority as an AM to prevent a stock's ACL from being exceeded.

The other species categories under consideration in these alternatives have been closed to directed fishing for many years. The proposed alternatives would manage one or more of the component groups on an individual basis. Species groups assessed at the Tier 5 level are generally assigned an OFL/ABC that allows for sufficient incidental catch and may allow enough for a directed fishery (e.g., sculpins). Species assessed at the Tier 6 level are less likely to be allowed a directed fishery, and are more likely limited to incidental catch status (e.g., sharks, octopuses, and squids). Catch of Tier 6 species is more likely to reach OFL and ABC because those management benchmarks are typically based on average historic catch.

Council deliberation of its Preferred Alternative The following summarizes Council comments during its determination of the Preferred Alternative (Alternative 2) for this action in April 2010. The Preferred Alternative would replace the other species assemblage with ACL management at the group level for sharks, sculpins, octopuses, and (GOA) squids because the assemblage does not conform to the guidance for National Standard 1, which recommends that while stocks with similar life histories may be managed under assemblages, assemblage management of stocks with dissimilar life histories is not appropriate.

The initiative for revising management of the other species assemblage began in 1998 with a State of Alaska proposal to the Council to revise management of sharks and skates, to complement State action to prohibit directed fisheries on the two groups with a Commissioner's permit, and accompanying data collection requirements. The Council's initiative on sharks and skates expanded to address all the groups under the other species assemblage to enhance the protection of the disparate groups that have been managed under collective catch limits that would allow any one group (or species) to be harvested to the limit calculated for the five groups. Protection of the groups conforms to the Council's precautionary approach for managing the marine resources under its jurisdiction. The Council's initiative was later expanded to address all non-target groundfish species to address similar precautionary concerns on all data poor stocks. These efforts were folded into required FMP amendments to address ACLs and AMs for stocks in the fishery and identification of stocks not in the fishery but requiring AMs as ecosystem components in the FMPs.

The Council distinguished between this action to incorporate a process for setting ACLs and AMs in the groundfish FMPs and the harvest specification process for setting ACLs that occurs under an annual rulemaking action. In its Preferred Alternative, the Council determined that the EA references Plan Team and SSC recommendations for 2010 group level OFLs and ABCs that were used to determine the other species assemblage aggregate OFLs and aggregate ABCs to inform the Council and the public of the potential effects of the Preferred Alternative, but this action defers the determination of harvest specifications to the annual specifications process that would follow Secretarial approval of these FMP amendments. It will become far more feasible to meaningfully assess the socioeconomic impacts of setting separate ACLs for each of the component groups during the harvest specifications process, as these will depend on how the ACL for each group is allocated among participants in the groundfish fishery. The biological benchmarks included herein are intended as informative rather than proscriptive. Efforts continue to enhance stock assessments for sharks, sculpins, squids, and octopuses in anticipation of Secretarial approval of the Preferred Alternative. The Council tasked its SSC with developing new methods for determining ACLs for stocks managed under Tier 6 or to identify the necessary steps to move stocks from Tier 6 to Tier 5.

The Council acknowledged that some directed groundfish fisheries may be affected as a result of a combination of the Preferred Alternative and future actions to set ACLs for sharks and octopuses, more so than for sculpins and GOA squids, described in the EA. During its deliberations at final action, the Council initiated a discussion paper of potential management measures that would result in slowing incidental harvests of sharks and octopuses, specifically, through the use of discard mortality rates in directed fisheries with the express purpose of avoiding future closures of directed fisheries due to their incidental harvest. The Council reviewed some past examples in which NMFS Alaska Region applied in-season adjustments by gear, target, and/or area in which high incidental catch of non-target species occurred above the biological reference points and avoided widespread closures of directed fisheries. The Council was confident that NMFS would continue to employ such management approaches that both conserved marine resources and allowed fisheries to attain optimal yield, in accordance with National Standard 1, and minimized bycatch in accordance with National Standard 9. Further, the Council initiated a discussion paper on a number of management issues related to the development of new ACLs under the annual harvest specification process (http://www.alaskafisheries.noaa.gov/npfmc/current_issues/ACL/

ACL_motion410_discpaper.pdf) and requested that its SSC address potential new methods for determining ACLs for Tier 6 stocks in June 2010.

The Preferred Alternative would classify the prohibited species assemblage and the forage fish assemblage as ecosystem component species. Forage fish are not likely to become subject to overfishing or overfished in the absence of conservation and management measures. The EA includes the conclusions of a preliminary vulnerability analysis for indicator forage fish stocks for which there is sufficient available information to reliably assess productivity and susceptibility to the groundfish fishery (i.e., capelin and eulachon). Due to the relatively high productivity of these stocks and their relatively low susceptibility to the fishery, the analysis concludes that these stocks are not likely to become subject to overfishing. In addition, forage fish species will continue to be subject to conservation and management measures as implemented in federal regulations, even with the group placed in the ecosystem component category. Forage fish are not generally retained for sale or personal use in the groundfish fisheries. Current regulations (1) prohibit participants in the groundfish fisheries from directed fishing for forage fish (50 CFR 679.20(i)(3)); (2) limit the retention of forage fish to no more than 2% of the weight of retained target species; and (3) restrict the sale, barter or trade of forage fish (50 CFR 679.20(i)(5)).

Further, it is appropriate to continue with existing efforts to conserve and manage forage fish given their classification as ecosystem component species. Forage fish play an important role in the food web and conserving forage fish stocks will benefit target groundfish stocks, as well as marine mammals and seabirds, which are dependent on forage fish as prey. Forage fish are preyed upon by many species that are targeted by the groundfish fisheries. The juvenile stages of pollock, Pacific cod and many other groundfish species prey on euphausiids, such as krill. The conservation of forage fish populations is, therefore, important to the health and productivity of the ecosystem in the Bering Sea, Aleutian Islands, and Gulf of Alaska, and to the health and productivity of the target stocks. Measures that limit the fishing mortality and incidental catch of forage fish benefit the target stocks and their habitat, and are appropriate for the conservation and management of the target stocks in the fishery.

Prohibited Species are not generally retained for sale or personal use in the groundfish fishery and are not likely to be subject to overfishing or to become overfished in the absence of additional conservation and management measures. Current regulations (1) prohibit retention of prohibited species by the groundfish fleet, with limited exceptions (50 CFR 679.21(b)); manage prohibited species for which there are fisheries in federal waters (crab, salmon, halibut) under other authorities (Crab FMP, Salmon FMP, and the International Pacific Halibut Commission) that would suffice to prevent overfishing, without the need for any new conservation and management measures under the Groundfish FMPs. It is appropriate to continue to establish catch limits for these species under their respective FMPs or other management authorities.

1.3.3 Alternative 3. Revise the Groundfish FMPs to Comply with Requirements to Set Annual Catch Limits and Accountability Measures

- **Eliminate the "other species" category and manage (BSAI and GOA) sculpins, (BSAI and GOA) sharks, (BSAI and GOA) octopus, and GOA squid separately in the "target species" category.**
- **Target species and forage fish are in "the fishery."**
- **Prohibited species are in the ecosystem component category.**
- **Non-specified species are removed from the FMPs.**

Alternative 3 is the same as Alternative 2, except that forage species would be managed "in the fishery." If the Council determines that forage fish are in the fishery and warrant additional conservation and management, then status determination criteria and reference points must be specified for them (similar to

target species and other species). Stocks in the fishery are also subject to EFH requirements, including EFH consultation on federal actions that may adversely affect EFH.

1.3.4 Alternatives Considered but Not Carried Forward

Six alternatives were considered and not moved forward in this EA because they do not comply with NS1 guidelines, which were published in the *Federal Register* on January 16, 2009 (74 FR 3178) and/or the MSA, or will be considered in future action(s). Other alternatives considered and not moved forward do not meet the Council's objectives to comply with the NS1 guidelines and the MSA requirements by January 2011. These alternatives would require additional information or analysis to support further consideration (e.g., grenadiers). The alternatives that were not analyzed follow.

Alternative 4. Target species, other species, prohibited species, forage fish, and non-specified species are in the fishery.

Alternative 5. - List the current target species and other species in the fishery.
- List prohibited species, forage fish, and non-specified species under an EC category.

Alternative 6. - List current target species and other species in the fishery.
- Remove prohibited species, forage fish, and non-specified species from the FMPs.

Alternative 7. - List the current target species, skates, sculpins, sharks, squid, and octopus in the fishery.
- List prohibited species catch, forage fish, and non-specified species under an EC category.

Alternative 8. - List the current target species[1], sculpins, and sharks in the fishery.
- List prohibited species catch, forage fish, squid, and/or octopus under an EC category.
- Remove the non-specified category from the FMPs.

Alternative 9. - List the current target species, sculpins, and sharks in the fishery.
- List prohibited species catch, forage fish, non-specified species, squid, and/or octopus under an EC category.

Alternative 10. List grenadiers in the fishery and set ACLs for them,

Alternative 11. List grenadiers in the EC category.

Alternative 12. List a giant, Pacific, and popeye grenadier complex in the fishery and set ACLs for them while the remaining "other grenadier" complex would be listed in the EC category.

1.4 Affected Environment and Environmental Consequences

This section describes the human environment, including the physical environment, habitat, groundfish life history, marine mammals, seabirds, the ecosystem, harvesting sector, the processing sector, and community and social conditions. The environmental impacts of Amendments 96 and 87 are discussed in this section of the EA and socioeconomic effects are discussed in Section 1.5. NEPA significance is determined by considering the context in which the action will occur and the intensity of the action. The context in which the action will occur includes the specific resources, ecosystem, and the human environment affected. The intensity of the action includes the type of impact (beneficial versus adverse) and the duration of impact.

[1] In the GOA, skates are managed as a "target species" category, but squid are managed in the "other species" category. In the BSAI, squid are managed as a "target species" category; FMP Amendment 95 to manage skates separately is under Secretarial review.

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

The fishery (including target species, other species, and possibly forage fish)

Ecosystem component (including prohibited species and possibly forage fish)

Non-specified species

Seabirds

Marine mammals

Marine benthic habitat and essential fish habitat

The ecosystem

Social and economic consequences

The alternatives are limited in scope and will likely not affect all environmental components of the BSAI and GOA. This action is expected to have very limited potential for impacts on target species, non-specified species, forage species, prohibited species, marine mammals, seabirds, habitat, or the ecosystem not previously considered in the Groundfish Harvest Specification Environmental Impact Statement (EIS) (NMFS 2007) because the action is not expected to change how any commercial fisheries are conducted in the BSAI or GOA in a manner that would substantially affect these environmental components. The environmental components that could potentially be directly affected by this action include other species and the economic and social conditions of one or more fisheries for other species groups (e.g., sharks). Overall, fishing practices will not substantially change under this amendment so very limited potential effects are expected on the other environmental components. The effects of the alternatives on social and economic conditions are analyzed in Section 1.5.

1.4.1 Bering Sea/Aleutian Islands and Gulf of Alaska Environment

Under the MSA, the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ), which extends between three 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 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 FMPs for Groundfish of the BSAI Management Area and for Groundfish of the GOA. Actions taken to amend FMPs or implement other regulations governing these fisheries must meet the requirements of federal laws and regulations. The action area effectively covers all of the BSAI under U.S. jurisdiction, extending southward to include the waters south of the AI west of 170°W to the border of the EEZ. The Gulf of Alaska management area encompasses the U.S. EEZ of the North Pacific Ocean, exclusive of the Bering Sea, between the eastern Aleutian Islands at 170°W. longitude and Dixon Entrance at 132°40' W. longitude. The marine waters of the State of Alaska (State) have been treated as a part of the action area because vessels fishing in federal waters pass through state waters, and because some fishing for federal TACs takes place in state waters.

Detailed descriptions of the fishery may be found in the following reports and are incorporated by reference. These public documents are readily available in printed form or over the Internet at links provided here.

1.4.1.1 Alaska Groundfish Programmatic Supplemental Environmental Impact Statement

The implementation of the harvest specifications is a project-level action within the fishery management programs under the BSAI and GOA groundfish FMPs. In June 2004, NMFS approved the Alaska Groundfish Programmatic Supplemental Environmental Impact Statement (PSEIS) that disclosed the impacts from alternative groundfish fishery management programs on the human environment (NMFS 2004). NMFS issued a Record of Decision on August 26, 2004, with the simultaneous approval of Amendments 81 and 74 to the FMPs, respectively. This decision implemented a policy for the groundfish fisheries management programs that is ecosystem-based and is more precautionary when faced with scientific uncertainty. For more information on the PSEIS, see the Alaska Region website at: http://www.alaskafisheries.noaa.gov/sustainablefisheries/seis/default.htm.

The PSEIS analyzed comprehensive policy-level FMP alternatives that examine all of the major components of the BSAI and GOA FMPs at a programmatic level, consistent with the requirements of NEPA. Each alternative contains a policy statement, goals and objectives for that policy statement, and except for Alternative 1 (status quo), a pair of FMP "bookends" that illustrate and frame the range of implementing management measures for the alternative's policy. The PSEIS analyzed five policy-level FMP alternatives for the BSAI and GOA groundfish fisheries. Chapters 2 and 4 of the PSEIS describe the alternatives considered. Alternative 1 represented the status quo BSAI and GOA FMPs. Alternative 2 represented a policy to maximize fishery production and included two FMPs with management measures that reduced restrictions on fishing. Alternative 2 included the status quo, as revised by recent Council actions that had yet to be approved by the Secretary. Alternative 3 included two FMP amendments that modified management measures to continue to balance fishery production with ecosystem protection. Alternative 4 was a policy to restrict fishing to the extent necessary to provide the least impacts on the marine environment. The Preferred Alternative was a combination of elements from Alternatives 3 and 4.

The PSEIS brought the decision-maker and the public up-to-date on the current state of the human environment (as of 2004), while describing the potential environmental, social, and economic consequences of alternative policy approaches and their corresponding management regimes for management of the groundfish fisheries off Alaska. In doing so, the PSEIS serves as the overarching analytical framework that will be used to define future management policy with a range of potential management actions. Future amendments and actions will logically derive from the chosen policy direction set for the PSEIS's Preferred Alternative.

As stated in the PSEIS, any specific FMP amendments or regulatory actions proposed in the future will be evaluated by subsequent EAs or EISs that incorporate by reference information from the PSEIS but stand as case-specific NEPA documents and offer more detailed analyses of the specific alternatives. As a comprehensive foundation for management of the GOA and BSAI groundfish fisheries, the PSEIS functions as a baseline analysis for evaluating subsequent management actions and for incorporation by reference into subsequent EAs and EISs which focus on specific federal actions.

The Council on Environmental Quality (CEQ) regulations encourage agencies that prepare NEPA documents to incorporate by reference the general discussion from a programmatic EIS and concentrate solely on the issues specific to the EIS subsequently prepared. According to the CEQ regulations, whenever a programmatic EIS has been prepared and a subsequent EIS is then prepared on an action included within the entire program or policy, the subsequent EIS shall concentrate on the issues specific to the subsequent action. The subsequent EIS need only summarize the issues discussed and incorporate discussions in the programmatic EIS by reference (see 40 CFR 1502.20).

The Alaska Groundfish Harvest Specifications EIS, described below, offers a detailed analysis of the harvest specifications process. This EA incorporates by reference information from the PSEIS, when applicable.

1.4.1.2 Annual Harvest Specification Environmental Assessments

In addition to the PSEIS, EAs have been written to accompany annual harvest specifications since 1991. The 2005 and 2006 harvest specifications (NMFS 2005) were analyzed in an EA, and a finding of no significant impact was made prior to publication of the specifications. Harvest specification EAs dating back to 2000 may be found at the NMFS Alaska Regional Office (AKRO) web site at: http://www.alaskafisheries.noaa.gov/index/analyses/analyses.asp#top.

1.4.1.3 Periodic Harvest Specification EIS

The Alaska Groundfish Harvest Specifications EIS (NMFS 2007) replaced the annual EA that accompanied harvest specifications for each new fishing year. This EIS provides decision-makers and the public with an evaluation of the latest information on the environmental, social, and economic effects of alternative harvest strategies for the federally managed groundfish fisheries in the BSAI and the GOA. It examines alternative harvest strategies that comply with federal regulations, the BSAI Groundfish FMP, the GOA Groundfish FMP, and the MSA. These alternative harvest strategies are applied to the best available scientific information to derive the total allowable catch estimates for the groundfish fisheries. The EIS is available at http://www.alaskafisheries.noaa.gov/analyses/specs/eis/final.pdf. Each year, a supplemental information report is produced to determine if new information has become available since the completion of the harvest specifications EIS that would lead to different impact conclusions. These reports are available at the NMFS AKRO websites at http://www.alaskafisheries.noaa.gov/index/analyses/analyses.asp. This EA incorporates by reference information from the harvest specifications EIS, when applicable.

The NEPA documents listed above contain extensive information on the fishery management areas, marine resources, ecosystem, social and economic parameters of these fisheries and the harvest specifications process. Rather than duplicate an affected environment description here, readers are referred to those documents. For purposes of analyzing the effects of Amendments 96 and 87, the PSEIS (NMFS 2004) contains the following descriptions that are adopted by reference in this analysis:

Section 3.9.2.4 contains sector profiles including BSAI trawl (Tables 3.9–11 and 3.9–12) and BSAI longline (Tables 3.9–14, 3.9–15, and 3.9–16).

Section 3.9.3.2 contains descriptions of the regions and communities involved in the groundfish fisheries, including the Kodiak Island Region on page 3.9–65.

Section 3.5.3 contains descriptions of other species management, trophic interactions, past and present effects analysis, comparative baseline, and cumulative effects analysis.

Section 3.5.3 contains life history and distribution, trophic interactions, management, past and present effects analysis, comparative baseline, and cumulative effects analysis.

The harvest specifications EIS (NMFS 2007) contains recent environmental and effects information and is incorporated by reference as noted in specific chapters in this EA. Each chapter in this EIS included the reasonable foreseeable future actions for each environmental component and supports the cumulative effects analysis for this EA.

1.4.1.4 GOA Groundfish FMP Amendment 63

Amendment 63 to the GOA Groundfish FMP (NPFMC 2003) moved skates from the "other species" category to the "target species" category in the GOA FMP. Skates had been included in the other species quota category with sharks, sculpins, and octopuses. A single TAC was specified annually for the "other species" category as a whole, which was determined equal to 5 percent of the total TACs for all other GOA groundfish. Amendment 79 was implemented in 2008, which allowed the Council to determine an aggregate OFL and ABC for the "other species" category. These specifications are based on the sum of

the specifications of the component groups. The Amendment 63 Preferred Alternative was selected because of the potential of a developing skate fishery in 2004 that would harvest at levels too high for the available skate biomass. It requires NMFS to directly manage the skate group or groups and control directed fishing activities on skates in the GOA. Detailed descriptions of the social and economic characteristics of the BSAI groundfish fisheries at the time of the action may be found in the PSEIS (NMFS 2004), which contains detailed fishery descriptions and statistics in section 3.9, "Social and Economic Conditions." Analysis for this action is available at http://www.alaskafisheries.noaa.gov/analyses/amd63/GOA63-fr_frfa.pdf.

1.4.1.5 BSAI Groundfish FMP Amendment 95

In October 2009 the Council adopted a Preferred Alternative under Amendment 95 to remove skates from the BSAI "other species" category and set separate specifications for them. This action was necessary to conserve skate species. Skates have been included in the other species quota category with sharks, sculpins, and octopuses. An aggregate OFL, aggregate ABC, and aggregate TAC are specified annually for the "other species" category. The Preferred Alternative, if approved by the Secretary, would require the Council to establish separate annual specifications for skates as a group or individual skate species, thereby providing enhanced means to control their harvest in the BSAI. The susceptibility of skates to fishing pressure has been well documented. While no target fishery has yet developed for skates in the BSAI the potential exists for the entire other species TAC to be taken as skates without the proposed FMP amendment. Implementation is anticipated for the 2011 fishing year, pending Secretarial approval of the FMP amendment in 2010. Analysis for this action is available at http://www.alaskafisheries.noaa.gov/npfmc/analyses/BSAI95_Skate909.pdf.

1.4.2 The BSAI and GOA Groundfish Fisheries

NS1 guidelines require SDC for all stocks identified as in the fishery. The SDC used for management of BSAI and GOA groundfish is defined in section 3.2.3.5.2 of Appendix A. Direct estimates of B_{MSY} (i.e., "the MSY level") are available for Tiers 1 and 2. For Tier 3, no direct estimate of B_{MSY} is available, but $B_{35\%}$ is used as a proxy for B_{MSY}. For Tiers 4 through 6, neither direct estimates of B_{MSY} nor reliable estimates of B_{MSY} proxies are available. Therefore, the "overfished" status of stocks and stock complexes managed under Tiers 4 through 6 is *undefined*. For these groups (complexes) the SDC would only address whether overfishing has occurred.

Due to legal mandates and limitations on resources, fisheries management has historically prioritized the protection and sustainability of economically important target species. In the North Pacific, management of such species consists largely of a quota-based system, where ACLs are set and catches are monitored in real time in target groundfish fisheries, while simultaneously obtaining life history information and abundance estimates for those stocks for which ACLs are specified. This is an extensive and complex system, with which NMFS and the Council have effectively managed over 20 core species and species groups that are the targets of groundfish fisheries under each FMP, or are taken incidentally in target fisheries (e.g., other species). While the catch of some other non-target species are monitored within this system or under the fisheries observer program, NMFS and the Council have generally not managed non-target species[2] as directly (with the notable exceptions of other species, prohibited species, and forage fish). For stocks that are managed by the State of Alaska and international treaty and for which there is not a federal FMP, federal MSY and SDC are not applicable.

[2] Non-target species include "other species," prohibited species, forage fish, and non-specified species. While the category of non-specified species is listed in the FMPs, no management actions are identified for them.

Every FMP must contain "conservation and management measures" (MSA section 303(a)(1)) and an "optimum yield" specification (section 303(a)(3)). Conservation and management measures are defined, in part, as those which are "useful in rebuilding, restoring, or maintaining, any fishery resource and the marine environment" and which are designed to assure that "irreversible or long-term adverse effects on fishery resources and the marine environment are avoided" (section 3(5)). The specification of optimum yield is defined, in part, as the amount of fish which "will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems" (section 3(33)). Thus, the definitions of "conservation and management" and "optimum yield" contemplate the imposition of measures designed to maintain and protect the marine environment and ecosystem together with measures designed to maintain fishery resources or to produce food and recreational opportunities.

Simply mentioning a stock in an FMP does not thereby transform the stock into a "fishery." Neither does mentioning a stock transform the FMP into an FMP *for* that stock. The practice of referring to stocks that are "in" the FMP has caused confusion. The guidelines suggest that it would be better to reference stocks that are targets of a fishery managed under the FMP and distinguish those from other stocks that are incidentally impacted by those fisheries. Another source of confusion is that, under the Act, "fishery" can mean either (1) a stock or group of stocks, or (2) any fishing for such stocks. The context should determine which of these meanings is relevant.

The following suggests an outline for structuring the FMPs.

1) List the fisheries that the FMP is intended to manage.
   Here, "fishery" means the act of fishing for a stock or group of stocks. For example, these would include the fishery for walleye pollock, the fishery for Pacific cod, the fishery for yellowfin sole, etc.
2) Specify the management measures required by the MSA for each of these fisheries (e.g., ACL, OY and overfishing definition).
   In this context, "fishery" can mean a stock or group of stocks rather than the act of fishing for such stocks. For example, vessels targeting Pacific cod might have impacts on Pacific halibut, skates, and other species in addition to Pacific cod, but the overfishing definition for Pacific cod would focus on limiting the impact of fishing mortality on the Pacific cod stock, not the impact of the vessels targeting Pacific cod on all affected species.
3) Specify management measures designed to protect other components of the marine ecosystem that might be impacted by the fisheries managed under the FMP (e.g., gear restrictions, time and area closures, allowable bycatch rates, quotas).
   a. These measures would be based on the need to protect the marine ecosystem, not on maximizing or optimizing the yield from nontarget species.
   b. These measures might result in lesser or greater impacts on nontarget species than would be the case if the nontarget species became targets of fisheries managed under the FMP; it depends on the amount of protection that is needed for each species or group of species and the extent to which such protection actually constrains the fisheries.
   c. If these measures include quotas, the quotas should not be called "overfishing definitions," because they would not necessarily correspond to the way that term is used in the MSA.

It is not necessary for every *stock* within a Regional Council's geographical area of authority to be managed under an FMP, because not all stocks are the subjects of fisheries or vulnerable to incidental harvest by the fisheries (e.g., it would probably not be necessary for a stock of tubeworms to be managed under an FMP if no fishermen are interested in harvesting tubeworms).

It is not necessary for every fishery within a Regional Council's geographical area of authority to be managed under an FMP, because not all fisheries require conservation and management (e.g., if a single fisherman started an artisanal tubeworm fishery, it may have such small impacts on the tubeworm stock that federal management would not be required).

If a stock is not the subject of any fishery or if a fishery for that stock exists but is so small that federal management is not required, this does not obviate the Council's responsibility to ensure that its FMPs provide due protection for the marine environment, including those stocks that are incidentally impacted by the fisheries managed under the FMPs (e.g., a Regional Council could require that impacts on tubeworms be held to ecologically safe levels, by designating closed areas or gear restrictions or by other means, including bycatch limits).

It is permissible for an FMP to require collection of data pertaining to certain "unmanaged" stocks without thereby engendering a requirement to specify MSY, OY, and status determination criteria for such stocks (e.g., requiring collection of bycatch data on tubeworms does not mean that the Council must also specify status determination criteria for tubeworms).

1.4.2.1 Target Species

Target species are those species or species groups that support either a single species or mixed species target fishery, are commercially important, and for which sufficient data exist to allow each species or species group to be managed on its own biological merits. A specific TAC is established annually for each target species. Stocks may be listed in this category as the Council removes them from assemblage management under the annual specification process. Catch of each species must be recorded and reported. These species may be harvested either as a target in a directed fishery or incidentally in a directed fishery for a different target species. As a result of Amendments 96 and 87, stocks or groupings of stocks may also be listed in this category if a specific TAC is desirable to limit incidental catch and to prevent overfishing, even though such stocks may not support a target fishery.

This category in the BSAI FMP includes walleye pollock, Pacific cod, yellowfin sole, Greenland turbot, arrowtooth flounder, flathead sole, Alaska plaice, northern rock sole, other flatfish, sablefish, Pacific Ocean perch, shortraker rockfish, blackspotted/rougheye rockfish, northern rockfish, other rockfish, Atka mackerel, skates,[3] and squid.

In the GOA Groundfish FMP, this category includes walleye pollock, Pacific cod, arrowtooth flounder, deep water flatfish, shallow water flatfish, flathead sole, rex sole, sablefish, Pacific ocean perch, shortraker rockfish, rougheye rockfish, pelagic shelf rockfish, demersal shelf rockfish, other slope rockfish, thornyhead rockfish, Atka mackerel, longnose skate, big nose skate, and other skates.

1.4.2.1.1 Annual Harvest Specification Process and Incorporation of Uncertainty

Regulations at 50 CFR part 679 address management of groundfish in the BSAI and GOA. These regulations describe the annual process of specifying OFL, ABC, and TAC levels for target species and other species. Under § 679.20(a), a TAC must be specified for each "target species" category and for the combined "other species" category. TACs for the target species may be split or combined by the Council to establish new quota categories through the annual specifications process, as recommended by its scientific advisors; a plan amendment is not required. The Council, however, is not currently authorized under § 679.20 to split or combine the species in the "other species" category. Before the Council can

[3] FMP Amendment 95 to manage BSAI skates separately is under Secretarial review. Under Alternative 1, this analysis assumes that the Preferred Alternative under Amendment 95 will be approved and implemented by the Secretary prior to this action.

specify a TAC for a single species or species group within the "other species" category, it first must move this species from the "other species" category to the "target species" category in the FMPs. Once a species or species group is categorized as a target species in the FMPs, the Council must specify a separate OFL, ABC, and TAC for the species or species group in the annual groundfish specifications process, or combine this new target species with some other target species to form a target species group. Annual specifications for 2010 are listed for the BSAI in Table 10 and for the GOA in Table 11.

The control rule used for setting specifications for target groundfish is intended to account for scientific uncertainty in two ways. First, the control rule is structured explicitly in terms of the type of information available, which is related qualitatively to the amount of scientific uncertainty. Second, the size of the buffer between the maximum fishing mortality rate (maxF) and ABC in Tier 1 of the ABC control rule and F and OFL in Tier 1 of the OFL control rule varies directly with the amount of scientific uncertainty. For the information levels associated with the remaining tiers, relating the buffer between maxF/ABC and F/OFL to the amount of scientific uncertainty is more difficult because the amount of scientific uncertainty is harder to quantify, so buffers of fixed size are used instead.

The probability that the specified ABC exceeds the "true" OFL (i.e., the OFL that would be specified if all scientific uncertainty were eliminated) was evaluated for a variety of stocks in Tiers 1, 3, 5, and 6. The SSC has determined that the range of resulting probabilities provide sufficient protection against overfishing, at least for the time being. It is anticipated that research regarding estimation of these probabilities will continue. This research may result in a future amendment proposal that prescribes the buffer between ABC and OFL explicitly in terms of the amount of scientific uncertainty (presently, Tier 1 prescribes the buffer explicitly as a function of the amount of scientific uncertainty, but the other tiers do not).

1.4.2.1.2 Total Catch Accounting

Regulations at 50 CFR § 600.310(e)(3)(v)(C) require that "all catch must be counted against OY, including that resulting from bycatch, scientific research, and all fishing activities." The Groundfish FMPs would be amended to include the accounting for all commercial and research catch in the annual stock assessment process. All types of catch, including bait, state waters, and research catch (scientific research permits, letters of acknowledgement and exempted fishing permits), are estimated each year and provided to the stock assessment authors for inclusion in stock assessment models for recommending OFLs and ABCs for the following year. This will ensure that all catch is accounted for in the stock assessment process and results in OFLs and ABCs that take into account all types of harvests.

1.4.2.1.3 Stock Complex

"Stock complex" refers to a group of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impact of management actions on the stocks is similar. Stock complexes may be comprised of (1) one or more indicator stocks (defined under Section 1.4.2.1.4), each of which has SDC and an ACL, and several other stocks; (2) "several stocks without an indicator stock, with SDC and an ACL for the complex as a whole;" or (3) "in certain circumstances, one or more indicator stocks, each of which has SDC and management objectives, with an ACL for the complex as a whole." (50 CFR § 600.310(d)(8))

Stocks may be grouped into complexes for various reasons, including where stocks in a multispecies fishery cannot be targeted independent of one another; where there are insufficient data to measure their status relative to SDC; or when it is not feasible for fishermen to distinguish individual stocks among their catch. The vulnerability of stocks to the fishery should be evaluated when determining if a particular stock complex should be established or reorganized, or if a particular stock should be included in a complex. Stocks will be grouped into complexes, as appropriate, during the annual specifications process.

This action neither requires nor forecloses the future establishment of stock complexes. Periodic evaluation could occur during the annual specification cycle of whether the vulnerability of a species or species group that is not included in the FMP has changed to the point that an FMP amendment could be considered to include the species or species group in the fishery.

For stock complexes, the SDC measured on a complex-wide basis or for an indicator stock should satisfy MSA requirements to prevent overfishing and achieve OY for a fishery. Vulnerability of stocks to the fishery should be evaluated when determining if (1) a particular stock complex should be established or reorganized or (2) a particular stock should be a member of a stock complex. Indicator stocks are selected as representatives for a stock complex because they have known status determinations and known values for MSY and OY, and can form the basis for an MSY and OY for the combination of stocks in a complex. Although it is common for the indicator stock for a stock complex to be the most abundant stock, if an indicator stock is less vulnerable than other stocks in the complex, the management measures should be more conservative to protect the more vulnerable stocks from overfishing. A preliminary vulnerability analysis was conducted by NMFS Alaska Fisheries Science Center (AFSC) to assist the Council in its deliberations of management approaches for vulnerable stocks (section 1.4.3).

1.4.2.1.4 Indicator Stocks

An indicator stock is a stock that is used to help manage and evaluate stocks that are in a stock complex and do not have their own SDC. If an indicator stock is used to evaluate the status of a complex, it should be representative of the typical status of each stock within the complex, due to similarity in vulnerability. If the stocks within a stock complex have a wide range of vulnerability, they should be reorganized into different stock complexes that have similar vulnerabilities; otherwise the indicator stock should be chosen to represent the more vulnerable stocks within the complex. In instances where an indicator stock is less vulnerable than other members of the complex, management measures need to be more conservative so that the more vulnerable members of the complex are not at risk from the fishery. More than one indicator stock can be selected to provide more information about the status of the complex. Although the indicator stock(s) are used to evaluate the status of the complex, individual stocks within complexes should be examined periodically using available quantitative or qualitative information to evaluate whether a stock has become overfished or may be subject to overfishing.

1.4.2.1.5 MRA Regulations and Management Function

MRA regulations establish the calculation method and specifications for groundfish species that are closed to directed fishing.[4] The MRA is calculated as a percentage of the retained amount of species closed to directed fishing relative to the retained amount of basis species or species groups open for directed fishing. All MRA accounting is computed based on round weight equivalent. Amounts that are caught in excess of the MRA percentage must be discarded. Current regulations limit vessels to MRAs at any time during a fishing trip.

50 CFR 679.2 defines a fishing trip as follows:

(i) With respect to retention requirements of MRA, an operator of a catcher/processor or mothership processor vessel is engaged in a fishing trip from the time the harvesting, receiving, or processing of groundfish is begun or resumed in an area until

(A) The effective date of a notification prohibiting directed fishing in the same area under § 679.20 or § 679.21;

[4] MRAs apply only when the fishery is closed to directed fishing (on bycatch status) and when retention is not prohibited (on PSC status).

(B) The offload or transfer of all fish or fish product from that vessel;
(C) The vessel enters or leaves an area where a different directed fishing prohibition applies;
(D) The vessel begins fishing with different type of authorized fishing gear; or
(E) The end of a weekly reporting period, whichever comes first.

These MRAs are the primary tool NMFS uses to regulate the catch of species closed to directed fishing. The MRA table is a matrix of proportions representing a range of rates of expected or accepted incidental catch of species closed to directed fishing relative to target species. As a management tool MRAs rely on the ability of the vessel operator to selectively catch the target species. The target species is called a basis species in regulation. The species closed to directed fishing is the incidental species. The MRA percentages are intended to slow the rate of harvest of a species when insufficient TAC or PSC (halibut, crab, herring, and salmon in the BSAI) amounts are available to support a directed fishery.

NMFS prohibits directed fishing for a species to avoid exceeding a TAC (typically established for conservation reasons), exceeding an amount or percentage of groundfish included in the annual specifications for a gear and species or species group, or exceeding a PSC limit (e.g., halibut limits). When NMFS prohibits directed fishing, retention is allowed up to an amount calculated with the MRA. The MRA tables (Tables 10 and 11 to 50 CFR part 679) show retainable proportions of incidental species relative to species open to directed fishing. This table displays bycatch species in the columns and species open to directed fishing (basis species) in the rows. Each species open to directed fishing retained on board a vessel would become a basis species from which individual retainable bycatch amounts for the bycatch species would be measured. The individual retainable bycatch amount would be calculated by multiplying the retainable percentage in the appropriate block of the table by the round-weight equivalent of the corresponding basis species. The maximum retainable bycatch amount for a given bycatch species would be the sum of all the individual retainable bycatch amounts for the various basis species retained on board the vessel.

Vessel operators calculate the MRA through three basic steps. First, they identify and calculate the round weight of the basis (or target) species onboard. Next, they identify the appropriate fraction from the MRA table, and then multiply that rate against the round weight of the basis species. The calculated MRA is the limit for retention of the incidental species. A vessel will typically discard catch of the incidental species in excess of that amount to avoid violation of current regulations. The catcher/processor vessel operator calculates the MRA at any time for the duration of the fishing trip, often referred to as an "instantaneous" calculation. The shoreside catcher vessel operator calculates the MRA upon returning to port for delivery of retained catch.

When NMFS prohibits directed fishing on a groundfish species, MRAs buffer the amount of catch of species on bycatch status occurring in the open directed fisheries. Ideally, the application of an MRA rate slows catch of a species so that harvest can be managed up to the TAC by the end of the year. Beyond management of a TAC to obtain optimum yield, MRA calculations perform two additional functions. First, MRAs limit retention to species' expected or accepted incidental catch rate. Alternately, the MRA functions as a trip limit for retention of incidental catch of a species. This function allows for limited targeting of a species up to the MRA ("topping off").

For several incidental/basis species combinations, the use of low MRA rates may reduce the incentive for topping off that would occur in the absence of this tool. In these cases, the MRAs represent the expected catch of an incidental species absent deliberate action by the vessel operator to maximize that incidental catch. The requirement to not exceed MRA proportion at any time during a trip limits the vessel operator's ability to maximize catch. This restriction is used to limit total catch of species with low TACs (relative to the species caught in directed fisheries), at greater risk of being caught in excess of the overfishing level, and of high value. Several GOA rockfish species and sablefish meet these criteria.

Under all alternatives, the MRAs for stocks that are not open to directed fishing would be unchanged from the status quo. The other species assemblage would continue to be defined in regulation for the purpose of setting MRAs.

Other species (sculpins, sharks, octopuses, and GOA squid) will be treated as a group for MRA calculations. However, the implications of this may differ depending on whether or not a species within the group has a large enough TAC to allow for a directed fishery (i.e., the TAC is sufficiently larger than the incidental catch allowance (ICA) to permit a directed fishery allowance (DFA)). If the Council created a BSAI sculpin TAC that was large enough to permit a DFA, sculpin would be treated as a basis species for MRA purposes. This means that the total basis species against, which the 20 percent MRA was calculated would include sculpin catches, and that sculpin would not be included in the portion of the catch subject to the MRA.

As an explicit example, suppose the Council set a sculpin TAC that was large enough to permit a sculpin DFA. Suppose further that a vessel had a retained directed catch of 100 tons of groundfish other than sculpin and 10 tons of sculpin, and an incidental catch of 10 tons of a mixture of sharks, octopuses, and squids. The basis amount would be 110 tons, the 20 percent other species MRA would be 22 tons, and the 10 tons of incidental catch would fall within the MRA limit. If the sculpin had not had a DFA, the basis amount would have been 100 tons, the MRA amount would have been 20 tons, and the 20 tons of incidental catch (sculpins, squids, octopuses, and sharks) would have been right at the MRA threshold. If the retained sculpin catch had been larger, perhaps 15 tons, the volume of other species catch would have been greater than the MRA if there were no sculpin DFA.

Thus, depending on the TAC for a species and the potential for a DFA, the volume of basis species and the volume of fish to be covered by an MRA, can both change. Inseason managers and fishermen already deal with this situation in the management and harvest of rockfish. Rockfish currently constitute an MRA grouping in which some species may be open to directed fishing, and some may be closed. Moreover, some species of rockfish change to PSC status when the TAC is reached and retention is thereafter prohibited. If a specified rockfish species is open to directed fishing then it is a target species. If there is enough TAC to support a directed fishery then it is usually open for directed fishing, so as not to create regulatory discards. An example of a species that doesn't have enough TAC to support a directed fishery is shortraker rockfish in the GOA and BSAI. There isn't enough shortraker rockfish left after the amount retained or discarded in non-shortraker rockfish fisheries to allow for a directed shortraker rockfish fishery. Accordingly, NMFS does not issue a DFA for shortraker rockfish and any catch of shortraker rockfish would be subject to the MRA for the rockfish group, whether or not other rockfish species are also subject to the MRA.

1.4.2.1.6 Effects of Alternatives on Target Groundfish Fisheries

Stock assessments are prepared for each target stock, species or species group, and other species group and are contained in the annual SAFE reports (Figure 3 and Figure 4). Impacts to the target species stock, species or species group are predicted to be insignificant for all target fish evaluated under the alternatives, because the alternatives would not be expected to have the following effects:

1) jeopardize the capacity of the stock to produce maximum sustainable yield on a continuing basis;
2) alter the genetic sub-population structure such that it jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold;
3) alter harvest levels such that it jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold;
4) alter harvest levels or distribution of harvest such that prey availability would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold; or

5) disturb habitat at a level that would alter spawning or rearing success such that it would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold.

See the individual stock assessments in the SAFE report for additional information and documentation of the assessment process (NPFMC 2009a and 2009b).

Target stocks would be identified as in the fishery under the Preferred Alternative and Alternative 3; this action results in an organizational change to the FMP for this category. Target stocks would maintain their current management regime under all alternatives. The current harvest strategy for setting annual harvest specifications would continue. The current process for managing PSCs and MRAs would continue. Additional or earlier closures of target fisheries and seasonal allocation may occur as a result of the specification of additional ACLs for the other species component groups in each FMP.

If it is determined that a total allowable catch (TAC) amount of groundfish species or species group will be reached then NMFS calculates the incidental catch amount in other fisheries necessary for the remainder of the season or year. For example, Pacific cod taken incidentally in a pollock target fishery contributes to the Pacific cod incidental catch. NMFS bases the amount of the incidental catch on current and historical catch rates. After deducting the incidental catch amount, the remaining TAC is the directed fishing allowance (DFA) which allows vessels full retention of the species. Once the DFA is caught, the directed fishery closes. Closures limit retention to a percent of the other retained species which are open for directed fishing. This percent is the maximum retainable amount (MRA). The percentage relates to the expected rate of catch and may be used as a tool to harvest a species that is low in volume but high in value. Retention is prohibited if the total TAC is caught before the end of the year.

Prohibiting retention removes any incentive to increase incidental catch as a percentage of other fisheries. If the ABC, which is equivalent to the ACL, is taken and the catch rate indicates that the OFL may be approached then additional closures are issued. To prevent overfishing, NMFS may prohibit directed fishing for other species or species groups in the area, district, or part thereof where the notification applies, or may limit time, area, or gear types that may be used in directed fishing for the other target species or species groups. NMFS identifies specific fisheries by gear and area that have the greatest incidental catch and issue the least restrictive closure possible that will decrease catch rates enough to avoid reaching the OFL. If the rate of take is not sufficiently slowed then additional closures will be issued until reaching the OFL is prevented. Over fishing closures are rare. Since 1995, NMFS issued 7 closures to prevent overfishing for a rockfish species (either Pacific ocean perch, shortraker, or rougheye) in the BSAI. One of the closures included Atka mackerel in the Aleutian Islands subarea.

In the Bering Sea and Aleutian Islands, the Amendment 80 cooperative, pollock, and CDQ fishery allocations are granted to particular participants. In exchange, the participants limit their catch rather than the agency imposing fishing time limits.

The proposed alternatives may affect federal fisheries for target groundfish because the harvest of target groundfish in federal waters may be reduced as a result of separate (and lower) ACLs for sharks, octopuses and GOA squids; fisheries that incidentally take sculpins are not expected to be affected. The target groundfish categories that may be affected by creating additional specification categories for sharks, sculpins, octopuses, and GOA squids are addressed under Section 1.4.2.2.1.

1.4.2.1.7 Effects of Alternatives on State of Alaska Managed State Waters Seasons and Parallel Fisheries

The State of Alaska has assumed authority under MSA Sec. 306(a)(3)(A)(i) for some groundfish species (e.g., black, blue, and dark rockfishes), for which "there is no fishery management plan or other applicable Federal fishing regulations for the fishery in which the vessel is operating." If a state-managed stock is identified in the FMP for purposes of incidental catch management in fisheries for stocks that are in the fishery, ACLs may not be required for those state-managed stocks. Those stocks may qualify to be

placed in the ecosystem component category, if they satisfy applicable criteria (e.g., prohibited species: Pacific herring, crab, and salmon). Principal management by the State of Alaska does not affect their status as prohibited species.

For all other groundfish fisheries that occur within state waters in the BSAI, ADF&G adopts the seasons, bycatch limits, and allowable gear types in effect in the adjacent EEZ and promulgated by NMFS, except where Board regulations take precedent. ADF&G issues a global emergency order at the beginning of each year to establish the commercial parallel groundfish seasons, bycatch limits, and gear types for those fisheries not exclusively managed by the State of Alaska, to coincide with federal regulations of the adjacent EEZ.

The Council's authority is limited to managing fishing by federally permitted vessels within state waters from 0 nm to 3 nm. For fish stocks that occur in both state and federally managed waters and are managed under an FMP as in the fishery, the catch limits are specified for the entire stock. Total catch of that stock, including harvest inside state waters, is reported and applied toward the setting of catch limits during the annual harvest specifications process. While harvests may be managed under separate sector ACLs for the federal sector and a state sector, the Council will develop ACLs by considering total removals (including those from state waters) in groundfish stock assessments. Also, the Council directly adjusts its TACs to account for state water harvests for some state water fisheries (e.g., Pacific cod), but not for others (e.g., sablefish, rockfish). The Council may wish to consider implementing a standard policy for addressing state water catches when setting TACs for federal groundfish fisheries in the annual specification process.

Target stocks would maintain their current management regime under all the alternatives. They would be identified as in the fishery under the Preferred Alternative and Alternative 3. This is an organizational change to the FMPs. None of the alternatives are believed to directly or indirectly affect the incidental take of prohibited species by the groundfish fisheries. The action is not expected to change the gear types, amounts, timing or location of the groundfish fisheries; therefore, no change in the management of state fisheries is believed to occur under any of the alternatives compared to status quo.

1.4.2.2 Other Species

The original BSAI and GOA Groundfish FMPs identified three separate species categories: (1) prohibited, (2) specific species or species complexes, and (3) other species. The GOA FMP placed grenadiers in the "other species" category in 1979. The Council quickly learned that including the grenadier catch in the total catch assessed for other species would close the foreign longline and trawl fisheries. Amendment 5 established a new, distinct category for grenadiers with a separate MSY/OY as a short term solution to high bycatches of grenadiers in the sablefish fisheries.

The "other species" category was redefined in Amendment 8 to the GOA FMP in 1980, as follows: species that have "only slight economic value and are generally not targeted upon, but which are either significant components of the ecosystem or have economic potential." Since then, the definition has been modified to "groups that currently are of slight economic value and not generally targeted upon, but which have the potential to be targeted on in the future or are important ecosystem components." They also are described as those species for which insufficient data exist to allow management under separate TACs. The FMPs specify that a single set of specifications be implemented for this category as a whole. If any circumstances change that led a species to be placed in a specific stock category in the FMP, an FMP amendment is needed to move that species to a more appropriate stock category. Amendment 8 created a fourth FMP species category for non-specified species that included all fish caught incidental to other species and not used commercially for any purpose, as a long term solution. Grenadiers were placed in the non-specified category under Amendment 8.

The "other species" category has further evolved over time, complicating the management measures associated with these species. Atka mackerel was combined in the GOA "other species" category in 1988 under Amendment 18 due to its low abundance and the absence of a directed fishery for the previous several years. However, beginning in 1990, Atka mackerel were targeted in the GOA. Catches of the GOA "other species" category were dominated by Atka mackerel from 1990 to 1993, primarily from the Western GOA regulatory area. Atka mackerel were separated from the "other species" category and became a separate target category in the GOA in 1994, after approval of GOA Amendment 31. Forage fish species were moved to a new category created under Amendment 39 in 1998.

Skates were removed from the other species assemblage under GOA Amendment 63 when a longline fishery around Kodiak began in 2003. The Council now sets specifications for longnose skates, big skates, and other skates even though the fishery was not continued.

Not as many changes have occurred in the BSAI "other species" category. Amendment 11a in 1988 identified the component groups in the "other species" category and created the non-specified species category to include those species taken incidentally in the groundfish fisheries but not managed by the FMP. Squid and Atka mackerel had been managed separately since implementation of the FMP. Forage fish species were moved to a new category created under BSAI Amendment 36 in 1998. In 2009 the Council created a new specification category for BSAI skates under Amendment 95. The BSAI Groundfish Plan Team has indicated an interest in developing separate specifications for Alaska skates and other skates, perhaps as early as 2011.

Sharks

The following is taken from the 2009 GOA and BSAI SAFE Reports and references can be found in Tribuzio et al. (NPFMC 2009a and b). Sharks are long-lived species with slow growth to maturity, a large maximum size, and low fecundity. Therefore, the productivity of shark populations is very low relative to most commercially exploited teleosts (Holden 1974, 1977, Compagno 1990, Hoenig and Gruber 1990). Shark reproductive strategies in general are characterized by long gestational periods (6 months to 2 years), with small broods of large, well-developed offspring (Pratt and Casey 1990). Because of these life history characteristics, large-scale directed fisheries for sharks have collapsed, even where management was attempted (Anderson 1990, Hoff and Musick 1990, Castro et al. 1999).

The three shark species most likely to be encountered in the BSAI and GOA are the Pacific sleeper shark (*Somniosus pacificus)*, the piked or spiny dogfish (*Squalus acanthias)*, and the salmon shark (*Lamna ditropis*). Sharks catches have only been identified to the species level since 1997 and have made up from 11 percent to 64 percent of GOA other species catch from 1997 to 2009. Vulnerability analyses indicate that sharks were three of the four most vulnerable species (Spencer and Ormseth 2009).

Pacific sleeper sharks range as far north as the arctic circle in the Chukchi Sea (Benz et al. 2004), west off the Asian coast and the western BS (Orlav and Moiseev 1999), and south along the Alaskan and Pacific coast and possibly as far south as the coast of South America (de Astarloa et al. 1999). However, Yano et al. (2004) reviewed the systematics of sleeper sharks and suggested that sleeper sharks in the southern hemisphere and the southern Atlantic were misidentified as Pacific sleeper sharks and are actually *Somniosus antarcticus*, a species of the same subgenera. Pacific sleeper sharks have been documented at a wide range of depths, from surface waters (Hulbert et al. 2006) to 1,750 m (seen on a planted grey whale carcass off Santa Barbara, California, www.nurp.noaa.gov/Spotlight/Whales.htm). Sleeper sharks are found in relatively shallow waters at higher latitudes and in deeper habitats in temperate waters (Yano et al. 2007).

Spiny dogfish are demersal, occupying shelf and upper slope waters from the Bering Sea to the Baja Peninsula in the North Pacific, and worldwide in non-tropical waters. They are considered more common off the U.S. west coast and British Columbia than in the GOA or Bering Sea and Aleutian Islands (Hart

1973, Ketchen 1986, Mecklenburg et al. 2002). This species may once have been the most abundant living shark. However, it is commercially fished worldwide and has been heavily depleted in many locations. Directed fisheries for spiny dogfish are often selective on larger individuals (mature females), resulting in significant impacts on recruitment (Hart 1973, Sosebee 1998).

Salmon sharks range in the North Pacific from Japan through the Bering Sea and GOA to southern California and Baja, Mexico. They are considered common in coastal littoral and epipelagic waters, both inshore and offshore. Salmon sharks have been considered a nuisance because they consume salmon and they damage fishing gear (Macy et al. 1978, Compagno 1984). Salmon sharks have been investigated as potential target species in the GOA; however, they are currently only targeted by sport fishermen in the state fishery (Paust and Smith 1989). Salmon sharks tend to be more pelagic and surface oriented than the other shark species in the GOA, about 72 percent of their time is spent in waters less than 50 m deep (Weng et al. 2005). While some salmon sharks migrate south during the winter months, others remain in the GOA throughout the year (Weng et al. 2005, Hulbert et al. 2006).

There are currently no directed commercial fisheries for shark species in federal or state managed waters of the GOA and most incidentally caught sharks are not retained. A small amount of spiny dogfish landings in Kodiak were reported in 2004, 2005, and 2007 (approximately 1 metric ton [mt] each year). There is an ADF&G Commissioner's Permit fishery for spiny dogfish in lower Cook Inlet; however, only one application has been received to date and the permit was not issued. Spiny dogfish are also allowed as retained incidental catch in some ADF&G managed fisheries with some landings reported in Yakutat for 2005 to 2008. The landings were highest in 2005 (about 11,363 kg landed) and decreased in 2008 to 138 kg landed. There were no recorded landings of dogfish in Yakutat in 2009.

From 1997 to 2009 in the BSAI, spiny dogfish were caught primarily in the Pacific cod fishery (85%), while Pacific sleeper sharks were caught primarily in the pollock fishery (49%). Pacific sleeper sharks were also caught in the Pacific cod fishery (40%). Salmon sharks were rarely encountered, but 89% of the salmon shark catch occurred in the pollock fisheries. Other sharks and unidentified sharks occurred primarily in the pollock fisheries (48%).

Spiny dogfish, salmon shark, and Pacific sleeper shark are caught in the recreational fisheries of Southeast and Southcentral Alaska. Sleeper sharks are uncommon in the recreational catch and rarely retained. The State of Alaska manages recreational shark fishing in state and federal waters, but most of the harvest occurs in state waters. The shark fishery is managed under a statewide plan with a daily bag limit of one shark of any species and an annual limit of two sharks (5 AAC 75.012).

Estimated annual harvest of all shark species combined averaged 308 fish in Southeast Alaska and 795 fish in Southcentral Alaska from 2003 to 2007. Estimated annual catch, including released fish, averaged about 18,000 sharks in Southeast and 36,000 sharks in Southcentral Alaska from 2003 to 2007. These catches are incorporated into the stock assessment. The discrepancy between catch and harvest illustrates that the vast majority of sharks are caught incidentally and released.

There is a modest directed sport fishery for salmon sharks involving a few charter boats, most of which operate in Prince William Sound. A small fraction of the directed salmon shark harvest is taken by unguided anglers. Annual statewide harvests range from about 140 to 280 fish per year. The directed sport salmon shark fishery appeared to increase in the late 1990s in response to media attention, but appeared to wane in 2007 and 2008.

Spiny dogfish make up the vast majority of the recreational shark catch and harvest but are rarely targeted. Most of the catch is incidental to the sport halibut fishery. Catch rates can be quite high at certain times of the year, particularly in Cook Inlet, southwestern Prince William Sound, and near

Yakutat. Anecdotal reports indicate that many spiny dogfish are handled poorly when released. Discard mortality is unknown but probably substantial.

Historical catches of sharks in the GOA are composed entirely of incidental catch, and nearly all shark catch is discarded. Mortality rates of discarded catch are unknown, but are estimated to be 100 percent.

Sharks would directly benefit under both the Preferred Alternative and Alternative 3. Both alternatives have the same effect, as ACLs would be required to be set for them at more biologically appropriate levels, which reduce their risk of being overharvested. The aggregate assemblage catch limits would be replaced by those for each group. While the TAC for the other species assemblage is set at a level that prevents overfishing of other species (at least as an aggregated mixed stock) under the status quo, the effect of the Preferred Alternative and Alternative 3 would be to ensure that these otherwise vulnerable species (under aggregate ACLs) are afforded better protection (under group level ACLs), while not reducing protection for any of the species and stocks currently managed in aggregate.

Sculpins

The following is taken from the 2009 GOA and BSAI SAFE Reports and references can be found in Ormseth and TenBrink (NPFMC 2009a and b). Sculpins are a group of relatively small, benthic-dwelling predatory teleost fishes, which includes 46 species in waters off the coast of Alaska. Cooperative United States–Japan trawl surveys identified 41 species of sculpins in the Eastern Bering Sear (EBS) and 22 species in the AI. Only 39 of 46 species of sculpins have been identified in the GOA AFSC trawl survey; an additional 7 species may occur in the GOA. Sculpins are distributed throughout the BSAI and GOA and occupy all benthic habitats and depths. The stock assessments focus on large sculpin species from the genera *Myoxocephalus*, *Hemitripterus*, and *Hemilepidotus*. Vulnerability analyses indicate that sculpins could be managed as a separate assemblage and catch could be constrained through assemblage catch limits and spatial management.

Sculpins lay adhesive eggs in nests, and many exhibit parental care for eggs (Eschemeyer et al. 1983). Markevich (2000) observed the sea raven, *Hemitripterus villosus*, releasing eggs into crevices of boulders and stones in shallow waters in Peter the Great Bay, Sea of Japan. This type of reproductive strategy may make sculpin populations more sensitive to changes in benthic habitats than other groundfish species such as pollock, which are broadcast spawners with pelagic eggs. In the western Pacific, great sculpins *Myoxocephalus polyacanthocephalus* are reported to have late ages at maturity (5to 8 years, Tokranov 1985) despite being relatively short-lived (13 to 15 years), which suggests a limited reproductive portion of the lifespan relative to other groundfish species. Fecundity for the great sculpin off East Kamchatka waters ranged from 48,000 to 415,000 eggs (Tokranov 1985). In contrast, bigmouth sculpin (*Hemitripterus bolini*) averaged 2283 eggs per female (Morgan Busby, AFSC, personal communication). The diversity of sculpin species suggests that each sculpin population might respond differently to environmental changes (whether natural or fishing induced). Observed spatial differences in fecundity, egg size, and other life history characteristics suggest local population structure within each species (Tokranov 1985).

There are no directed fisheries for sculpin species in the BSAI or GOA at this time. Sculpins constituted about 65 percent of the 2008 GOA other species catch. Retained catch of sculpin species in the GOA has increased recently from 7 percent in 2003 to 20 percent in 2009. Sculpins are caught incidentally by a wide variety of fisheries. The main fisheries that catch sculpins are the flatfish, Pacific cod, and IFQ halibut fisheries. Sculpin catch has increased in the last several years from 583 t in 2006 to 960 t in 2007 and 1,943 t in 2008. The 2009 catch as of October is also high at 1,146 t. These catches are mainly the result of increased catches of sculpins in the shallow-water flatfish fishery.

In 2007, *Hemilepidotus* spp. (the Irish lords) made up 65 percent of the sculpin total observed catch. *Hemitripterus* spp. (bigmouth sculpin) constituted approximately 18 percent of the total sculpins. In 2008, the first year observers identified the top five species of sculpins to species, shows that *Hemilepidotus jordani* (yellow Irish lord) were 62 percent of all sculpin catch in the GOA, followed by Irish lord unidentified. In 2009 the catch percentage of *H. jordani* is lower but still the largest fraction of sculpin catch. *Myoxocephalus* species make up only a small part of GOA sculpin catches. Sculpins provide the greatest contribution (96 percent) to the combined GOA other species OFL and ABC.

There is no directed fishing for any sculpin species in the BSAI. The Aleutian Islands both the Pacific cod and Atka mackerel fisheries were the main fisheries catching sculpins. In the EBS the Pacific cod fisheries and the yellowfin sole fishery were the main fisheries that caught sculpins. They generally are not retained by fisheries in the BSAI region, although the retention rate increased to 13 percent in 2009. Sculpins constitute the bulk of the other species catches in the BSAI (excluding skates which are proposed to be removed from the assemblage). Based on total catch estimates from 1998 to 2008, sculpins comprised 19 percent to 28 percent of the total other species catch during this time period (with skates comprising 70 percent). Sculpins are caught by a wide variety of fisheries, but trawl fisheries for yellowfin sole, Pacific cod, walleye pollock, Atka mackerel and flathead sole, and Pacific cod hook-and-line fishery catch the most.

Sculpins would directly benefit under both the Preferred Alternative and Alternative 3. Both alternatives have the same effect, as ACLs would be required to be set for them at more biologically appropriate levels, which reduce their risk of being overharvested. The aggregate assemblage catch limits would be replaced by those for each group. While the TAC for the other species assemblage is set at a level that prevents overfishing of other species (at least as an aggregated mixed stock) under the status quo, the effect of the Preferred Alternative and Alternative 3 would be to ensure that these otherwise vulnerable species (under aggregate ACLs) are afforded better protection (under group level ACLs), while not reducing protection for any of the species and stocks currently managed in aggregate.

Octopuses

The following is taken from the 2009 GOA and BSAI SAFE Reports and references can be found in (Conners and Conrath in NPFMC 2009a and b). In federal waters octopus is open to directed fishing with any legal gear for groundfish. The generic life history of octopus is conducive for a viable directed fishery because they are short-lived, fast growing, and fecund. However, little is known about the species assemblage. Cephalopod identification is difficult and it is likely that there are several species that are harvested in Alaska. The majority of harvested octopus is assumed to be the Giant Pacific octopus. Biomass, migrations, and discard mortality by gear type and the level of non-reporting of octopus retained for personal use as bait are unknown. Biomass estimates of octopus from the NMFS trawl survey have been produced but are not considered reliable by the stock assessment authors.

The other species catch specifications and MRAs would limit octopus harvests if a directed octopus fishery were to develop in federal waters. A vessel participating in both state and federal waters may not land more than 20 percent octopus bycatch from state waters but could land an amount above 20 percent from federal waters. Setting a separate specification for octopuses (relative to the entire other species assemblage) would lower the upper harvest limit and provide a more precautionary management approach for these species, pending development of improved assessment methods and additional accountability measures for them. The management differences for octopus between state and federal waters may lead to misreporting of octopus bycatch harvests when vessel operators are participating in a directed fishery that is open in state and federal waters (e.g. parallel/federal Pacific cod).

The following is a brief overview of octopus management in state waters and federal waters that was prepared for the Council in May 2008 from contributions from ADF&G staff in Southeast Alaska, Prince

William Sound, Cook Inlet, Kodiak, Chignik, South Alaska Peninsula, and BSAI management areas. NMFS classifies octopus as a groundfish in federal waters, whereas the state of Alaska classifies octopus as a miscellaneous shellfish in state waters. Different classification by state and federal management systems results in fishery management that is not coordinated for this transboundary species.

Directed fishing for octopus in state waters may occur only by commissioner's permit (5 AAC 38.062) and requires a Commercial Fisheries Entry Commission (CFEC) interim use permit card for octopus. The commissioner's permit allows ADF&G to stipulate harvest location and duration, limit gear and other harvest procedures, and require periodic or annual reporting. Commissioner's permit terms are crafted to structure fishing so that ADF&G may gather catch per unit effort, distribution and other biological data with gear restrictions designed to reduce crab and fish bycatch. Harvests are closely monitored through catch reporting and biological catch sampling. In Westward Region, during recent years only a few vessel operators have requested this permit and harvests have been very limited. In Prince William Sound no permits have been issued in recent years. Cook Inlet is closed to directed fishing; octopus may only be retained as bycatch. In Southeast Alaska, in the 1980s, permits were issued for exploratory fisheries using lair pots but catch was insignificant. Since 2000, two permit requests in Southeast Alaska for a directed octopus fishery were denied since ADF&G has no funding or program in place to sustainably manage a directed octopus fishery. In all management areas there are no preseason harvest levels established for octopus, or survey or biomass information.

Retention of octopus bycatch in other directed fisheries within state waters is allowed (this would include parallel groundfish fisheries). In most management areas bycatch is allowed at 20 percent, however in the Southeast Alaska pot shrimp fishery octopus bycatch is limited by permit to 5 percent of the total converted whole weight of shrimp on board the fishing vessel. In Southeast Alaska a commissioner's permit is required for retaining octopus bycatch; however, the bycatch is landed on the directed fishery CFEC permit card. In Southeast Alaska, an average of 2,806 pounds of octopus have been landed on an average of 22 permits per year since 2001—0.3 percent of total shrimp landings.

Bycatch is landed on the harvester's directed species CFEC permit, not an octopus CFEC permit. This practice allows ADF&G to calculate the octopus bycatch harvest as a percentage of the target species harvest. Bycatch retention does not require registration, except in Southeast Alaska. Octopuses are regularly landed as bycatch, constituting the bulk of octopus landed from state waters.

Octopuses would directly benefit under both the Preferred Alternative and Alternative 3. Both alternatives have the same effect, as ACLs would be required to be set for them at more biologically appropriate levels, which reduce their risk of being overfished. The aggregate assemblage catch limits would be replaced by those for each group. While the TAC for the other species assemblage is set at a level that prevents overfishing of other species (at least as an aggregated mixed stock) under the status quo, the effect of the Preferred Alternative and Alternative 3 would be to ensure that these otherwise vulnerable species (under aggregate ACLs) are afforded better protection (under group level ACLs), while not reducing protection for any of the species and stocks currently managed in aggregate.

GOA Squids

The following is taken from the 2009 GOA SAFE Report and references can be found in Ormseth et al. (2009c) and in NPFMC 2009b. Squids are cephalopod molluscs that are related to octopus. They are active predators that swim by jet propulsion, reaching swimming speeds of up to 40 km/hr, the fastest of any aquatic invertebrate. An *Archeteuthis* species holds the record for largest size of any invertebrate. There are at least 15 squid species found in the mesopelagic regions of the EBS; the same species are believed to inhabit the GOA. Squid are distributed throughout the North Pacific, but are common in large schools in pelagic waters surrounding the outer continental shelf and slope (Sinclair et al. 1999). The most common squid species in the EBS are in the family Gonatidae. The more common species near the

continental shelf are *Berryteuthis anonychus* and *B. magister*. The likely common species further offshore are *Gonatopsis borealis*, *Gonatus middendorfi*, and several other *Gonatus* species. Marine mammal food habits data and recent pilot studies indicate that *Ommastrephes bartrami* may also be common.

Relative to most groundfish, squids are highly productive, short-lived animals. They display rapid growth, patchy distribution and highly variable recruitment (O'Dor 1998). Unlike most fish, squids may spend most of their life in a juvenile phase, maturing late in life, spawning once, and dying shortly thereafter. Whereas many groundfish populations (including skates and rockfish) maintain stable populations and genetic diversity over time with multiple year classes spawning repeatedly over a variety of annual environmental conditions, squids have no such "reserve" of biomass over time. Instead, it is hypothesized that squids maintain a "reserve" of biomass and genetic diversity in space with multiple cohorts spawning and feeding throughout a year and over a wide geographic area across locally varied environments (O'Dor 1998). Many squid populations are composed of spatially segregated schools of similarly sized (and possibly related) individuals, which may migrate, forage, and spawn at different times of the year (Lipinski 1998). Most information on squids refers to *Illex* and *Loligo* species which support commercial fisheries in temperate and tropical waters. Of North Pacific squids, life history is best described for western Pacific stocks (Arkhipkin et al. 1995; Osako and Murata 1983).

The most commercially important squid in the north Pacific is the magistrate armhook squid or "red squid" *Berryteuthis magister*. This species is distributed from southern Japan throughout the BS, AI, and GOA to the U.S. West coast as far south as Oregon (Roper et al. 1984). The maximum size reported for *B. magister* is 28 cm mantle length. *B. magister* from the western Bering Sea are described as slow growing (for squid) and relatively long lived (up to 4 years). Males grew more slowly and matured earlier than females. *B. magister* in the EBS have shorter life spans (approximately one year) and mature earlier than western populations (Drobny 2008). *B. magister* were dispersed during summer months in the western BS, but formed large, dense schools over the continental slope between September and October. Stock structure is complex, with three seasonal cohorts identified in the region: summer-hatched, fall-hatched, and winter-hatched. Growth, maturation, and mortality rates varied between seasonal cohorts, with each cohort using the same areas for different portions of the life cycle. For example, the summer-spawned cohort used the continental slope as a spawning ground only during the summer, while the fall-spawned cohort used the same area at the same time primarily as a feeding ground, and only secondarily as a spawning ground (Arkhipkin et al. 1995).

Timing and location of fishery interactions with squid spawning aggregations may affect both the squid population and availability of squid as prey for other animals (Caddy 1983; O'Dor 1998). The essential position of squid within North Pacific pelagic ecosystems, combined with the limited knowledge of the abundance, distribution, and biology of many squid species in the FMP areas, make squid a good candidate for management distinct from that applied to other species. In the EBS, fishery interactions with squid happen in predictable locations (Gaichas 2005), suggesting that in some cases, squid may be most effectively managed by spatial restrictions rather than by quotas.

Squid are generally taken incidentally in target fisheries for pollock, but have been the target of Japanese and Republic of Korea trawl fisheries in the past. There are no directed squid fisheries in Alaskan waters at this time. Squids could potentially become targets of Alaskan fisheries, however. There are many fisheries directed at squid species worldwide, although most focus on temperate squids in the genera *Illex* and *Loligo* (Agnew et al. 1998, Lipinski et al. 1998). For instance, the market squid *Loligo opalescens* supports one of the largest fisheries in the Monterey Bay area of California (Leos 1998), and has also been an important component of bycatch in other fisheries in that region (Calliet et al. 1979). There are fisheries for *B. magister* in the Western Pacific, including Russian trawl fisheries with annual catches of 30,000 to 60,000 mt (Arkhipkin et al. 1995), and coastal Japanese fisheries with catches of 5,000 to 9,000 t in the late 1970s to early 1980s (Roper et al. 1982; Osaka and Murata 1983). Therefore, monitoring

catch trends for species in the squid complex is important because markets for squids exist and fisheries might develop rapidly.

Since 2003, the NMFS Alaska Regional Office (AKRO) has reported total squid catch, without breaking down the squid catch by species. Prior to 2003, catch of squids was not reported separately from the "other species" category, but observer species composition sampling was used to estimate catches of each other species component (see below).

Squids have historically represented a small proportion (about 1–2 percent) of the other species catch in the GOA. This began to change in 2003, when the proportion rose to 5%, and increased to an especially large catch in 2006 (1,530 t, 39 percent of the other species catch). The catch declined to 412 t in 2007 and 84 t in 2008. The 2009 catch, as of October 2009, is similar to that in 2007. The 2006 GOA squid catch was similar to catch levels in the BSAI during the 2000s (Ormseth and Jorgenson 2007). Analysis of fishery observed data suggests that retention of squids varies considerably; estimates of retention rates range from 19 percent to 97 percent, although retention has been high for the last several years.

Most squid are caught incidentally in the pollock fishery, which has the highest observer coverage in the central Gulf of Alaska (areas 620 and 630). The distribution of squid catch in unobserved fisheries is not known. The spatial distribution of the observed portion of the squid catch has changed over time, with the highest catches shifting from areas 610 and 630 in the mid-1990s to area 620 since 2001. Given the relatively low levels of observer coverage in GOA groundfish fisheries, and the generally low catches of squid in years before 2004, it is difficult to determine whether the apparent redistribution of squid catch results from changes in observer coverage over time, changing fishing patterns, or changes in squid distribution.

The predominant species of squid in commercial catches in the GOA is believed to be *B. magister*, although there is no way to verify this because the majority (99 percent) of squid catch is reported as "squid unidentified" (the remainder is identified as *Moroteuthis* spp, or "giant squid unidentified"). Squid catches from 1990 to 2002 are estimated using the Blend system, which combines observer catch data with landings data. Since 2003 the AKRO's Catch Accounting System (CAS), using a similar approach, has reported catches of squid and other species groups. Because squids are delicate and almost certainly killed in the process of being caught, 100 percent mortality of discards is assumed.

GOA squids would directly benefit under both the Preferred Alternative and Alternative 3. Both alternatives have the same effect, as ACLs would be required to be set for them at more biologically appropriate levels, which reduce their risk of being overfished. The aggregate assemblage catch limits would be replaced by those for each group. While the TAC for the other species assemblage is set at a level that prevents overfishing of other species (at least as an aggregated mixed stock) under the status quo, the effect of the Preferred Alternative and Alternative 3 would be to ensure that these species, which would face a higher risk of overharvest under aggregate ACLs, are afforded better protection (under group level ACLs), while not reducing protection for any of the species and stocks currently managed in aggregate.

1.4.2.2.1 Effects of Alternatives on Other Species (Including Indirect Effects on Target Stocks)

Under the status quo, the BSAI Groundfish FMP lists sculpins, sharks, and octopus in the other species assemblage and the GOA groundfish FMP lists sculpins, sharks, octopus, and squid in the other species assemblage. There are 8 shark species, 49 sculpin species, and 8 octopus species in the BSAI "other species" category. As many as 8 shark species, 39 sculpin species, 7 octopus species, and 15 squid species are believed to occur in the GOA. Lists of species are provided in the SAFE Report sections for each group. The OFL and ABC for the other species assemblages are recommended by the SSC each year as the sum of the estimated OFLs and ABCs of the component groups.

The other species assemblages aggregate very different taxa into a common specification category. Catch of multiple species groups with distinct life histories is regulated under a single set of management benchmarks (OFL and ABC). Each OFL and ABC for sharks, sculpins, octopuses (and squids in the GOA) is combined into a single assemblage OFL and ABC. The practice of combining species groups under umbrella catch limits raises the possibility that the catch for an individual group could exceed the respective maximum fishing mortality threshold (MFMT), were MFMT specified at the group level.

Generally the TAC for the other species assemblage is set at a level to prevent overfishing of the assemblage (at least as an aggregated mixed stock) while also (1) providing for traditional bycatch retention without restricting the major directed fisheries and (2) providing limited opportunity for the development of new fisheries. Based on whether the Council recommendation during the annual specification process for the other species TAC would prevent directed fishing harvests and incidental harvests from exceeding the TAC, NMFS determines whether to (1) allow a directed fishery for other species or (2) designate the category as bycatch only. Typically, NMFS sets the "other species" category as bycatch only at the start of the fishing year, although this could change in accordance with fishing practices. Typically the Council recommends the TAC so that neither prohibited species status nor closures of directed fishing are expected to occur. The FMP mandates that species for which TAC has been achieved shall be treated in the same manner as prohibited species; therefore, other species must be returned to the sea with a minimum of injury. Closures are made when inseason information indicates the apportioned TAC has been or soon will be reached, or at the end of the specified season, if the particular TAC has not been taken.

Commercial fisheries that land other species groups differ in various ways: in target species harvested, other incidental species caught, bycatch mortality, geographic location, gear used, season, vessel characteristics, and non-target species present (NMFS 2001). Consequently, each commercial fishery poses different levels of risk for incidental catch of other species. The level of risk to specific fish populations depends on the life history characteristics of each species and on the level of mortality in the fisheries harvesting these species. These issues are further addressed below.

The BSAI other species TAC in 2008, 2009, and 2010 was set at 50,000 mt (below an ABC of 78,100 mt in 2008, 63,700 mt in 2009, and 61,100 mt in 2010). The TACs during that period were set higher than the five year average (2003 through 2007) of 30,930 mt to cover incidental harvests, as TAC overages occurred during that five year period. The OFL, ABC, and TAC for the BSAI other species complex in 2010 are 88,200 mt, 61,100 mt, and 50,000 mt, respectively. Figure 7 and Figure 8 demonstrate that aggregated catches of the other species assemblages have been well under their respective benchmarks in the BSAI and GOA, except for 2006 when high incidental catch of GOA octopus occurred.

Catches of BSAI other species have been small relative to those of target species. The OFL and ABC have been set well above catch levels from 2003 through 2008 (Table 15). While a sufficient buffer exists between the harvest amount of other species and the ABC under the status quo for the stock complex, Table 15 shows that the harvest of all BSAI other species slightly exceeded the TAC in 2005. The Council responded by increasing the TAC in 2007 and 2008. Those higher TACs were intended to allow target fisheries to continue without being closed, although lower harvests have occurred during 2006 to 2009 from a peak in 2005. The BSAI other species TAC also is constrained to amounts necessary to support incidental catch in other directed fisheries and by the 2 million mt OY cap.

Catches of GOA other species also are low relative to those of target species. The OFL and ABC have been set well above catch levels from 2003 through 2008 (Table 16). As described above, the TAC had been constrained by a prescribed formula in the FMP until 2007, when the formula was relaxed for two years until it was replaced by the harvest strategy applied for target groundfish and BSAI other species through the tier system in 2009. The Council may set the TAC at levels that would allow a directed fishery for those groups or restrict harvest to incidental levels at the start of the year. The Council also

may set TAC (constrained by the ABC) to allow for sufficient incidental catch of those groups in directed fisheries so as to avoid early closures of those target fisheries.

Historically the TAC for GOA other species was set *equal to* 5 percent of the sum of TACs for all other groundfish due to the paucity of data then available for component species groups. Amendment 69 to the GOA groundfish FMP allowed the Council to specify TAC *less than or equal to* 5 percent of the sum of TACs for all other groundfish beginning in 2007 as a precautionary measure to minimize the harvest of component species groups. Amendment 79 allowed the Council to specify OFL and ABC for GOA other species and allowed the Council to set TAC less than or equal to the ABC for other species beginning in 2009.

Table 16 demonstrates the effect of these changes to GOA other species specifications. The TAC was lowered from 13,900 mt in 2006 to 4,500 mt in 2007. An OFL and ABC were first specified in 2009. The OFL and ABC for 2010 is specified at 9,430 mt and 7,075, respectively; the TAC remains at 4,500 mt.

Since initial implementation of the groundfish FMPs, NMFS and the Council have increasingly recognized the need to better understand and manage fishery impacts on species not targeted by fisheries. As more emphasis is placed on protecting biodiversity and ecosystem structure and function, managers will be challenged to cultivate a management system that maintains healthy non-target species stocks, protects these species from overfishing, and allows target fisheries on these species to develop only when sufficient information is available to ensure sustainable populations. This has required a substantial investment of additional management resources, because to achieve these objectives such a system must be based on a better understanding of the life history, distribution, and abundance of non-target species, species groups, and assemblages. Little information exists regarding the stock structure or status of most non-target populations in Alaska; however, the Stock Assessment Improvement Plan prioritized the collection of the needed data with which to manage some key stocks that are caught incidentally in target fisheries (http://www.nmfs.noaa.gov/pr/sars/improvement/pdfs/marine_fisheries_saip.pdf).

In the GOA, the species and species groups included in the original category included grenadiers (for one year) and Atka mackerel (which was broken out of the assemblage to allow separate ACLs for them in 1994). Life history information, however, suggests that some of these other species (particularly species with long lives, slow growth, and low fecundity) are easily over-exploited and, once overfished, may take decades to recover.

The potential for rapid growth in commercial fishing and the potential for over-exploitation in combined state and federally managed fisheries convinced the Board to close the directed commercial fishery for sharks and skates and require a Commissioner's permit to target sharks and skates. On behalf of the Board, the ADF&G submitted a groundfish proposal to the Council in 1998 for similar action in the GOA EEZ. The Council initiated plan amendments to the GOA and BSAI groundfish FMPs at its October 1998 meeting. The Council invoked the precautionary approach to manage these long-living, slow-growing, and low fecundity fishes, and other regional and international efforts to conserve sharks and skates. The GOA Groundfish FMP was amended in 2004 to remove skates from the "other species" category. Beginning in 2005, specifications were set for big skate, longnose skate, and other skates. In October 2009, the Council selected a Preferred Alternative to remove skates from the other species assemblage under the BSAI Groundfish FMP. Annual specifications for BSAI skates are scheduled to be implemented in 2011. This analysis completes the action to address management of other species groups, which was begun in 1998.

Information on distribution, stock structure, and life history characteristics is extremely limited for the component groups. It is unlikely that the observed incidental catch of the groups is having a negative

effect on their abundance, according to the limited trawl survey data available. However, data limitations are severe, and continued effort is necessary to ensure that no species component is adversely affected by groundfish fisheries.

The Preferred Alternative and Alternative 3. The following analysis describes recent catch trends of the aggregated other species categories and their constituent groups relative to their proposed management benchmarks under the Preferred Alternative and Alternative 3, as compared to the status quo. A series of figures were prepared to demonstrate whether Alternatives 2 or 3 would affect directed fisheries that take sharks, sculpins, octopuses, or GOA squids as incidental catch. One set of figures were prepared to determine whether individual groups were being overharvested relative to their group level bench marks (Figure 10 through Figure 15). A second set of figures were prepared to determine which target fisheries had the highest catches and rates of catches of those groups (Figure 16 through Figure 22). After determining that overharvests theoretically could have occurred, a third set of figures were prepared to determine which fisheries/gear types might be most affected by potential closures under Alternatives 2 or 3. These results should not be viewed as predictions of harvest levels that will occur in the future, as various factors may influence future harvests. These comparisons do not account for the implementation of other management restrictions that would have been triggered, first, when the TAC was exceeded, and second, as the ABC/ACL was approached and after it was exceeded, and/or voluntary actions that the fleets may have enacted to limit their harvests before the TAC, ABC, and OFL would have been reached. They do, however, illustrate the inherent variability in harvests of these groups and potential for early closures of directed fisheries under group level ACLs under the Preferred Alternative and Alternative 3.

Figure 9 demonstrates that shark harvests would have exceeded the 2010 OFL, if it had been in place in 2006 in the BSAI. Figure 10 shows the same for shark harvests in the GOA in 2006 and 2007. More recently shark harvests have been below the 2010 OFL and ABC in both areas (had they been in place in the past). Figure 16 shows that the highest average 2003 to 2009 catch of sharks occurred in the pelagic trawl (PT) pollock fishery and hook-and-line (HAL) Pacific cod fishery. The highest rates of shark catch occurred in the BSAI fisheries for HAL other, HAL sablefish, and PT other groundfish.

GOA sharks were caught incidentally in a number of target categories and gear types. The highest average 2003 to 2009 catch occurred in the HAL categories for other groundfish, sablefish, and Pacific cod. The highest rates of shark catch occurred in the non-pelagic trawl (NPT) target categories for rockfishes and yellowfin sole, and HAL Pacific cod (Figure 19).

Figure 11 and Figure 12 demonstrate that there would have been no overharvest of sculpins by directed groundfish fisheries relative to their respective 2010 bench marks, had they been in place in either management area. Figure 17 shows that the highest average 2003 to 2009 catch of sculpins occurred in the BSAI fisheries for NPT yellowfin sole, HAL Pacific cod, NPT Pacific cod, and NPT rock sole. The highest rates of sculpin catch in the BSAI fisheries occurred in the categories NPT flathead sole, NPT other flatfish, PT other groundfish, NPT rock sole, and NPTR yellowfin sole. Figure 20 shows the highest catch and rates of sculpins in the GOA fisheries occurred in the NPT rock sole and NPTR yellowfin sole categories.

Octopus harvests would have exceeded the 2010 OFL, if it had been in place in 2005 and 2006 for the BSAI and would have been under the 2010 ABC between 2007 and 2009 (Figure 13). Figure 21 shows that the highest average 2003 to 2009 catch of BSAI octopuses occurred in the pot Pacific cod fishery; lower rates occurred in the pot other, HAL Pacific cod, and NPT Pacific cod fishery. The highest rate of incidental catch occurred in the pot other and Pacific cod fisheries.

Opposite trends in octopus catch occurred between the BSAI and GOA. Octopus harvests would have been under the ABC in 2005 and 2006, under the 2010 OFL but above the 2010 ABC, and exceeded the 2010 OFL in 2008 and 2009, if they had been in place for the GOA (Figure 14). The highest average 2003

to 2009 catch of GOA octopuses occurred in the NPT yellowfin sole fishery (Figure 21). The highest rate of incidental catch occurred in the pot Pacific cod fishery. Reuter et al. (2010) noted an episodic pattern of occasional outbreaks of high abundance that is consistent with the known short life span (1-2 years or 3-5 years for most species) and pelagic larval dispersal of the dominant species *Enteroctopus dofleini*.

GOA squid harvests would have exceeded the 2010 OFL, if it had been in place in 2006 (Figure 15). The highest average 2003 to 2009 catch of GOA squid occurred in the pot other category (Figure 22) and the highest rate of incidental catch occurred in the pelagic trawl (PTR) other category.

Summary The NS1 guidelines do not require the FMPs to classify each stock as a "target" stock or "non-target" stock as the management requirements of stocks in the fishery do not differ between them. The groups would be listed in the "target species" category in the fishery in the FMPs and ACLs would be set for them. The Preferred Alternative would not automatically change the gear types, amounts, timing, or location of the groundfish fisheries under any of the alternatives compared to status quo.

Sharks, sculpins, octopuses, and GOA squids would directly benefit under both the Preferred Alternative and Alternative 3. Both alternatives have the same effect on the groups, as ACLs would be required to be set for these groups at more biologically appropriate levels, which reduce their risk of being overfished. The aggregate assemblage catch limits would be replaced by those for each group. The effect of both alternatives would be to ensure that these otherwise vulnerable species (under aggregate ACLs) are afforded better protection (under group level ACLs), while not reducing protection for any of the species and stocks currently managed in aggregate. The Preferred Alternative is not expected to require changes to the gear types, amounts, timing or location of the groundfish fisheries under either of the alternatives compared to status quo in a manner that would affect target species. Fisheries would continue to be conducted within the harvest specifications limits. Incidental catches of these groups are unpredictable and theoretically could exceed their respective ACLs, though management measures would be implemented to reduce this potential as the harvest amounts near the ACLs. The increased protection is not likely significantly beneficial for other species as there is no information that other species groups currently are experiencing overfishing under status quo.

It is possible that indirect effects of the proposed alternatives may result in some target fisheries being closed earlier in a season than under status quo. The analysis identifies that several target categories have either high catches or high catch rates, or both, of several of the other species groups directly affected by the action. Table 12 summarizes those fishery interactions that are described above. Past incidental catch history or rates however should not be used as predictors to how the fleets may respond if ACLs are in place for the other species groups, particularly since there have not been any theoretical overharvests of any group in the two most recent years.

1.4.3 Ecosystem Component Species

Under the Preferred Alternative and Alternative 3, the Council is considering which species to list in the EC category to be consistent with NS1 Guidelines. The guidelines envision that Regional Councils and the agency can utilize the EC category as a means of including a species within an FMP for one fishery even though that species is primarily managed pursuant to another FMP (i.e., king and Tanner crab and salmon are managed under their own FMPs and are managed as prohibited species in the BSAI groundfish FMP). The final rule reflects a desire to avoid "overlapping or duplicative conservation and management regimes in multiple FMPs under different Council jurisdictions" (74 FR 3185; January 16, 2009) (see also 50 CFR 600.310(d)(7) noting that a stock may be identified as being in the fishery for multiple FMPs, but that in such cases, only one FMP would establish management objectives, status determination criteria, the stock's overall ACL, and other reference points).

To be considered for possible EC classification, species should, among other considerations, conform to the following criteria; conversely, failure to satisfy these criteria could eliminate some groups from further consideration as EC stocks.

- Be a non-target species or non-target stock;
- Not be determined to be subject to overfishing, approaching an overfished condition, or overfished;
- Not be likely to become subject to overfishing or overfished, according to the best available information, in the absence of conservation and management measures; and
- Not generally be retained for sale or personal use.

EC species may be identified at the species or stock level, and may be grouped into complexes. EC species may be included in an FMP or FMP amendment for any of the following reasons: data collection purposes; ecosystem considerations related to specification of OY for the associated fishery; as considerations in the development of conservation and management measures for the associated fishery; or to address other ecosystem issues. While EC species are not considered to be "in the fishery," a Regional Council should consider measures for the fishery to minimize bycatch and bycatch mortality of EC species consistent with National Standard 9, and to protect their associated role in the ecosystem. EC species do not require specification of reference points but should be monitored on a regular basis, to the extent practicable, to determine changes in their status or their vulnerability to the fishery. If necessary, they should be reclassified as in the fishery.

Beyond identifying the stocks in the fishery, a Regional Council may, but is not required to, include EC species in an FMP. Such species could include non-target fish species that are not considered part of the fishery but rather species with which the fishery may occasionally interact (i.e., catch) (see 50 CFR 600.310(d)(4)-(5). A Regional Council may choose to include EC species for purposes of incorporating ecosystem approaches to fishery management or data collection. Identification of EC species must be done through an FMP amendment process (see 50 CFR 600.310(d)). Such species are appropriate to consider when addressing specification of OY and conservation and management measures for the fishery (see MSA sections 3(33) [referring to taking into account the marine ecosystems in OY definition] and 3(5) [referring to avoiding irreversible or long-term effects on fishery resources and the marine environment and ensuring multiplicity of options]) and 303(b)(12). Because EC species are not considered to be in the fishery, specification of reference points, ACLs, and AMs is not required.

A basic question, for purposes of the groundfish FMPs, is the extent to which bycatch in the groundfish fisheries is a significant contributor to the vulnerability of the stock. A vulnerability analysis was prepared by the NMFS AFSC to assist the Council in its determination of whether some groundfish stocks may be likely to become subject to overfishing absent conservation and management or whether some may be appropriate for management in the EC category. The following is taken from Ormseth (2009).

> "There are no clear divisions among the stocks in their vulnerability scores, and the working group that developed the methodology did not provide any guidance regarding how the vulnerability score of a stock corresponds to the appropriate management measures for that stock (this was done on purpose due to the difficulty of making divisions that would be broadly applicable in different regions). However, considering the vulnerability scores relative to each other and particularly to the scores of target stocks provides some insight into how stocks should be classified.

In the BSAI, squid have the lowest vulnerability (0.84), and they have the most distinct vulnerability score. Vulnerability scores for target stocks begin at 1.39 (yellowfin sole). The analyses conducted by the Vulnerability Evaluation Work Group also suggested that target stocks and nontarget stocks commonly believed to be conservation concerns (e.g., BSAI skates) tended to have vulnerability scores greater than

1. Thus, the productivity-susceptibility analysis (PSA) for this region suggests that squid may be a candidate for EC classification.

This conclusion is supported by the results for the GOA, where squid, capelin, and eulachon form a somewhat distinct, high-productivity group. Eulachon have the highest susceptibility score of this group, as they are the only member of the forage fish category that is regularly caught in the groundfish fisheries. Capelin and eulachon were used as indicator species because 1) they are thought to be representative of the forage fish assemblage, and 2) there is not sufficient reliable information for other species within the forage fish assemblage to conduct a PSA analysis. The PSA results suggest that the current management measures used for capelin and eulachon as part of the forage fish classification (i.e., no ACLs) may also be appropriate for squid. Octopuses have a vulnerability score almost equivalent to eulachon and so may be considered for EC classification. However, their lower productivity separates them from the squid/forage fish group. This separation is even more pronounced in the BSAI.

In summary, the PSA results demonstrate that octopuses, squid, and forage fishes have relatively low vulnerabilities to commercial fishing and may be candidates for an EC classification. While some sculpin species have relatively low scores (though still greater than 1), other members of that group have high scores. As a result, the author recommended that sculpins should remain in the fishery. He noted that skates and sharks have high vulnerability scores and also require ACLs (Ormseth 2009). Additional analysis of managing vulnerable species and groups under the EC category is scheduled for a future analysis.

1.4.3.1 Prohibited Species

Prohibited species are not in the groundfish FMPs for purposes of managing them per se; they are listed to limit the impact of the groundfish fishery on their biomass. Prohibited species identified in the BSAI and GOA Groundfish FMPs are Pacific halibut, Pacific herring, Pacific salmon, steelhead trout, king crab, and Tanner crab. Species identified as prohibited must be avoided while fishing groundfish and must be immediately returned to the sea with a minimum of injury when caught and brought aboard, except when their retention is authorized by other applicable law. Groundfish species and species groups under the FMPs for which the TAC has been reached also shall be treated in the same manner as prohibited species.

The Council may recommend measures that provide incentives to individual vessels to reduce bycatch rates of prohibited species for which PSC limits are established. The intended effect of such measures is to increase the opportunity to harvest groundfish TACs before established prohibited species catch (PSC) limits are reached.

1.4.3.1.1 Prohibited Species Catch Limits

Prohibited species catch is non-retainable catch. It can take the form of a prohibited or non-groundfish species and/or a groundfish species for which TAC has been achieved and that is captured incidentally in groundfish fisheries. A PSC limit is an apportioned, non-retainable amount of fish provided to a fishery for bycatch purposes. The attainment of a PSC limit for a species will result in the closure of the appropriate fishery or the closure of an area where high bycatch rates may occur.

PSCs have been designated in the BSAI for Pacific halibut, Pacific herring, Pacific salmon, steelhead trout, king crab, and Tanner crab and in the GOA for Pacific halibut. Pacific halibut mortality PSC limits are established annually in regulation; they may be apportioned by season, regulatory area, gear type, and/or target fishery.

The Council believes that discarding incidental catches of fish is wasteful and should be minimized. However, recognizing that in the groundfish fisheries incidentally caught species are managed outside the

FMPs, the treatment of such species as a prohibited species is appropriate. Except as provided under the prohibited species donation program, retention of prohibited species captured while harvesting groundfish is prohibited to prevent covert targeting on these species. The prohibition removes the incentive that groundfish fishers might otherwise have to target on the relatively high-valued prohibited species, thereby resulting in a lower incidental catch. It also eliminates the market competition that might otherwise exist between halibut fishers and groundfish fishers who might land halibut in the absence of the prohibition.

When a PSC limit is reached, further fishing with specific types of gear or modes of operation during the year is prohibited in that area. All other users and gear would remain unaffected. However, when the fishery to which a PSC limit applies has caught an amount of prohibited species equal to that PSC limit, the Secretary may, by notice, permit some or all of those vessels to continue to engage in fishing for groundfish in the applicable regulatory area, under specified conditions. These conditions may include the avoidance of certain areas of prohibited species concentrations and will be determined on a case-by-case basis.

Final PSCs for BSAI and GOA groundfish under the authorities of their respective FMPs are under Table 13 and Table 14.

1.4.3.1.2 Effects of Alternatives on Prohibited Species

NS1 guidelines state that one criterion to be an EC species is a species "not generally be retained for sale or personal use." Prohibited species have no economic value for fishermen fishing under the groundfish FMPs due to restrictions on their sale and use. As a result of this requirement, the EC species is not generally retained for sale or use under the particular FMP at issue. If MSY and SDC (for overfishing) are required, they should be identified under its primary management plan, for example the crab FMP or the salmon FMP. For State/International managed stocks where there is not a federal FMP, identifying MSY and SDC would be superfluous because the stocks are in the groundfish FMP only for purposes of limiting their catch. Effectively, the targeted harvest of these species is primarily managed by State and International authority. It is appropriate to list a target stock in its primary FMP and list it as an ecosystem component species in another FMP. If a stock is identified in more than one fishery, Regional Councils should choose which FMP will be the primary FMP in which management objectives, SDC, and other reference points for the stock are established. In most cases, the primary FMP for a stock will be the one in which the stock is identified as a target stock. Other FMPs in which the stock is identified as part of a fishery should contain management measures consistent with the primary FMP for the stock.

Under the status quo, the Council's current policy for managing prohibited species does not comport with NS1 guidance because by default all stocks in an FMP would be considered in the fishery and subject to ACLs. The Council does not, nor does it intend to, set catch limits on prohibited species in the groundfish FMPs; therefore the creation of a new ecosystem component category would allow prohibited species to remain in the FMPs under either Alternative 2 or Alternative 3, yet not be considered "in the fishery," and therefore not required to have ACLs. This is only an organizational change to the FMPs.

None of the alternatives are likely to directly or indirectly affect the incidental take of prohibited species by the groundfish fisheries. The action would not substantially change the gear types, amounts, timing or location of the groundfish fisheries in a manner that would increase or decrease the catch of prohibited species; therefore, no change in the incidental takes of prohibited species would occur under any of the alternatives compared to status quo.

1.4.3.2 Forage Fish Species

Ormseth (2009) reports that over 60 forage fish species with diverse characteristics occur in the BSAI and GOA. This category includes all species in the families Osmeridae, Bathylagidae, Myctophidae, Ammodytidae, Trichodontidae, Pholidae, Stichaeidae, Gonostomidae, and euphausiid shrimps.

Many of the species in both regions are rare and poorly sampled with standard survey methods; therefore the exact number and types of species in the forage fish category are not known. Forage fish perform a critical role in the complex ecosystem functions of the BSAI and GOA by providing the transfer of energy from the primary or secondary producers to higher trophic levels. As a group they occupy a nodal or central position in the North Pacific food web, being consumed by a wide variety of fish, marine mammals and seabirds (Ormseth et al. 2009). Forage species are a central focus of an integrated ecosystem research plan in the GOA (http://goaierp.nprb.org/) funded through the Pacific Research Board that will provide information to enhance the monitoring and assessment of forage fishes in the GOA.

The forage fish category was created in 1998 in recognition of their importance in the food web. Forage fishes are outside of the specification process and stock assessments are not performed. Directed fishing forage fish is prohibited, catches are limited by an MRA of 2 percent by weight of the retained target species, and processing of forage fishes is limited to fish meal. The regulation applies only to vessels fishing in federal waters, so onshore processors are not affected by the rule. The 2 percent MRA was chosen to accommodate existing levels of catch that were believed to be sustainable because they were occurring at the time the category was created. The category was created as a precautionary action to prevent an increase in forage fish removals, not to reduce existing levels of catch. In 1999, the state of Alaska adopted a statute with the same taxonomic groups and limitations (5 AAC 39.212 of the Alaska administrative code), except that no regulations were passed regarding the processing of forage fishes (Ormseth et al. 2009).

The MRA alleviated the potential for any "topping-off" activities that may be associated with a bycatch only status. The sale, barter, trade, and any other commercial exchange, as well as the processing of forage fish in a commercial processing facility, was prohibited, except that retained catch of forage fish species not exceeding the MRA may be processed into fishmeal and sold. Some forage fish are harvested in subsistence activities and the FMPs do not prohibit subsistence harvest and traditional trade and barter of forage fish. Based on historical information, the total burden to the Alaska fishing industry resulting from restricting a fishery on the forage fish species was estimated to be minimal because only six vessels reported targeting any species in this proposed category from 1984 to 1994, no annual commercial fishery had been established, and market availability for capelin varies (Ormseth et al. 2009).

Forage fish compose an important part of the diet of commercial groundfish species, marine mammals and seabirds in the BSAI and GOA. Significant declines in marine mammals and seabirds in the GOA and the BSAI raised concerns that changes in the forage fish biomass may contribute to the further decline of marine mammal, seabird, and commercially important fish populations. Forage fish species have been defined to include Osmeridae (which includes capelin and eulachon), Myctophidae, Bathylagidae, Ammodytidae, Trichodontidae, Pholidae, Stichaeidae, Gonostomatidae, and the Order Euphausiacea. These species were grouped together because (1) insufficient data and management measures exist to manage each species separately, (2) they are considered to be primary food resources for other marine animals, and (3) they have the potential to be the targets of a commercial fishery.

Many species undergo large, seemingly unexplainable fluctuations in abundance. Most of these are R-selected species (e.g., pollock, herring, Atka mackerel, capelin, sand lance), which generally have higher reproductive rates, are shorter-lived, attain sexual maturity at younger ages, and have faster individual growth rates than K-selected species (e.g., rockfish, many flatfish). Predators that utilize r-selected fish species as prey (marine mammals, birds, and other fish) have evolved in an ecosystem in which

fluctuations and changes in relative abundances of these species have occurred. Consequently, most of them, to some degree, are generalists who are not dependent on the availability of a single species to sustain them, but on a suite of species any one (or more) of which is likely to be abundant each year.

There is some evidence, mostly anecdotal, that osmerid abundances, particularly capelin and eulachon, have declined significantly since the mid-1970s. It is not known, however, whether smelt abundances have declined or whether their populations have redistributed vertically, due presumably to warming surface waters in the region beginning in the late 1970s.

Smelts (Capelin, Rainbow Smelt, and Eulachon). Smelts (family Osmeridae) are slender schooling fishes that can be either marine (such as capelin) or anadromous (rainbow smelt and eulachon).

Capelin are distributed along the entire coastline of Alaska and south along British Columbia to the Strait of Juan de Fuca. In the North Pacific, capelin can grow to a maximum of 25 cm at age 4. Most capelin spawn at age 2 to 3, when they are only 11 to 17 cm (Pahlke 1985). Spawning occurs in spring in intertidal zones of coarse sand and fine gravel—especially in Norton Sound, northern Bristol Bay, and Kodiak. Very few capelin survive spawning. The age of maturity of capelin in the Barents Sea has been shown to be a function of growth rate, with fast-growing cohorts reaching maturity at an earlier age than slow-growing cohorts. Thus, it is possible to have slow and fast-growing cohorts mature in the same year, resulting in large spawning biomasses one year preceded and potentially followed by small spawning biomasses.

Adult capelin are only found near-shore in the Bering Sea during the months surrounding the spawning run. During other times of the year, capelin are found far offshore in the vicinity of the Pribilof Islands and the continental shelf break. The seasonal migration may be associated with the advancing and retreating polar ice front, as it is in the Barents Sea. In the eastern Bering Sea, winter ice completely withdraws during the summer months. If migration follows the ice edge, the bulk of the capelin biomass in the Bering Sea could be located in the northern Bering Sea, beyond the area worked by the groundfish fisheries and surveys. Very few capelin are found in surveys, yet they are a major component of the diets of marine mammals feeding along the winter ice edge (Wespestad 1987), and of marine birds, especially in the spring. Capelin overwinter in the bays of Kodiak Island and in Kachemak Bay in the GOA, which remains ice free year round.

Rainbow smelt ascend rivers to spawn in spring shortly after the breakup of the ice. After spawning, they return to the sea to feed. Surveys have found concentrations of rainbow smelt off Kuskokwim Bay, Togiak Bay, and off Port Heiden, but they also probably occur in many nearshore areas near river mouths. Rainbow smelt mature at ages 2 to 3 (19 to 23 cm), but can live to be as old as 9 years and as large as 30 cm. Little is known about trends in abundance of this species.

Eulachon also spawn in spring in rivers of the Alaska Peninsula, and possibly other rivers draining into the southeastern Bering Sea. Eulachon live to age 5 (and grow to 25 cm), but most die following first spawning at age 3. Eulachon are consistently found by groundfish fisheries and surveys between Unimak Island and the Pribilof Islands in the Bering Sea, and in Shelikof Strait in the Gulf of Alaska. Evidence from fishery observer and survey data suggests that eulachon abundances declined in the 1980s (Fritz et al. 1993). These data should be interpreted with caution since surveys were not designed to sample small pelagic fishes such as eulachon, and fishery data were collected primarily for total catch estimation of target groundfish. Causes of the decline, if real, are unknown, but may be related to variability in year-class strength as noted for capelin.

Pacific Sand Lance (Ammodytidae). Pacific sand lance are usually found on the bottom, at depths between 0 to 100 m except when feeding (pelagically) on crustaceans and zooplankton. Spawning is believed to occur in winter. Sand lance mature at ages 2 to 3 years and lengths of 10 to 15 cm. Little is

known of their distribution and abundance; they are rarely caught by trawls. In the Bering Sea, sand lance are common prey of salmon, northern fur seals, and many species of marine birds. Thus, they may be abundant in Bristol Bay, along the Aleutian Islands and Alaska Peninsula. In the Gulf of Alaska, sand lance are prey of harbor seals, northern fur seals and marine birds, especially in the Kodiak area and along the southern Alaska Peninsula. Given the sand lance's short life span and the large number of species which prey on it, mortality, fecundity, and growth rates of Pacific sand lance are probably high.

Myctophidae and Bathylagidae. Myctophids (lanternfishes) and bathylagids (deep-sea smelts) are distributed pelagically in the deep sea throughout the world's oceans. Most species in both families occur at depth during the day and migrate to near the surface to feed (and be fed upon) at night. A common myctophid in the Bering Sea and Gulf of Alaska is the northern lampfish (*Stenobrachius leucopsarus*), which has a maximum length of approximately 13 cm. Bathylagids of the north Pacific include *Bathylagus* spp. (blacksmelts) and *Leuroglossus stilbius schmidti* (northern smoothtongue), each of which have maximum lengths of between 12 to 25 cm. Myctophids and bathylagids are important forage fishes for marine birds and marine mammals. Since they are rarely caught in survey or fishery trawls, nothing is known of recent trends in their abundance.

Pacific Sandfish (Trichodontidae). The Pacific sandfish (*Trichodon trichodon*) lives in shallow inshore waters to about 50 m depth and grows to a maximum length of 30 cm. Nothing is known of trends in their abundance. They are fed upon by salmon and other fish, as well as pinnipeds.

Euphausiids. Along with many copepod species, the euphausiids form a critical zooplanktonic link between the primary producers (phytoplankton) and all upper pelagic trophic levels. These crustaceans, also known as krill, occur in large swarms in both neritic and oceanic waters. Members of at least 11 genera of euphausiids are known from the North Pacific, the most important (in terms of numbers of species) being *Thysanopoda, Euphausia, Thysanoëssa* and *Stylocheiron* (Boden et al. 1955; Ponomoreva 1963). Euphausiids are generally thought to make diurnal vertical migrations, remaining at depth (usually below 500 m) during the day and ascending at night to 100 m or less. However, this is complicated by the fact that as euphasiids grow they are found at deeper depths, except during spawning, which occurs in surface waters. Spawning occurs in spring to take advantage of the spring phytoplankton bloom, and the hatched nauplii larvae live near the surface (down to about 25 m). By fall and winter, the young crustaceans are found mainly at depths of 100 m or less, and make diurnal vertical migrations. Sexual maturity is reached the following spring at age 1. After spawning, adult euphausiids gradually descend to deeper depths until fall and winter, when they no longer migrate daily to near-surface waters. In their second spring, they again rise to the surface to spawn; euphausiids older than 2 years are very rarely found. This classical view of euphausiid life history and longevity was questioned by Nicol (1990), who reported that Antarctic euphausiids may live as long as 6 to 10 years; annual euphausiid production, then, would be much lower than if they lived only 2 years.

While euphausiids are found throughout oceanic and neritic waters, their swarms are most commonly encountered in areas where nutrients are available for phytoplankton growth. This occurs primarily in areas where upwelling of waters from depth into the surface region is a consistent oceanographic feature. Areas with such features are at the edges of the various domains on the shelf or at the shelf-break, at the heads of submarine canyons, on the edges of gullies on the continental shelf (e.g., Shumagin, Barnabus, Shelikof gullies in the Gulf of Alaska), in island passes (on certain tides) in the Aleutian Islands (e.g., Seguam Pass, Tanaga Pass), and around submerged seamounts (e.g., west of Kiska Island). It is no coincidence that these are also prime fishing locations used by commercial fishing vessels seeking zooplanktivorous groundfish, such as walleye pollock, Atka mackerel, sablefish, and many species of rockfish and flatfish (Livingston and Goiney 1983; Fritz 1993; Yang 1993).

The species comprising the euphausiid group occupy a position of considerable importance within the North Pacific food web. Euphausiids are fed upon by almost all other major taxa inhabiting the pelagic

realm. The diet of many species of fish other than the groundfish listed above, including salmon, smelts (capelin, eulachon, and other osmerids), gadids (Arctic cod and Pacific tomcod), and Pacific herring is composed, to varying degrees, of euphausiids (Livingston and Goiney 1983), while euphausiids are the principal item in the diet of most baleen whales (e.g. minke, fin, sei, humpback, right, and bowhead whales; Perez 1990). While copepods generally constitute the major portion of the diet of planktivorous birds (e.g. auklets), euphausiids are prominent in the diets of some predominately piscivorous birds in some areas (e.g. kittiwakes on Buldir Island in the Aleutians, Middleton Island in the Gulf of Alaska, and St. Matthew Island in the Bering Sea; Hatch et al. 1990). Euphausiids are not currently sought for human use or consumption from the North Pacific ocean on a scale other than local, but large (about 500,000 mt per year) krill fisheries from Japan and Russia have been operating in Antarctic waters since the early 1980s (Swartzman and Hofman 1991).

Pholidae (Gunnels) and Stichaeidae (Pricklebacks, Warbonnets, Eelblennys, Cockscombs, and Shannys). Gunnels and pricklebacks are long, compressed, eel-like fishes with long dorsal fins often joined with the caudal fin. Pricklebacks are so named because all rays in the dorsal fin are spinous in most species (while some may have soft rays at the rear of the dorsal fins). Gunnels have flexible dorsal fin rays, and differ from pricklebacks in that the anal fin is smaller (the distance from the tip of the snout to the front of the anal fin is shorter than the length of the anal fin). Most species of both families live in shallow nearshore waters among seaweed and under rocks and are mostly less than 45 cm in length. There are approximately 14 species of Stichaeidae and 5 species of Pholidae in Alaska. Nothing is known about their absolute abundance or trends in abundance, and little about their growth rates, maturity schedules, and trophic relationships. They feed mostly on small crustacea and arthropods, and are thought to grow quickly. Some cockscombs in British Columbia attain sexual maturity at age 2 years.

Gonostomatidae (Bristlemouths, Lightfishes, Anglemouths). This is a large and diverse family of small (to about 8 cm), bathypelagic fish that are rarely observed except by researchers. They can be abundant at depths of up to 5000 m. There may be as many as 6 species in the North Pacific Ocean and Bering Sea.

1.4.3.2.1 Effects of Alternatives on Forage Fish

Under the status quo, the Council's policy for managing forage fish species does not comport with NS1 guidance because all stocks in an FMP would be considered in the fishery by default and subject to ACLs. Under Alternative 2 (Preferred Alternative), the Council would move this category into the EC category "umbrella" where they would not be "in the fishery" and thus not subject to ACL requirements. This proposed alternative is closest to the status quo, while also conforming to the NS1 guidelines. It would result in an organizational change to the FMPs. Under Alternative 3, the Council would identify them as "in the fishery" and set annual specifications for the assemblage. The Council has signaled its interest in maintaining the present set of tools used to manage forage fish in federal regulation under either alternative.

The Council added Alternative 3 to the analysis after public testimony raised some issues regarding essential fish habitat (EFH) and requirements for consultation with NMFS on federal actions that may adversely affect forage fish EFH. This is the key issue that distinguished the Preferred Alternative and Alternative 3; however, the groundfish FMPs do not contain EFH descriptions for forage fish. There is no existing EFH for forage fish that would be lost as a result of selecting Alternative 2 as a Preferred Alternative. The FMPs do contain descriptions of forage fish habitat in appendices, and these descriptions would remain intact (as there is no action proposed to remove them).

Sufficient information is not currently available to describe EFH for forage fish in the GOA or in the BSAI (NPFMC 2009a and 2009b). The December 2009 5-year review of EFH states that not enough information is available to describe EFH for the forage fish complex (Appendix 1 and 2 to the EFH 5-year

review report available at http://www.alaskafisheries.noaa.gov/npfmc/current_issues/efh/EFH5yr_rev1209_appendix1.pdf); therefore no EFH descriptions for forage fish would be in the FMPs in the next 5 years. This may change in the future if sufficient information becomes available to describe EFH for forage fish.

Under NMFS guidelines, forage fish that are important prey species for target and non-target stocks in the fishery should be included as a component of the EFH description for the target species. Thus, as information becomes available to identify forage fish that are important prey for stocks in the fishery, the forage fish themselves (as opposed to the habitat of the forage fish) would be identified as EFH and would receive the protections afforded to EFH.

Habitat descriptions for capelin and eulachon are in Appendix D to each of the groundfish FMPs. The habitat descriptions are limited to text. Because no EFH is described for forage fish under Alternative 1, no EFH consultation is required for federal actions that may have an adverse impact on forage fish habitat. Under Alternative 3, forage fish would be identified as in the fishery, and EFH description would be required if sufficient information is available. Because at this time there is not enough information to describe forage fish EFH, the effects of Alternatives 1 and 3 on forage fish EFH would be the same as the effects under Alternative 2 (Preferred Alternative), where forage fish is in the ecosystem component, and no EFH description would be required. Placing forage fish in the fishery under Alternative 3 would ensure the 5-year review of EFH information and may lead to the designation of EFH for forage fish, if enough information becomes available. This may provide a future benefit to habitat under Alternative 3 compared to Alternative 2, but the amount of benefit to habitat would depend on the information available and the overlap of forage fish EFH with other groundfish EFH. Any such benefit would be highly speculative and is not reasonably foreseeable.

The MSA requires ACLs and AMs to be set for all stocks in the fishery, yet the Council has previously removed forage fish from the "other species" category and the annual specification process in favor of managing them through MRAs only; insufficient information exists with which to set ACLs for them at the group level or assemblage level. They would likely fall under Tier 6 and rely on historic catch levels, which have been kept at very low levels under the FMPs or another approach yet to be identified by the SSC. The SSC may consider applying a large buffer between ABC and OFL to account for an unusually high degree of uncertainty regarding these stocks. Further insufficient information is available to describe EFH for forage fish, as described above.

While the Council may recommend that NMFS continue to consult on the agency's own actions that may adversely affect important habitat that could someday be identified for forage fish, NMFS will not be compelled to do so. Under Alternative 2 (Preferred Alternative), EFH could not be identified for forage fish because they would not be in the fishery. If EFH is not designated for forage fish, the Council and NMFS would not have legal authority to compel federal agencies to consult on actions that may affect the habitat of these species that might someday be identified as EFH if the stocks remained in the fishery. Nonetheless, there would be no current effect on forage fish habitat compared to the status quo, because at present there is not sufficient information to identify and protect EFH for forage fish. Moreover, any future effect on forage fish habitat would be speculative because it is not possible to determine what additional habitat, if any, would be identified as EFH for forage fish in the future.

Summary The status quo does not conform to the MSA and NS1. Alternative 2 (Preferred Alternative) is closest to the status quo, while also conforming to the MSA and NS1. There is insufficient information with which to set ACLS for forage fish, as would be required under Alternative 3. While the intention of Alternative 3 also would be to enhance EFH protection of forage fish, there is insufficient information with which to do so under *any* of the alternatives.

None of the alternatives would directly or indirectly affect the incidental take of forage fish species by the groundfish fisheries, unless ACLs would be set at levels that would allow increased harvests of forage fish under Alternative 3.

1.4.3.3 Non-Specified Species

The non-specified species category consists of all species of finfish and marine invertebrates not listed in the target category, "other species" category, prohibited species category, and forage fish category. There may be many hundreds of these species. Some attempts have been made to enumerate them, but a comprehensive, verifiable list is not available due to the paucity of data collected on these poorly understood species. Considering that there are hundreds of different types of animals in the non-specified species category, some of which are still being described in the scientific literature, this challenge to management appears formidable. Catches of some of these species in the commercial fishery are recorded by observers, as are catches during survey cruises. There is insufficient information with which to set ACLs. The Preferred Alternative and Alternative 3 are close to the status quo, while also conforming to the NS1 guidelines.

1.4.3.3.1 Effects of Alternatives on Non-Specified Species

Under the status quo, the Council's current policy for managing non-specified species does not comport with NS1 guidance. The Council does not, nor does it intend to, set catch limits or management measures on non-specified species in the groundfish FMPs. Under either Alternative 2 (Preferred Alternative) or Alternative 3 the non-specified species would be removed from the FMP, in accordance with how these species are treated under the status quo. This would be only an organizational change to the FMPs as none of these species are managed under the groundfish FMPs.

None of the alternatives are likely to directly or indirectly affect the incidental take of non-specified species by the groundfish fisheries. The action would not change the gear types, amounts, timing, or location of the groundfish fisheries in a manner that would be likely to substantially increase or decrease the amount of non-specified species catch; therefore, no change in the incidental takes of non-specified species would occur under any of the alternatives compared to status quo.

1.4.4 Seabirds

Various species of seabirds occur in the GOA and the BSAI, including resident species, migratory species that nest in Alaska, and migratory species that occur in Alaska only outside of the breeding season (Table 2). A list of species is provided below.[5] The Groundfish PSEIS (NMFS 2004) provides descriptions of the range, habitat, diet, abundance, and population status for these seabirds.

More information on seabirds in Alaska's EEZ may be found in the following NMFS, Council, and United State Fish and Wildlife Service (USFWS) documents.

The USFWS Migratory Bird Management program webpage may be accessed at: http://alaska.fws.gov/mbsp/mbm/index.htm.

The USFWS Birds of Conservation Concern 2008 may be accessed at: http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf. This list identifies species, subspecies, and populations of all migratory nongame birds that

[5] Source: (USFWS web site "Seabirds. Species in Alaska. Accessed at http://alaska.fws.gov/mbsp/mbm/seabirds/species.htm on August 31, 2007).

without additional conservation action are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973.

Section 3.7 of the PSEIS (NMFS 2004) provides background on seabirds in the action area and their interactions with the fisheries. This may be accessed at http://www.alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_7.pdf.

The annual Ecosystems Considerations chapter of the SAFE reports has a section on seabirds. Back issues of the Ecosystem Considerations chapters may be accessed at http://www.afsc.noaa.gov/REFM/REEM/Assess/Default.htm.

The Seabird Fishery Interaction Research webpage of the Alaska Fisheries Science Center may be accessed at http://www.afsc.noaa.gov/refm/reem/Seabirds/Default.php.

The NMFS Alaska Region's Seabird Incidental Take Reduction webpage may be accessed at http://www.alaskafisheries.noaa.gov/protectedresources/seabirds.html.

The BSAI and GOA Groundfish FMPs each contain an "Appendix I" dealing with marine mammal and seabird populations that interact with the fisheries. The FMPs may be accessed from the Council's home page at http://www.alaskafisheries.noaa.gov/npfmc/default.htm.

Washington Sea Grant has several publications on seabird takes, and technologies and practices for reducing them: http://www.wsg.washington.edu/communications/onlinepubs.html.

Seabirds and fishery impacts are also described in Chapter 9 of the Alaska Groundfish Harvest Specifications EIS (NMFS 2007).

The information in the PSEIS and in the above sources is adopted by reference for purposes of this analysis.

Species nesting in Alaska

Tubenoses-Albatrosses and relatives: Northern Fulmar, Fork-tailed Storm-petrel, Leach's Storm-petrel
Kittiwakes and terns: Black-legged Kittiwake, Red-legged Kittiwake, Arctic Tern, Aleutian Tern
Pelicans and cormorants: Double-crested Cormorant, Brandt's Cormorant, Pelagic Cormorant, Red-faced Cormorant
Jaegers and gulls: Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Bonaparte's Gull, Mew Gull, Herring Gull, Glaucous-winged Gull, Glaucous Gull, Sabine's Gull
Auks: Common Murre, Thick-billed Murre, Black Guillemot, Pigeon Guillemot, Marbled Murrelet, Kittlitz's Murrelet, Ancient Murrelet, Cassin's Auklet, Parakeet Auklet, Least Auklet, Whiskered Auklet, Crested Auklet, Rhinoceros Auklet, Tufted Puffin, Horned Puffin
Eiders: Common, King, Spectacled, Steller's

Species that visit Alaska waters

Tubenoses: Short-tailed Albatross, Black-footed Albatross, Laysan Albatross, Sooty Shearwater, Short-tailed Shearwater
Gulls: Ross's Gull, Ivory Gull

Several species of conservation concern occur in the GOA and the BSAI as well (Table 3). Short-tailed albatrosses are listed as endangered under the ESA, while Kittlitz's Murrelet is a candidate species for listing under the ESA. Spectacled and Steller's eiders are listed as threatened. The USFWS is currently working on a 12-month finding for black-footed albatrosses. The USFWS determined that listing of Yellow-billed loon was warranted but not a priority.

The USFWS has primary responsibility for managing seabirds, and has evaluated effects of the BSAI and GOA FMPs and the harvest specifications process on currently listed species in two Biological Opinions

(USFWS 2003a and 2003b). Both Biological Opinions concluded that the groundfish fisheries are unlikely to jeopardize populations of listed species or adversely modify or destroy critical habitat for listed species.

1.4.4.1.1 Effects of Alternatives on Seabirds

The groundfish fisheries have direct and indirect impacts on seabirds. Seabird take is the primary direct effect of fishing operations. Incidental takes of seabirds occur primarily in the hook-and-line and the trawl fisheries. Hook-and-line and trawl gear accounts for up to 97 percent of seabird bycatch in the BSAI and GOA groundfish fisheries combined (AFSC 2006). Seabirds are taken in the hook-and-line fisheries in two ways. While hooks are being set, seabirds attracted to bait may become entangled in fishing lines. Seabirds are also caught directly on baited hooks. Seabirds are taken in the trawl fisheries when they are attracted by offal or discarded fish and become entangled in fishing gear. Indirect effects include impacts to food sources and disturbance of the birds that may prevent reproduction or affect foraging activities. Some groundfish fisheries may reduce the biomass of prey species available to seabird populations. Fishing gear may disturb benthic habitat used by seabirds that forage on the seafloor and reduce available prey. Trawl gear is the primary source of benthic habitat disturbance in the groundfish fisheries (NMFS 2005). Fishing activities may also create feeding opportunities for seabirds, for example when catcher/ processors discard offal.

Biological Opinions by the USFWS (2003a and 2003b) concluded that the groundfish fisheries are unlikely to jeopardize populations of ESA-listed species or adversely modify or destroy critical habitat for listed species. Based on current estimates of seabird bycatch, potential disturbance, and effects on prey availability, the status quo alternative is not likely to have a significant impact on seabird populations (NMFS 2007).

None of the alternatives would likely substantially affect the incidental take of seabirds by the groundfish fisheries. The action would not substantially change the gear types, amounts, timing, or location of the groundfish fisheries in a manner that may increase or decrease the amount of seabird incidental take; therefore, no change in the incidental take of seabirds would occur under any of the alternatives compared to status quo.

As with incidental take, disturbance of seabirds under the alternatives is not likely to differ among the alternatives because they would not substantially change the gear types, amounts, timing, or location of the groundfish fisheries. The Preferred Alternative and Alternative 3 would change the management of the other species groups by applying OFLs, ABCs, and TACs to each group rather than to a combined "other species" category. By managing other species as individual groups in the fishery, the harvest will be controlled to reduce the possibility of overharvesting the GOA squid, octopus, sculpins, and sharks groups. Under Alternative 1, the ABCs and OFLs for the sharks, sculpin, octopus, (and in the GOA only) squid groups' are added together to apply an aggregate ABC and OFL for the other species assemblage. Setting the aggregate TAC and managing the assemblage to this TAC may allow for an individual species group within the other species group to be harvested at an amount that exceeds the ABC or OFL that would have been set for that group under Alternatives 2 or 3, but still not exceed the other species aggregate ABC or OFL. This may be more of a potential problem for sharks and octopus which have lower ABCs and OFLs than squids and sculpins (NPFMC 2009a and 2009b). Table 4 shows seabird species, their foraging habitats and prey species. All of these species may forage on species that are managed under the other species group (assuming that the "mollusks" listed in these tables may include octopus and squid, and "invertebrates" taken by surface feeders may include squid).

The Preferred Alternative and Alternative 3 would reduce the potential for the groundfish fisheries to impact potential prey resources of seabirds that depend on invertebrates and fish that occur in the other species groups. The significance of effects on seabirds is dependent on population level effects (NMFS

2006b). Improvements in other species management that may impact foraging seabirds is likely to be on a localized level, depending on where the prey is located, the fishing intensity in that area and the dependence of the population on prey in that location. Because there is no information to indicate that the current groundfish fisheries management of other species is affecting the ability of seabirds to forage on prey species at a population level, it is not likely that the alternatives would provide a measurable improvement to prey availability for seabirds. Because it is unlikely that an improvement in prey resources would result in a population effect, the beneficial effect from improved management of other species is not likely to be significant.

Sufficient information is not available to describe EFH for forage fish in the GOA or in the BSAI (NPFMC 2009a and 2009b). The December 2009 5-year review of EFH states that not enough information is available to describe EFH for the forage fish complex (Appendix 1 and 2 to the EFH 5-year review report available athttp://www.alaskafisheries.noaa.gov/npfmc/current_issues/efh/EFH5yr_rev1209_appendix1.pdf); therefore no EFH descriptions for forage fish would be in the FMPs in the next 5 years. This may change in the future if enough information becomes available to describe EFH for forage fish. Habitat descriptions for capelin and eulachon are in Appendix D to each of the groundfish FMPs. The descriptions are limited to text. Because no EFH is described for forage fish under Alternative 1, no EFH consultation is required for federal actions that may have an adverse impact on forage fish habitat. Under Alternative 3, forage fish would be identified as in the fishery, and EFH description would be required if sufficient information is available. Because at this time there is not enough information to describe forage fish EFH, the effects of Alternatives 1 and 3 on forage fish EFH would be the same as the effects under Alternative 2 (Preferred Alternative), where forage fish is in the ecosystem component, and no EFH description would be required. Placing forage fish in the fishery under Alternative 3 would ensure the 5-year review of EFH information and may lead to the designation of EFH for forage fish, if enough information becomes available. This may provide have a future benefit to habitat under Alternative 3 compared to Alternative 2, but the amount of benefit to seabirds dependent on forage fish prey would depend on the information available and the overlap of forage fish EFH with other groundfish EFH. Any such future benefit is speculative and cannot be considered, at this time, a reasonably foreseeable effect.

1.4.5 Marine Mammals

Marine mammals occur in diverse habitats in the GOA and the BSAI, and include both resident and migratory species. GOA and BSAI marine mammal species and their status are presented in Table 5 and Table 6 (Allen and Angliss 2009 and NMFS 2007c). The Groundfish PSEIS (NMFS 2004) provides descriptions of the range, habitat, and diet for these marine mammals. Annual stock assessment reports prepared by the National Marine Mammal Laboratory provide population estimates, population trends, and estimates of potential biological removals (Allen and Angliss 2009).

Marine mammals listed or candidates under the Endangered Species Act (ESA) that may be present in the GOA and BSAI are listed in Table 5 and Table 6. All of these species are managed by NMFS, with the exception of northern sea otter, Pacific walrus, and polar bear, which are managed by the USFWS. An ESA section 7 biological opinion evaluating impacts of the groundfish fisheries on the endangered species managed by NMFS was completed in November 2000 (NMFS 2000). The western population segment of Steller sea lions was the only ESA-listed species identified as likely to be jeopardized or have critical habitat adversely modified by the groundfish fisheries. A 2001 biological opinion on the Steller sea lion protection measures for the groundfish fisheries determined that the fisheries were not likely to result in jeopardy of extinction or adverse modification or destruction of critical habitat for Steller sea lions (NMFS 2001). Because of new information on Steller sea lions and potential fishery interactions and new information on humpback and sperm whales, a new Section 7 consultation was initiated in 2006. A draft biological opinion for these species is expected to be released in 2010.

NMFS completed informal consultation on northern sea otters in 2006 and found that the Alaska fisheries were not likely to result in jeopardy of extinction for the species (Mecum 2006). Critical habitat for sea otters has been designated and is located primarily in nearshore waters (74 FR 51988, October 8, 2009) and is not likely affected by federal fisheries. On October 29, 2009, NMFS Sustainable Fisheries Division initiated informal section 7 consultation on Cook Inlet Beluga whales (Salveson 2009). Even though this stock is generally not found in federal waters, the Alaska groundfish fisheries may harvest prey species, which prompted the consultation.

Critical habitat for polar bear has been proposed by the USFWS (74 FR 56058, October 29, 2009). Only the ice habitat is likely to overlap with groundfish fishing locations in the northern Bering Sea.

1.4.5.1.1 Effects of Alternatives on Marine Mammals

Direct and indirect interactions between marine mammals and the groundfish fisheries result from temporal and spatial overlap between commercial fishing activities and marine mammal occurrence. Direct interactions include injury or mortality due to entanglement in fishing gear and disturbance. Indirect interactions include overlap in the size and species of groundfish important both to the fisheries and to marine mammals as prey. This action would not change the methods, location, timing, or amounts of groundfish harvest so it is unlikely that the Preferred Alternative and Alternative 3 would result in different levels of incidental take or disturbance than Alternative 1. The Preferred Alternative and Alternative 3 would manage the other species as individual groups rather than as an aggregate under the status quo. Separate management for these groups is likely to lessen the chance of overharvesting these stocks which may result in more protection of potential marine mammal prey species. Table 4 shows the marine mammals that may eat species that are currently managed in the other species and forage fish categories.

Polar bear feed on marine mammals dependent on benthic habitat prey (e.g., bearded seals). Very little to no fishing occurs in the GOA or BSAI at this time, and it is closed to nonpelagic trawling, so no effects on the proposed polar bear critical habitat (ice habitat) from groundfish fishing is expected at this time.

The significance of effects on marine mammals is dependent on population level effects (NMFS 2006c). Improvements in other species management that may impact foraging marine mammals is likely to be on a localized level, depending on where the prey is located, the fishing intensity in that area, and the dependence of the marine mammal population on prey in that location. Because no information indicates that the current groundfish fisheries management of other species is affecting the ability of marine mammals to forage on prey species at a population level, it is not likely that the Preferred Alternative and Alternative 3 would provide a measurable improvement to prey availability for marine mammals. Because it is unlikely that a slight improvement in prey resources would result in a population level effect, the beneficial effect on prey availability for marine mammals from improved other species management under the Preferred Alternative and Alternative 3 is not likely to be significant.

Placing forage fish in the fishery under Alternative 3 would ensure the 5-year review of EFH information and may lead to the designation of EFH for forage fish, if enough information becomes available. This may provide a future benefit to habitat under Alternative 3 compared to Alternatives 1 and 2, but the amount of benefit to marine mammals dependent on forage fish prey would depend on the information available and the overlap of forage fish EFH with other groundfish EFH. Any such speculative future benefit cannot, at this time, be considered a reasonably foreseeable effect.

1.4.6 Habitat

Benthic habitat that has not been previously fished could potentially be fished in the future due to global warming and the potential for some target fish stocks to migrate into northern waters. The issues of

primary concern with respect to the effects of fishing on benthic habitat 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, history of fishing in an area, and recovery rates of habitat features. This process is presented in more detail in Section 3.2 of the Habitat Areas of Particular Concern (HAPC) EA (NMFS 2006a) as well as Section 3.4.3 of the EFH EIS (NMFS 2005).

A specific description of the effects of fishing on habitat is in Section 3.2.1 of the HAPC EA and is adopted here by reference. Five main classes of fishing gear are used in the groundfish fisheries that may affect benthic habitat: 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. 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). Dredges have similar effects on the bottom as trawl gear as dredges are dragged across the bottom. Longlines, pots, and troll gear have less effect on the bottom than trawl and dredges because they have less contact with the bottom. Longline gear may snag epibenthic organisms and pots placed or dragged across the bottom may break off epibenthic organisms from the substrate. Dinglebars used on troll gear may strike epibenthic organisms and cause damage.

1.4.6.1.1 Effects of Alternatives on Habitat

This action has almost no potential effects on benthic habitat and habitat features. The alternatives would revise the FMP and regulations to ensure consistency with the NS1 guidelines and do not substantially change fishing practices that may change the overall impacts habitat from the groundfish fisheries. Habitat may be affected potentially only in terms of future review of information regarding EFH for forage fish under Alternatives 1 and 3, which may lead to a potential for additional protection as described in sections 1.4.5 and 1.4.6. As for seabirds and marine mammals, the potential beneficial effects are not likely significant for habitat.

1.4.7 Ecosystem

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

Fishing has the potential to influence ecosystems in several ways. Certain groundfish species, such as walleye pollock and Atka mackerel, are at a central position in the food web and their abundance is an indicator of prey availability for many species. Removal of top level predators is another potential effect of fishing, contributing to a “fishing-down the food web” effect. Introduction of non-native species may occur through emptying of ballast water in ships from other regions. These species introductions have the

potential to cause large changes in community dynamics. 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. The recipients, locations, and forms of this returned biomass may differ from those in an unfished system. Selective removal of species or sizes of organisms has the potential to change predator–prey relationships and other aspects of community structure. Fishing can alter different measures of diversity. Species richness, or the number of species, can be altered if fishing essentially removes a species from the system. Fishing can alter functional or trophic diversity if it selectively removes a structural living habitat group or trophic guild member and changes the evenness with which biomass is distributed among a functional or 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. Fishing gear may alter bottom habitat and damage benthic organisms and communities.

1.4.7.1.1 Effects of Alternatives on the Ecosystem

Chapter 11 of the Harvest Specifications EIS (NMFS 2007) provides an analysis of the effects of Alternative 1 (through its evaluation of Alternative 2 in the EIS for effects on the ecosystem). None of the alternatives would directly affect the ecosystem. The alternatives would revise the FMP and regulations to ensure consistency with the NS1 guidelines and do not substantially change the gear types, amounts, timing or location of the groundfish fisheries. The action is intended to manage groundfish stocks at the appropriate biological level for other species component groups, and would have no substantial effect on target species, prohibited species, forage fish species, and non-specified species as these categories only would be reorganized under the FMPs.

Because this action is not likely to change fishing activities or harvest levels in the Alaska groundfish fisheries, it is likely that the alternatives would have very similar if not the same effects on most components of the ecosystem. Alternative 2 (Preferred Alternative) and Alternative 3 would improve the management of species groups that are currently managed as an aggregate in the other species group. This may have a benefit to predator–prey relationships and to ecosystem diversity as these alternatives would reduce the potential to overfish the GOA squid, sharks, sculpins, and octopus groups and BSAI sharks, sculpins, and octopus groups. Even with the separate group management, the overall harvest of these groups is not likely to change substantially compared to the status quo so any beneficial effect of Alternative 2 or 3 on the ecosystem is not likely significant.

The ecosystem may be affected indirectly, potentially, by reductions in the harvest of sharks, sculpins, octopuses, or GOA squids resulting from group-specific harvest specifications under Alternatives 2 or 3. Also, improvements in the information collected on groundfish species may lead to improvements in stock assessments for currently assessed species and those species for which assessments may be possible in the future.

1.5 Socioeconomic Considerations

The economic impacts of the proposed alternatives on the human environment are discussed in this section relative to the status quo.

1.5.1 Description of the Fishery

Section 1.4.1 of the EA lists NEPA documents that provide detailed background information on the groundfish fisheries off Alaska. Detailed descriptions of the social and economic characteristics of the BSAI and GOA groundfish fisheries may be found in the following reports:

- NMFS (2004) contains detailed fishery descriptions and statistics in section 3.9, "Social and Economic Conditions."
- Hiatt et al. (2009) contains 60 tables that summarize a wide range of fishery information through 2008.

1.5.2 Impacts of the Alternatives

The impacts on BSAI and GOA fisheries and BSAI community development quota (CDQ) fisheries will depend largely on decisions made by the Council in future annual specification cycles for setting ACLs on the groups now managed under the other species assemblage. Since the purpose of the Preferred Alternative is to reduce the risk of overfishing by setting ACLs for the groups, rather than for the assemblage of these groups, there will be three more ACLs to manage in the BSAI and four more in the GOA. In the efforts to enhance the ability of managers to constrain harvests of these groups to protect their biomasses, this action may lead to reductions in the gross revenues from fishing in the short run, but also may lead to greater gross revenues from a sustainable fishery in the longer term, as a result of enhanced protection for the biomasses of those groups. Consideration also must be given to the impacts of those additional ACLs on target fisheries and potential mitigating measures that may be undertaken by the fishing fleets to respond to those additional, and smaller, ACLs for sharks, sculpins, octopuses, and GOA squids.

1.5.2.1 Economic Effects of ACL Management

An ABC control rule is an approach to setting ABC for each stock or stock complex as a function of stock abundance, scientific uncertainty, and other factors. It is designed to reduce the probability that overfishing occurs, and thereby improve the likelihood that OY is achieved for the fishery as a whole.

The achievement of OY is a major tenent of fisheries management under the MSA (MSA Section 301, 16 U.S.C. 1851). National Standard 1 reads as follows:

> (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.

The MSA, Section 3, 16 USC § 1802 defines OY as follows:

> (33) The term "optimum, with respect to the yield from a fishery, means the amount of fish which—
>
> (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
>
> (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and
>
> (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Stocks undergoing overfishing would likely have lower annual catch limits established in the near term. In very general terms, stocks with lower annual catch limits could have short-term reductions in revenues. Once these stocks recover, and are no longer undergoing overfishing, allowable annual harvests could increase, with likely increases in revenues. For fish stocks that are not undergoing overfishing, such as the North Pacific groundfish stocks, ACL requirements still might require catch targets slightly less than current catch quotas to protect against overfishing. However, any reduction in short-term revenues would generally be smaller than for stocks subject to overfishing, and are expected to be offset by sustained future harvests. In general, management via ACLs should contribute to the conservation of stocks through more rapid rebuilding of overfished stocks and preventing overfishing, even in stocks not presently

overfished. Thus, ACL based management should lead to greater long-term economic benefits and thus improve the likelihood that OY is achieved for the fishery as a whole.

Impacts of Alternative 1

Alternative 1 represents the status quo, with no change to the management of any categories in the BSAI and GOA groundfish FMPs and would result in future non-compliance with the MSA and NS1 guidelines. Status quo groundfish fishing is periodically evaluated in the Groundfish Harvest Specifications EIS (NMFS 2007). The analysis of status quo fishing provided in NMFS (2007) is incorporated by reference. The EIS found that status quo groundfish fishery management does not result in significantly adverse social or economic impacts.

Under Alternative 1, the Council retains the ability to set specifications for individual target species and groups and for an aggregate other species assemblage, comprised of sharks, sculpins, and octopuses in the BSAI and sharks, sculpins, octopuses, and squids in the GOA. All of the catch of the other species assemblage is taken incidentally in the directed groundfish fisheries. Historically the Council has set the other species TAC well below the ABC that is set by the SSC, but at a level sufficient to accommodate incidental catch. Thus, in practice, the status quo has not resulted in overfishing of any species or species group; however, if the component other species groups continue to be managed under the status quo, a risk of overfishing remains because fishing practices could change unexpectedly, resulting in a disproportionate harvest of a species relative to its contribution to the aggregate catch limit. Under Alternative 1, no change would occur for prohibited species, forage fish species, and non-target species. Thus, the current management regime for those categories, as well as the other species assemblage, may no longer comport with MSA requirements and NS1 guidelines.

Impacts of Alternative 2(Preferred Alternative) and Alternative 3

The following describes the considerations and hypothetical methods that may be used to manage harvest of sharks, sculpins, octopuses, and squids in the GOA and BSAI. These methods would be the same under Alternative 2 and Alternative 3, as these alternative would provide harvest specifications for individual other species groups. The listing of forage fish in the fishery under Alternative 3 would have no effect on the management as directed fishing for forage fish would continue to be prohibited and management of forage fish catch would remain the same under all alternatives.

April 2010 Council meeting

In April 2010, the Council recommended amendments to the BSAI and GOA groundfish FMPs to comply with requirements of the Magnuson-Stevens Act to end and prevent overfishing, rebuild overfished stocks, achieve optimum yield, and comply with statutory requirements for ACLs and AMs. Species and species groups must be identified in the fishery for which ACLs and AMs would be required. An EC may also be included in the FMPs for species and species groups that are not targeted for harvest, or likely to become overfished or subject to overfishing, and are not generally retained for sale or personal use (NPFMC 2010).

The Council selected Alternative 2 as its Preferred Alternative. The Preferred Alternative would (1) manage target species "in the fishery"; (2) eliminate the "other species" category and manage BSAI sharks, octopuses, and sculpins, and GOA sharks, octopuses, sculpins, and squids separately "in the fishery" [6]; (3) manage prohibited species and forage fish in an EC category; and (4) remove the non-

[6] In the BSAI, squid are already treated separately in specifications, and skates are being taken from other species in a separate action (Amendment 95), which will be combined with Amendments 96 and 87; in the GOA, skates are already treated as a separate species.

specified species category from the FMPs. The Council also adopted housekeeping amendments to the FMPs and amendments to federal regulations for consistency with the FMP amendments (NPFMC 2010).

The Council's action will make it necessary to adopt separate ABCs and OFLs for the species from the "other species" category that are moved "in the fishery." The introduction of these new, independently managed species, raises the possibility that management measures adopted during the season ("inseason management") to control catches of these species may reduce existing revenues from these species, or constrain harvesting effort and/or harvests of other, more valuable, species, and thus impose new costs on industry. Any such effect would not occur until harvest specifications are adopted that implement these amendments to the FMPs.

The Tier System[7]

Understanding of fish stocks, and information about stock status, vary considerably depending on the stock. The Council addresses the differing levels of uncertainty in part by applying different rules for setting catch limits for different stocks. Stocks are assigned to one of six "tiers," and more restrictive rules are used in the tiers for stocks about which less is known. Stocks about which the least is known are assigned to tier 6, which applies relatively conservative rules to the determination of harvest.

Most of the stocks considered here are assigned to tier 6. Only sculpins are assigned to tier 5, the next higher tier. Tier 5 assignment requires reliable point estimates of biomass and natural mortality rate. The tier 5 OFL is calculated as the fishing mortality (equal to the natural mortality rate) times the biomass. The ABC is calculated as three quarters of the OFL. In Tier 6, the OFL is normally set equal to the average catch history from 1978 through 1995, and the ABC is three quarters of the OFL unless an alternative value is established by the SSC on the basis of the best available scientific information.

The annual stock assessment volume contains a chapter or sub-chapter for each stock or stock complex in the "target species" category, and a summary chapter prepared by the Groundfish Plan Team. To the extent practicable, each chapter contains estimates of all annual harvest specifications except TAC, all reference points needed to compute such estimates, and all information needed to make annual status determinations with respect to "overfishing" and "overfished." In providing this information, the chapter uses the official time series of historic catch for each stock or stock complex. This time series, which is provided by the NMFS Alaska Region, includes estimates of retained and discarded catch taken in the groundfish fisheries; non-target taken in other fisheries; catches in state commercial, recreational, and subsistence fisheries; catches taken during scientific research; and catches taken during the prosecution of exempted fisheries.

While tier 6 OFLs and ABCs have typically been set with specific reference to catches in the groundfish fishery, new statutory requirements, and changes to the FMPs will require that all OFLs and ABCs, including those for tier 6 species, be set with reference to all catches from any source. It has not yet been determined how this new requirement will be implemented for tier 6 species.

Both the Plan Teams and the SSC have noted the difficulty of developing an OFL and ABC for tier 6 species. The SSC has charged the Plan Teams with developing alternative methods to establish OFLs within tier 6. The SSC has recognized, among several issues, that the catch of species like octopus and shark may be so low in relation to population size that average catch is not a meaningful measure of an overfishing limit (February 2006 SSC minutes).

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[7] This discussion of the tier system, and the following discussion of inseason management, is adapted, with modifications, from Smoker (2007).

In April 2010, the Council discussed specific cases where new group level ACLs based on tier 6 (average catch) may constrain directed fisheries, noting particular concern regarding octopus and shark bycatch in the Pacific cod longline fisheries. The Council requested that the SSC schedule a discussion of tier 6 methodologies on its June 2010 agenda, with the goal of developing new methods for determining tier 6 ACLs for those groups that are poorly sampled by the bottom trawl surveys. After its June discussion, the SSC may schedule a workshop during summer 2010 to develop new Tier 6 approaches for possible application for 2011 or later. Recommendations from a report from a 2009 SSC/Plan Team workshop on groundfish stock identification and splitting assemblages, which also may be germane to the management of tier 6 stocks, will be scheduled for review by the Groundfish Plan Teams in September 2010 and SSC in October 2010 (NPFMC 2010).

A species' or species group's tier assignment has an effect on the size of its OFL and ABC. An assessment under tier 5 is likely to result in a larger OFL/ABC than an assessment under tier 6 as tier 5 OFL/ABC is based on more information about the stock than only catch data for tier 6. The magnitude of the OFL/ABC affects management of that TAC category. As the OFL/ABC increases, more management options become available. If a TAC is set large enough relative to incidental catch needs, a directed fishery is allowed. Otherwise retention is restricted, to limit catch to the TAC (which often is equal to the ABC). In general, the Inseason Management Branch's tasks become easier as the TAC increases.

Inseason Management

The Inseason Management Branch of the NMFS Alaska Region is charged with managing the complex of TAC categories annually specified by NMFS on the basis of recommendations by the Council. An important objective of management is to limit catch of the TAC of a species or species group to its specified amount at the end of a fishing year. As required by the FMPs, TACs must be set at or below the ABC, which results in management actions to control fishing within the TACs occurring at or before the ABCs are reached. ABC is equivalent to the ACL and therefore managing at the TAC level is equal or more conservative than managing at the ACL level.

The Inseason Management Branch determines how much of an individual TAC is necessary for the incidental catch allowances (ICA) in other directed fisheries. For example, Pacific cod taken in a pollock target fishery creates a requirement to allocate tonnage to the Pacific cod ICA. ICA determinations are made on the basis of ICA requirements in previous years.

After the ICA is deducted, the remaining TAC is the directed fishing allowance (DFA) which allows vessels full retention of the species. Once the DFA is caught the fishery closes to directed fishing. Closure of a TAC category to directed fishing limits a vessel's retention of the closed species to a fraction of the vessel's amount of retained catch of the other species that remain open to directed fishing. If the ABC is taken and catch rates indicate that the OFL may be approached, additional fishery closures are imposed. To prevent overfishing, specific fisheries identified by gear and area, that incur the greatest non-target catch, are closed. Areas may be subsets of regulatory or reporting areas. Catch data provided by observers and vessel locations provided by vessel monitoring systems help the Inseason Management Branch determine potential discrete areas for closure to prevent overfishing while allowing groundfish fisheries to occur in other areas. Closures can expand to other fisheries and larger areas if the rate of catch is not sufficiently slowed. Overfishing closures are rare.

In recent years, the "other species" group has been closed for directed fishing in the BSAI and open for directed fishing in the GOA. Species groups assessed at the tier 5 level are generally assigned an OFL/ABC that exceeds ICA needs and may allow enough for a directed fishery. Species assessed at the tier 6 level are not likely to be opened for a directed fishery, and are more likely to be limited to ICA

status. Catch of tier 6 species is more likely to reach an ABC or approach an OFL because those management benchmarks are based on historic average catch.

Inseason managers are in touch with industry during the management process. Fishing entities can quickly respond to information on cumulative catches, and hot spot locations, by moving fishing operations to areas with lower incidental catches. Industry responsiveness, independent of federal regulatory action, has been enhanced in recent years by changes in the fishery, including the deployment of vessel monitoring systems (VMS), the development of independent companies providing analysis of fisheries information, and the emergence of industry fishing cooperatives. The implementation of the "squid box" by the pollock cooperatives in the BSAI in 2006 is the most widely known example of voluntary industry action to address high non-target catch rates. The fleet voluntarily avoided an area of high squid catch rates and reduced the catch before NMFS needed to issue a closure.

VMS make it possible to track individual vessel locations, almost in real time. Regulatory requirements, particularly Steller sea lion protection requirements imposed on Pacific cod, pollock, and Akta mackerel fishing operations, mean that much of the groundfish fleet carries VMS units. A fleet's VMS coverage matters because, in combination with other reports of harvest, it allows managers to determine the precise location of unusually high rates of incidental catch, making the design of localized closures possible. Moreover, managers make inferences of potential effort in a fishery on the basis of VMS information about vessel location and behavior. This can assist in forecasting rates of catch. Measures that extend VMS coverage may make it easier to design and enforce area closures customized to individual incidental catch concerns.

Estimates of catches of species that are discarded depend heavily on information gathered by observers on board fishing vessels. Vessel classes differ in their required observer coverage; vessels under 60 feet in length overall are not required to carry observers, vessels from 60 to under 125 feet are required to carry observers on 30 percent of their days at sea, and vessels 125 feet and over are subject to 100 percent observer coverage. In certain circumstances, when data from every haul is required, vessels may be required to carry two observers. An aggregate catch estimate for a species that is commonly discarded, such as sharks, will often depend on an extrapolation of catch volume from observed catches. If a fleet has limited observer coverage, an extrapolation may be made from a small number of hauls, and if those hauls are not representative of overall fleet activity at that time, the results can be misleading. The discussion of the 2006 shark catch in the BSAI later in this analysis will provide an example. Information from observed vessels may come in with a lag, and this can affect management response. Higher levels of observer coverage permit more accurate estimates of the volume and spatial distribution of non-target catches and make more precise area closures possible.

Fishing firms can often take voluntary steps to reduce the catches of the species considered here. A capacity for voluntary action is attractive because it can often be taken more quickly than action in response to agency regulations, and may provide more flexible responses, reducing costs incurred by industry. Industry associations or cooperatives can facilitate voluntary private-sector action, and the presence of these institutions thus can contribute to more effective in-season management. Cooperatives created in response to statutory and regulatory incentives enacted over the last ten years already have procedures for coordinating action by their members and with other cooperatives. These institutions can speed the distribution of hot spot information among their members and create contractual arrangements to implement and enforce measures to close fishing areas and reduce undesirable catches. The Bering Sea pollock catcher vessel cooperatives quickly responded to high incidental catch of squid during the 2006 B season pollock fishery. In that case NMFS identified the area of concern and the fleet stopped fishing through an intra-cooperative agreement. Incidental catch was essentially stopped before the BSAI squid ABC was exceeded. Thus, institutions that can facilitate voluntary action reduce the costs of effective inseason management.

Inseason management is forward looking and proactive. Managers take account of the current year's cumulative catch, current catch rates, and projected incidental catch needs in groundfish target species. Managers apply "braking" measures to catch in a graduated response as various catch benchmarks are approached. They have several tools, primarily determining the amounts of ICA and DFA (and zero allocations to DFA), shift of a species from incidental catch status to prohibited species status to prohibit retention of that species, facilitation of private sector responses, gear restrictions, and time and area closures, and they use these as necessary in response to the evolving fisheries situation.

Nevertheless, the process is uncertain. Management of a fleet is easier for fleets covered with VMS and carrying high levels of observer coverage, but levels of VMS and observer coverage vary among fleets and management areas. A higher proportion of vessels in the BSAI have VMS and observers than in the GOA, resulting in more use of extrapolated catch information and less certainty in harvest management in the GOA compared to the BSAI. Catch rates can fluctuate unexpectedly and can upset predictions of cumulative catches. Management measures are, in many cases, indirect. For example, an area closure may affect effort in an area known to have high incidental catch rates, but it is not a direct control on incidental catch volume.

Bering Sea and Aleutian Islands

Table 19 summarizes estimated 2003 to 2009 catches of the species in the "other species" category that will receive their own individual ABCs and OFLs in the BSAI under this action. Table 21 summarizes the SSC's 2010 BSAI OFL and ABC recommendations for these species groups. From 2003 through 2009, the 2010 shark ABC would have been exceeded three times, and the OFL would have been exceeded once; the octopus ABC would have been exceeded four times, and the OFL three times; the sculpin OFL and ABC would not have been exceeded.

Tables 19 and 21, and later figures illustrating these relationships, cannot be used for forecasting or projection of harvests or of harvests in relation to ABC and OFL under this action, because the management regime for the "other species" was fundamentally different in earlier periods than it will be if this action is adopted. Prior to this proposed action, NMFS inseason managers managed a joint "other species" ABC and OFL rather than species-specific ABCs and OFLs. Once individual species are managed under their own ABCs and OFLs, NMFS will take active management steps earlier in the year, if necessary to control catches. Moreover, other management changes in the fisheries (such as observer coverage, cooperative arrangements among fishing firms, and NMFS experience with using VMS data), that affect inseason management, have been changing, or are expected to change, as well.

The tables and figures do show that catches of some species have risen to levels that might trigger inseason management actions if they were to occur in 2011 or later. The sections below discuss hypothetical NMFS responses to these types of situations. The relatively large sculpin OFL and ABC indicate that sculpin will not raise concerns in the BSAI. Thus, subsequent sections in this analysis treat BSAI sharks and octopuses, but not BSAI sculpins.

BSAI Sharks

Figure 23 compares BSAI shark catches to the SSC's 2010 OFL and ABC recommendations over a longer time period (1997 to 2009) than Table 25 (2003 to 2009).[8] As shown in the figure, over this

[8] The longer period is shown in Figure 23, and in subsequent figures, because it provides more perspective on catches in relation to 2010 OFLs and ABCs, and because an industry analysis at the April 2010 Council meeting

longer time frame the cumulative average catch of sharks exceeded the 2010 ABC eight times since (and including) 1997; the catch also exceeded the 2010 OFL three times.

The BSAI incidental shark catch is highly concentrated in two fisheries. From 2003 through 2009, over half (58 percent) of the incidental shark catch took place in the pelagic trawl fishery for pollock (including both bottom and mid-water targets). A further 28 percent took place in the hook-and-line fishery for Pacific cod. Smaller amounts of sharks were taken in a variety of other hook-and-line, non-pelagic trawl, and pot gear fisheries. Annual catch estimates, by gear type and target, are summarized in Table 25.

Vessels fishing for pollock or Pacific cod in the BSAI are required to carry transmitting VMS units under regulatory measures adopted to protect Steller sea lions. Pollock fishing efforts of individual firms are coordinated by fishing cooperatives organized under the American Fisheries Act (AFA). Cooperatives have experience of inter-cooperative coordination, for example, the pollock fleet has already shown a capacity to organize itself to address high incidental catch rates of squid. Similarly, much of the Pacific cod hook-and-line fleet is coordinated by the Freezer-Longliner Cooperative. This cooperative has shown an ability to coordinate individual firm efforts to control halibut PSC catch in the GOA. Observer coverage is relatively high in these fleets. AFA vessels fishing for pollock are currently divided between vessels with 30 percent observer coverage, and vessels with 100 percent. Most vessels fishing for Pacific cod with hook-and-line gear have 100 percent observer coverage, and all have at least 30 percent coverage.

The incidental shark catch came mostly from Areas 517, 519, and 521 from 2003 through 2009. Figure 28 shows the distribution of shark incidental catches in the BSAI from 2006 through 2009. The figure shows four areas that might be evaluated for hot spot closures if catch rates were found to be unacceptably high.

Shark catches tend to be concentrated in time. Over the period 2003 through 2009, 63 percent came from July through October. The pelagic trawlers take 20 percent of their catch of sharks from January through March, and 82 percent from June through October (with a peak of 35 percent in September). Hook-and-line vessels targeting cod took about 26 percent of their shark catch in January, February, and March, but 64 percent from August through November.

Given that the cumulative catch of sharks has frequently approached or exceeded one or both of the management benchmarks, actions in the future to prevent overfishing and reduce the incidental catch of sharks would be possible if this species were managed on an individual basis.

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used a similar time frame. Most of the analysis and discussion in this section, however, uses the shorter 2003 to 2009 time frame. This frame is used for two reasons: (1) NMFS catch accounting system data series on which the estimates have been based begins in 2003, and (2) fisheries management has been evolving in the BSAI and GOA, and measures in place in the earlier part of the period have been replaced by new measures. The new measures include changes in the constraints on fishing practices, changes in the way catches are monitored, and changes in the private sector organization for harvesting fish.

A prohibition on retention of shark catch would be an ineffective management tool in this instance since sharks are not usually targeted or retained. The pollock trawl and Pacific cod longline fisheries combine high observer and VMS[9] coverage; therefore targeted spatial closures would likely be effective in reducing shark catch. The impact of closures would depend on timing and spatial coverage. The impact on the fleet could be limited by careful delineation of hot spots.[10]

Based on an evaluation of 2004 hot spots, inseason managers may follow a two-step strategy to control incidental catches when concerns about exceeding ABC arise. In the first step, NMFS may close five statistical areas to directed fishing for Pacific cod for all hook-and-line gear and to directed fishing for pollock for trawl gear. These statistical areas are two northern areas and three southern areas (655409, 655430, 645501, 735730, 745830) (Figure 31, tier 1 closures). If shark catch continued to be high, further closures of areas near Zemchung Canyon (725830 ,735900, 745900), Pribilof Canyon (685600, 695600) and east of Bering Canyon (655500, 665430) may be warranted, depending on fleet location and observed shark catch (Figure 31, tier 2 closures).

In order to make the issues associated with control of shark catches more concrete, the following paragraphs look at 2004 and 2006, two years in which shark catch exceeded the 2010 OFL and/or ABC. The discussion draws on NMFS records of actual catches and interweaves a hypothetical narrative of possible agency responses. These discussions are hypothetical: sharks were not managed independently of the remainder of the "other species" category during this time, and the issues addressed here did not actually arise.

In 2004, the 2010 ABC for sharks was exceeded by 61 tons. Weekly shark catch rates looked sustainable until around the first weeks of July when the pollock fleet started actively fishing their B season. The average weekly rate of catch for the pollock fleet is historically around 3 to 5 metric tons. But in early July, this jumped to weekly rates of 15 tons or more. Inseason managers projecting the needed amount of shark ICA to support the hook-and-line catcher/processor fishery would have become concerned that there was a risk of exceeding the 2010 ABC.

Managers' first step would have been to notify the pollock fleet that NMFS had concerns about the high levels of shark catch, and to provide the fleet detailed information on the locations where high shark catches were being observed. This would have allowed operators to voluntarily avoid these areas. The AFA cooperative structure could have facilitated communication and coordination of any efforts. This has worked in the past in similar cases, and would likely reduce shark catch rates. The fleet can change their fishing behavior faster than NMFS can through inseason action. Pollock trawlers have an incentive to cooperate in order to prevent the regulatory closure of areas. This makes it possible for them to return to an area later if pollock is present and the shark catch is low.

NMFS would have monitored VMS and observer data to determine if the pollock fleet avoided high shark catch areas. If shark catch rates had remained high and there had been no response from the fleet in reaction to the high rates, the first group of targeted area closures would have been implemented for all trawl gear; additional statistical areas with high shark catch might also have been closed.

The hook-and-line catcher/processor fleet would have been informed of inseason management concerns and encouraged to avoid shark. Inseason managers would then have had to determine whether or not to

[9] A VMS combines a GPS and a transmitter. In fisheries where VMS is a requirement, inseason managers are able to monitor vessel location.

[10] In Appendix A, a case study written in 2007, is less optimistic about the potential for targeted closures. However, as noted, management has changed since then in ways that make targeted closures more effective.

allow the hook-and-line catcher/processor fleet to fish in the closed areas following the opening of their B season on August 15. If a projection using historic average shark catch rates by the hook-and-line fleet had not exceeded the 2010 ABC, the hook-and-line fleet would likely have been allowed to fish in those areas. If the projection had suggested otherwise, then the five areas might have been closed for directed fishing for Pacific cod using hook-and-line gear as well.

In 2006, both the 2010 ABC and the 2010 OFL were exceeded. The shark catch rate was similar to that in prior years until September. However, the catch during the week ending September 19 was very high. This catch, 249 metric tons, was approximately equal to the cumulative 2006 catch on September 12. Thus, the cumulative annual catch approximately doubled this week. Almost all of this catch was made by pollock trawlers. When the week closed on September 19 the cumulative catch for the year was 550 metric tons, 61 metric tons greater than the 2010 ABC and 48 metric tons less than the OFL.

This sudden increase in estimated shark catch was largely driven by one vessel's catch in the AFA pollock fishery during two hauls in September. The amount of shark was so great that a very large at-sea discard rate for sharks was generated. This led to the use of a high catch rate for extrapolation to unobserved vessels. To estimate total shark catch during that week, this rate was applied to all unobserved vessels targeting pollock in that area.

If Amendment 91 for Chinook Salmon bycatch management is approved, starting in 2011 monitoring and enforcement regulations would require all AFA pollock vessels to have 100 percent observer coverage. This will eliminate the extrapolation of a high rate to unobserved vessels. If the Amendment 91 regulations had been in place in 2006, the catch during the week closing on September 19 would likely have been less than 30 metric tons and the 2010 OFL would not have been exceeded.[11]

In response to targeted area closures, some pollock trawlers and hook-and-line catcher/processors may have to change the areas within which they operate, moving to less desirable fishing grounds. The impact on these operations may be some combination of increased costs and/or decreased revenues. Increased costs may occur if operations have to travel further to reach alternative fishing grounds, or if they must fish in areas with lower catch-per-unit of effort (and thus incur increased costly fishing effort to catch the same amount of fish). Decreased revenues may occur if fishing operations find that they are unable to catch the same amount of fish because increased travel or fishing time makes it impossible to catch the same amount of fish in the time available. Decreased revenues may also occur if shifts in fishing activity also make it harder to deliver a quality product. Specific revenue impacts are not estimated due to the highly speculative nature of future events. This later consideration may affect catcher vessel fleet segments more than catcher/processor segments. The pollock B season begins on June 1 and the Pacific cod season does not begin until September 1. This gives the pollock fleet the ability to complete much of their B season catch before regulations permit the hook-and-line fleet to begin fishing. The hook-and-line fleet's Pacific cod fishing opportunities are therefore relatively vulnerable to large shark catches by the pollock fleet. As noted in the 2004 case study, inseason managers would take late season hook-and-line incidental catch needs into account while determining management measures to apply to the pollock fleet.

[11] Smoker (2007) uses events in 2006 for this case study as well, indicating that, in 2006, inseason managers would have been "hard-pressed to continue to identify small specific areas to close to prevent overfishing of sharks [by which Smoker means the 2007 OFL]. A general closure of broader areas would have to be contemplated, perhaps including entire reporting areas that consist of most of the productive directed fishing areas." That is true given the tools available in 2006. However, this is an instance in which evolving management makes past relations between catch and 2010 OFLs and ABCs a poor guide to the future.

Any adverse impacts would be incurred by both large and small fishing entities in the BSAI. The standard used here to identify small entities is the $4 million gross revenues threshold used to separate large from small fishing vessel entities for analyses under the Regulatory Flexibility Act.[12] The 2009 Economic SAFE identifies 215 small groundfish entities operating in the BSAI in 2008, with estimated average 2008 gross revenues from all sources of about $1.53 million.[13] Most of these (204 of them) are catcher vessels, with estimated average gross revenues of $1.49 million. About half of the catcher-vessels (103) are trawlers with average gross revenues of about $1.71 million, 46 are hook-and-line vessels with average gross revenues of about $0.58 million, and 62 are pot vessels with average gross revenues of about $1.70 million. The SAFE estimates that there were 11 small catcher-processors, a majority (7) of which were hook-and-line vessels with average gross revenues of about $2.65 million. The SAFE may overstate the number of small entities since it considers individual vessel gross revenues, but does not capture affiliations among vessels. (Hiatt, et al. 2009, Tables 37 and 39)

The key fleets[14] impacted by the shark breakout are the Pollock trawlers and the hook-and-line vessels fishing for Pacific cod. All of the Pollock trawlers are believed to be large entities, either because the vessels themselves gross more than $4 million or because they are members of American Fisheries Act cooperatives that gross more than that. The BSAI hook-and-line vessels targeting Pacific cod are predominately large vessels. Two are believed to be small.[15]

There are no new record keeping and reporting requirements associated with this action, and NMFS has not identified conflicts with other federal statutes or regulations. A no-action alternative might be able to avoid adverse impacts to small entities, however, this alternative is precluded by the statutory requirements of the Magnuson-Stevens Act.

BSAI Octopus

Figure 24 compares BSAI octopus catches to the SSC's 2010 OFL and ABC recommendations over a longer time period (1997 to 2009) than Tables 19 and 21 (2003 to 2009). As shown in the figure, over this longer time frame the average cumulative catch of octopus exceeded the 2010 ABC in eight of the years from 1997 to 2009, inclusive, and exceeded the 2010 OFL in six of the years.

The pot fishery for Pacific cod took 59 percent of the catch of octopus from 2003 through 2009. The pot gear fishery targeting octopuses, and the hook-and-line fishery for Pacific cod each took another 11 percent. Non-pelagic trawlers targeting Pacific cod took another nine percent. Most of the remainder of the catch was made by non-pelagic trawlers targeting one of several species. Although directed fishing for octopus is closed in federal waters, directed fishing has occurred in state waters in the BSAI (Conners and Conrath, 2009a, page 1239). BSAI octopuses are used for bait in pot and hook-and-line fisheries; some octopuses are also reportedly sold for human consumption (Conners and Conrath, 2009a, page

[12] All small vessel counts and average gross revenues estimates in this section, and in subsequent sections, are estimates based on participation in 2008.
[13] Revenues from all sources includes estimated revenues from all fishing sources in Alaska, whether the fishing was conducted in federal or state waters. Some vessels earn revenues from fishing outside of Alaska and from non-fishing activities (such as tendering). Estimates of revenues from these sources are not available for this analysis.
[14] The key fleet estimates in this paragraph, and in the remaining sections, were prepared for this analysis by the AKR Sustainable Fisheries Division, and take account of some account of some affiliations among vessels, unlike the SAFE estimates. Nevertheless, the network of affiliations among vessels is complex, and this estimate in all likelihood misses some affiliations and thus still overstates the number of small entities that are affected by this action.
[15] Estimated gross revenues are not provided for these two vessels to preserve confidentiality.

1239). Detailed annual estimates of BSAI octopus catch, broken out by gear type and target species, may be found in Table 23.

Almost half (47 percent) of the BSAI octopus catch comes from Area 519, almost another quarter comes from Area 509, and 11 percent comes from Area 517. Even with limited observer data, a distinct octopus hot spot appears northeast of Dutch Harbor (Figure 30). Octopus catch rates in much of the Bering Sea are extremely low.

The pot fishery in the BSAI has an A season that opens on January 1 and runs through June 10, and a B season that begins on September 1 and runs through the end of the year (75 FR 11785; March 12, 2010). The fishing begins when the season opens, but is finished long before the season technically ends. About 32 percent of the catch from 2003 through 2009 came in January and February, and a further 42 percent came in September and October. After October, when the pot fleet is targeting crab, cumulative catches tend to level off.

Because octopus is retained for sale and bait, a prohibition on retention could be effective. Once the TAC was reached, inseason managers could prohibit retention. Because the fleet is observed and carries VMS, a hot spot closure could be a second step. As a last resort, if the catch approaches the OFL, then a potential closure of pot Pacific cod would prevent an OFL overage.

In order to make the issues associated with control of BSAI octopus catches more concrete, the following paragraphs look at 2006, a year in which octopus catch exceeded the 2010 OFL and ABC. As in the discussion of BSAI sharks, this discussion melds NMFS records of actual catches with a hypothetical narrative of possible agency responses. This discussion is hypothetical: octopuses were not managed independently of the remainder of the "other species" category during this time, and the issues addressed here did not actually arise.

Inseason managers would have been monitoring octopus catches throughout 2006. There would not have been a concern about exceeding the TAC until about the first week of September. Before that, average weekly catches were on the order of three to four metric tons a week, and inseason managers would not have anticipated exceeding the TAC at those rates.

However, in early September managers would have noticed a large increase in the weekly rate to about 20 to 30 metric tons. Managers would have investigated a change of this amount, and would have noticed that over half of that catch was retained by the pot catcher-vessel sector.

In order to slow down the catch, and to avoid exceeding the TAC, inseason managers would have prohibited retention of octopus in the BSAI. A prohibition on retention, implemented on September 9, should have prevented around 140 metric tons of octopus from being retained. Since most octopus (aside from some observed catches) enter the NMFS catch accounting system when they are delivered, the prohibition on retention would thus have been likely to prevent the fleet from exceeding the TAC and OFL, and the estimated total catch for BSAI octopus would have been around 210 metric tons for the year.

If the TAC had been exceeded and OFL approached, inseason management would have investigated the possibility of a hot spot closure northeast of Dutch Harbor. A line of statistical areas stretching from Area 519 to western Area 509, including statistical areas 665401, 655409, 655410, 655430, 645434, and 645501, may have been closed to Pacific cod fisheries using pot gear (Figure 32). As a final step, Pacific cod fisheries with pot gear, followed by hook-and-line and non-pelagic trawl fisheries, would have been candidates for closure to prevent overfishing.

In 2006, 21 vessels were retaining octopus, which was selling for around 50 cents per pound that fall (NMFS catch accounting derived from eLandings). If the prohibition of octopus retention had been sufficient to control catches, a saving of 140 metric tons, or about 309,000 pounds, would have caused a potential revenue loss of about $155,000.

If targeted area closures became necessary, some Pacific cod pot vessels (and potentially other types of operations) may have to change the areas within which they operate, moving to less desirable fishing grounds. The impact on these operations may be some combination of increased costs and/or decreased revenues. Increased costs may occur if operations have to travel further to reach alternative fishing grounds, or if they must fish in areas with lower catch-per-unit of effort (and thus incur increased costly fishing effort to catch the same amount of fish). Decreased revenues may occur if fishing operations find that they are unable to catch the same amount of fish because increased travel or fishing time makes it impossible to catch the same amount of fish in the time available. Decreased revenues may also occur if shifts in fishing activity also make it harder to deliver a quality product. Specific revenue impacts are not estimated due to the highly speculative nature of future events.

Any adverse impacts would be incurred by both large and small fishing entities in the BSAI. The SAFE estimates of the numbers of small entities operating in the BSAI in 2008 were described in the section on BSAI sharks, above. Pot vessels targeting Pacific cod take a large proportion of the octopus catch. Most of the vessels in this fleet segment (which has an estimated 63 vessels) are small. Restrictions on this fleet may adversely impact 55 small vessels with average gross revenues of about $1.78 million. The hook-and-line fishery for Pacific cod, which was discussed under sharks, takes a smaller proportion of octopus; two entities may be small. The pot fishery targeting octopuses may include any of the 62 small pot vessels identified from the SAFE report in 2008. The non-pelagic trawl fishery for Pacific cod has 13 small entities with average gross revenues of about $0.81 million.[16]

There are no new record keeping and reporting requirements associated with this action, and NMFS has not identified conflicts with other federal statutes or regulations. A no-action alternative might be able to avoid adverse impacts to small entities, however, this alternative is precluded by the statutory requirements of the Magnuson-Stevens Act.

Gulf of Alaska

Table 20 summarizes estimated catches from 2003 through 2009 for the species in the "other species" category that will receive their own individual ABCs and OFLs in the GOA under this action. Table 22 summarizes the 2010 OFL and ABC recommendations of the SSC for these species groups. Over this time period, the 2010 shark ABC would have been exceeded three times, and the OFL would have been exceeded twice; the octopus ABC would have been exceeded four times, and the OFL twice; the sculpin OFL and ABC would not have been exceeded; the squid ABC would have been exceeded once, and the OFL would not have been exceeded.[17]

As explained earlier, while not useful for forecasting, the tables and figures do show that catches of sharks and octopuses have risen to levels that would have triggered inseason management actions if they occurred in 2011 and thereafter. The high relatively large sculpin OFL and ABC indicate that sculpin will

[16] Many vessels may participate in more than one of the fleets just described, thus the vessel counts and gross revenues in this paragraph are not additive across fleets.

[17] The failure to exceed the OFL, however, is an artifact of the approach taken to applying the Tier 6 rules in this instance; the GOA squid OFL is set equal to the maximum catch in the period 1997 to 2007. In the absence of a larger catch in 2008 or 2009, the 2006 catch is the OFL by definition.

not raise concerns in the GOA. Thus, subsequent sections in this analysis treat GOA sharks, octopuses, and squids, but not GOA sculpins.

Fleets in the GOA tend to have lower levels of VMS, cooperative institutions, and observer coverage, than BSAI fleets. Vessels licensed to fish for Atka mackerel, Pacific cod, and pollock, are required to have a transmitting VMS if they are operating while one of these fisheries anywhere in the state is open. However, some vessels may not be licensed to fish for these species and may thus lack VMS units. A significant part of the shark incidental catch, for example, comes from halibut vessels. Vessels targeting halibut often do not carry transmitting VMS units. The GOA fleet also tends to be composed of smaller vessels than are found in the BSAI. Large numbers are under 60 feet in length, and are not required to carry observers; most others fall into the 60 to 125 foot category, and are only subject to 30 percent observer coverage. Finally, although not absent, cooperatives are less widespread among firms operating vessels in the GOA. This may mean that GOA fleets have less capacity to organize voluntary private-sector efforts to slow down non-target catch rates.

GOA Sharks

Annual GOA shark catch estimates from 1997 through 2009 are compared to the SSC's 2010 ABC and OFL recommendations in Figure 25. Estimated catches exceeded the ABC eight times during these 13 years and exceeded the OFL four times. Thus, in the absence of species-specific management, and given the nature of tier 6 stock assessments, catches would be expected to attain the ABC or OFL.

In the GOA, sharks are incidentally caught in a large number of separate groundfish target fisheries. Just over half of the catch from 2003 through 2009 was made with hook-and-line gear. Almost a quarter of the total (about 24 percent) was made in fisheries targeting halibut. Sablefish hook-and-line accounted for 16 percent, and Pacific cod hook-and-line accounted for about 13 percent. Pelagic trawl targeting pollock (both mid-water and bottom) accounted for about 18 percent of the catch, non-pelagic gear targeting arrowtooth flounder accounted for about nine percent, and non-pelagic gear targeting shallow-water flatfish accounted for about seven percent. Smaller proportions were taken in other fisheries, particularly non-pelagic trawl fisheries. Detailed, fishery by fishery, estimates of GOA shark catch may be found in Table 26.

The trawlers targeting pollock, and the hook-and-line vessels targeting Pacific cod, will carry transmitting VMS units, pursuant to regulations. Vessels targeting other species may or may not have transmitting VMS units. They would only be required to do so if they have a Federal Fisheries Permit endorsed for Pacific cod, pollock, or Atka mackerel, and those species' seasons were open. Observer coverage is limited in the fleets taking sharks incidentally. About 800 vessels had GOA shark catch associated with them in 2009; only 17 percent of these had 30 percent coverage, and only about one percent had 100 percent coverage. Cooperative arrangements that would facilitate voluntary industry efforts to reduce shark incidental catches are absent in most GOA fleets.

From 2003 to 2009, about 44 percent of shark catches came from Area 630, about 26 percent from Area 620, and eight to ten percent from each of Areas 610, 640, and 650. Over the period 1997 to 2009, about 30 percent of the shark catch came in March and April, and about 35 percent in September and October.

To make the issues associated with control of GOA shark catches more concrete, the following paragraphs look at 2006, a year in which shark catch exceeded the 2010 OFL and ABC. As in earlier examples, this discussion melds NMFS records of actual catches with a hypothetical narrative of possible agency responses. This discussion is hypothetical: sharks were not managed independently of the remainder of the "other species" category in 2006, and the issues addressed here did not actually arise.

In 2006, 1,603 metric tons of sharks were caught in the GOA. Of that amount only 63 metric tons (four percent) was retained. The remaining 96 percent was discarded at sea as incidental catch. The top fisheries for shark catch in the GOA were the halibut and sablefish IFQ fisheries. These caught 951 metric tons or 60 percent of the shark incidental catch. This was followed by 114 metric tons (7 percent) in the hook-and-line Pacific cod fishery, and 86 metric tons (5 percent) in the arrowtooth flounder fishery. Table 26 summarizes information on GOA shark catches by gear type and target.

Inseason managers would not have created a shark DFA in 2006. Thus, when the fishing season started on January 1, no directed fishing for sharks would have been permitted. Managers would have closely followed the catch of sharks and seen a dramatic increase in March. Managers would have been likely to react by investigating where high shark catch was being observed and to have determined spatial areas for closure in order to avoid exceeding the OFL. These areas would have been determined using a combination of catch reports, VMS, and current and historical observer information on shark catch. Possible areas are shown in Figure 29.

NMFS does not currently have regulations that would make it possible to impose constraints on the halibut fishery to reduce shark catches. The Northern Pacific Halibut Act of 1982 (16 U.S.C. sec. 773c(c)) provides that "[t]he Regional Fishery Management Council having authority for the geographical area concerned may develop regulations governing the United States portion of Convention waters . . . applicable to nationals or vessels of the United States, or both, which are in addition to, and not in conflict with regulations adopted by the Commission. Such regulations shall only be implemented with the approval of the Secretary, shall not discriminate between residents of different States, and shall be consistent with the limited entry criteria set forth in section 1853(b)(6) of this title." NMFS has implemented seabird avoidance measures in the halibut longline fishery pursuant to the authority of the Halibut Act. Similarly, the Council may be able to recommend regulations to protect sharks under the Halibut Act that would be applicable to nationals or U.S. vessels in Convention waters.

In response to targeted area closures, some GOA sablefish, Pacific cod, and pollock fishermen may have to change the areas within which they operate, moving to less desirable fishing grounds. The impact on these operations may be some combination of increased costs and/or decreased revenues. Increased costs may occur if operations have to travel further to reach alternative fishing grounds, or if they must fish in areas with lower catch-per-unit of effort (and thus incur increased costs of fishing effort to catch the same amount of fish). Decreased revenues may occur if increased travel or fishing time requirements makes it impossible to catch the same amount of fish in the time available. Decreased revenues may also occur if shifts in fishing activity also make it harder to deliver a quality product. Since sharks are not retained for market purposes, there should be no loss in revenues when retention is prohibited. Specific revenue impacts are not estimated due to the highly speculative nature of future events. Halibut IFQ operations would not be affected by inseason managers since regulations do not currently allow inseason management of the halibut fishery to control shark catches.

Any adverse impacts would be incurred by both large and small fishing entities in the GOA. The standard used here is the $4 million in gross revenues standard used for analyses under the Regulatory Flexibility Act. The 2009 Economic SAFE identifies 702 small groundfish entities operating in the GOA, with average revenues from all sources of about $0.60 million. Most of these, 697 are catcher vessels with average revenues of about $0.60 million. A majority of the catcher-vessels, 520, use hook-and-line gear and have average revenues of about $0.49 million, 73 are trawlers with average revenues of about $1.27 million, and 142 are pot vessels with average revenues of $0.85 million. There were five catcher-processors, mostly hook-and-line vessels, with average gross revenues of about $1.52 million. The SAFE may overstate the number of small entities since it considers individual vessel gross revenues, but does not capture affiliations among vessels. (Hiatt, et al. 2009, Tables 37 and 39)

While halibut hook-and-line vessels took a significant proportion of the shark catch, they will not be directly regulated by this action, since they are not included in the FMP. There were an estimated 270 small sablefish hook-and-line vessels with an estimated average gross revenue from all sources of $0.77 million, an estimated 128 Pacific cod hook-and-line vessels with an average gross of $0.59 million, an estimated 21 small pelagic pollock trawlers with average gross revenues of about $1.02 million, five non-pelagic trawlers targeting arrowtooth flounder with average gross revenues of about $0.58 million, and five non-pelagic trawlers targeting shallow water flatfish with average gross revenues of about $0.65 million. [18]

There are no new record keeping and reporting requirements associated with this action, and NMFS has not identified conflicts with other federal statutes or regulations. A no-action alternative might be able to avoid adverse impacts to small entities, however, this alternative is precluded by the statutory requirements of the Magnuson-Stevens Act.

GOA Octopus

Annual GOA octopus catch estimates from 1997 through 2009 are compared to the SSC's 2010 ABC and OFL recommendations in Figure 26. Estimated catches exceeded the ABC six times during these 13 years, and exceeded the OFL three times. Thus, in the absence of species-specific management, and given the nature of tier 6 stock assessments, catches occasionally can be expected to attain the ABC or OFL.

Most of the GOA octopus catch from 2003 through 2009 (91 percent) was made in the pot fishery for Pacific cod. Aside from this fishery, only the hook-and-line fishery for Pacific cod took as much as two percent. Pacific cod pot catches are large at the start of the year; a smaller fishery takes place in September and October. About 65 percent (218 metric tons in 2008 and 213 metric tons in 2009) of the catch is sold for human consumption. About 15 percent (43 metric tons in 2008 and 37 metric tons in 2009) was retained for bait or sold for bait. Details about annual catches by different gear type and target combinations may be found in Table 24.

Under the terms of the Steller sea lion protection measures, vessels targeting Pacific cod are required to have transmitting VMS units while they are operating. Thus, the locations of the vessels in this fleet should be relatively well known in almost real time. Observer coverage of these boats is incomplete. Almost all fall into size groups that either do not require observers, or that only require 30 percent observer coverage. In 2009, 126 vessels fished for Pacific cod with pots in the GOA. Only 20 percent of these were required to have 30 percent observer coverage. These vessels accounted for 20 percent of the Pacific cod catch. Moreover, the activities of this fleet are not covered by a fishing cooperative.

Most of the catch (about 93 percent), from 2003 through 2009, is taken from Areas 610 and 630. Most of the remainder (about 7 percent) comes from Area 620. It is, however, difficult to identify specific hot spots within these large regions due to lack of observer data.

There are two cod fishing seasons in the Western and Central GOA regions. An A season, allocated 60 percent of the TAC, opens on January 1 and closes on June 10. Pot, longline, and jig fishermen compete for the A season allocation. Most of the harvest actually occurs in the first part of the season. A further 40 percent of the TAC is released to the same competitive fishery for a B season that starts on September

[18] Many vessels may participate in more than one of the fleets just described, thus the vessel counts and gross revenues in this paragraph are not additive across fleets.

1 and runs through the end of the year. Again, most of the harvest occurs in the early part of the B season (NMFS 2010b; NMFS 2009). Over the period 2003 to 2009, about 27 percent of the harvest was made in January, 22 percent in February, 17 percent in September, and 11 percent in October.

The most recent years in the catch series shown in Figure 26 are 2008 and 2009; estimated catches exceeded the 2010 OFL and ABC in both years. Because octopus was part of the other species TAC and the other species complex was open to directed fishing in the GOA, there were no constraints on retention of octopus in 2008 and 2009.

If octopus had had a separate TAC in 2008 and 2009, inseason managers would have established a DFA for octopus and closed directed fishing when that DFA was exceeded. Once directed fishing for octopus was closed, incidental catches would have been restricted by a 20 percent MRA. If retention of incidentally caught octopus continued, and if the TAC was projected to be exceeded, managers would have prohibited retention of octopus. Since octopus are retained for food and bait, leading to retention and perhaps targeting of octopus, a prohibition of retention alone would more than likely keep catches within the OFL.

Because of poor observer coverage and the spatial distribution of octopus in the GOA, it is difficult to implement hot spot closures. However, if the OFL was projected to be exceeded, a spatial closure for pot gear of several statistical areas, based on the spatial information collected on fish tickets where large amounts of octopuses were reported to be caught and retained, would have been implemented. The projected state statistical areas for 2008 and 2009 would have been 515700, 515730, 525733, 605502, 605504, an 605507 (Figure 32).

In response to targeted area closures, some Pacific cod pot fishermen may have to change the areas within which they operate, moving to less desirable fishing grounds. The impact on these operations may be some combination of increased costs and/or decreased revenues. Increased costs may occur if operations have to travel further to reach alternative fishing grounds, or if they must fish in areas with lower catch-per-unit of effort (and thus incur increased costs of fishing effort to catch the same amount of fish). Decreased revenues may occur if increased travel or fishing time requirements makes it impossible to catch the same amount of fish in the time available. Decreased revenues may also occur if shifts in fishing activity also make it harder to deliver a quality Pacific cod product. Specific revenue impacts are not estimated due to the highly speculative nature of future events.

Moreover, Pacific cod fishermen may lose revenue from forgone sales of octopus, or from forgone use of octopus for bait fisheries. If the fisheries had been held to the ABC in both 2008 and 2009, octopus catch would have dropped by about 199 metric tons, or by about 439,000 pounds. At the estimated ex-vessel price of about $0.50 per pound, used in the discussion of the BSAI octopus, this would have been an average of about $110,000 per year during the period.

Any adverse impacts would be incurred by both large and small fishing entities in the GOA. The SAFE estimates of the numbers of small entities operating in the GOA in 2008 were described in the section on GOA sharks, above. Most of the catch of octopus came from the pot fishery for Pacific cod. There were an estimated 132 small vessels in this fishery in 2008, with estimated average gross revenues from all sources of about $0.88 million.

There are no new record keeping and reporting requirements associated with this action, and NMFS has not identified conflicts with other federal statutes or regulations. A no-action alternative might be able to avoid adverse impacts to small entities, however, this alternative is precluded by the statutory requirements of the Magnuson-Stevens Act.

GOA Squid

Annual GOA squid catch estimates from 1997 through 2009 are compared to the SSC's 2010 ABC and OFL recommendations in Figure 27. Estimated catches exceeded the 2010 ABC only once during this period and did not exceed the 2010 OFL. The fact that the 2010 OFL was not exceeded is in part an artifact of the specifications process.

The tier 6 approach is applied somewhat differently to GOA squid than it is to other species. The 2009 GOA squid SAFE notes that "Tier 6 is problematic for squids because fishing pressure on squid appears to be low and average catch may not be a good indicator of productivity in a lightly fished population…. " (NPFMC 2009b). In 2009, the SSC recommended an OFL equal, not to the average catch over a base period, but to the maximum catch over the years 1997 to 2007 (NPFMC 2009b). Since 2008 and 2009 catches were below that maximum level, by definition this fishery did not exceed the OFL during the 1997 to 2009 period.

Almost all squid is caught by trawl gear in the pollock targets (96 percent of the catch from 2003 to 2009). Under the terms of the Steller sea lion protection measures, vessels targeting pollock are required to have transmitting VMS units while they are operating. Thus, the locations of the vessels in this fleet should be relatively well known in almost real time. Observer coverage of these boats is incomplete. Most of this fleet requires 30 percent observer coverage; out of 62 vessels that targeted pollock in 2009, 17 were unobserved, 45 had 30 percent observer coverage, and none had 100 percent observer coverage. Moreover, the activities of this fleet are not covered by a fishing cooperative. Detailed, fishery by fishery, estimates of GOA squid harvests may be found in Table 27.

Annual GOA pollock TACs are apportioned among management areas 610, 620, and 630, and by season. Nearly the entire catch of squid occurs in Area 620. The key harvest areas are the west side of Kodiak Island and western Shelikof Strait. The harvest areas are thus relatively concentrated within the GOA. If an overfishing closure is warranted, that area would clearly be a candidate for closure while allowing pollock fishing to continue in other areas.

Four seasonal allocations are defined and limited rollovers of unused pollock TAC are permitted from one season to another. An A season runs from January 20 to March 10, and a B season runs from March 10 to May 31. Pollock is fished competitively by the industry and harvests tend to be concentrated toward the start of each season. In Area 620, the combination of seasonal allocation, and allocations across the three management areas, has the net effect of concentrating the Area 620 pollock allocations in the A and B seasons. In 2010, about 30 percent of the Area 620 TAC is available in the A season, and a further 35 percent is available in the B season. Most of the squid catch takes place during the pollock A season. Since the A season starts late in January, there is relatively little time for harvest in January. Most of the harvest takes place during the A season in February and March, and during the start of the B season in March.

Figure 27 shows that the fishery only exceeded, or came close to exceeding, the squid 2010 ABC in 2006. Inseason management restrictions are thus likely to be rare in the fisheries catching GOA squid. If catch exceeds the ABC, as in 2006, inseason managers would focus on the pollock fishery in Area 620 to identify an area for potential closure. With the use of information from vessel operators, reported catch, VMS, and observer data, the high squid catch area can be identified. The area can either be closed by NMFS or closure can be avoided through cooperation among vessel operators. If vessel operators can cooperatively reduce incidental catch they can preserve more flexibility to their fishing operations than if NMFS closes the pollock fishery.

The Shelikof Strait is very popular for high-value roe-bearing pollock and a closure could impact the value of the A season pollock fishery. In response to targeted area closures, some pollock trawlers may have to change the area within which they operate, moving to less desirable fishing grounds. The impact on these operations may be some combination of increased costs and/or decreased revenues. Increased costs may occur if operations have to travel further to reach alternative fishing grounds, or if they must fish in areas with lower catch-per-unit of effort (and thus incur increased costs of fishing effort to catch the same amount of fish). Decreased revenues may occur if increased travel or trawling time requirements makes it impossible to catch the same amount of fish in the time available. Decreased revenues may also occur if shifts in fishing activity also make it harder to deliver a quality pollock product. Specific revenue impacts are not estimated due to the highly speculative nature of future events.

Any adverse impacts would be incurred by both large and small fishing entities in the GOA. The SAFE estimates of the numbers of small entities operating in the GOA in 2008 were described in the section on GOA sharks, above. Almost all of the GOA squid harvest is taken by Pollock vessels. In 2008, there were 21 were small Pollock vessels with average gross revenues of about $1.02 million.

There are no new record keeping and reporting requirements associated with this action, and NMFS has not identified conflicts with other federal statutes or regulations. A no-action alternative might be able to avoid adverse impacts to small entities, however, this alternative is precluded by the statutory requirements of the Magnuson-Stevens Act.

1.5.2.2 Impacts on PSC and Discards

Halibut, salmon, king crab, Tanner crab, and herring are important species in other directed subsistence, commercial, and recreational fisheries. These species have been designated "prohibited species" in the FMPs. Groundfish fishing operations are required to operate so as to minimize their interception of prohibited species and, under most circumstances, must discard them if they are caught. Prohibited species are protected by harvest caps and/or the closure of areas to directed groundfish fishing, if high concentrations of the prohibited species are present. Because of these caps or other protection measures, new specification categories for the three groups in the BSAI and the four groups in the GOA are expected to have little impact on catches of prohibited species.

Sharks, sculpins, and octopuses (and squids in the GOA) are protected by an aggregate harvest cap and/or closure areas, if excessive amounts of these species are caught. Retention rates of these groups are summarized in Table 18. New specification categories should have little impact on catches of prohibited species because the groups are not currently targeted.

1.5.2.3 Consumer Effects

Consumer effects of changes in production will be measured by changes in consumers' surplus. The consumers' surplus is a measure of what consumers would be willing to pay to buy a given amount of a product or service at a given price, above the amount which they actually must pay. A decrease in quantity supplied and an associated increase in price will reduce consumer welfare, as measured by consumers' surplus. An increase in quantity supplied and a consequent decrease in price will increase consumer welfare, as measured by consumers' surplus. A decrease in consumers' surplus is not a total loss to society, since some of that decrease is transferred to producers and suppliers (e.g., fishermen) in the form of higher prices. However, this transfer is still a loss to consumers and, if the producer gains accrue to non-U.S. fishermen and processors, there is a net economic efficiency loss to the nation from this source.

For pollock, Pacific cod, and Atka mackerel, for example, the impact on domestic consumers of moderate increases or decreases in production might be fairly modest. Pollock surimi and roe and Atka mackerel were described as being principally sold and consumed overseas. Pacific cod and pollock fillets were

described as being sold into domestic markets, in which there were many relatively close substitutes. Under these circumstances, consumers would be unlikely to gain or lose much from "moderate" changes in supply.

1.5.2.4 Passive Use Values

Passive use is also called "non-use" value, because a person need never actually use a resource in order to derive value from it. That is, people enjoy a benefit (which can be measured in economic terms) from simply knowing that some given aspect of the environment exists. Survey research suggests that passive use values can be significant in at least some contexts. Because passive use values pertain to the non-marginal changes in the status of resources, the focus in this discussion is on classes of resources in the GOA and BSAI that have been listed as endangered under the U.S. Endangered Species Act. Under the Act, an endangered species is one that is "...in danger of extinction throughout all or a significant portion of its range..." and not insects designated as "pests" (16 U.S.C. Section1532(6)).

Changes in groundfish harvests in the BSAI and GOA may affect (largely indirectly) passive use values by affecting the probability of continued existence or recovery of a listed species. At present, four endangered species or classes of endangered or threatened species range into the BSAI and GOA management areas: (a) Steller sea lions; (b) seven species of whales; (c) two species of Pacific Northwest salmon; and (d) four species of seabirds.

The mechanisms through which the fisheries might affect endangered species are, in many cases, poorly understood. Models that would relate fishing activity to changes in the probability that a species would become extinct are not available, or do not yet have strong predictive power, and information on the ways in which passive use values would change as these probabilities change is not available.

While not among charismatic megafauna—a category of species with widespread popular appeal and often associated with conservation campaigns (e.g., polar bears, great whales) slow—growing, long—lived, low—fecundity species such as skates and sharks may also receive increased levels of scrutiny as these species may not be able to recover to sustainable levels, once they are overfished.

1.5.2.5 Management and Enforcement Costs

In-season management and enforcement expenses are related to management of annual catch limits, in complicated ways. Five additional quota categories (seven groups replacing two assemblages) may lead to a slight increase in management and enforcement costs, as it becomes necessary to manage and monitor more openings and closures and to prevent poaching.

1.5.2.6 Summary

Under both the Preferred Alternative and Alternative 3, the "other species" category would be eliminated for the purpose of specifying ACLs and separate ACLs would be set for sharks, sculpins, and octopuses (and squids in the GOA). Both alternatives are expected to benefit the component groups by limiting the amount of their removal to an appropriate biological level so as to prevent overfishing of the groups. Because overharvesting a species or species group may occur rapidly under an aggregate catch limit and recovery can take decades for many species, successful management should be based on the precautionary approach in which measures are implemented proactively before overfishing occurs.

The proposed alternatives would give managers more control over harvests of the other species groups and the ability to constrain their harvests to protect their biomasses, if necessary. This Preferred Alternative may lead to limits on the gross revenues from fishing, in the short run, but, as a result of protecting the biomasses of the other species groups, may lead to greater gross revenues from sustainable fisheries in the longer term. Consideration must also be given to the impacts on the Pacific cod fisheries, which take the highest amounts of some of the groups as incidental catch (although, well under the proposed specifications in the 2009 BSAI and GOA SAFE Reports).

The EA identified limited potential impacts in target fisheries that incidentally harvest sharks, octopuses, and GOA squids. The economic impacts of this action will depend upon decisions made by the Council in the annual specifications process and the methods used by Inseason Management to prevent overfishing. The effects primarily will be limited to stocks in the fishery, such as Pacific cod, which may take some of the groups incidentally. Determinations of the TAC for the groups would be determined by the individual stock assessments.

None of the alternatives appear to have a significant impact on the affected species. Thus, there is very little potential for any of the alternatives to seriously adversely impact any of the species currently in the FMPs, and thus, the potential option value associated with any of these alternatives is very (trivially) small.

1.6 Cumulative Effects

This section analyzes the cumulative effects of the actions considered in this EA. A cumulative effects analysis includes the effects of past, present, and reasonably foreseeable future action (RFFA). The past and present actions are described in several documents and are incorporated by reference. These include the PSEIS (NMFS 2004), the EFH EIS (NMFS 2005), the Harvest Specifications EIS (NMFS 2007), and the supplemental information report for the groundfish harvest specifications (NMFS 2010c). These NEPA documents evaluate the effects, including the cumulative effect, of past and present action. The cumulative effects analyses in these documents are incorporated by reference and any potentially significant cumulative effects identified therein need not be evaluated again in this EA.

This analysis provides a brief review of the RFFA that may affect environmental quality and result in cumulative effects. Future effects include harvest of federally managed fish species and current habitat protection from federal fishery management measures, harvests 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 most recent analysis of RFFAs for the groundfish fisheries is in the Harvest Specifications EIS (NMFS 2007) and the supplemental information report for this EIS (NMFS 2010c). No additional RFFAs have been identified for this Preferred Alternative. The RFFAs are described in the Harvest Specifications EIS section 3.3 (NMFS 2007), are applicable for this analysis, and are incorporated by reference. A summary table of these RFFAs is provided below (Table 7). The table summarizes the RFFAs identified applicable to this analysis that are likely to have an impact on a resource component within the action area and time frame. Actions are understood to be human actions (e.g., a proposed rule to designate polar bear critical habitat), as distinguished from natural events (e.g., an ecological regime shift). CEQ regulations require a consideration of actions, whether taken by a government or by private persons, which are reasonably foreseeable. This is interpreted as indicating actions that are more than merely possible or speculative. Actions have been considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or the publication of a proposed rule. Actions simply "under consideration" have not generally been included because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen. Identification of actions likely to impact a resource component within this action's area and time frame will allow the public and the Council to make a reasoned choice among alternatives.

RFFA that may affect target and prohibited species are shown in Table 7. Ecosystem management, rationalization, and traditional management tools are likely to improve the protection and management of target and prohibited species, and are not likely to result in significant effects when combined with the direct and indirect effects of Alternatives 2 or 3. The Council is pursuing methods of reducing salmon and halibut bycatch through FMP amendments and exempted fishing permits to allow testing of salmon and halibut excluder devices. Other government actions and private actions may increase pressure on the

sustainability of target and prohibited fish stocks either through extraction or changes in the habitat or may decrease the market through aquaculture competition, but it is not clear that these would result in significant cumulative effects. Any increase in extraction of target species would likely be offset by federal management. These are further discussed in sections 4.1.3 and 7.3 of the Harvest Specifications EIS (NMFS 2007).

RFFA for non-specified and forage species include ecosystem-sensitive management, traditional management tools, and private actions. Impacts of ecosystem-sensitive management and traditional management tools are likely to be beneficial as more attention is brought to the taking of non-specified species in the fisheries and accounting for such takes. The subsistence harvest of forage fish and non-specified species is expected to continue into the future and is expected to continue at present levels. Future subsistence harvest of these species is not expected to have any substantial impact on population levels or sustainability. The minimal geographic extent of future coastal development in relation to the extent of distribution of forage species and nonspecified species in Alaska waters is also not expected to result in substantial impacts on these species. Effects of coastal development on forage fish and nonspecified species is considered in the coastal zone management program implemented by the State of Alaska, reducing potential adverse effects of future development. The combination of the incremental direct and indirect effects of the Preferred Alternative and Alternative 3 with the RFFA is not likely to result in significant effects on non-specified and forage fish species. Alternative 1 is not likely to have any incremental impacts beyond those already described in NMFS 2007.

RFFA for marine mammals and seabirds include ecosystem-sensitive management; rationalization; traditional management tools; actions by other federal, state, and international agencies; and private actions, as described in sections 8.4 and 9.3 of the Harvest Specifications EIS (NMFS 2007). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to marine mammals and seabirds by considering these species more in management decisions and by improving the management of the fisheries through the observer program, catch accounting, seabird avoidance measures, and vessel monitoring systems. Any action by other entities that may impact marine mammals and seabirds will likely be offset by additional protective measures for the federal fisheries to ensure ESA-listed mammals and seabirds are not likely to experience jeopardy or adverse modification of critical habitat. Direct mortality by subsistence harvest is likely to continue, but these harvests are tracked and considered in the assessment of marine mammals and seabirds. The incremental impact under the Preferred Alternative and Alternative 3, together with the RFFA, is likely to be primarily beneficial. Alternative 1 is unlikely to have any incremental impact. The cumulative effect of the impacts of Alternative 2 (Preferred Alternative) or Alternative 3 is not likely to be significant because of the limited forage fish habitat benefits under Alternative 3 and the limited benefits of managing other species groups separately under the Preferred Alternative and Alternative 3.

RFFA for habitat and the ecosystem include ecosystem-sensitive management; rationalization; traditional management tools; actions by other federal, state, and international agencies; and private actions, as detailed in Sections 10.3 and 11.3 of the Harvest Specifications EIS (NMFS 2007). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to ecosystems and habitat by considering ecosystems and habitat more in management decisions and by improving the management of the fisheries through the observer program, catch accounting, seabird and marine mammal protection, gear restrictions, and vessel monitoring systems. Continued fishing under the harvest specifications is likely the most important cumulative effect on EFH, but the EFH EIS (NMFS 2005) has determined that this effect is minimal. The Council is also considering improving the management of non-specified species incidental takes in the fisheries to provide more protection to this component of the ecosystem. Any shift of fishing activities from federal waters into state waters would likely result in a reduction in potential impacts to EFH because state regulations prohibit the use of trawl gear in much of state waters. Nearshore impacts of coastal development and the management of the

Alaska Water Quality Standards may have an impact on EFH, depending on the nature of the action and the level of protection the standards may afford. Development in the coastal zone is likely to continue, but Alaska overall is lightly developed compared to coastal areas elsewhere; therefore overall impact to EFH are not likely to be substantial. Overall, the cumulative effects on habitat and ecosystems are primarily beneficial in combination with the implementation of the breaking out of other species groups for harvest specifications under the Preferred Alternative and Alternative 3 and with the placing of forage fish species in the fishery under Alternative 3. These effects are not likely to be significant because there is, at most, a slight potential difference in effects between status quo and the Preferred Alternative and Alternative 3.

Changes in the North Pacific due to global warming may be of a concern to the organisms that live within this environment and depend on sea ice and aragonite saturation for shell production. The release of carbon to the atmosphere from the burning of fossil fuels likely contributes to global warming. The impacts of global warning in the Bering Sea and Gulf of Alaska can include a rise in sea surface temperature, retreat of sea ice, and acidification of marine waters as excess carbon dioxide is absorbed into the cold ocean waters. The following information is from the January 9, 2007, *Federal Register* notice regarding the proposed listing of polar bears (72 FR 1064). This is a recent, general description of the potential changes in sea ice and the marine ecosystem due to global warming.

> *All models predict continued Arctic warming and continued decreases in the Arctic sea ice cover in the 21st century (Johannessen 2004, p. 328) due to increasing global temperatures, although the level of increase varies between models. Comiso (2005, p. 43) found that for each 1° Centigrade (C) (1.6 °F) increase in surface temperature (global average) there is a corresponding decrease in perennial sea ice cover of about 1.48 million km^2 (.57 million mi^2). Further, due to increased warming in the Arctic region, accepted models project almost no sea ice cover during summer in the Arctic Ocean by the end of the 21st century (Johannessen et al. 2004, p. 335). More recently, the [National Snow and Ice Data Center] cautioned that the Arctic will be ice-free by 2060 if current warming trends continue (Serreze [and Rigor] 2006, p. 2).*
>
> *The winter maximum sea ice extent in 2005 and 2006 were both about 6 percent lower than average values, indicating significant decline in the winter sea ice cover. In both cases, the observed surface temperatures were also significantly warmer and the onset of freeze-up was later than normal. In both years, onset of melt also happened early (Comiso in press). A continued decline would mean an advance to the north of the 0 °C (32 °F) isotherm temperature gradient, and a warmer ocean in the peripheral seas of the Arctic Ocean. This in turn may result in a further decline in winter ice cover.*
>
> *Predicted Arctic atmospheric and oceanographic changes for time periods through the year 2080 include increased air temperatures, increased precipitation and run-off, and reduced sea ice extent and duration (ACIA 2005, tables on pp. 470 and 476).*
>
> *A recent study of the Bering Sea, one of the most productive marine ecosystems on the planet, concluded ''[a] change from arctic to subarctic conditions is underway in the northern Bering Sea'' (Grebmeier et al. 2006, p. 1461). This is being caused by warmer air and water temperatures, and less sea ice. ''These observations support a continued trend toward more subarctic ecosystem conditions in the northern Bering Sea, which may have profound impacts on Arctic marine mammal and diving seabird populations as well as commercial and subsistence fisheries'' (Grebmeier et al. 2006, p. 1463).*

With the increase in atmospheric carbon dioxide, additional carbon dioxide may be absorbed by marine waters resulting in acidification (The Royal Society 2005). The acidification may have an impact on those

organisms that depend on calcium carbonate for skeletal structure, such as copepods, pteropods, and clams. Human inputs of carbon into the atmosphere may acidify marine waters, which may impact organisms that depend on calcium carbonate for skeletal structure.

This potential effect of ocean warming and acidification in combination with the potential effects of the Preferred Alternative and Alternative 3 may result in cumulative adverse impacts for organisms depending directly and indirectly on shell forming organisms and on sea ice. The effects of acidification and ocean warming may be widespread while the Preferred Alternative and Alternative 3 would have limited effects on the management of other species and potentially on forage fish habitat. It is not possible to predict the level of impact the combined effect may have because the level of acidification and the organisms' responses are not clearly understood. No evidence exists that a significant cumulative impact is occurring at this time, but additional studies should be encouraged to provide a better understanding of future impacts.

Additionally the Council has tasked staff with the development of a discussion paper on a number of management issues to better inform the Council, its Non-Target Species Committee, and the public in order to develop management alternatives for trailing amendments to the Groundfish FMPs and federal regulations, as needed, to address potential effects of (1) setting separate ACLs for sharks, sculpins, octopuses, and GOA squids; (2) moving grenadiers into the FMP under either in the fishery or EC category; and (3) moving squids and octopuses under the EC category. The Council requested that the paper address the following:

- For stocks in the fishery:
    - Discuss how species could be apportioned to particular targets/gears as is done with PSC (a "skeleton" framework for apportionments with actual numbers determined in the annual specification process)
    - Update a paper by Smoker and Miller that includes spatial and seasonal analysis along with potential impacts on directed fisheries, and includes tables of the data along with graphical interpretations;
    - Effects of moving grenadiers in the fishery by FMP area;
    - General discussion of discard mortality rates (DMR), with focus on sharks and octopuses. Include discussion of effect of groundfish retention requirements on mortality;
    - Description of Agency authority to control catch to prevent large closures (e.g., area-specific closures, careful release programs);
    - Discussion of effect of unobserved/poorly observed fisheries on determination of total catch accounting and the effects of extrapolation of observed fisheries; and
    - Brief discussion of data needs to move stocks from Tier 6 to Tier 5.
- For stocks in the EC category:
    - Effects of managing squids and/or octopuses (compared to status quo);
    - Effects of managing grenadiers (compared to status quo or in the fishery) by FMP area;
    - General discussion of current NMFS management authority for EC species (specific issues include (1) processing limits, (2) how to define EC criteria of "not generally retained," (3) MRAs, (4) DMRs, (5) mandatory review of species, and 6) frequency of vulnerability analyses); and
    - General discussion of management implications for total catch accounting (e.g., observer program) for stocks moved into the EC category.

The Council also requested that the SSC discuss potential of developing new methods for determining ACLs for Tier 6 stocks on June 2010 agenda. This may result in a work shop with Groundfish Plan Team members and Tier 6 assessment authors during summer 2010.

Future considerations of uncertainty in the groundfish tier system may be addressed in future amendments to the groundfish FMPs, as needed.

Summary

Considering the direct and indirect impacts of the Preferred Alternative when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the cumulative impacts of the Preferred Alternative are not significant.

1.7 Environmental Analysis Conclusions

One of the purposes of an environmental assessment is to provide the evidence and analysis necessary to decide whether an agency must prepare an environmental impact statement (EIS). The Finding of No Significant Impact (FONSI) is the decision maker's determination that the action will not result in significant impacts to the human environment; therefore, further analysis in an EIS is not needed. Council on Environmental Quality regulations (at 40 CFR 1508.27) state that the significance of an action should be analyzed both in terms of "context" and "intensity." An action must be evaluated at different spatial scales and settings to determine the context of the action. Intensity is evaluated with respect to the nature of impacts and the resources or environmental components affected by the action. NOAA Administrative Order (NAO) 216-6 provides guidance on the NEPA specifically to line agencies within NOAA. It specifies the definition of significance in the fishery management context by listing criteria that should be used to test the significance of fishery management actions (NAO 216-6 sections 6.01 and 6.02). These factors form the basis of the analysis presented in this EA/RIR. The results of that analysis are summarized here for those criteria.

Context: For this action, the setting is the BSAI and the GOA. Any effects of this action are limited to this area. The effects of this action on society within this area are on individuals directly and indirectly participating in the groundfish fisheries and on those who use the ocean resources. Because this action concerns the use of a present and future resource, this action may have impacts on society as a whole or regionally.

Intensity: Considerations to determine intensity of the impacts are set forth 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 NMFS Instruction 30-124-1 dated July 22, 2005, Guidelines for Preparation of a FONSI. The sections of the EA that address the considerations are identified.

1) *Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?*

(EA Section 1.3.2.1.2). No. No significant adverse impacts on target species were identified for Alternatives 2 or 3. No substantial changes in overall amount, timing, or location of harvest of target species are expected with any of the alternatives for the proposed action. The action would improve the management of target species that have been managed within the other species group and would clarify the process used for setting harvest level. No groundfish species are known to be overfished or are experiencing overfishing. The impacts of harvest strategies and resulting groundfish TAC amounts were analyzed in the Groundfish Harvest Specifications EIS (NMFS 2007) and were found not to jeopardize the sustainability of any target species. The EA prepared for this action found no substantial adverse

additional impacts on targeted species not previously considered in the EIS; therefore the sustainability of target species is not expected to be jeopardized.

2) *Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?*

(EA Sections 1.3.3.1.1 and 1.3.4). No. Other species, prohibited species, and forage fish are all non-target species under the Groundfish FMPs. Potential effects of the Preferred Alternative and Alternative 3 on other species are expected to be beneficial as the upper limit for total removals of sharks, sculpins, octopuses, and GOA squids would be lowered from the maximum ABC determined for the other species assemblage to the maximum ABC determined for each group. The effect of the alternatives would not be significant compared to the status quo because the total removal of each species would be limited by the TAC established for each group or species, which is expected to enhance the sustainability of these species and would be further constrained by the MRA and PSC limits for each.

Potential effects of the Preferred Alternative and Alternative 3 on prohibited species are expected to be insignificant and similar to status quo because no overall harvest changes to prohibited species are expected. Potential effects of Alternatives 2 on forage fish species are expected to be insignificant and similar to status quo because no overall harvest changes to forage species are expected. Potential effects of Alternatives 3 on forage fish species are expected to be insignificant, but would differ from status quo because ACLs would be required to be set for them; however, current MRAs would continue to apply.

Because no overall changes in non-target species harvests under the alternatives are expected, the alternatives are not likely to jeopardize the sustainability of any non-target species.

3) *Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in the fishery management plans (FMPs)?*

(EA Sections 1.3.7). No significant adverse impacts were identified for the Preferred Alternative and Alternative 3 on ocean or coastal habitats or EFH. The alternatives make no substantial changes to the fishing methods that may have impacts on ocean and coastal habitats or EFH. Substantial damage to ocean or coastal habitat or EFH by the Preferred Alternative and Alternative 3 is not expected. No differences in the current descriptions of EFH and the current EFH consultation requirements are seen among the alternatives. Alternative 3 would require a 5-year review of forage fish EFH which may be a future benefit to forage fish habitat over Alternative 2, if information became available to describe EFH for forage fish. Any such future benefit is speculative and should not be considered reasonably foreseeable. The potential overlap of groundfish EFH with forage fish habitat would provide some protection to forage fish habitat as EFH consultations are conducted for federal actions that may adversely affect EFH.

4) *Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?*

(EA Section 1.1). No. Public health and safety will not be affected in any way not evaluated under previous actions or disproportionately as a result of the proposed action. The proposed action for the Preferred Alternative and Alternative 3 is limited to the harvest specifications process and will not change fishing methods in any way that may affect pubic health and safety.

5) *Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?*

(EA Sections 1.3.5 and 1.3.6). No. the Preferred Alternative and Alternative 3 would ensure the harvest specification process complies with NS1 guidelines. The removal of the "other species" category and managing the individual species groups that are currently in the "other species" category would improve the management of these groups. Improved management of these groups may result in improved prey availability for those marine mammals and ESA-listed species that may prey on these species. This action would have no effect on critical habitat beyond those effects already consulted on for the groundfish fisheries, as it does not change fishing practices and locations that may affect designated critical habitat. There are no substantive differences among the alternatives regarding critical habitat. No effects beyond those already analyzed in previous ESA consultations on the groundfish fisheries are expected.

6) *Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator–prey relationships, etc.)?*

(EA Section 1.4.2). No significant adverse impacts on biodiversity or ecosystem function were identified for the Preferred Alternative and Alternative 3. The alternatives would result in removing reference to non-specified species category in the FMPs, but the effect is not different than the status quo since there are no management measures identified for them in the FMP or federal regulations. The alternatives may provide some protection to biodiversity and ecosystem function by improving the management of groups currently within the "other species" category. Better management may improve predator–prey relationships as the groundfish fisheries would be less likely to impact prey availability.

7) *Are significant social or economic impacts interrelated with natural or physical environmental effects?*

(EA Section 1.5 and RIR). Socioeconomic impacts of this action are limited to the management of other species as individual groups and the placement of forage fish in the fishery under Alternative 3. Management will go from one group to four groups, increasing the management complexity. This additional management is not expected to be a large impact on available resources. The potential future description of EFH for forage fish would result in future consultation on federal actions that may adversely affect EFH, which would require agency resources to conduct such consultations. Because there is currently no EFH for forage fish and EFH for the Alaska managed fisheries covers much of the Alaska EEZ, the potential increased future consultation needs under Alternative 3 is not expected to be substantial. No significant adverse impacts were identified for the Preferred Alternative and Alternative 3 for social or economic impacts interrelated with natural or physical environmental effects.

8) *Are the effects on the quality of the human environment likely to be highly controversial?*

(EA Section 1.1)No. This action is limited to providing clear descriptions of the management of the groundfish fisheries in a manner that is nearly the same as currently practiced. The action is required by the MSA, and the impacts on the environment for the management of the groundfish harvest are well studied and well understood. Development of the proposed action has involved national guidance (NS1) and consultation with the AFSC. No issues of controversy were identified in the process.

9) *Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?*

(EA Section 1.1). No. This action would not affect any categories of areas on shore. This action takes place in the geographic area of the Alaska EEZ. The land adjacent to this marine area may contain archeological sites of native villages. This action would occur in adjacent marine waters so no impacts on these cultural sites are expected. The marine waters where the fisheries occur contain ecologically critical areas. Effects on the unique characteristics of these areas are not anticipated to occur with this action

because of the amount of fish removed by vessels are within the TAC and no changes to ecologically critical nearshore areas are proposed.

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

(EA Section 1.1) No. The potential effects of the action are well understood as demonstrated through the successful, sustainable management of the Alaska groundfish fisheries. No groundfish stocks have been identified as either overfished or experiencing overfishing. National guidance for NS1 is applied to the management of the other species groups. The method of harvest management in the guidance is based on the successful management program used on Alaska, which has demonstrated the capability to sustainably manage the groundfish fisheries. Potential effects on Tier 6 stocks, and the fisheries in which they are harvested, are less well understood.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

(EA Chapter 1.6). No. Beyond the cumulative impact analyses in the 2006 and 2007 harvest specifications EA, the Groundfish Harvest Specifications EIS, and the 2004 Programmatic Supplemental EIS for the Alaska Groundfish Fisheries, no other additional past or present cumulative impact issues were identified. Reasonably foreseeable future impacts in this analysis include potential effects of global warming. The combination of effects from the cumulative effects and this proposed action are not likely to result in significant effects for any of the environmental component analyzed and are therefore not significant.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

(EA Section 1.1). No. 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. Because this action extends from nearshore waters to 200 nm at sea, this consideration is not applicable to this action

13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

(EA Section 1.1). No. This action poses no effect on the introduction or spread of nonindigenous species into the Alaska EEZ beyond those previously identified because it does not change fishing, processing, or shipping practices in a manner that may lead to the introduction of nonindigenous species.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

(EA Section 1.1). No. This action would ensure the FMPs and regulations are consistent with the requirements of the NS1 guidelines. This action does not establish a precedent for future action because any future application of other types of management measures would have to be evaluated and considered through the Council and NMFS process before implementation. Pursuant to NEPA for all future action, appropriate environmental analysis documents (EA or EIS) will be prepared to inform the decision makers of potential impacts to the human environment and to implement mitigation measures to avoid significant adverse impacts.

15) Can the proposed action reasonably be expected to threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment?

(EA Sections 1.1 and 2) No. This action poses no known violation of federal, state, or local laws or requirements for the protection of the environment. The proposed action 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.

16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

(EA Section 1.6). No. The effects on target and non-target species from the alternatives are mostly beneficial effects from improvements to management of the individual species groups that currently are managed as an aggregate under the other species assemblage. No substantive changes are proposed for managing prohibited species, forage fish species, or non-specified species; only changes to the organization of the FMP is proposed for these groups. No cumulative effects were identified that added to the direct and indirect effects on target and nontarget species would result in significant effects.

Conclusions

None of the alternatives appear to have a significant impact on the affected species. Thus there is very little potential for any of the alternatives to seriously adversely impact any of the species currently in the FMPs. Thus, the potential option value associated with any of these alternatives is very (trivially) small.

2.0 CONSISTENCY WITH APPLICABLE LAW AND POLICY

2.1 Magnuson-Stevens Act

2.1.1 National Standards

Below are the ten National Standards as contained in the MSA (Act), and a brief discussion of the consistency of the proposed alternatives with those National Standards, where applicable.

National Standard 1 - Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery.

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

National Standard 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.

National Standard 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 U.S. 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.

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

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

National Standard 7 - Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

National Standard 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.

National Standard 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.

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

FMP Amendments 96 and 87 propose to identify stocks in the fishery (NS1), move sharks, sculpins, octopuses, and GOA squids from the other species complex (NS3) into the target category and require that ACLs be set for them (NS1), and to move prohibited species and possibly forage fish species into the EC category (NS1). The FMP amendment is intended to reduce the risk of overfishing (NS1) of groundfish in the BSAI and GOA (NS3) using information provided in the annual SAFE Reports (NS2). Complementary regulatory amendments would conform federal regulations to the FMP amendments. Inseason management would manage fisheries to keep harvests within the harvest limits and in a manner to minimize adverse economic effects to the extent practicable (NS 8). The setting of TACs for other species and any allocation of theses TACs would determined based on the criteria in NS4.

Section 303(a)(9) – Fisheries Impact Statement

Section 303(a)(9) of the MSA requires that any plan or amendment include a fishery impact statement which shall assess and describe the likely effects, if any, of the conservation and management measures on (1) participants in the fisheries and fishing communities affected by the plan or amendment; and (2) participants in the fisheries conducted in adjacent areas under the authority of another Regional Council, after consultation with such Council and representatives of those participants taking into account potential impacts on the participants in the fisheries, as well as participants in adjacent fisheries.

The alternatives considered in this analysis and the impacts of these alternatives on participants in the fisheries and fishing communities are described in the EA (Section 1.5) and the RIR (Section 2.5) of this document. The alternatives are expected to have little to no effect on more than 722 small catcher vessels and 6 small catcher processors that participated in recent BSAI and/or GOA groundfish fisheries. Potential impacts to fisheries other than the BSAI and GOA groundfish fishery are not anticipated as a result of this action.

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7.0 TABLES

Table 1 Issues/Advice referring to National Standard Guidelines.

Issue	NS1 Guidelines	NMFS Advice	Potential Action
How should Prohibited Species be managed under NS1 Guidance?	50 CFR 600.310(d)(5)(D) states that to be an EC species it is "Not generally be retained for sale or personal use."	Maximum Sustainable Yield (MSY) and Status Determination Criteria (SDC) should be listed under the primary FMP (e.g., crab FMP). For State/International managed stocks where there is not a federal FMP, MSY and SDC criteria are not appropriate because the stocks are in the groundfish FMP for purposes of limiting their catch. It is appropriate to have a stock listed as a target stock in the primary FMP and as an EC species in another FMP.	Prohibited species should be managed in the ecosystem component.
How are Status Determination Criteria defined for species in the fishery?	Status determination criteria (SDC) are required for all stocks in the fishery. SDC are used to monitor the condition of fish stocks by providing definitions for overfishing and stocks that are "in an overfished condition." If overfishing is occurring, the harvest rate is above a defined fishing mortality limit. If a stock is in an overfished condition, it is below a prescribed biomass threshold or level.	The PSC species are not in the groundfish FMPs for purposes of managing them *per se*; they are in the FMPs to limit the impact of the groundfish fishery on them. The Council should articulate why the management regime that applies to stocks in the FMPs may not be necessary or appropriate for prohibited species in the groundfish fishery. For State/International managed stocks where there is not a federal FMP, federal MSY and SDC criteria do not apply.	Halibut, crab, salmon, and herring may be managed as EC species
Can other species remain together with one ACL for the complex?	"Stock complex" means a group of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impact of management actions on the stocks is similar. At the time a stock complex is established, the FMP should provide a full and explicit description of the proportional composition of each stock in the stock complex, to the extent possible. Stocks may be grouped into complexes for various reasons, including where stocks in a multispecies fishery cannot be targeted independent of one another and MSY can not be defined on a stock-by-stock basis; where there is insufficient data to measure their status relative to SDC; or when it is not feasible for fishermen to distinguish individual stocks among their catch. The vulnerability of stocks to the fishery should be evaluated when determining if a particular stock complex should be established or reorganized, or if a particular stock should be included in a complex. Stock complexes may comprise: one or more indicator stocks, each of which has SDC and ACLs, and several other stocks; several stocks without an indicator stock, with SDC and an ACL for the complex as a whole; or one of more indicator stocks, each of which has SDC and management objectives, with an ACL for the complex as a whole.	The other species assemblage does not comply with ACL requirements for managing stock complexes.	Because the other species complex does not conform to the NS1 definition of a stock complex, the Council should consider eliminating the complex and move sharks, sculpins, octopus, and GOA squids in the fishery to meet the statutory deadline under this action; it may consider moving groups under the EC category in a trailing ACL amendment.

Issue	NS1 Guidelines	NMFS Advice	Potential Action
Would management for new shark, sculpin, squid, and octopus assemblages meet the standard for defining appropriate stock complexes, given their range of life histories?	Same as above.	There is no one standard for meeting MSA requirements for setting ACLs. The Regional Councils have the authority to recommend management actions that comply with the MSA. The Councils will list stocks or stock complexes in particular categories based on information in the Stock Assessment and Fishery Evaluation (SAFE) Reports, the AFSC vulnerability (PSA) analysis, and the NS1 guidelines.	The Council may further refine management of assemblages in future actions (e.g., it may choose to manage only *O. dofleini* and remove the remaining octopus species, or set separate ACLs for large sculpins and small sculpins.
May skates, squid, octopus, sharks, and sculpins continue to be managed under a collective other species MRA?	NS1 Guidelines are silent on this issue. As long as the management approach conforms to the statutory requirement to develop ACLs and accountability measures that prevent overfishing, it is a policy decision for the Council.	The harvests of squid, skates, octopus, sharks, and sculpins may be managed under a collective other species MRA in the regulations even if those groups are listed in the fishery.	An FMP amendment is not required. A regulatory amendment also is not required since a collective MRA is the status quo and not subject to change under this action.

Issue	NS1 Guidelines	NMFS Advice	Potential Action
Should grenadiers be added to the FMPs and, if so, should they be in the fishery or managed in the EC category?	A stock's vulnerability is a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce MSY and to recover if the population is depleted, and susceptibility is the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery (e.g., loss of habitat quality). Regional Councils in consultation with their SSCs, should analyze the vulnerability of stocks in stock complexes where possible.	NS1 guidelines are silent on whether grenadiers should be managed under the FMPs, so it is a policy decision for the Council. The guidelines also are silent on whether grenadiers should be managed under ACLs or under the EC category. If the Council adopts an FMP amendment to move grenadiers into the fishery, then they would be subject to ACLs so their overall harvest would be limited; they would also be subject to the 2 million t OY cap in the BSAI. If the Council moves them into the EC category, no limits on their harvest would necessarily be imposed, provided this is consistent with MSA conservation and management requirements (the same as under the status quo where they are a non-specified species in the FMPs). A regulatory amendment would be required if the Council deems that additional management restrictions are needed to limit the harvest of grenadiers. The Council's action plan identifies that it is streamlining this analysis to those actions necessary to comply with the January 1, 2011, statutory deadline for revised NS1 guidelines. Because action to manage grenadiers is not required under NS1, in February 2010 the SSC concurred with the Council's timeline to set action to move grenadiers into the FMP as a trailing plan amendment, but recommended it as a high priority for future action.	The Council may revise management of grenadiers on its own timeline.
How are ACL requirements addressed for state managed fisheries?	Missing	ACLs are not required for state-managed stocks if they are identified in the FMPs for purposes of managing incidental catch in fisheries for stocks that are in the fishery. For fish stocks that occur in both state and federally managed waters and are managed in the fishery, ACLs are specified for the entire stock. Total catch of that stock, including harvest inside state waters, is reported and applied toward the setting of ACLs during the federal harvest specifications process.	State-managed stocks would be managed in the EC category (e.g., herring). ACLs would be set that account for harvests of state water fisheries (e.g., Pacific cod); this approach should apply to all state fisheries.

Table 2 BSAI and GOA seabirds and their prey.

Species	Foraging Habitats	Prey
Red-legged and black-legged Kittiwakes	Surface fish feeder	Myctophids, squid, amphipods, euphausids, minor amounts of pollock and sand lance
Black-footed albatross	Surface fish	Fish eggs, fish, squid, crustaceans
Short-tailed albatross	Surface feeder	Juvenile pollock and sablefish, squid, zooplankton
Laysan Albatross	Surface feeder	Squid, lantern fish, other invertebrates, and fish
Spectacled Eider	Diving	Mollusks and crustaceans
Steller's eider	Diving	Clams, worms, snails, and amphipods.
Kittlitz's Murrelet	Surface dives	Fish, invertebrates, macroplankton
Storm petrels	Surface feeder	Small fish, squid, euphasids, capelin
Short-tailed and sooty shearwaters	Surface dives	Crustaceans, jelly fish, fish, squid
Northern Fulmar	Surface fish feeder	Fish, squid, crustaceans
Murres (thick-billed and common)	Diving fish-feeders offshore	Fish, crustaceans, invertebrates
Cormorants (pelagic and red-faced)	Diving fish-feeders nearshore	Bottom fish, crab, shrimp
Jaegers	Steal from other birds, surface feeders	Small schooling fish (capelin), sand lance
Gulls	Surface fish feeder	Fish, marine invertebrates, birds

Sources: Dragoo et al. 2008; USFWS 2006; NMFS 2004.

Table 3 ESA-listed and candidate seabird species that occur in the GOA and BSAI.

Common Name	Scientific Name	ESA Status
Short-tailed Albatross	*Phoebaotria albatrus*	Endangered
Yellow-billed Loon	*Gavia adamsii*	Listing warranted but not priority
Spectacled Eider	*Somateria fischeri*	Threatened
Steller's Eider	*Polysticta stelleri*	Threatened
Kittlitz's Murrelet	*Brachyramphus brevirostris*	Candidate
Black-footed Albatross	*Phoebastria nigripes*	USFWS working on 12-month finding

Table 4 Marine mammals species and their prey.

Species	Prey
Gray whale	Benthic invertebrates
Sperm whale	Mostly squid, some fish, shrimp, sharks, skates, and crab (up to 1,000 m depth)
Humpback whale	Euphausiids and small schooling fish
Fin whale	krill, small schooling fish (e.g., herring, capelin, and sand lance), and squid
Minke whale	Krill, copepods, and small schooling fish
Blue whale	Primarily krill, some copepods and small schooling fish
Sei whale	Planktonic crustaceans (e.g., krill)
Bowhead whale	Surface feeding on copepods, euphausiids, and other invertebrates
N. Pacific right whale	Copepods and euphausiids
Beluga whale	Wide variety invertebrates and fish
Cuvier's beaked whale	mostly cephalopods (e.g., squid and octopus) and sometimes fish and crustaceans
Baird's beaked whale	deep-sea and "pelagic" fish (e.g., mackerel, sardines, and saury), crustaceans, sea cucumbers as well as cephalopods (e.g., squid and octopus)
Stejneger's beaked whales	deep-water fish, tunicates, and cephalopods
Resident Killer whale	fish (including herring, halibut, salmon, and cod)
Pacific walrus	Benthic invertebrates (primarily mollusks), occasionally seals and birds
Dall porpoise	hake, squid, lanternfish, anchovy, sardines and small schooling fish.
Pacific white-sided dolphin	squid and small schooling fish such as capelin, sardines, and herring
Harbor porpoise	demersal and benthic species, mainly consisting of schooling fish (e.g., herring and capelin) and cephalopods
Bearded seal	Primarily crab, shrimp, and mollusks; some fish (Arctic cod, saffron cod, sculpin, and pollock)
Spotted seal	Primarily pelagic and nearshore fish; occasionally cephalopods and crustaceans
Ringed seal	Primarily Arctic cod, saffron cod, herring and smelt in fall, fish in winter, and crustaceans in summer and spring
Ribbon seal	Arctic and saffron cods, pollock, capelin, eelpouts, sculpin and flatfish, crustaceans and celphalopods
Harbor seal	crustaceans, squid, fish, and mollusks
N. fur seal	Pollock, gonatid squid, sand lance, Pacific herring, N. smoothtongue, Atka mackerel, and salmon
Steller sea lion	pollock, Atka mackerel, Pacific herring, Capelin, Pacific sand lance, Pacific cod, and salmon

Sources: Kawamura 1980; Lowry et al. 1980; NMFS 2007; NMFS 2004; Nemoto 1957 and 1959; Clapham and Mead 1999; NOAA 1988; Tomilin 1957; Zeppelin and Ream 2006; http://www.afsc.noaa.gov/nmml/education/cetaceans/sperm.php; http://www.afsc.noaa.gov/nmml/education/cetaceans/right.php#eat; http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/finwhale.htm; http://www.adfg.state.ak.us/pubs/notebook/marine/orca.php, http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=34#feeding; http://www.adfg.state.ak.us/pubs/notebook/marine/blue.php; http://www.adfg.state.ak.us/pubs/notebook/marine/bowhead.php; http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/beakedwhale_cuviers.htm; http://www.afsc.noaa.gov/nmml/education/cetaceans/dalls.php; http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/whitesideddolphin_pacific.htm; and http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/minkewhale.htm .

Table 5 Status of pinniped and U.S. Fish and Wildlife Service managed stocks potentially affected by the Alaska groundfish fisheries.

Pinnipedia species and stock	*Status under the ESA*	*Status under the MMPA*	*Population Trends*	*Distribution in action area*
Steller sea lion – Western and Eastern Distinct Population Segment (DPS)	Endangered (W) Threatened (E)	Depleted & a strategic stock	For the western DPS, regional increases in counts in trend sites of some areas have been offset by decreased counts in other areas so that the overall population of the western DPS appears to have stabilized (Fritz et al. 2008). The eastern DPS is steadily increasing and has been recommended to delisting consideration (NMFS 2008e).	Western DPS inhabits Alaska waters from Prince William Sound westward to the end of the Aleutian Island chain and into Russian waters. Eastern DPS inhabit waters east of Prince William Sound to Dixon Entrance. Occur throughout AK waters, terrestrial haulouts and rookeries on Pribilof Islands, Aleutian Islands, St. Lawrence Island, and off the mainland. Use marine areas for foraging. Critical habitat designated around major rookeries, haulouts, and foraging areas.
Northern fur seal – Eastern Pacific	None	Depleted & a strategic stock	Recent pup counts show a continuing decline in the number of pups surviving in the Pribilof Islands. NMFS researchers found an approximately 9% decrease in the number of pups born between 2004 and 2006. The pup estimate decreased most sharply on St. Paul Island.	Fur seals occur throughout Alaska waters, but their main rookeries are located in the Bering Sea on Bogoslof Island and the Pribilof Islands. Approximately 55% of the worldwide abundance of fur seals is found on the Pribilof Islands (NMFS 2007c). Forages in the pelagic area of the Bering Sea during summer breeding season, but most leave the Bering Sea in the fall to spend winter and spring in the N. Pacific.
Harbor seal – Gulf of Alaska Bering Sea Southeast Alaska	None	None	Moderate to large population declines have occurred in the Bering Sea and Gulf of Alaska stocks.	GOA stock found primarily in the coastal waters and may cross over into the Bering Sea coastal waters between islands. Bering Sea stock found primarily around the inner continental shelf between Nunivak Island and Bristol Bay and near the Pribilof Islands.
Ringed seal – Alaska	Status under review	None	Reliable data on population trends are unavailable.	Found in the northern Bering Sea from Bristol Bay to north of St. George Island and occupy ice.
Bearded seal – Alaska	Status under review	None	Reliable data on population trends are unavailable.	Found in the northern Bering Sea from Bristol Bay to north of St. George Island and inhabit areas of water less than 200 m that are seasonally ice covered.
Ribbon seal – Alaska	None*	None	Reliable data on population trends are unavailable.	Found throughout the offshore Bering Sea waters.
Spotted seal – Alaska	None**	None	Reliable data on population trends are unavailable.	Found throughout the Bering Sea waters.
Pacific Walrus***	Status under review	Strategic	Population trends are unknown. Population size estimated from a 2006 ice survey is 15,164 animals, but this is considered a low estimate. Further analysis is being conducted on the 2006 survey to refine the population estimate.	Occur primarily in shelf waters of the Bering Sea. Primarily males stay in the Bering Sea in the summer. Major haulout sites are on Round Island in Bristol Bay and on Cape Seniavan on the north side of the Alaska Peninsula.
Northern Elephant Seal- California	None	None	Based on trends in pup counts, northern elephant seal colonies were continuing to grow in California through 2005, but appear to be stable or slowly decreasing in Mexico..	Males occur in the eastern Aleutian Islands and GOA in the fall.
Polar bear***	Threatened	strategic	Chukchi stock is data deficient.	Occurs in areas of ice in the northern Bering Sea between St. Lawrence and St. Matthew Islands.
Northern Sea Otter***	SW stock is Threatened	SW stock is strategic	South central and southeast stocks are stable; southwest stock is declining.	Occurs in nearshore coastal waters of the U.S. along the North Pacific Rim from the Aleutian Islands to California. The species is most commonly observed within the 40-meter depth contour.

Source: Allen and Angliss 2009; http://alaska.fws.gov/fisheries/mmm/stock/DraftPacificWalrusSAR/pdf. http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007sene-ca.pdf, (Stewart et al. 1994), Northern fur seal pup data available from http://www.alaskafisheries.noaa.gov/newsreleases/2007/fursealpups020207.htm. , http://www.nmfs.noaa.gov/pr/pdfs/sars/seaotter2008_ak_sw.pdf, http://alaska.fws.gov/fisheries/mmm/polarbear/pdf/Polar_Bear_Status_Assessment_Table1-3.pdf.

*NMFS determined that ribbon seals were not to be listed on December 3o, 2008 (73 FR 79822). The CBD and Greenpeace filed a notice of intent to sue against NMFS regarding this decision on March 31, 2009 and a complaint for declaratory and injunctive relief on September 3, 2009.

**Spotted seals occurring in Alaska waters are not ESA-listed (74 FR 53683, October 20, 2009).

*** Managed by USFWS

Table 6 Status of Cetacea stocks potentially affected by the Alaska groundfish fisheries.

Cetacea species and stock	*Status under the ESA*	*Status under the MMPA*	*Population Trends*	*Distribution in action area*
Killer whale – AT1 Transient; Eastern North Pacific GOA, AI, and BS transient; West Coast transient; Southern resident, and Eastern North Pacific Alaska Resident	AT1 Ttransient and southern resident are endangered	AT1 Transient and southern resident – Depleted & a strategic stock	AT1 group has been reduced to at least 50% of its 1984 level of 22 animals, and has likely been reduced to 32% of its 1998 level of 7 animals. Unknown abundance for the eastern North Pacific Alaska resident; West Coast transient; and Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea transient stocks. The minimum abundance estimates for the Eastern North Pacific Alaska Resident and West coast transient stocks are likely underestimated because researchers continue to encounter new whales in the Alaskan waters.	Transient-type killer whales from the Aleutian Islands and Bering Sea are considered to be part of a single population that includes Gulf of Alaska transients. Killer whales are seen in the northern Bering Sea and Beaufort Sea, but little is known about these whales. Southern residents do not occur in the action area. Potential effects are limited to the bycatch of Chinook salmon that may be prey returning to the Pacific NW.
Dall's porpoise – Alaska	None	None	Reliable data on population trends are unavailable.	Found in the offshore waters from coastal western Alaska to Bering Sea.
Pacific white-sided dolphin- North Pacific	None	None	Reliable data on population trends are unavailable.	Found from the southern Gulf of California, north to the Gulf of Alaska, west to Amchitka in the Aleutian Islands, and is rarely encountered in the southern Bering Sea. In high seas and coastal areas.
Harbor porpoise – Bering Sea	None	Strategic	Reliable data on population trends are unavailable	Primarily in coastal waters, usually less than 100 m.
Baird's beaked whale- Alaska	None	None	Reliable data on population trends are unavailable	N. Pacific and Bering Sea deep waters and along the Aleutian Islands.
Cuvier's beaked whale- Alaska	None	None	Reliable data on population trends are unavailable	North to the northern Gulf of Alaska, the Aleutian Islands, and the Commander Islands.
Stejneger's beaked whales- Alaska	None	None	Reliable data on population trends are unavailable	N. Pacific and Bering Sea deep waters and along the Aleutian Islands.
Humpback whale – Western North Pacific Central North Pacific	Endangered and under status review	Depleted & a strategic stock	Reliable data on population trends are unavailable for the western North Pacific stock. Central North Pacific stock thought to be increasing. The status of the stocks in relation to optimal sustainable population is unknown.	W. Pacific and C. North Pacific stocks occur in Alaskan waters and may mingle in the North Pacific feeding area. Humpback whales in the Bering Sea (Moore et al. 2002) cannot be conclusively identified as belonging to the western or Central North Pacific stocks, or to a separate, unnamed stock.
North Pacific right whale Eastern North Pacific	Endangered	Depleted & a strategic stock	Abundance not known, but this stock is considered to represent only a small fraction of its precommercial whaling abundance and is arguably the most endangered stock of large whales in the world.	Distributed in the SE Bering Sea and off Kodiak Island in designated critical habitat seasonally with availability of copepod prey.
Fin whale – Northeast Pacific	Endangered	Depleted & a strategic stock	Abundance may be increasing but surveys only provide abundance information for portions of the stock in the central-eastern and southeastern Bering and coastal waters of the Aleutian Islands and the Alaska Peninsula. Much of the North Pacific range has not been surveyed.	Found in the Bering Sea and coastal waters of the Aleutian Islands and Alaska Peninsula. Most sightings in the central-eastern Bering Sea occur in a high productivity zone on the shelf break.
Minke whale – Alaska	None	None	Considered common but abundance not known and uncertainty exists regarding the stock structure.	Common in the Bering and Chukchi Seas and in the inshore waters of the GOA.

Cetacea species and stock	*Status under the ESA*	*Status under the MMPA*	*Population Trends*	*Distribution in action area*
Sperm Whale – North Pacific	Endangered	Depleted & a strategic stock	Abundance and population trends in Alaska waters are unknown.	Inhabit waters 600 m or more depth, south of 62°N lat. Males inhabit Bering Sea in summer.
Gray Whale – Eastern North Pacific	None	None	Minimum population estimate is 17,752 animals. Increasing populations in the 1990s but below carrying capacity.	Most spend summers in the shallow waters of the northern Bering Sea and Arctic Ocean. Winters spent along the Pacific coast near Baja California.
Beluga Whale – Bristol Bay, Eastern Bering Sea, and eastern Chukchi Sea	None	None	Abundance estimate is 3,710 animals and population trend is not declining for the eastern Chukchi Sea stock. Minimum population estimate for the eastern Bering Sea stock is 14,898 animals and population trend is unknown. The minimum population estimate for the Bristol Bay stock is 1,619 animals and the population trend is stable and may be increasing.	Summer in the Arctic Ocean and Bering Sea coastal waters, and winter in the Bering Sea in offshore waters associated with pack ice.
Bowhead Whales	Endangered	Depleted and a strategic stock	Healthy and increasing. The Western Arctic stock of bowhead whales increased at a rate of 3.1% (95% CI: 1.4-4.7%) from 1978 to 1993, during which time abundance increased from approximately 5,000 to approximately 8,000 whales.	Northern Bering Sea during the winter
Sei Whales- North Pacific	Endangered	Depleted and a strategic stock	Reliable data on population trends are unavailable	N. Pacific offshore waters.
Blue Whale- North Pacific	Endangered	Depleted and a strategic stock	No evidence showing that the eastern North Pacific stock is currently growing.	GOA and Aleutian Islands to the Kamchatka Pen.

Source: Allen and Angliss 2009; Rice 1986, 1998; http://www.nmfs.noaa.gov/pr/pdfs/sars/po2008whbl-en.pdf; http://www.nmfs.noaa.gov/pr/pdfs/sars/po2008whse-en.pdf. North Pacific right whale included based on NMFS (2006c) and Salveson (2008); http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/spermwhale.htm.

Table 7 Reasonable foreseeable future actions.

Ecosystem-sensitive management	• Increasing understanding of the interactions between ecosystem components, and on-going efforts to bring these understandings to bear in stock assessments • Increasing protection of ESA-listed and other non-target species components of the ecosystem • Increasing integration of ecosystems considerations into fisheries decision-making • Proposed Amendment 91 to the BSAI groundfish FMP to minimize Chinook salmon bycatch in the pollock fishery
Fishery rationalization	• Continuing rationalization of federal fisheries off Alaska • Fewer, more profitable, fishing operations • Better harvest and bycatch control • Rationalization of groundfish in Alaskan waters • Expansion of community participation in rationalization programs
Traditional management tools	• Authorization of groundfish fisheries in future years • Increasing enforcement responsibilities • Technical and program changes that will improve enforcement and management
Other federal, state, and international agencies	• Future exploration and development of offshore mineral resources • Reductions in United States Coast Guard fisheries enforcement activities • Continuing oversight of seabirds and some marine mammal species by the USFWS • Expansion and construction of boat harbors • Expansion of state groundfish fisheries • Other state actions • Ongoing EPA monitoring of seafood processor effluent discharges
Private actions	• Commercial fishing • Increasing levels of economic activity in Alaska's waters and coastal zone • Expansion of aquaculture

Table 8 Species included in the BSAI FMP species categories.

	Finfish	Marine Invertebrates
Prohibited Species[1]	Pacific halibut Pacific herring Pacific salmon Steelhead	King crab Tanner crab
Target Species[2]	Walleye pollock Pacific cod Sablefish Yellowfin sole Greenland turbot Arrowtooth flounder Rock sole Flathead sole Alaska plaice Other flatfish Pacific ocean perch Northern rockfish Shortraker rockfish Rougheye rockfish Other rockfish Atka mackerel	Squid
Other Species[3]	Sculpins Sharks Skates	Octopus
Forage Fish Species[4]	Osmeridae family (eulachon, capelin, and other smelts) Myctophidae family (lanternfishes) Bathylagidae family (deep-sea smelts) Ammodytidae family (Pacific sand lance) Trichodontidae family (Pacific sand fish) Pholidae family (gunnels) Stichaeidae family (pricklebacks, warbonnets, eelblennys, cockscombs, and shannys) Gonostomatidae family (bristlemouths, lightfishes, and anglemouths)	Order Euphausiacea (krill)

[1]Must be returned to the sea
[2]TAC for each listing
[3]Aggregate TAC for group
[4]Management measures for forage fish are established in regulations implementing the FMP

Table 9 Species included in the GOA FMP species categories.

Prohibited Species[1]	Pacific halibut Pacific herring Pacific salmon Steelhead trout King crab Tanner crab
Target Species[2]	Walleye pollock Pacific cod Sablefish Flatfish (shallow-water flatfish, deep-water flatfish, rex sole, flathead sole, arrowtooth flounder) Rockfish (Pacific ocean perch, northern rockfish, shortraker and rougheye rockfish, other slope rockfish, pelagic shelf rockfish, demersal shelf rockfish[3], thornyhead rockfish) Atka mackerel Skates (big and longnose skates, other skates)
Other Species[4]	Squid Sculpins Sharks Octopus
Forage Fish Species[5]	Osmeridae family (eulachon, capelin, and other smelts) Myctophidae family (lanternfishes) Bathylagidae family (deep-sea smelts) Ammodytidae family (Pacific sand lance) Trichodontidae family (Pacific sand fish) Pholidae family (gunnels) Stichaeidae family (pricklebacks, warbonnets, eelblennys, cockscombs, and shannys) Gonostomatidae family (bristlemouths, lightfishes, and anglemouths) Order Euphausiacea (krill)

[1]Must be immediately returned to the sea

[2]TAC for each listing

[3]Management delegated to the State of Alaska

[4]Aggregate TAC for group

[5]Management measures for forage fish are established in regulations implementing the FMP

Table 10 Final 2010 and 2011 overfishing level (OFL), acceptable biological catch (ABC), total allowable catch (TAC), initial TAC (ITAC), and CDQ reserve allocation of groundfish in the BSAI.[1]

[Amounts are in metric tons]

Species	Area	2010					2011				
		OFL	ABC	TAC	ITAC[2]	CDQ[3]	OFL	ABC	TAC	ITAC[2]	CDQ[3]
Pollock[3]	BS[2]	918,000	813,000	813,000	731,700	81,300	1,220,000	1,110,000	1,110,000	999,000	111,000
	AI[2]	40,000	33,100	19,000	17,100	1,900	39,100	32,200	19,000	17,100	1,900
	Bogoslof	22,000	156	50	50	0	22,000	156	50	50	0
Pacific cod[4]	BSAI	205,000	174,000	168,780	150,721	18,059	251,000	214,000	207,580	185,369	22,211
Sablefish[5]	BS	3,310	2,790	2,790	2,302	384	2,970	2,500	2,500	1,063	94
	AI	2,450	2,070	2,070	1,682	349	2,200	1,860	1,860	395	35
Atka mackerel	BSAI	88,200	74,000	74,000	66,082	7,918	76,200	65,000	65,000	58,045	6,955
	EAI/BS	n/a	23,800	23,800	21,253	2,547	n/a	20,900	20,900	18,664	2,236
	CAI	n/a	29,600	29,600	26,433	3,167	n/a	26,000	26,000	23,218	2,782
	WAI	n/a	20,600	20,600	18,396	2,204	n/a	18,100	18,100	16,163	1,937
Yellowfin sole	BSAI	234,000	219,000	219,000	195,567	23,433	227,000	213,000	213,000	190,209	22,791
Rock sole	BSAI	243,000	240,000	90,000	80,370	9,630	245,000	242,000	90,000	80,370	9,630
Greenland turbot	BSAI	7,460	6,120	6,120	5,202	n/a	6,860	5,370	5,370	4,565	n/a
	BS	n/a	4,220	4,220	3,587	452	n/a	3,700	3,700	3,145	396
	AI	n/a	1,900	1,900	1,615	0	n/a	1,670	1,670	1,420	0
Arrowtooth flounder	BSAI	191,000	156,000	75,000	63,750	8,025	191,000	157,000	75,000	63,750	8,025
Flathead sole	BSAI	83,100	69,200	60,000	53,580	6,420	81,800	68,100	60,000	53,580	6,420
Other flatfish[6]	BSAI	23,000	17,300	17,300	14,705	0	23,000	17,300	17,300	14,705	0
Alaska plaice	BSAI	278,000	224,000	50,000	42,500	0	314,000	248,000	50,000	42,500	0
Pacific ocean perch	BSAI	22,400	18,860	18,860	16,677	n/a	22,200	18,680	18,680	16,518	n/a
	BS	n/a	3,830	3,830	3,256	0	n/a	3,790	3,790	3,222	0
	EAI	n/a	4,220	4,220	3,768	452	n/a	4,180	4,180	3,733	447
	CAI	n/a	4,270	4,270	3,813	457	n/a	4,230	4,230	3,777	453
	WAI	n/a	6,540	6,540	5,840	700	n/a	6,480	6,480	5,787	693
Northern rockfish	BSAI	8,640	7,240	7,240	6,154	0	8,700	7,290	7,290	6,197	0
Shortraker rockfish	BSAI	516	387	387	329	0	516	387	387	329	0
Rougheye rockfish	BSAI	669	547	547	465	0	650	531	531	451	0
Other rockfish[7]	BSAI	1,380	1,040	1,040	884	0	1,380	1,040	1,040	884	0
	BS	n/a	485	485	412	0	n/a	485	485	412	0
	AI	n/a	555	555	472	0	n/a	555	555	472	0
Squid	BSAI	2,620	1,970	1,970	1,675	0	2,620	1,970	1,970	1,675	0
Other species[8]	BSAI	88,200	61,100	50,000	42,500	0	88,200	61,100	50,000	42,500	0
TOTAL		2,462,945	2,121,880	1,677,154	1,493,994	159,478	2,826,396	2,467,484	1,996,558	1,779,254	191,050

[1] These amounts apply to the entire BSAI management area unless otherwise specified. With the exception of pollock, and for the purpose of these harvest specifications, the Bering Sea (BS) subarea includes the Bogoslof District.

[2] Except for pollock, the portion of the sablefish TAC allocated to hook-and-line and pot gear, and Amendment 80 species, 15 percent of each TAC is put into a reserve. The ITAC for these species is the remainder of the TAC after the subtraction of these reserves. For pollock and Amendment 80 species, ITAC is the non-CDQ allocation of TAC (see footnotes 3 and 5).

[3] Under § 679.20(a)(5)(i)(A)(1), the annual Bering Sea subarea pollock TAC after subtracting first for the CDQ directed fishing allowance (10 percent) and second for the incidental catch allowance (4.0 percent), is further allocated by sector for a directed pollock fishery as follows: inshore — 50 percent; catcher/processor — 40 percent; and motherships — 10 percent. Under § 679.20(a)(5)(iii)(B)(2)(i) and (ii), the annual Aleutian Islands subarea pollock TAC, after subtracting first for the CDQ directed fishing allowance (10 percent) and second for the incidental catch allowance (1,600 mt) is allocated to the Aleut Corporation for a directed pollock fishery.

[4] The Pacific cod TAC is reduced by three percent from the ABC to account for the State of Alaska's (State's) guideline harvest level in State waters of the Aleutian Islands subarea.

[5] For the Amendment 80 species (Atka mackerel, flathead sole, rock sole, yellowfin sole, Pacific cod, and Aleutian Islands Pacific ocean perch), 10.7 percent of the TAC is reserved for use by CDQ participants (see §§ 679.20(b)(1)(ii)(C) and 679.31). Twenty percent of the sablefish TAC allocated to hook-and-line gear or pot gear, 7.5 percent of the sablefish TAC allocated to trawl gear, and 10.7 percent of the TACs for Bering Sea Greenland turbot and arrowtooth flounder are reserved for use by CDQ participants (see § 679.20(b)(1)(ii)(B) and (D)). Aleutian Islands Greenland turbot, "other flatfish," Alaska plaice, Bering Sea Pacific ocean perch, northern rockfish, shortraker rockfish, rougheye rockfish, "other rockfish," squid, and "other species" are not allocated to the CDQ program.

[6] "Other flatfish" includes all flatfish species, except for halibut (a prohibited species), flathead sole, Greenland turbot, rock sole, yellowfin sole, arrowtooth flounder, and Alaska plaice.

[7] "Other rockfish" includes all Sebastes and Sebastolobus species except for Pacific ocean perch, northern, dark, shortraker, and rougheye rockfish.

[8] "Other species" includes sculpins, sharks, skates, and octopus. Forage fish, as defined at § 679.2, are not included in the "other species" category.

Table 11 Final 2010 ABCs, TACs, and OFLs of groundfish for the Western/Central/West Yakutat (W/C/WYK), Western (W), Central (C), Eastern (E) Regulatory Areas, and in the West Yakutat (WYK), Southeast Outside (SEO) and Gulfwide (GW) Districts of the Gulf of Alaska (Values are rounded to the nearest metric ton.)

Species	Area[1]	ABC	TAC	OFL
Pollock[2]	Shumagin (610)	26,256	26,256	n/a
	Chirikof (620)	28,095	28,095	n/a
	Kodiak (630)	19,118	19,118	n/a
	WYK (640)	2,031	2,031	n/a
	W/C/WYK (subtotal)	75,500	75,500	103,210
	SEO (650)	9,245	9,245	12,326
	Total	84,745	84,745	115,536
Pacific cod[3]	W	27,685	20,764	n/a
	C	49,042	36,782	n/a
	E	2,373	2,017	n/a
	Total	79,100	59,563	94,100
Sablefish[4]	W	1,660	1,660	n/a
	C	4,510	4,510	n/a
	WYK	1,620	1,620	n/a
	SEO	2,580	2,580	n/a
	E (WYK and SEO) (subtotal)	4,200	4,200	n/a
	Total	10,370	10,370	12,270
Deep-water flatfish[5]	W	521	521	n/a
	C	2,865	2,865	n/a
	WYK	2,044	2,044	n/a
	SEO	760	760	n/a
	Total	6,190	6,190	7,680
Shallow-water flatfish[6]	W	23,681	4,500	n/a
	C	29,999	13,000	n/a
	WYK	1,228	1,228	n/a
	SEO	1,334	1,334	n/a
	Total	56,242	20,062	67,768
Rex sole	W	1,543	1,543	n/a
	C	6,403	6,403	n/a
	WYK	883	883	n/a
	SEO	900	900	n/a
	Total	9,729	9,729	12,714
Arrowtooth flounder	W	34,773	8,000	n/a
	C	146,407	30,000	n/a
	WYK	22,835	2,500	n/a
	SEO	11,867	2,500	n/a
	Total	215,882	43,000	254,271

Flathead sole	W	16,857	2,000	n/a
	C	27,124	5,000	n/a
	WYK	1,990	1,990	n/a
	SEO	1,451	1,451	n/a
	Total	47,422	10,411	59,295
Pacific ocean perch[7]	W	2,895	2,895	3,332
	C	10,737	10,737	12,361
	WYK	2,004	2,004	n/a
	SEO	1,948	1,948	n/a
	E (WYK and SEO) (subtotal)	3,952	3,952	4,550
	Total	17,584	17,584	20,243
Northern rockfish[8,9]	W	2,703	2,703	n/a
	C	2,395	2,395	n/a
	E	0	0	n/a
	Total	5,098	5,098	6,070
Rougheye rockfish[10]	W	80	80	n/a
	C	862	862	n/a
	E	360	360	n/a
	Total	1,302	1,302	1,568
Shortraker rockfish[11]	W	134	134	n/a
	C	325	325	n/a
	E	455	455	n/a
	Total	914	914	1,219
Other rockfish[9,12]	W	212	212	n/a
	C	507	507	n/a
	WYK	273	273	n/a
	SEO	2,757	200	n/a
	Total	3,749	1,192	4,881
Pelagic shelf rockfish[13]	W	650	650	n/a
	C	3,249	3,249	n/a
	WYK	434	434	n/a
	SEO	726	726	n/a
	Total	5,059	5,059	6,142
Demersal shelf rockfish[14]	SEO	295	295	472
Thornyhead rockfish	W	425	425	n/a
	C	637	637	n/a
	E	708	708	n/a
	Total	1,770	1,770	2,360
Atka mackerel	GW	4,700	2,000	6,200
Big skate[15]	W	598	598	n/a
	C	2,049	2,049	n/a
	E	681	681	n/a
	Total	3,328	3,328	4,438

Longnose skate[16]	W	81	81	n/a
	C	2,009	2,009	n/a
	E	762	762	n/a
	Total	2,852	2,852	3,803
Other skates[17]	GW	2,093	2,093	2,791
Other species[18]	GW	7,075	4,500	9,432
Total		565,499	292,087	693,253

[1] Regulatory areas and districts are defined at § 679.2

[2] Pollock is apportioned in the Western/Central Regulatory Areas among three statistical areas. During the A season, the apportionment is based on an adjusted estimate of the relative distribution of pollock biomass of approximately 30 percent, 46 percent, and 24 percent in Statistical Areas 610, 620, and 630, respectively. During the B season, the apportionment is based on the relative distribution of pollock biomass at 30 percent, 54 percent, and 16 percent in Statistical Areas 610, 620, and 630, respectively. During the C and D seasons, the apportionment is based on the relative distribution of pollock biomass at 41 percent, 27 percent, and 32 percent in Statistical Areas 610, 620, and 630, respectively. Tables 5 and 6 list the proposed 2010 and 2011 pollock seasonal apportionments. In the West Yakutat and Southeast Outside Districts of the Eastern Regulatory Area, pollock is not divided into seasonal allowances.

[3] The annual Pacific cod TAC is apportioned 60 percent to the A season and 40 percent to the B season in the Western and Central Regulatory Areas of the GOA. Pacific cod is allocated 90 percent for processing by the inshore component and 10 percent for processing by the offshore component. Table 7 and 8 list the proposed 2010 and 2011 Pacific cod seasonal apportionments.

[4] Sablefish is allocated to trawl and hook-and-line gears for 2010 and to trawl gear in 2011. Tables 3 and 4 list the proposed 2010 and 2011 sablefish TACs.

[5] "Deep-water flatfish" means Dover sole, Greenland turbot, and deepsea sole.

[6] "Shallow-water flatfish" means flatfish not including "deep-water flatfish," flathead sole, rex sole, or arrowtooth flounder.

[7] "Pacific ocean perch" means *Sebastes alutus*.

[8] "Northern rockfish" means *Sebastes polyspinous*. For management purposes the 2 mt apportionment of ABC to the Eastern Gulf of Alaska has been included in the slope rockfish complex.

[9] "Slope rockfish" means *Sebastes aurora* (aurora), *S. melanostomus* (blackgill), *S. paucispinis* (bocaccio), *S. goodei* (chilipepper), *S. crameri* (darkblotch), *S. elongatus* (greenstriped), *S. variegatus* (harlequin), *S. wilsoni* (pygmy), *S. babcocki* (redbanded), *S. proriger* (redstripe), *S. zacentrus* (sharpchin), *S. jordani* (shortbelly), *S. brevispinis* (silvergrey), *S. diploproa* (splitnose), *S. saxicola* (stripetail), *S. miniatus* (vermilion), and *S. reedi* (yellowmouth). In the Eastern GOA only, slope rockfish also includes northern rockfish, S. polyspinous.

[10] "Rougheye rockfish" means *Sebastes aleutianus* (rougheye) and *Sebastes melanostictus* (blackspotted).

[11] "Shortraker rockfish" means *Sebastes borealis*.

[12] "Other rockfish" in the Western and Central Regulatory Areas and in the West Yakutat District means slope rockfish and demersal shelf rockfish. The category "other rockfish" in the SEO District means slope rockfish.

[13] "Pelagic shelf rockfish" means *Sebastes ciliatus* (dark), *S. variabilis* (dusky), *S. entomelas* (widow), and *S. flavidus* (yellowtail).

[14] "Demersal shelf rockfish" means *Sebastes pinniger* (canary), *S. nebulosus* (china), *S. caurinus* (copper), *S. maliger* (quillback), *S. helvomaculatus* (rosethorn), *S. nigrocinctus* (tiger), and *S. ruberrimus* (yelloweye).

[15] "Big skate" means *Raja binoculata*.

[16] "Longnose skate" means *Raja rhina*.

[17] "Other skates" means *Bathyraja* spp.

[18] "Other species" means sculpins, sharks, squid, and octopus.

Table 12 Target categories that may be indirectly affected by OFLs or ABCs for other species groups.

	BSAI		GOA		
	Shark	**Octopus**	**Shark**	**Octopus**	**Squid**
High Catches	PT pollock HAL P.cod	pot P.cod pot other HAL P.cod NPT P. cod	HAL other HAL sablefish HAL P.cod	NPT yfin sole	pot other
High Rates	HAL other HAL sablefish PT other	pot other pot P.cod	NPT rockfishes NPT yfin sole HAL P.cod	pot P.cod	PTR other

Table 13 Final 2010 and 2011 apportionment of prohibited species catch allowances to non-trawl gear, the CDQ program, Amendment 80, and the BSAI trawl limited access sectors

PSC species	Total non-trawl PSC	Non-trawl PSC remaining after CDQ PSQ[1]	Total trawl PSC	Trawl PSC remaining after CDQ PSQ[1]	CDQ PSQ reserve[1]	Amendment 80 sector		BSAI trawl limited access fishery
						2010	2011	
Halibut mortality (mt) BSAI	900	832	3,675	3,349	393	2,425	2,375	875
Herring (mt) BSAI	n/a	n/a	1,974	n/a	n/a	n/a	n/a	n/a
Red king crab (animals) Zone 1[1]	n/a	n/a	197,000	175,921	21,079	98,920	93,432	53,797
C. opilio (animals) COBLZ[2]	n/a	n/a	4,350,000	3,884,550	465,450	2,148,156	2,028,512	1,248,494
C. bairdi crab (animals) Zone 1[2]	n/a	n/a	830,000	741,190	88,810	351,176	331,608	348,285
C. bairdi crab (animals) Zone 2	n/a	n/a	2,520,000	2,250,360	269,640	599,271	565,966	1,053,394

[1]Section 679.21(e)(3)(i)(A)(2) allocates 326 mt of the trawl halibut mortality limit and § 679.21(e)(4)(i)(A) allocates 7.5 percent, or 67 mt, of the non-trawl halibut mortality limit as the PSQ reserve for use by the groundfish CDQ program. The PSQ reserve for crab species is 10.7 percent of each crab PSC limit.

[2] Refer to § 679.2 for definitions of zones.

Table 14 Final 2010 and 2011 Pacific halibut PSC limits, allowances, and apportionments for the GOA
(Values are in metric tons.)

Trawl gear			Hook-and-line gear[1]				
			Other than DSR			DSR	
Season	Percent	Amount	Season	Percent	Amount	Season	Amount
January 20 - April 1	27.5%	550	January 1 - June 10	86%	250	January 1 - December 31	10
April 1 - July 1	20%	400	June 10 - September 1	2%	5		
July 1 - September 1	30%	600	September 1 - December 31	12%	35		
September 1 - October 1	7.5%	150					
October 1 - December 31	15%	300					
Total		2,000			290		10

[1]The Pacific halibut PSC limit for hook-and-line gear is allocated to the demersal shelf rockfish (DSR) fishery and fisheries other than DSR. The hook-and-line sablefish fishery is exempt from halibut PSC limits.

Table 15 Time series of BSAI other species ABC, TAC, OFL, and catch (t), with group catch and proportion.

Year	other species OFL	other species ABC	other species TAC	other species catch	Shark catch	Shark % of catch	Sculpin catch	Sculpin % of catch	Octopus catch	Octopus % of catch	Skates % of catch
2005	87,920	53,860	29,000	29,505	417	1%	5,735	19%	338	1%	78%
2006	89,404	58,882	29,000	26,798	689	3%	5,814	22%	334	1%	74%
2007	91,700	68,800	37,355	26,668	331	1%	7,522	28%	166	1%	70%
2008	104,000	78,100	50,000	21,340	185	1%	7,618	36%	194	1%	63%
2009	80,800	66,700	50,000	24,291	132	1%	6,404	26%	NA	1%	72%

Table 16 Time series of GOA other species ABC, TAC, OFL, and catch (t), with group catch and proportion.

Year	Other species OFL	other species ABC	other species TAC	other species catch	Shark catch	Shark % of catch	Sculpin catch	Sculpin % of catch	Octopus catch	Octopus % of catch	Squid catch	Squid % of catch
2005	NA	NA	13,871	2,512	1,101	44%	626	25%	338	13%	635	25%
2006	NA	NA	13,856	3,882	1,603	41%	583	15%	334	9%	1,530	39%
2007	NA	NA	4,500	3,026	1,388	46%	960	32%	166	5%	412	14%
2008	NA	NA	4,500	2,984	619	21%	1943	65%	194	7%	84	3%
2009	8,720	6,540	4,500	2,085	365	18%	1146	55%	NA	NA	336	16%

Table 17 2010 group level ABCs, and maximum foregone catch and value.

BSAI	2010 ABC	foregone catch	avg $/mt	foregone value	GOA	2010 ABC	foregone catch	avg $/mt	foregone value
other species	61,082				other species	7,075			
skates	30,200	30,882	78.6	$2,427,325					
sharks	449	60,633	78.6	$4,765,754	sharks	957	6,118	78.6	$480,875
sculpins	30,200	30,882	78.6	$2,427,325	sculpins	4,746	2,329	78.6	$183,059
octopuses	233	60,849	78.6	$4,782,731	octopuses	224	6,851	78.6	$538,489
					squid	1,148	5,927	78.6	$465,862

Table 18 Retention rates of species in the other species complex for 2007.

	Retention Rate (%)	Retention Rate (%)
Species Group	**BSAI**	**GOA**
Sculpins	6	
Sharks	4	
Octopuses (2006)	70% pot; 36-41% trawl	
Squids		

Table 19 Catches of "other species" in the BSAI from 2003 through 2009 in metric tons.

Species	2003	2004	2005	2006	2007	2008	2009
Sculpins	5,614	6,020	5,642	5,727	7,701	7,364	7,012
Sharks	520	510	417	688	331	185	140
Octopuses	269	529	338	350	181	213	69
Unknown	76	121	84	14	4	34	2

Source: NMFS, AKR

Table 20 Catches of "other species" in the GOA from 2003 through 2009 in metric tons.

Species	2003	2004	2005	2006	2007	2008	2009
Sculpins	751	665	591	645	871	1,450	1,021
Shark-total	751	571	1,101	1,603	1,388	619	941
Octopuses	210	270	149	166	266	339	308
Squids	92	162	635	1,530	412	84	337
Unknown	300	795	1,996	2,090	1,852	1,334	0

Source: NMFS, AKR

Table 21 SSC recommended 2010 BSAI ABCs and OFLs for "Other Species" (in metric tons).

Species	OFL	ABC
Sharks	598	449
Octopuses	311	233
Sculpins	51,300	30,200

Source: SSC minutes from December 2009

Table 22 SSC recommended 2010 GOA ABCs and OFLs for "Other Species" (in metric tons).

Species	OFL	ABC
Sharks	1,276	957
Octopuses	298	224
Sculpins	6,328	4,476
Squids	1,530	1,148

Source: SSC minutes from December 2009

Table 23 BSAI Octopus catches.

	Non Pelagic Trawl Pacific Cod Target			Non Pelagic Trawl Flatfish Targets			Pelagic Trawl Pelagic Pollock Target		
Year	Octopus (mt)	Groundfish	Rate kg/mt	Octopus (mt)	Groundfish	Rate kg/mt	Octopus (mt)	Groundfish	Rate kg/mt
2003	27	92,198	0.30	32	163,818	0.20	9.1	1,303,044	0.01
2004	70	109,136	0.64	44	181,202	0.24	3.4	1,432,180	0.00
2005	25	81,216	0.31	17	192,555	0.09	1.3	1,430,398	0.00
2006	27	85,564	0.31	5	194,683	0.03	1.7	1,445,738	0.00
2007	14	93,270	0.15	7	217,734	0.03	3.8	1,312,402	0.00
2008	15	43,858	0.35	11	293,334	0.04	2.7	919,901	0.00
2009	2	37,906	0.06	10	245,907	0.04	2.1	665,479	0.00

	Hook And Line Pacific Cod Target			Pot Gear Pacific Cod Target			Pot Gear Non-Cod Targets *		
Year	Octopus (mt)	Groundfish	Rate kg/mt	Octopus (mt)	Groundfish	Rate kg/mt	Octopus (mt)	Groundfish	Rate kg/mt
2003	50	120,581	0.41	139	22,686	6.14	7	718	10.18
2004	57	137,899	0.42	151	17,804	8.48	194 **	1,142	170.09 **
2005	29	144,091	0.20	257	17,795	14.45	8	1,363	6.06
2006	30	119,617	0.25	274	20,503	13.37	10	1,159	8.39
2007	21	99,435	0.21	131	18,557	7.04	1	1,659	0.30
2008	16	117,334	0.14	162	21,275	7.63	1	1,003	0.86
2009	13	123,465	0.11	40	15,759	2.54	0	759	0.27

	All other Gears and Targets		
Year	Octopus (mt)	Groundfish	Rate kg/mt
2003	4	91,801	0.04
2004	8	99,780	0.08
2005	0	113,955	0.00
2006	3	113,003	0.02
2007	4	117,460	0.04
2008	4	148,842	0.03
2009	1	248,220	0.01

* Pot Gear Non-Cod Targets includes pot gear catch in the following targets: Other Species, Sablefish, Turbot, and Pollock.

2004 data includes a small directed octopus fishery.

All other gears and targets include all gear/target combinations not listed.

Groundish includes all groundfish caught in the Gear and Target grouping.

Table 24 GOA Octopus catches.

	Pot Gear Pacific Cod Target			Non Pelagic Trawl Pacific Cod Target			Non Pelagic Trawl Flatfish Targets		
Year	Octopus (mt)	Groundfish	Rate kg/mt	Octopus (mt)	Groundfish	Rate kg/mt	Octopus (mt)	Groundfish	Rate kg/mt
2003	185	21,159	8.76	0	15,867	0.03	6.8	43,619	0.16
2004	230	26,087	8.80	6	16,785	0.38	1.5	20,449	0.07
2005	137	24,726	5.54	0	12,443	0.02	7.7	29,622	0.26
2006	149	24,048	6.19	1	11,403	0.05	8.8	41,313	0.21
2007	247	24,827	9.95	1	13,662	0.05	11.1	42,578	0.26
2008	313	25,225	12.43	5	22,856	0.20	7.1	47,036	0.15
2009	287	22,313	12.86	3	8,772	0.34	5.5	51,474	0.11

	Hook And Line Pacific Cod Target			All other Gears and Targets		
Year	Octopus (mt)	Groundfish	Rate kg/mt	Octopus (mt)	Groundfish	Rate kg/mt
2003	3	9,876	0.30	14	100,962	0.14
2004	13	11,088	1.21	19	114,254	0.16
2005	1	6,137	0.20	3	127,193	0.02
2006	2	11,845	0.13	6	120,187	0.05
2007	2	13,015	0.19	4	94,407	0.05
2008	8	14,652	0.54	6	91,593	0.06
2009	5	14,914	0.37	7	82,279	0.09

All other gears and targets include all gear/target combinations not listed.

Groundish includes all groundfish caught in the gear and target groupings.

Table 25 BSAI shark catches.

	Hook And Line Pacific Cod Target			Non Pelagic Trawl Pacific Cod Target			Non Pelagic Trawl Flatfish Targets		
Year	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt
2003	141	120,581	1.17	12	92,198	0.13	36	163,818	0.22
2004	226	137,899	1.64	33	109,136	0.30	60	181,202	0.33
2005	197	144,091	1.37	17	81,216	0.21	9	192,555	0.04
2006	126	119,617	1.05	8	85,564	0.10	38	194,683	0.19
2007	43	99,435	0.43	6	93,270	0.06	15	217,734	0.07
2008	22	117,334	0.19	1	43,858	0.02	8	293,334	0.03
2009	29	123,465	0.24	0	37,906	0.01	10	245,907	0.04

	Pelagic Trawl Pelagic Pollock Target			Pelagic Trawl Bottom Pollock Target			All other Gears and Targets		
Year	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt
2003	191	1,303,044	0.15	90	15,112	5.95	49	100,093	0.49
2004	186	1,432,180	0.13	1	20,306	0.0	4	98,420	0.04
2005	163	1,430,398	0.11	7	31,651	0.21	25	101,463	0.24
2006	506	1,445,738	0.35	6	28,061	0.22	5	106,604	0.04
2007	214	1,312,402	0.16	31	28,978	1.06	22	108,698	0.20
2008	114	919,901	0.12	31	60,965	0.51	10	110,154	0.09
2009	89	665,479	0.13	8	144,073	0.05	3	120,665	0.03

All other gears and targets include all gear/target combinations not listed.

Groundish includes all groundfish caught in the gear and target groupings.

Table 26 GOA shark catches.

	Hook And Line Pacific Cod Target			Hook And Line Sablefish Target			All other Hook and Line Targets		
Year	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt
2003	79	9,876	7.96	37	14,723	2.54	121	3,608	33.49
2004	34	11,088	3.05	154	16,417	9.39	27	2,189	12.16
2005	144	6,137	23.47	402	14,763	27.21	50	2,230	22.23
2006	114	11,845	9.64	182	13,190	13.78	798	4,082	195.53
2007	227	13,015	17.44	174	12,317	14.13	231	3,347	68.90
2008	257	14,652	17.57	96	11,423	8.43	1	3,498	0.17
2009	43	14,914	2.85	70	9,553	7.28	519	4,124	125.87

	Non Pelagic Trawl Pacific Cod Target			Non Pelagic Trawl Deep Flatfish Targets			Non Pelagic Trawl Shallow Flatfish Targets		
Year	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt
2003	25	15,867	1.59	202	31,247	6.46	75	12,373	6.09
2004	15	16,785	0.89	46	13,258	3.46	67	7,191	9.38
2005	14	12,443	1.14	103	18,303	5.64	86	11,319	7.61
2006	16	11,403	1.38	124	28,491	4.34	76	12,822	5.89
2007	60	13,662	4.37	267	26,593	10.04	164	15,985	10.25
2008	48	22,856	2.08	41	30,182	1.37	51	16,854	3.00
2009	19	8,772	2.15	81	29,046	2.80	124	22,429	5.53

	Pelagic Trawl Bottom Pollock Target			Pelagic Trawl Pelagic Pollock Target			All other Gears and Targets		
Year	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt	Sharks (mt)	Groundfish	Rate kg/mt
2003	3	3,224	1.08	118	46,008	2.56	90	54,557	1.65
2004	97	10,326	9.37	125	47,658	2.63	6	63,751	0.10
2005	117	18,760	6.25	175	64,325	2.72	10	51,841	0.19
2006	184	32,389	5.68	70	40,835	1.71	40	53,738	0.75
2007	147	13,573	10.81	65	38,185	1.71	54	51,812	1.04
2008	32	13,430	2.38	54	32,896	1.64	39	55,571	0.71
2009	25	8,815	2.83	36	29,082	1.23	25	53,018	0.47

All other gears and targets include all gear/target combinations not listed.

Groundish includes all groundfish caught in the gear and target groupings.

Table 27 GOA squid catches.

	Non Pelagic Trawl Rockfish Target			Pelagic Trawl Bottom Pollock Target			Pelagic Trawl Pelagic Pollock Target		
Year	Squid (mt)	Groundfish	Rate kg/mt	Squid (mt)	Groundfish	Rate kg/mt	Squid (mt)	Groundfish	Rate kg/mt
2003	9	24,842	0.35	8	3,224	2.40	56	46,008	1.21
2004	11	25,365	0.45	20	10,326	1.95	111	47,658	2.33
2005	2	21,687	0.07	356	18,760	18.97	275	64,325	4.28
2006	9	22,142	0.41	1,411	32,389	43.56	93	40,835	2.27
2007	3	19,863	0.15	294	13,573	21.69	111	38,185	2.90
2008	5	20,022	0.25	24	13,430	1.82	53	32,896	1.60
2009	13	22,050	0.61	160	8,815	18.16	153	29,082	5.26

	All other Gears and Targets		
Year	Squid (mt)	Groundfish	Rate kg/mt
2003	20	117,409	0.17
2004	19	105,314	0.18
2005	3	95,349	0.03
2006	17	113,429	0.15
2007	4	116,869	0.03
2008	2	135,014	0.01
2009	10	119,806	0.09

All other gears and targets include all gear/target combinations not listed.

Groundish includes all groundfish caught in the gear and target groupings.

8.0 FIGURES

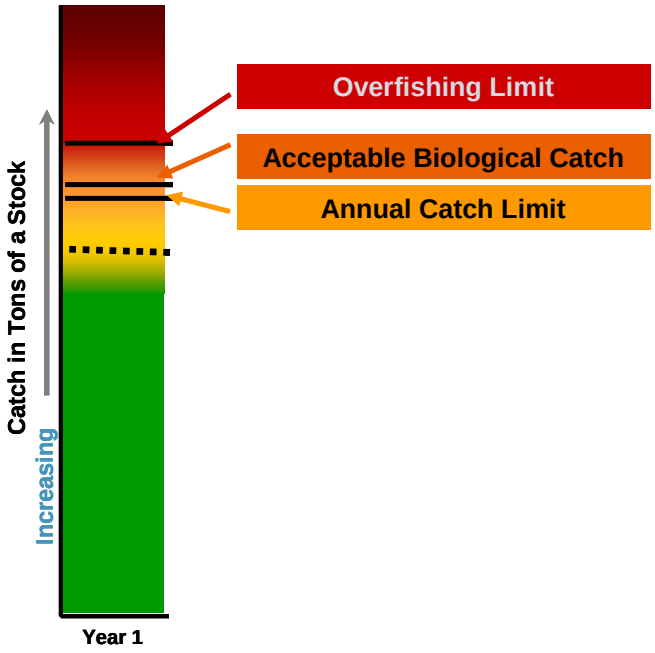


Figure 1 Definition framework for overfishing limit, acceptable biological catch, and annual catch limit.

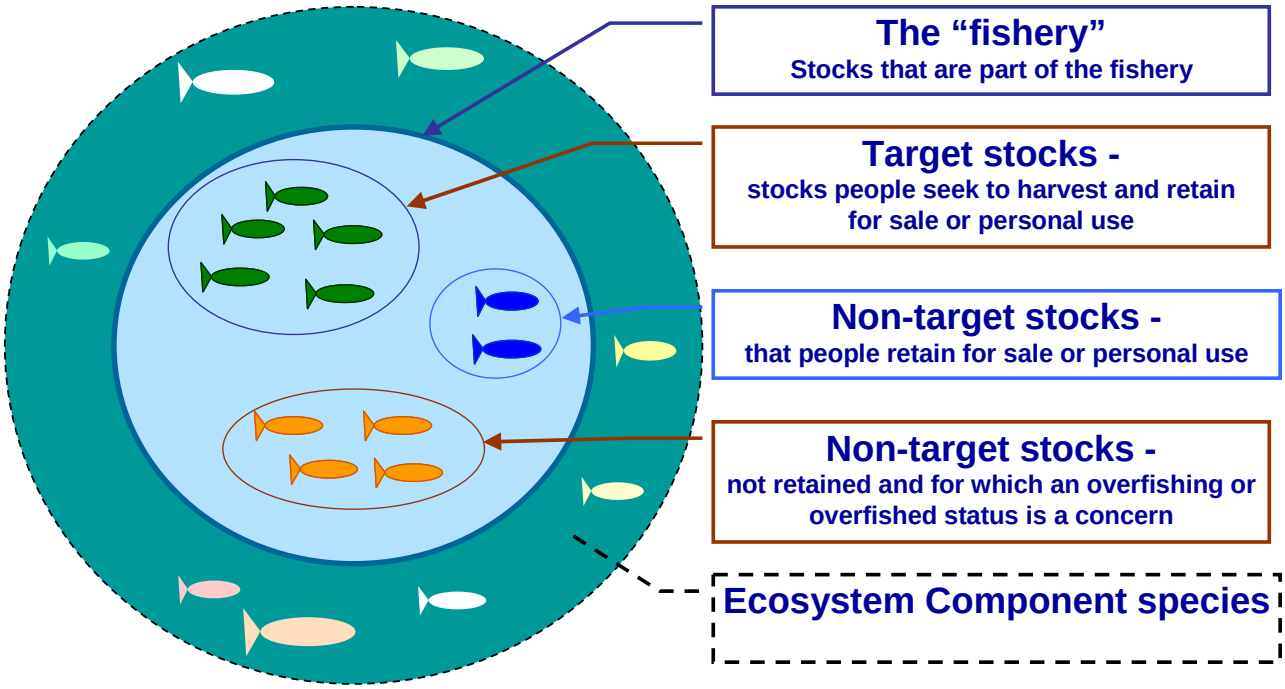


Figure 2 Classification of groundfish stocks in the fishery and in the ecosystem component category.

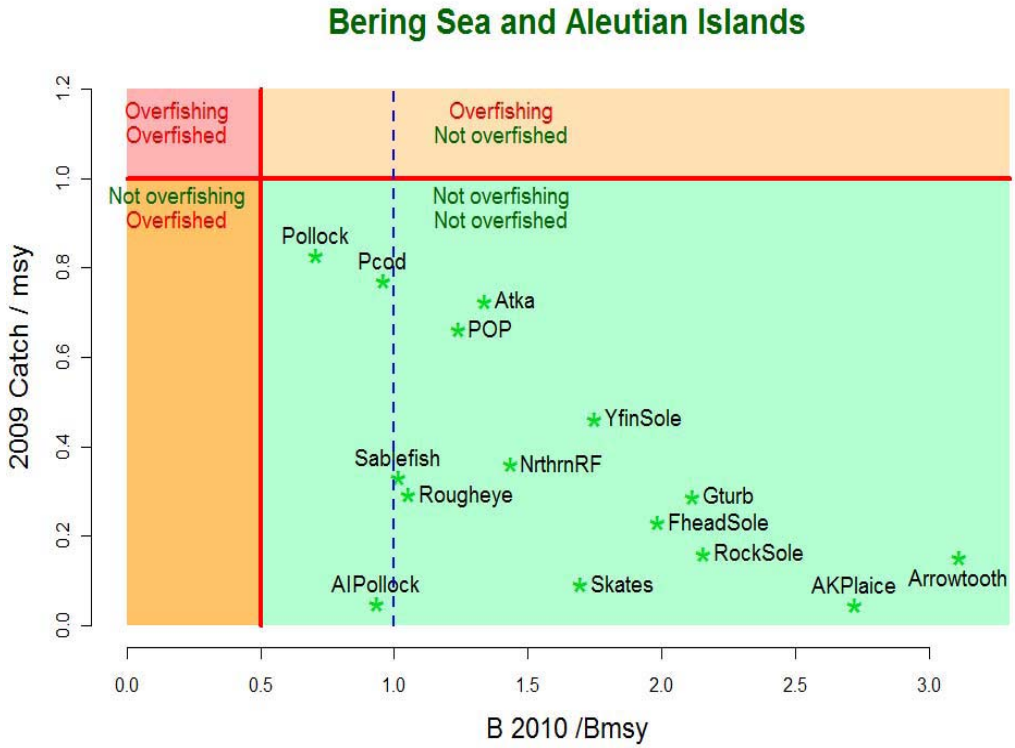


Figure 3 Summary status of age-structured BSAI species relative to 2009 catch levels (vertical axis) and projected 2010 spawning biomass relative to B_{msy} levels. Note that the 2009 MSY level is taken as the 2009 OFL (which is defined as the catch at Fmsy).

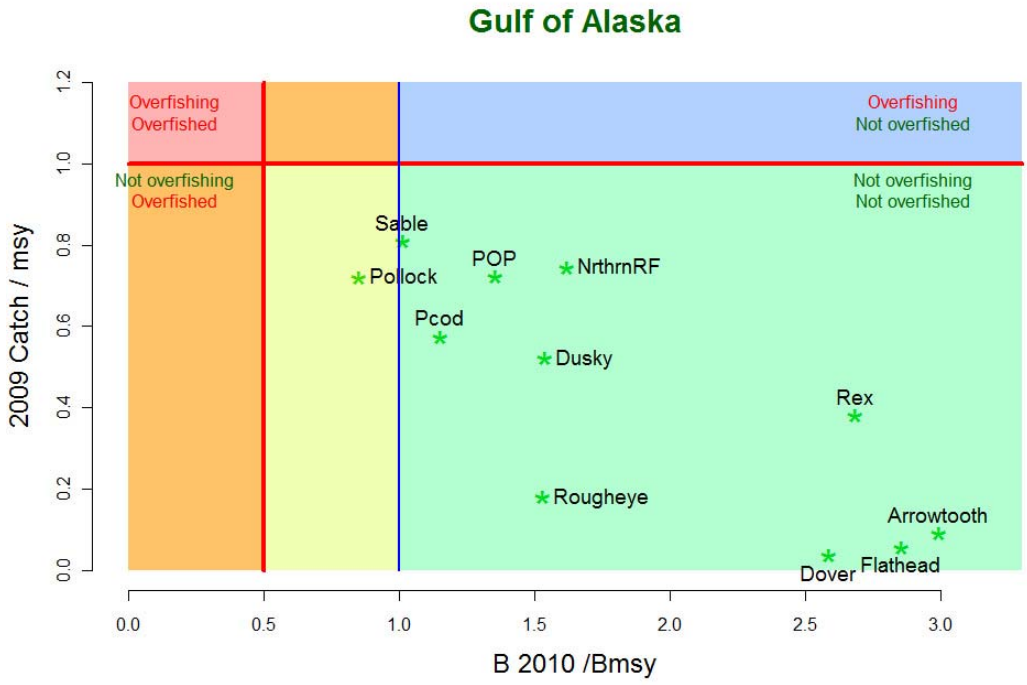


Figure 4 Summary status of age-structured GOA species relative to 2009 catch levels (vertical axis) and projected 2010 spawning biomass relative to B_{msy} levels. Note that the 2009 MSY level is taken as the 2009 OFL (which is defined as the catch at F_{msy}).

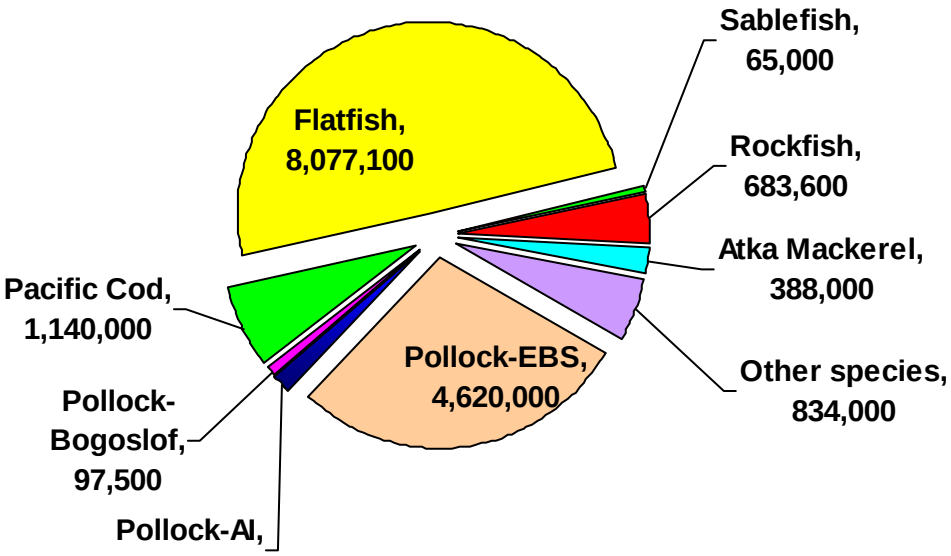


Figure 5 **2009 BSAI biomass by target category in metric tons.**

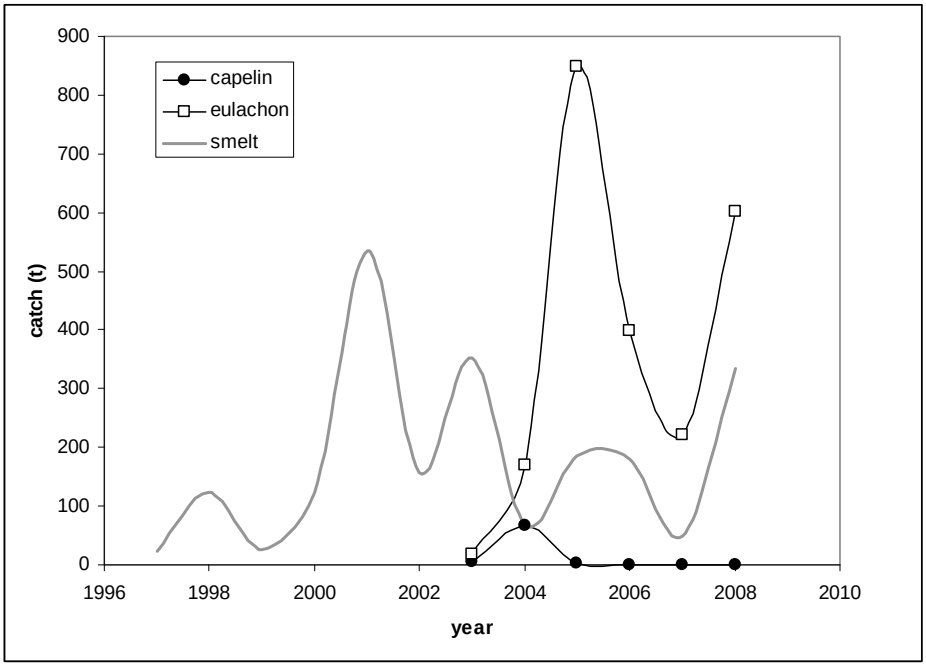


Figure 6 **Incidental catches of eulachon and capelin in the GOA, 1997-2008. Eulachon and capelin are often identified as "smelts"; consistent species identification began in 2005. Data source: AKRO Blend and CAS. (From Ormseth et al. 2008)**

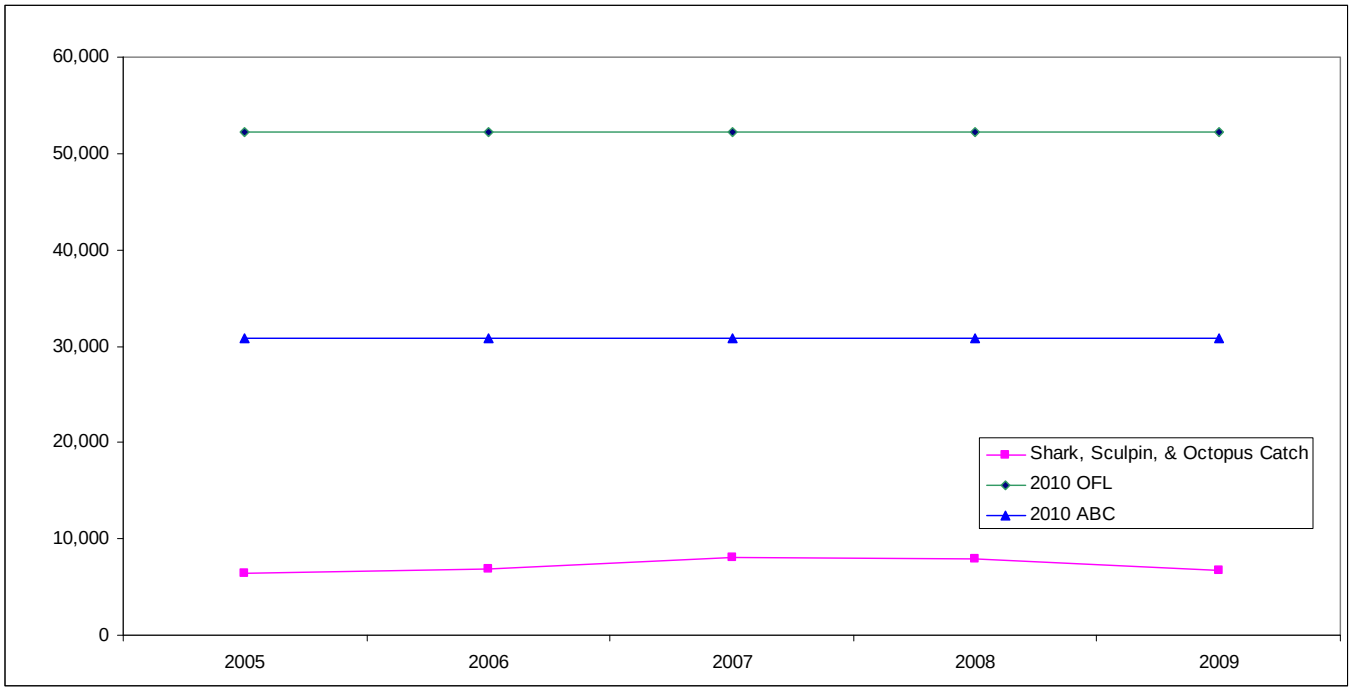


Figure 7Cumulative catch (mt) by year (2005-09) for BSAI other species

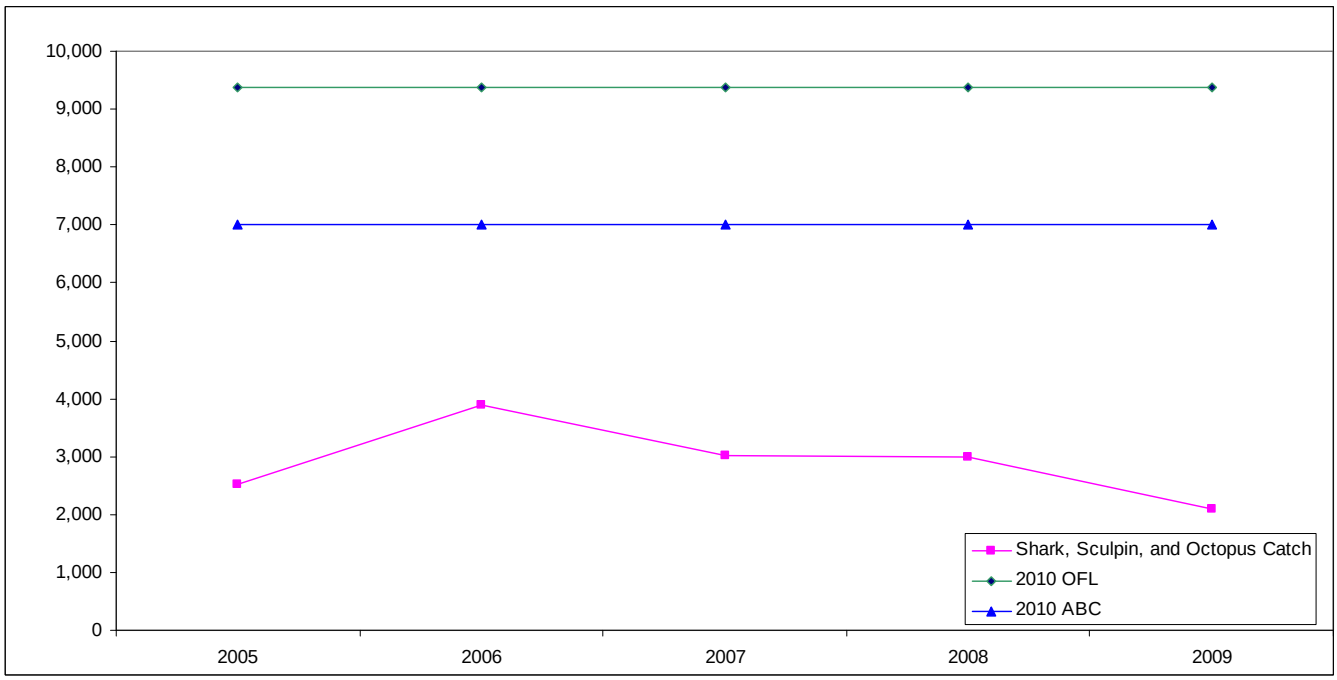


Figure 8 Cumulative catch (mt) by year (2005-09) for GOA other species

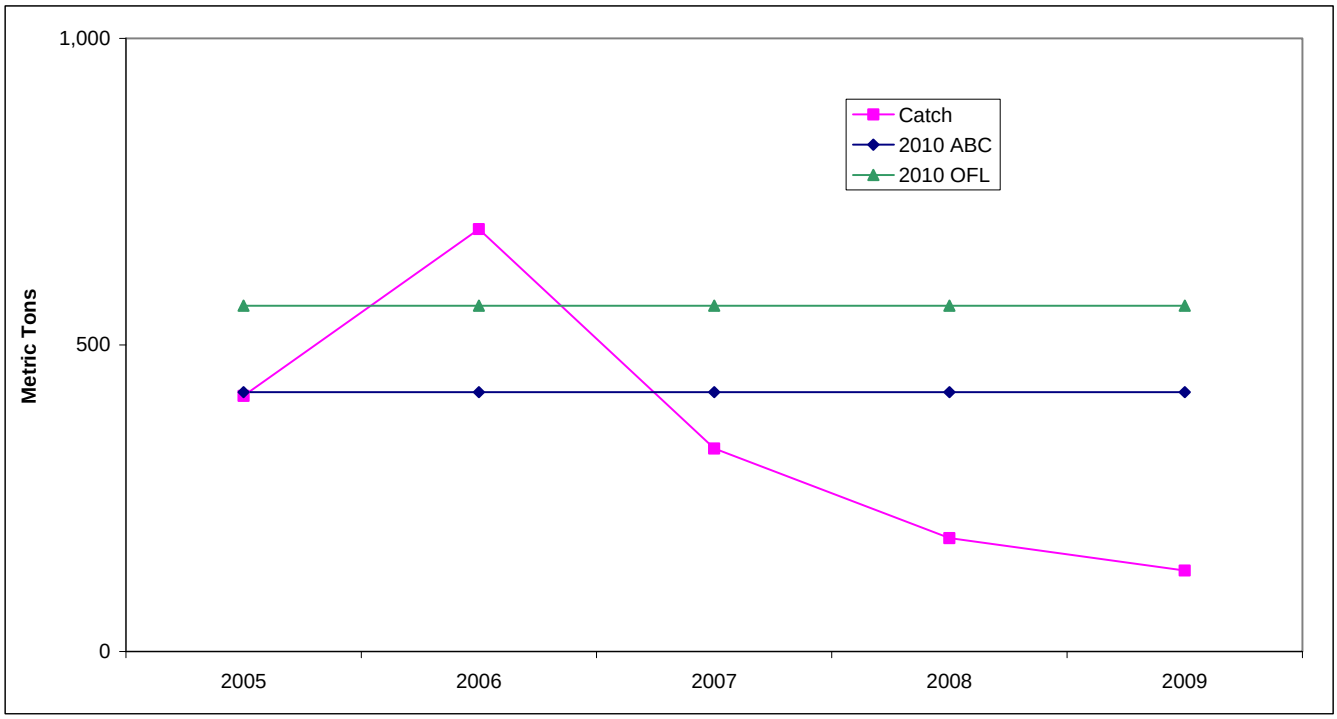


Figure 9Cumulative catch (mt) by year (2005-09) for BSAI sharks.

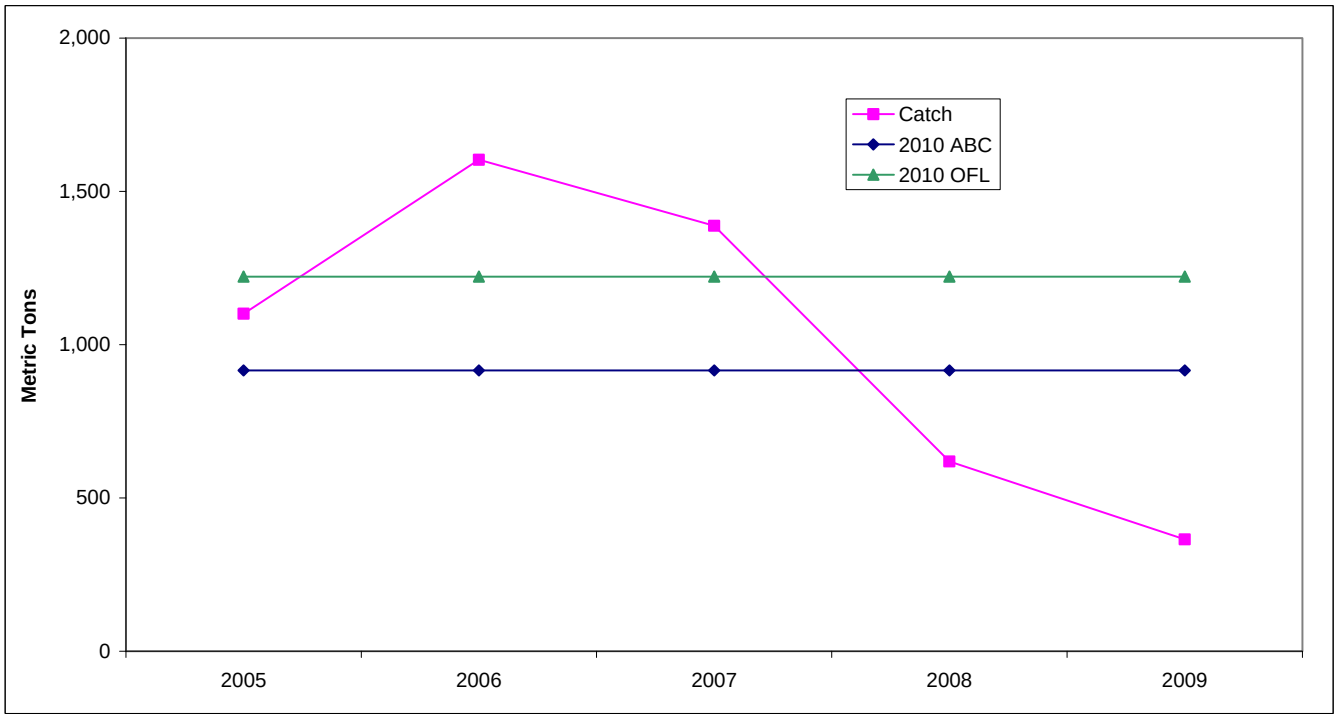


Figure 10 Cumulative catch (mt) by year (2005-09) for GOA sharks.

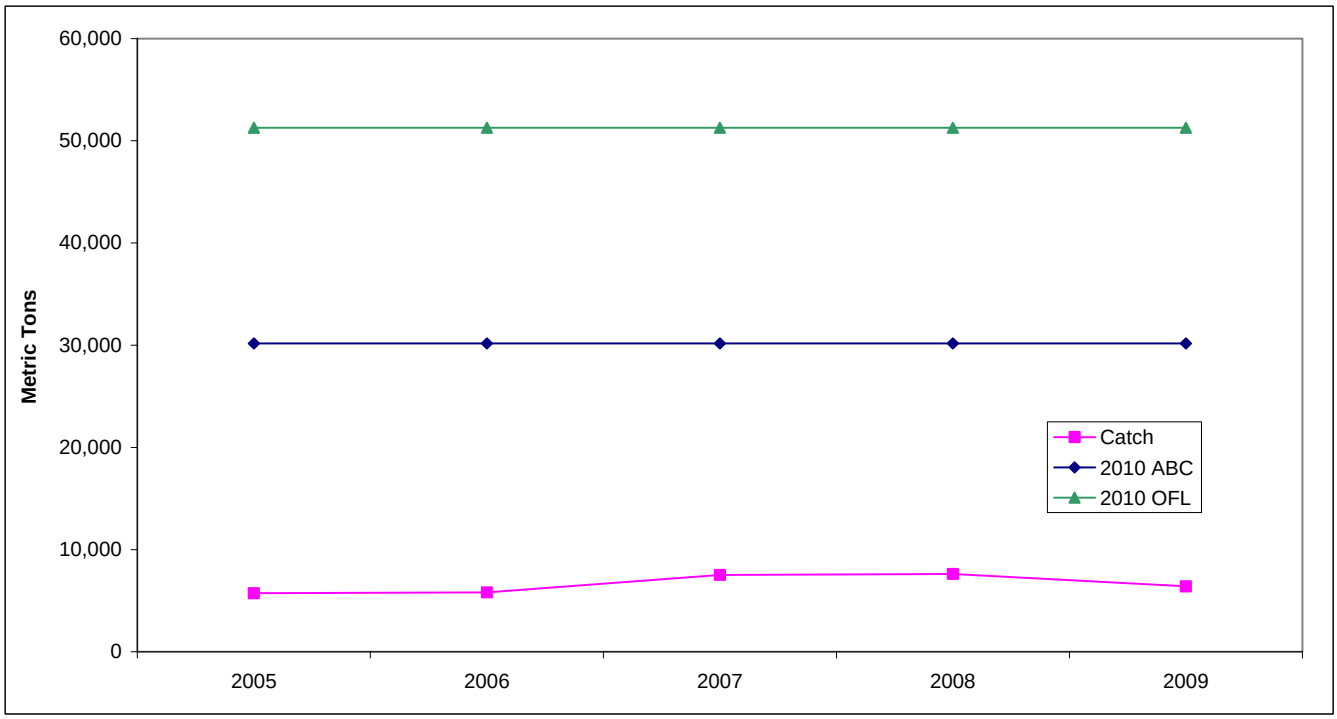


Figure 11 **Cumulative catch (mt) by year (2005-09) for BSAI sculpins.**

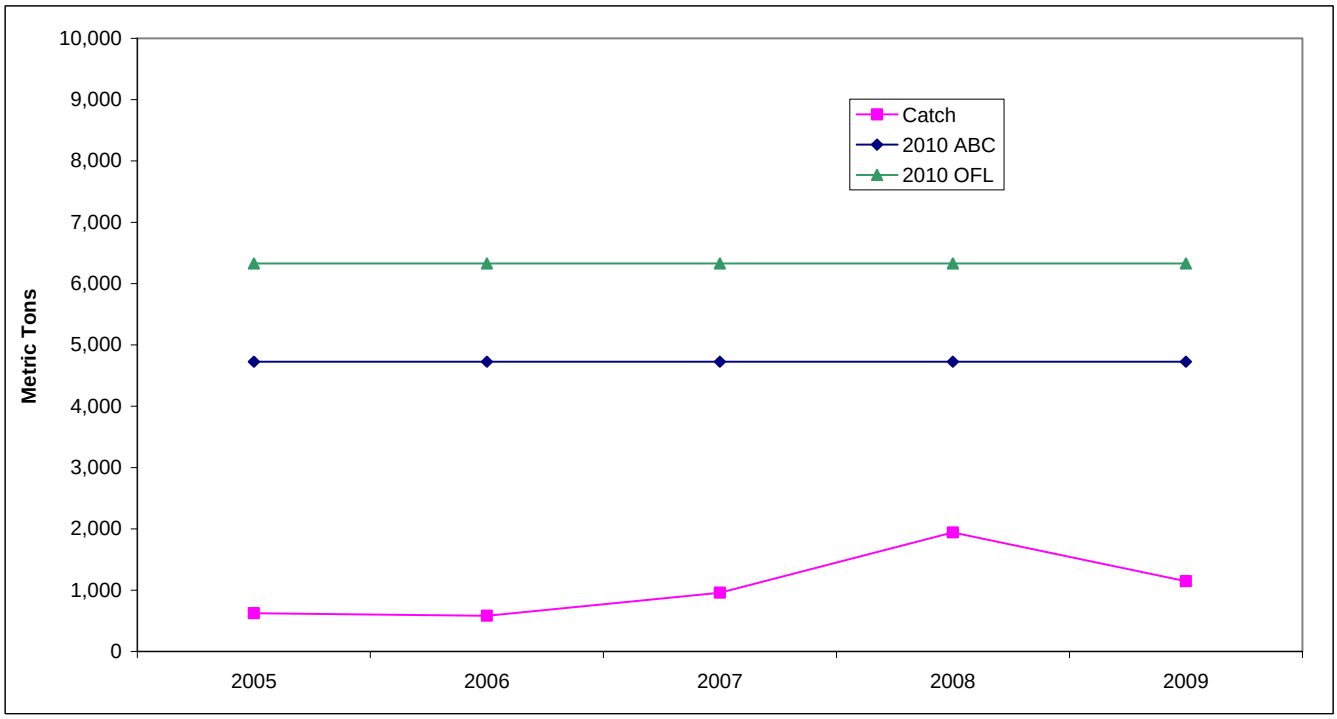


Figure 12 **Cumulative catch (mt) by year (2005-09) for GOA sculpins.**

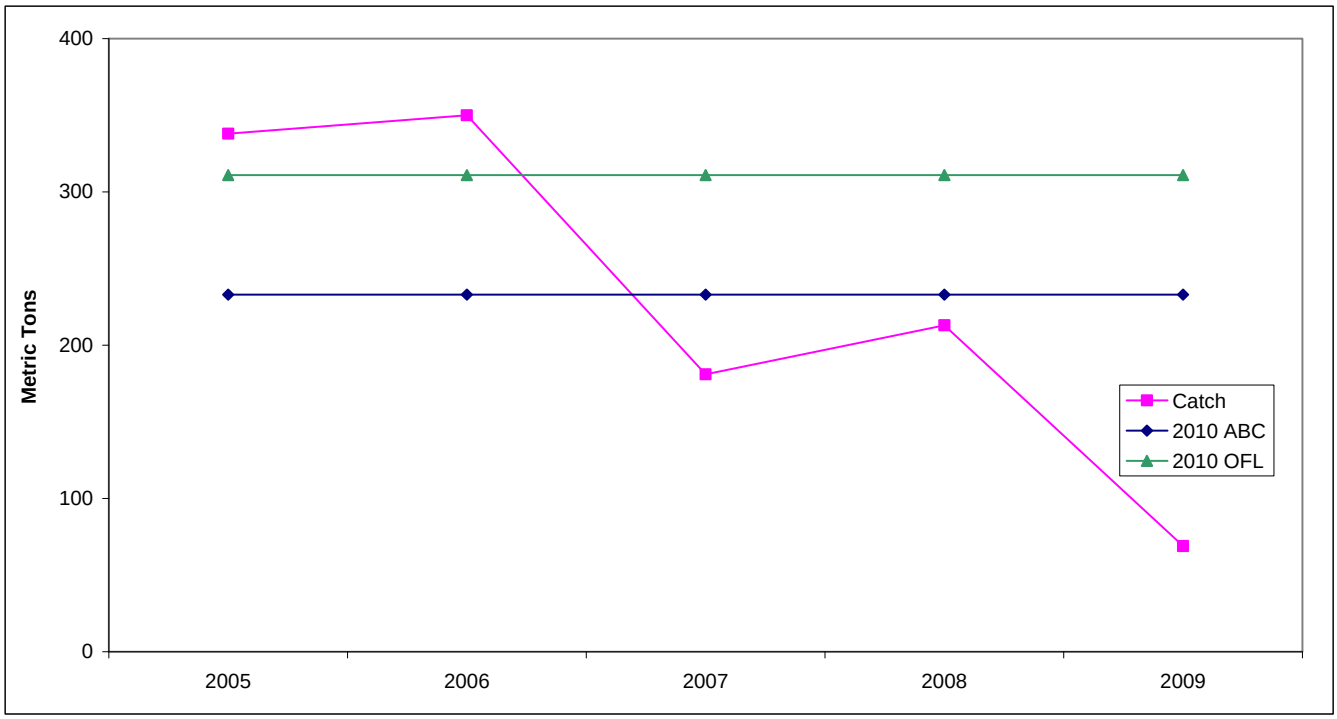


Figure 13 **Cumulative catch (mt) by year (2005-09) for BSAI octopuses.**

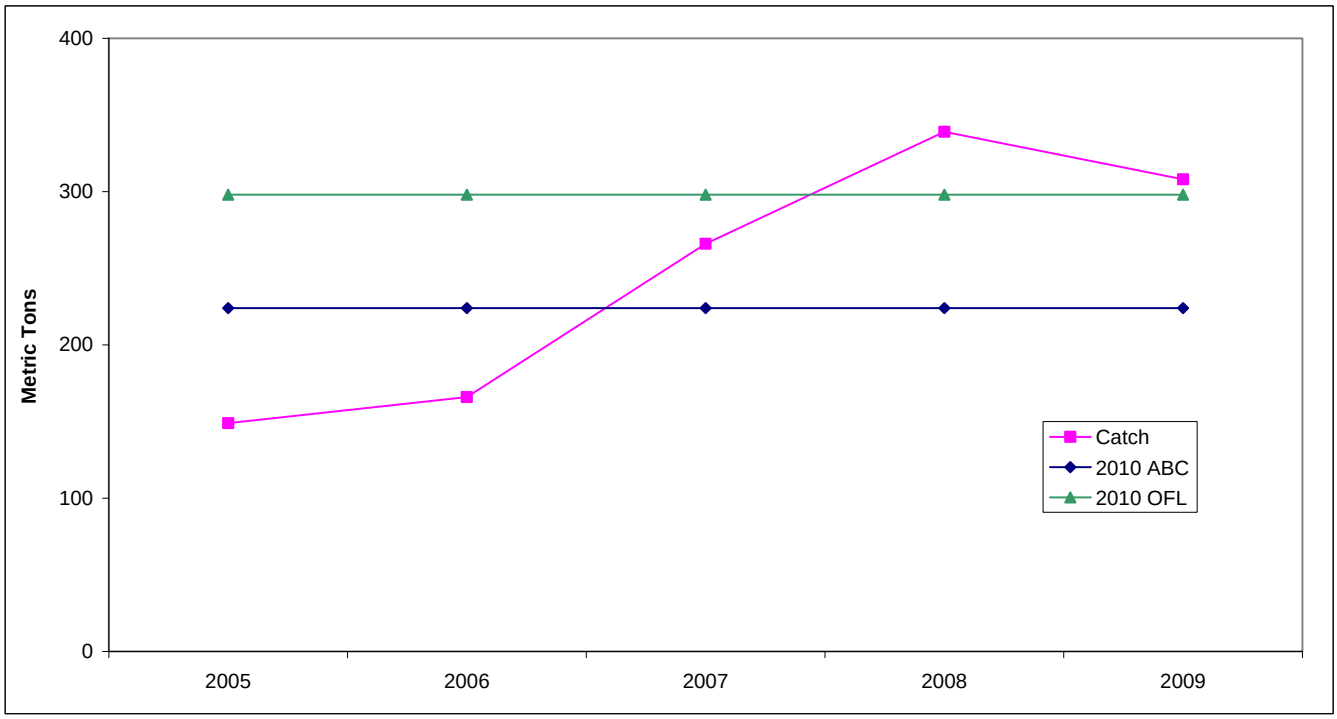


Figure 14 **Cumulative catch (mt) by year (2005-09) for GOA octopuses.**

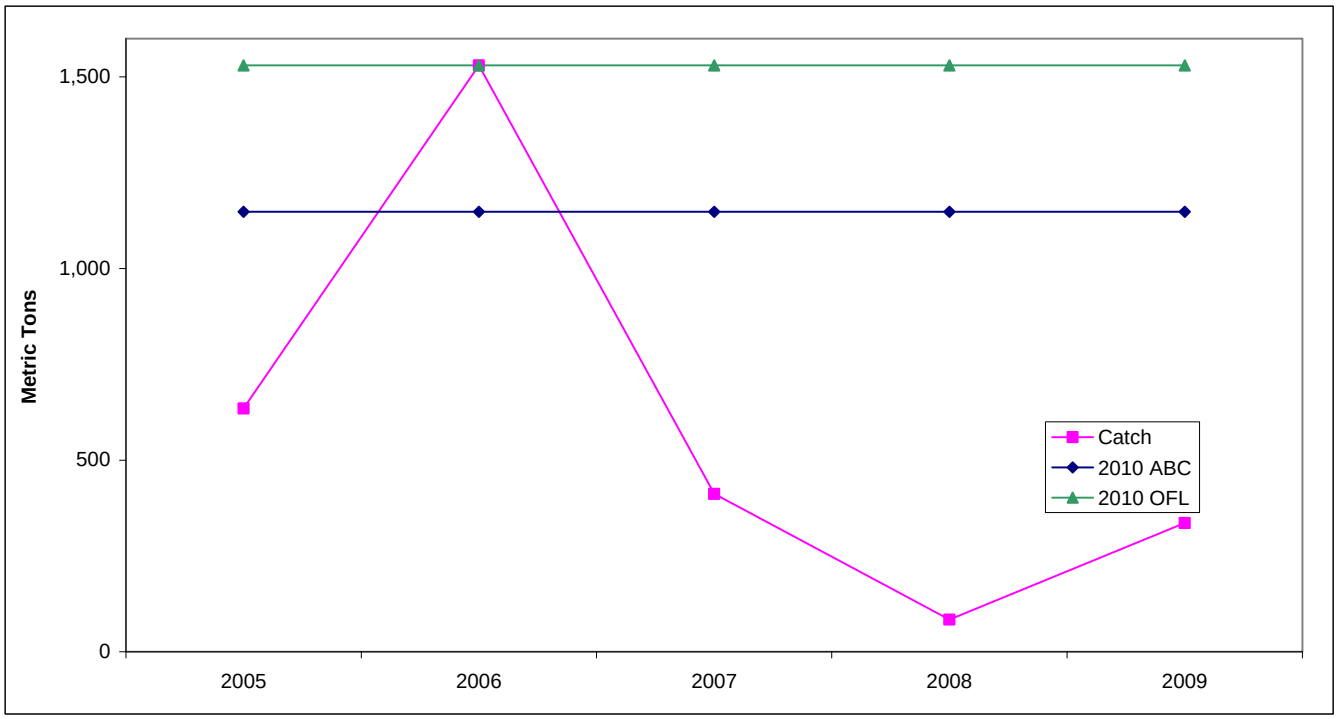


Figure 15 **Cumulative catch (mt) by year (2005-09) for GOA squids.**

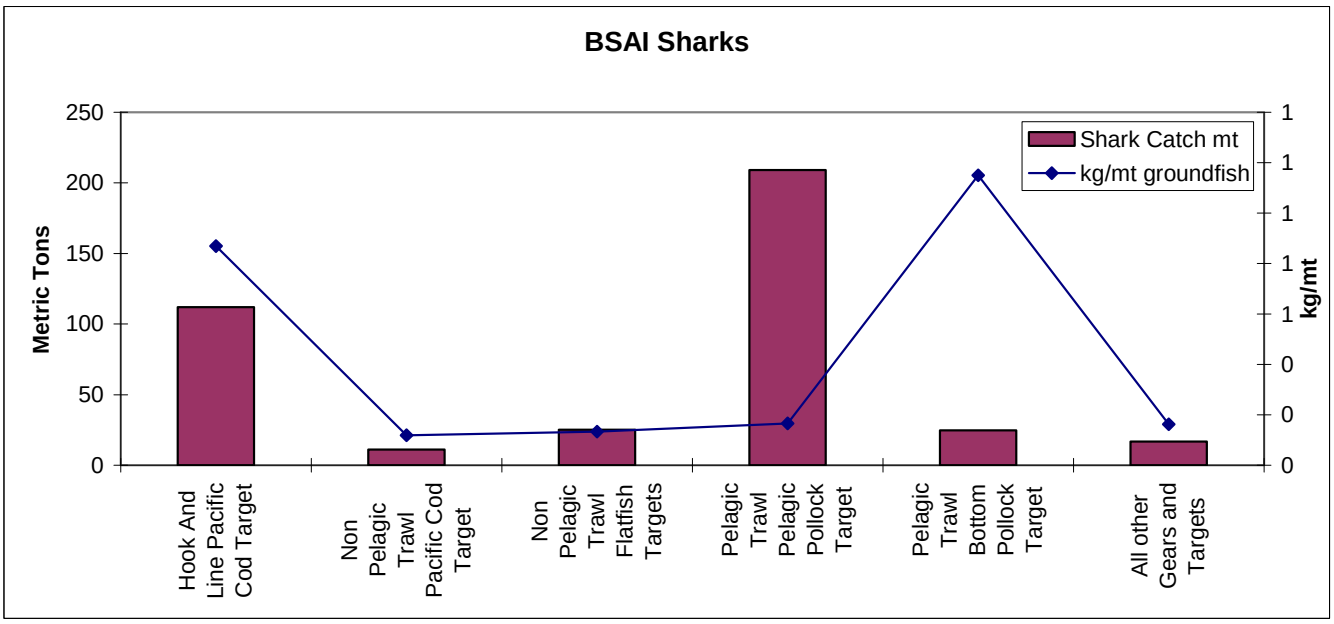


Figure 16 **Average catch (kg) of BSAI sharks (2003-09) by target fishery and gear type (mt).**

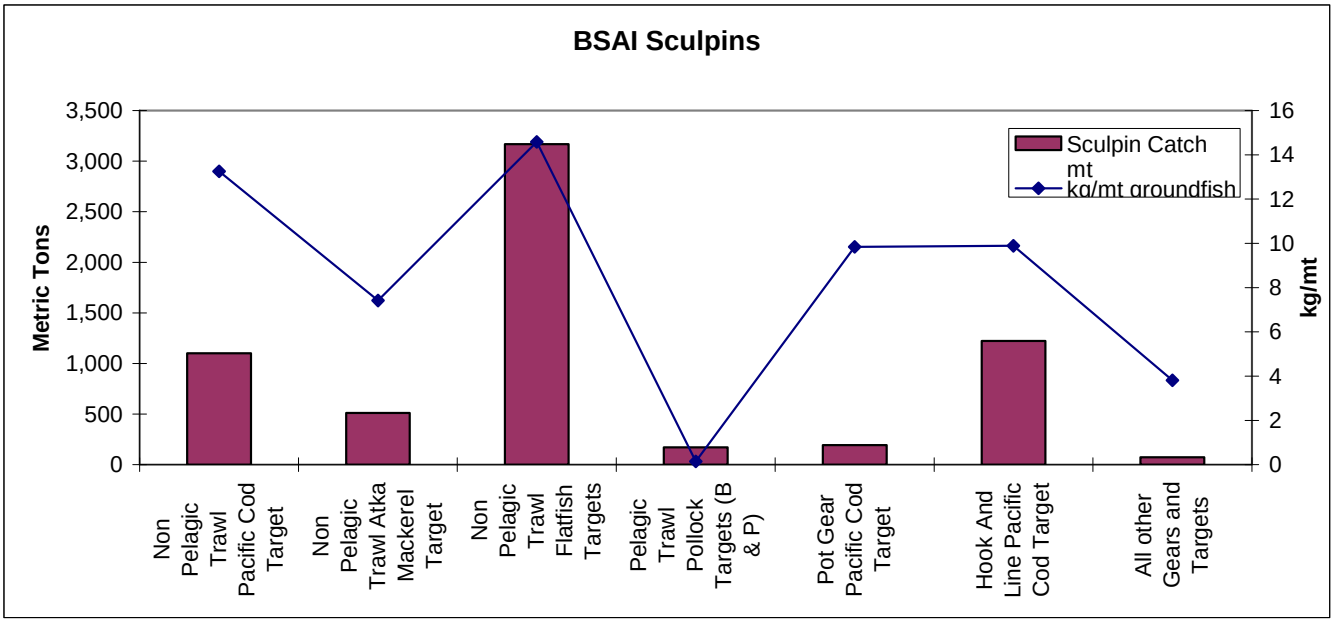


Figure 17 **Average catch (kg) of BSAI sculpins (2003-09) by target fishery and gear type (mt)**

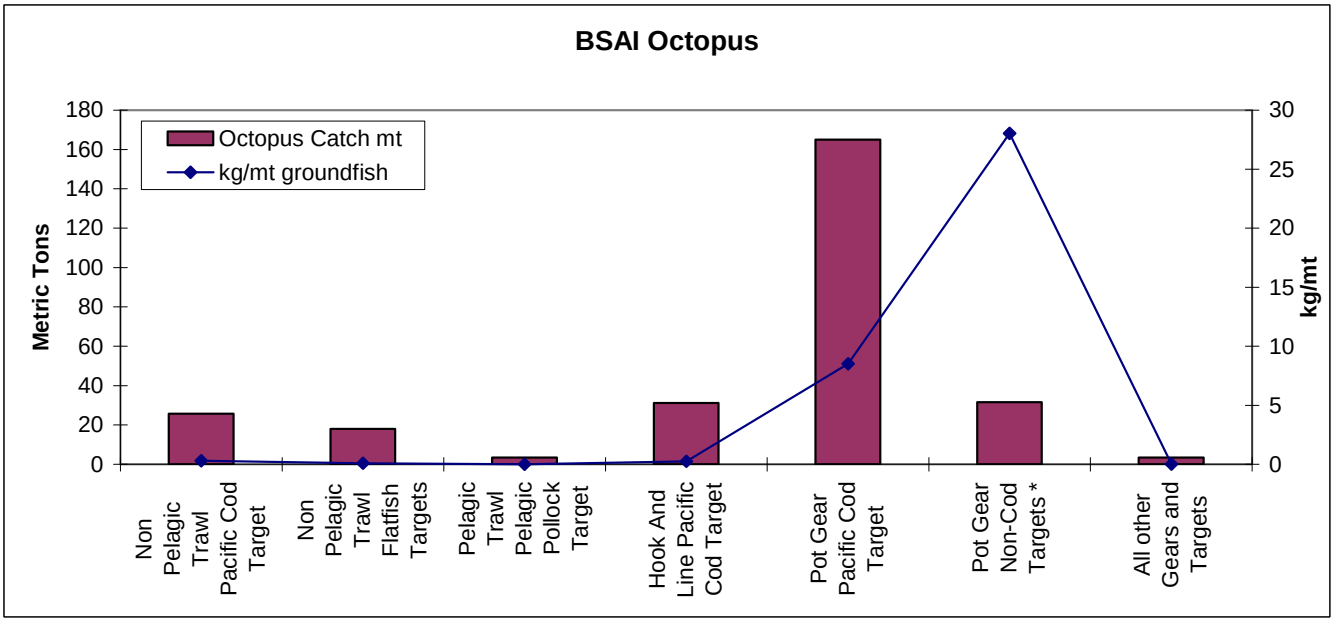


Figure 18 **Average catch (kg) of BSAI octopuses (2003-09) by target fishery and gear type (mt).**

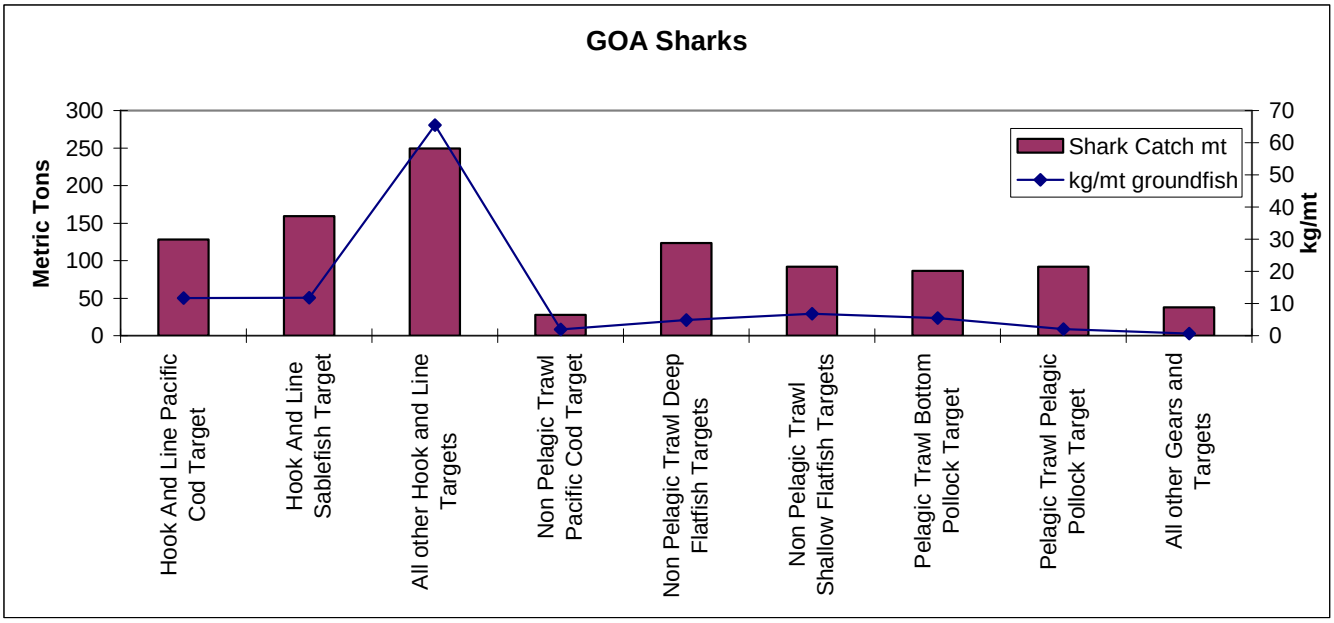


Figure 19 **Average catch (kg) of GOA sharks (2003-09) by target fishery and gear type (mt).**

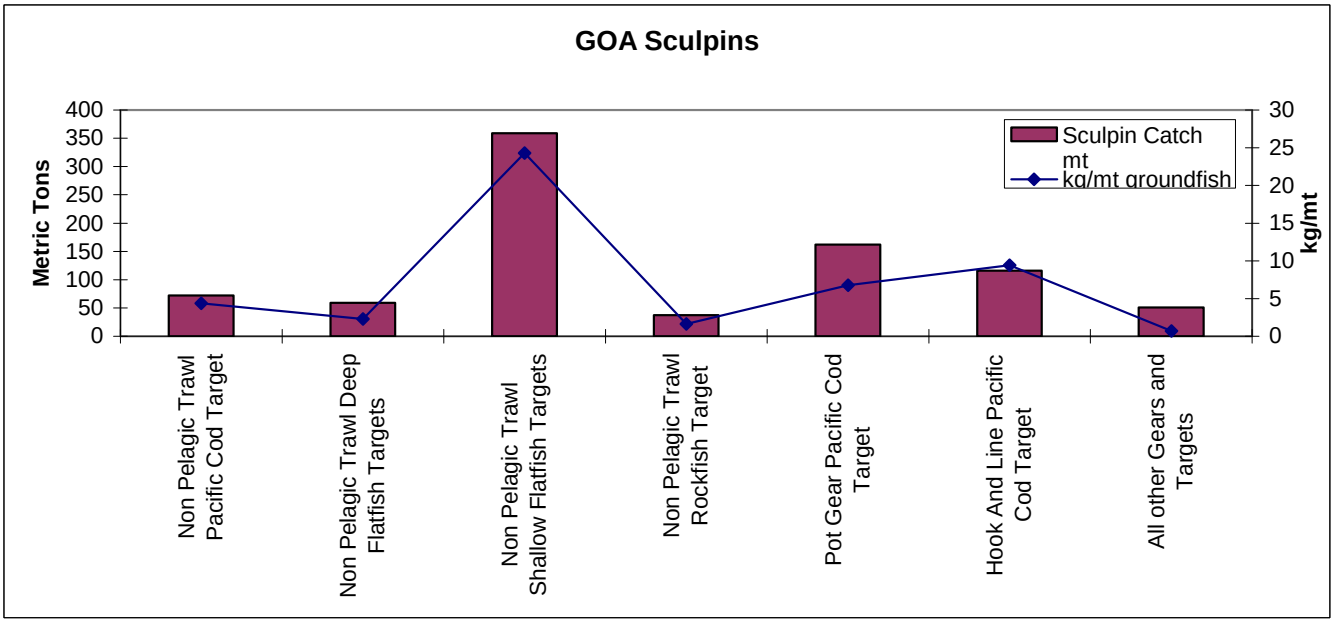


Figure 20 **Average catch (kg) of GOA sculpins (2003-09) by target fishery and gear type (mt).**

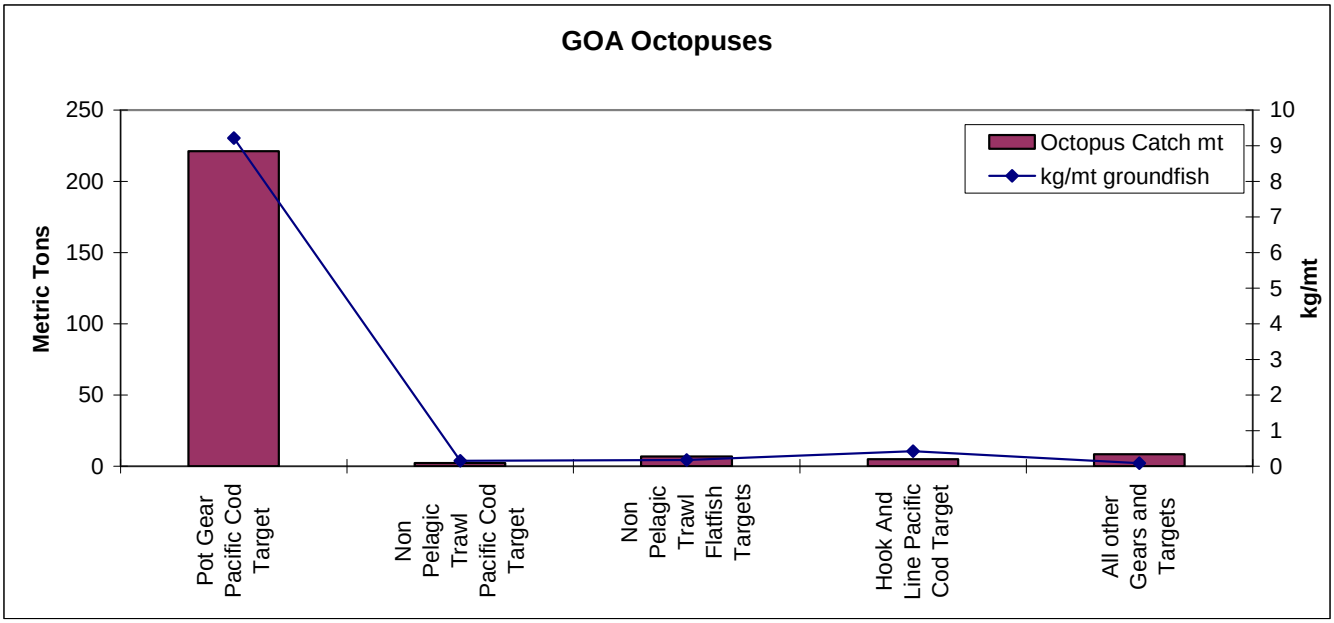


Figure 21 **Average catch (kg) of GOA octopuses (2003-09) by target fishery and gear type (mt).**

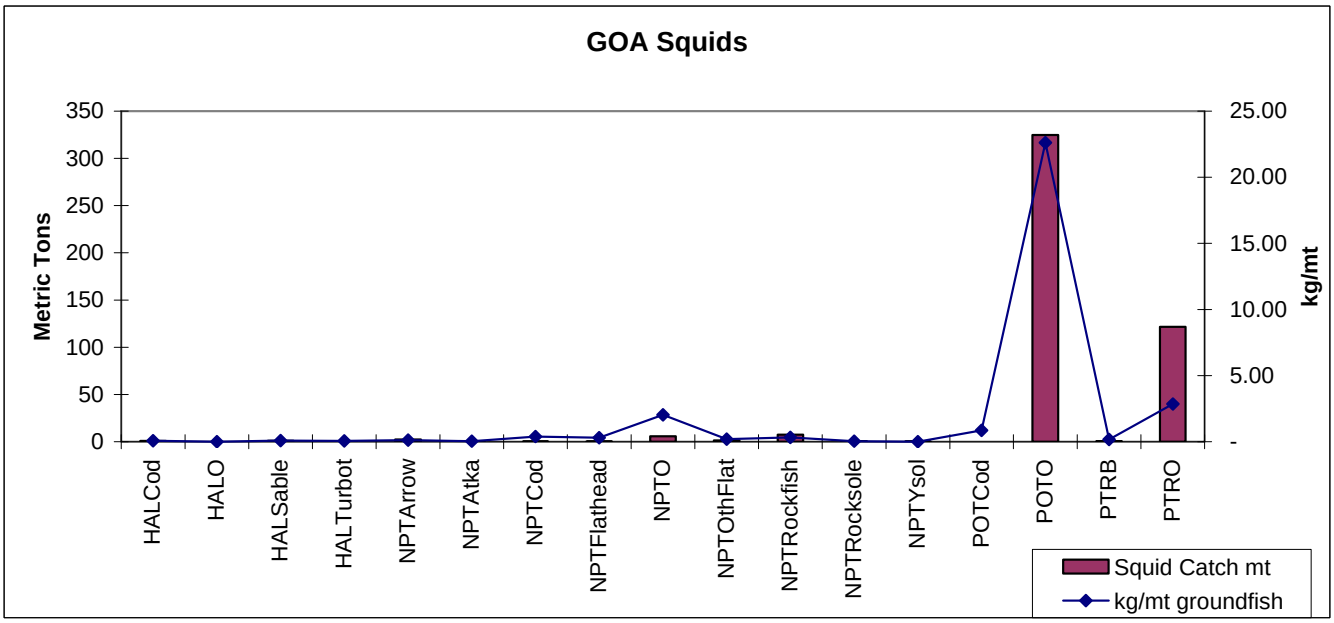
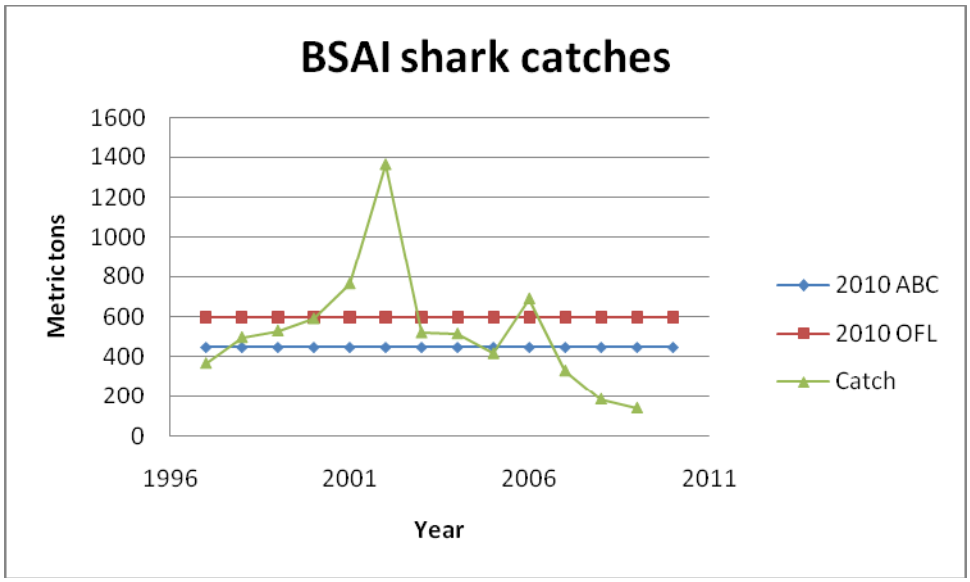
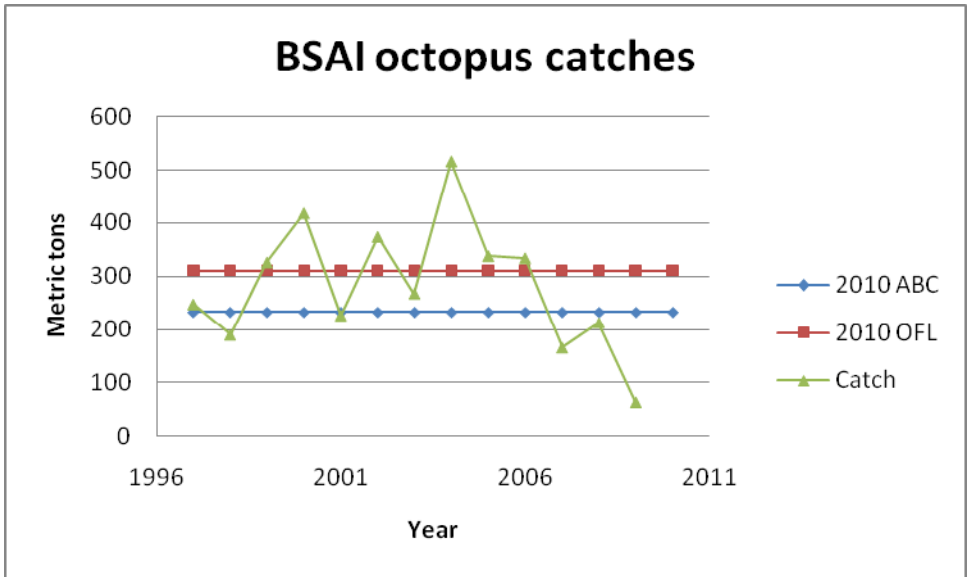


Figure 22 **Average catch (kg) of GOA squids (2003-09) by target fishery and gear type (mt).**



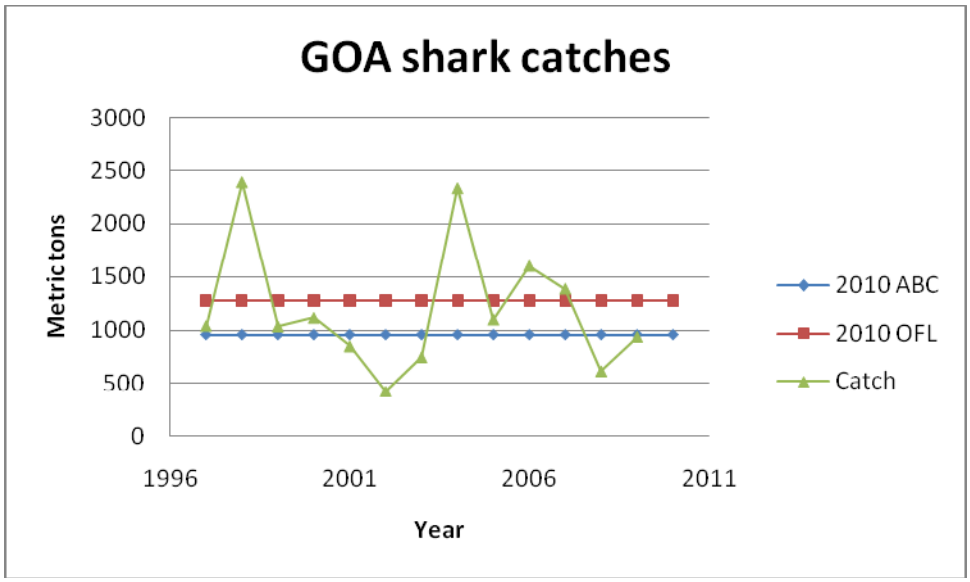
Sources: December 2009 SSC minutes; 2009 Groundfish SAFE; AKR estimate for 2009

Figure 23 Annual BSAI Shark Catches, and 2010 ABC and OFL, in Metric Tons, 1997-2010



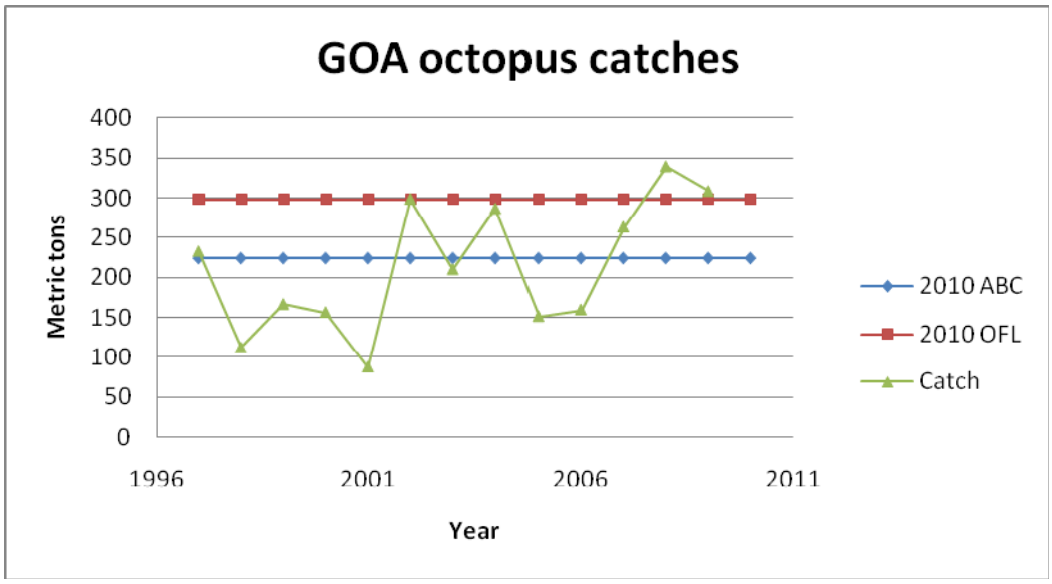
Sources: December 2009 SSC minutes; 2009 Groundfish SAFE; AKR estimates for 2008 and 2009

Figure 24 Annual BSAI Octopus Catches, and 2010 ABC and OFL, in Metric Tons, 1997-2010



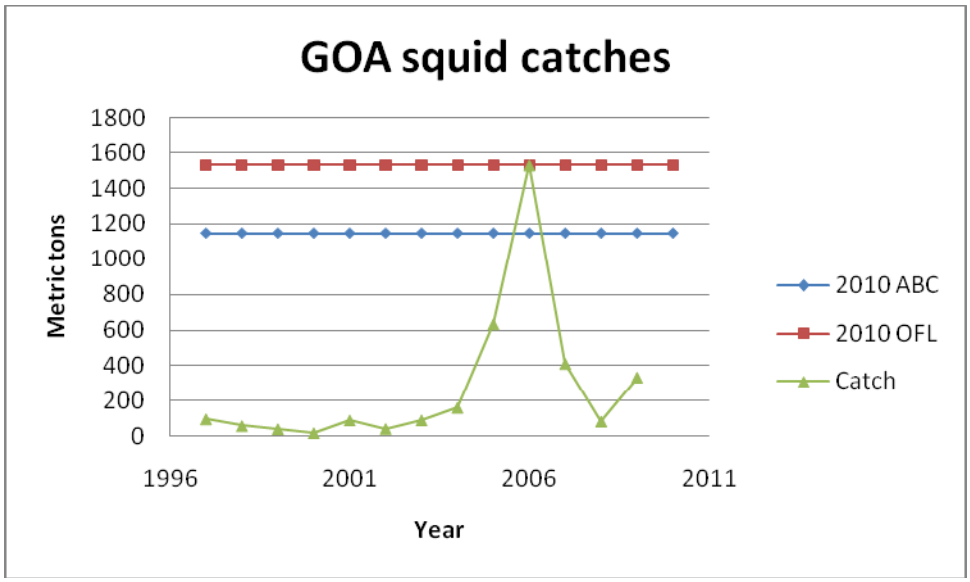
Sources: December 2009 SSC minutes; 2009 Groundfish SAFE; AKR estimate for 2009

Figure 25 Annual GOA Shark Catches, and 2010 ABC and OFL, in Metric Tons, 1997-2010



Sources: December 2009 SSC minutes; 2009 Groundfish SAFE; AKR estimate for 2009

Figure 26 Annual GOA Octopus Catches, and 2010 ABC and OFL, in Metric Tons, 1997-2010



Sources: December 2009 SSC minutes; 2009 Groundfish SAFE

Figure 27 Annual GOA Squid Catches, and 2010 ABC and OFL, in Metric Tons, 1997-2010

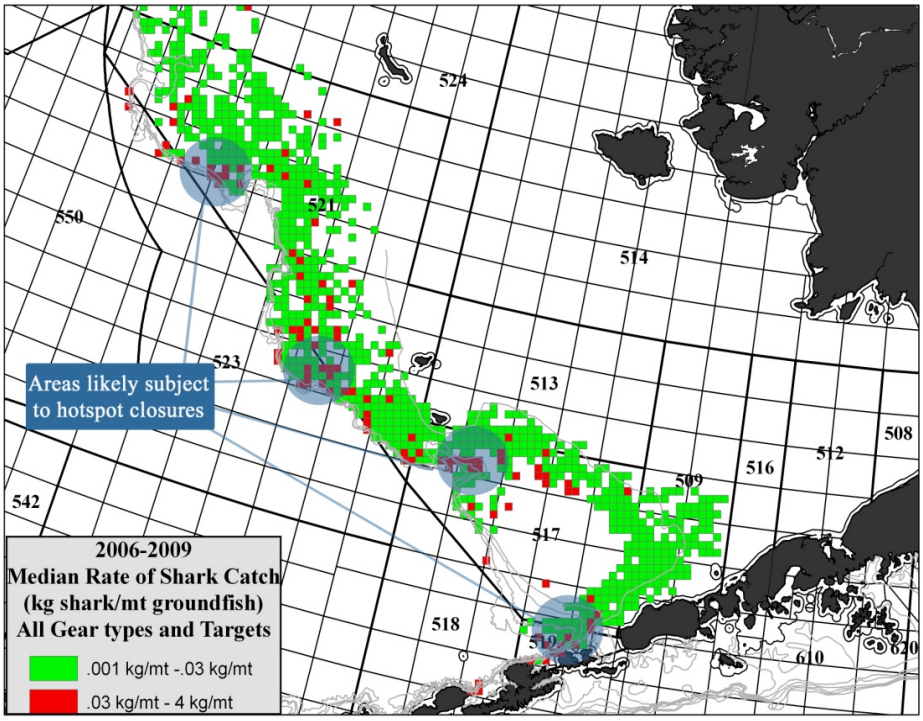


Figure 28 Distribution of Shark Incidental Catches in the BSAI, 2006-2009 (NMFS Inseason Management, May 2010)

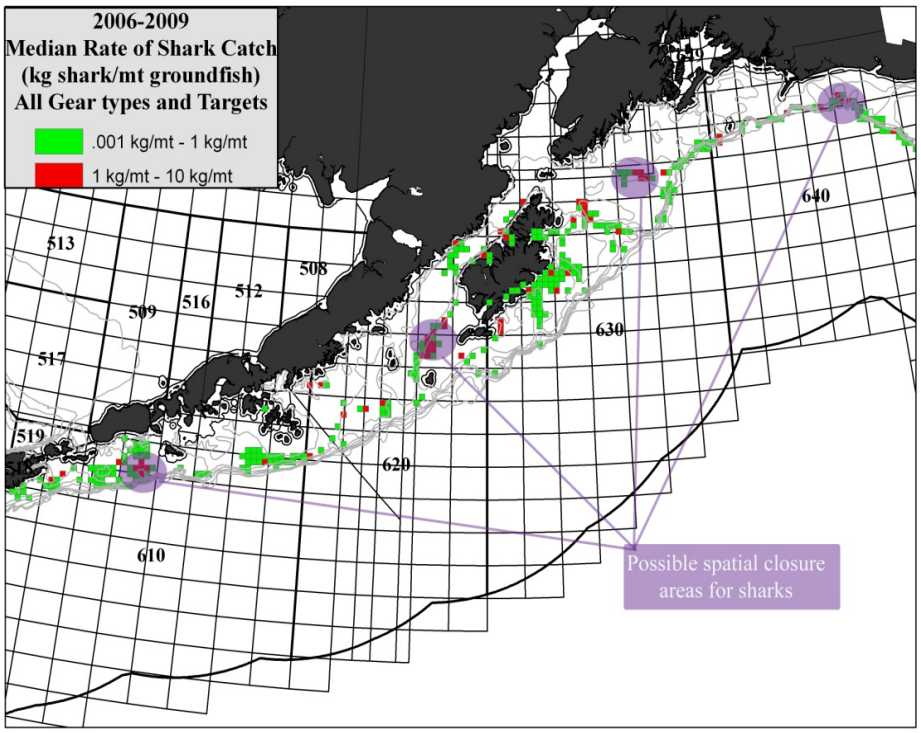


Figure 29 Distribution of Shark Incidental Catches in the GOA, 2006-2009 (NMFS Inseason Management, May 2010)

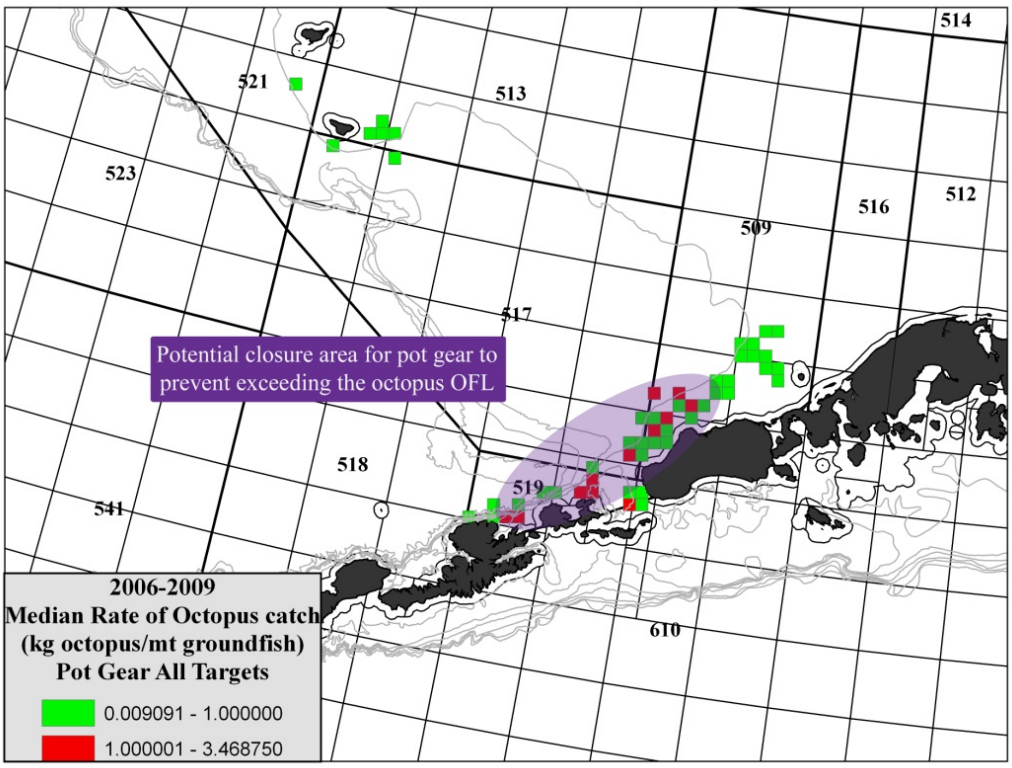


Figure 30 Distribution of Octopus Incidental Catches in the BSAI, 2006-2009 (NMFS Inseason Management, May 2010)

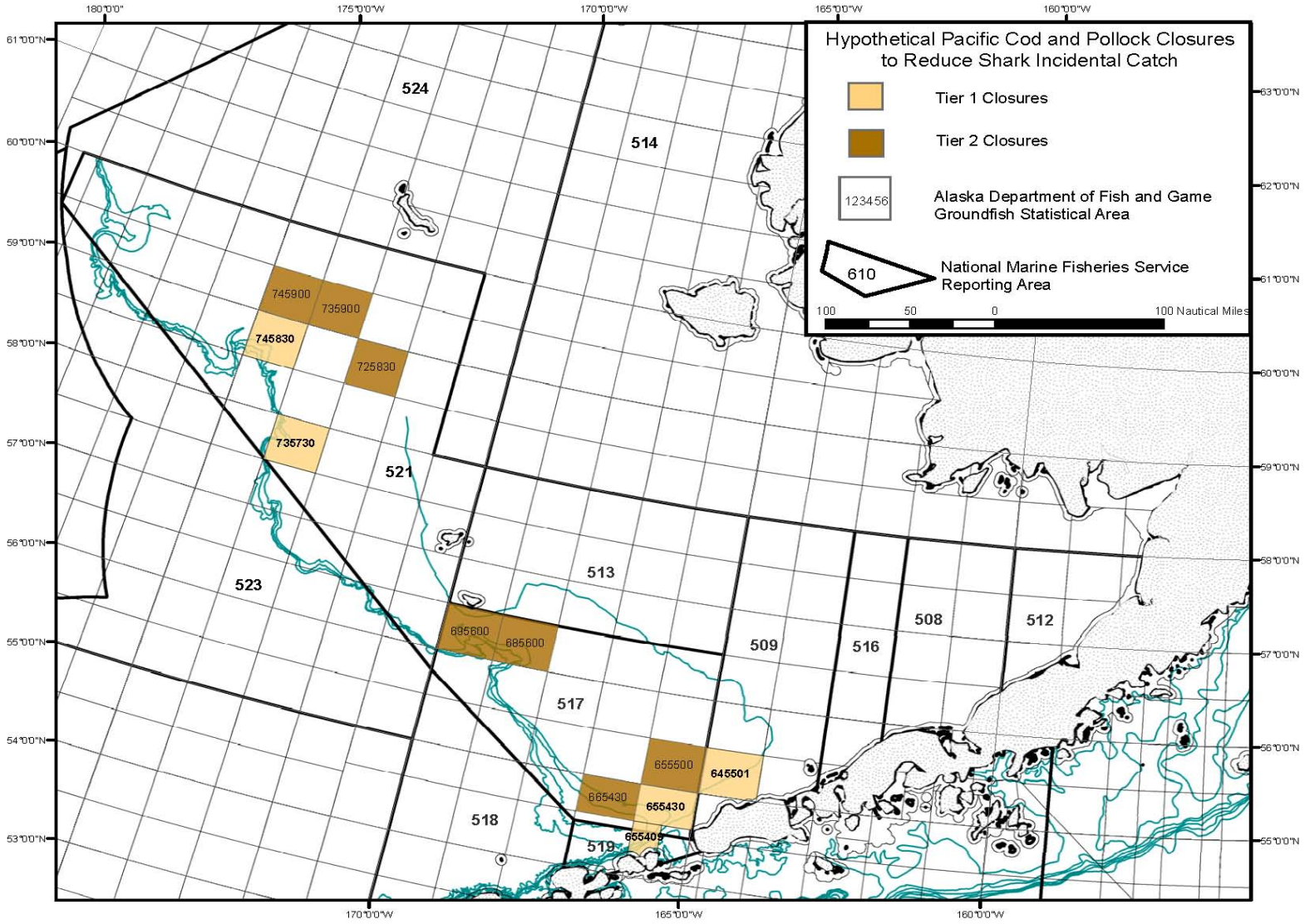


Figure 31 Hypothetical Closure of Statistical Areas to Reduce BSAI Shark Incidental Catch (NMFS Analytical Team, May 2010)

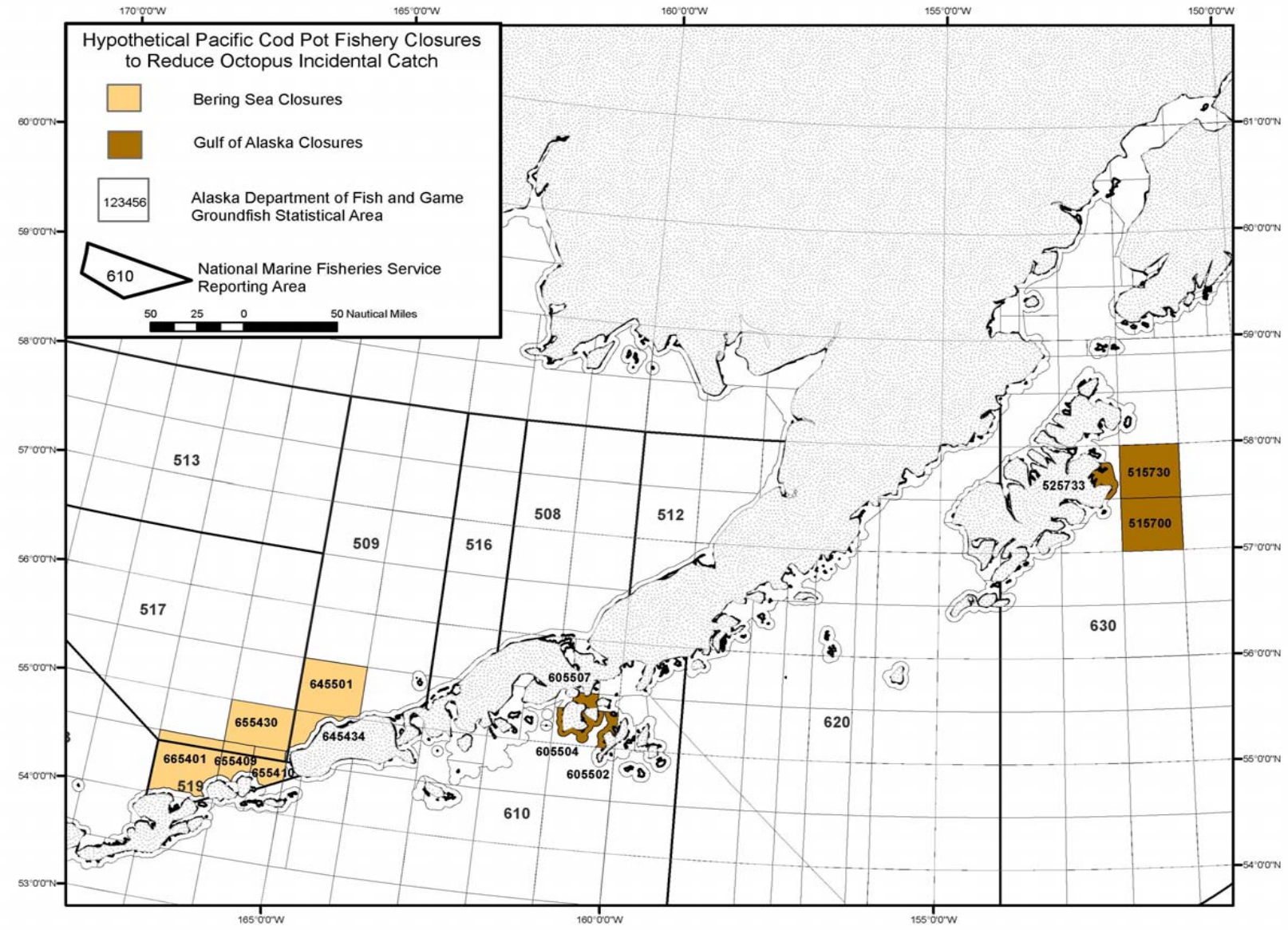


Figure 32 Hypothetical Closure of Statistical Areas to Reduce BSAI and GOA Octopus Incidental Catch
(NMFS Analytical Team, May 2010)

9.0 APPENDIX A HOUSEKEEPING CHANGES TO THE BSAI AND GOA GROUNDFISH FMPS

Six housekeeping changes are proposed for inclusion in Amendments 96/87 to the BSAI and GOA groundfish FMPs. All changes to the FMPs, even minor typographical changes, require an FMP amendment that is recommended by the Council and approved by the Secretary. The proposed changes are not substantive, but incorporate into the FMP text that describes current practices for harvest specifications development and fisheries management. These changes to the FMP have no effect on the human environment and are considered administrative changes to the FMP. NOAA Administrative Order 216-6 allows for categorical exclusions from NEPA analysis for minor technical additions, corrections, or changes to an FMP (section 603d.4(b)). Because these housekeeping amendments would not result in changes to the implementation of the fisheries management program, but only provide descriptive text for current practices, these proposed changes to the FMPs are considered minor technical additions and therefore, no further NEPA analysis is required for these additions to the FMPs.

The housekeeping amendments would add text to the FMPs to describe:

1. Specification of Minimum Stock Size Thresholds (MSSTs) or a reasonable proxy.

In 50 CFR 600.310(e)(2)(ii)(B) the MSST or reasonable proxy must be specified in terms of spawning biomass or other measure of reproductive potential. This description is currently incorporated into the annual groundfish Stock Assessment and Fishery Evaluation (SAFE) reports. The MSSTs are defined in the National Standard 1 guidelines as the level of biomass below which the stock or stock complex is considered to be overfished. Any stock that is expected to fall below its MSST in the next two years is approaching an overfished condition. The groundfish FMPs would be amended to provide a definition for MSST that to the extent possible, the MSST should equal whichever of the following is greater: one-half the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years, if the stock or stock complex were exploited at the maximum fishing mortality threshold. The specifications of MSST would be described in the section of the FMPs titled Determination of Overfished Status.

2. Measures that are taken if and when a stock drops below MSST.

50 CFR § 600.310(e)(2)(iii)(A)-(B) requires that fishing mortality be constrained if environmental conditions cause a stock to fall below MSST without affecting its long-term reproductive potential or to respecify status determination criteria (SDC) if the long-term reproductive potential is affected. Section 600.310(j)(2)(ii)(B) requires ACLs and AMs to end overfishing immediately. Text would be added to the FMPs so that if a stock is determined to be in an overfished condition, a rebuilding plan consistent with Section 304(e) of the MSA would be developed and implemented for the stock, including the determination of F_{OFL} and F_{MSY} that will rebuild the stock within an appropriate time frame.

Whether a stock is experiencing overfishing is an ongoing evaluation and a management response will occur when needed. The amendment language would fully describe the inseason fisheries management activities for monitoring and controlling harvests to ensure the TACs are not exceeded and preventing overfishing in the short term and in the long term preventing the stock biomass from dropping below MSST or its proxy.

Section 3.8.1 of the BSAI Groundfish FMP and Section 3.8.2.1 of the GOA Groundfish FMP (NPFMC 2009a and 2009b) describe the inseason management actions that can be taken by the Regional Administrator to prevent overfishing. The Regional Administrator is constrained, however, in his or her choice of management responses to prevent potential overfishing by having to first consider the least restrictive adjustments to conserve the resource. The order in which the Regional Administrator must consider inseason adjustments to prevent overfishing are specified as: 1) any gear modification that would protect the species in need of conservation protection, but that would still allow fisheries to continue for other species; 2) a time or area closure that would allow fisheries for other species to continue in non-critical areas and time periods; and 3) total closure of the management area and season.

3. Accountability measures that are triggered if an ACL (ABC) is exceeded;

50CFR §§ 600.310(f)(5)(i) requires that a multiyear plan must provide that, if an ACL is exceeded for a year, then AMs are triggered for the next year consistent with paragraph (g)(3) of this section.. Section 600.310(g)(3) requires that on an annual basis, the Council must determine as soon as possible after the fishing year if an ACL was exceeded. AMs must be triggered and implemented as soon as possible to correct the operational issue that caused the ACL overage, as well as any biological consequences to the stock or stock complex resulting from the overage when it is known.

The groundfish FMPs would be amended to reference the current in-season management system which has a more timely response than what would occur in the following year, as required under the guidelines.

4. Ecological factors that are considered by the Council in reducing Optimum Yield from Maximum Sustainable Yield.

50 C.F.R. § 600.310(e)(3)(iv) requires that even where quantification of social, economic, and ecological factors is not possible, the FMPs still must address them in their OY specifications. The Council is constrained in the OY specification for the BSAI Groundfish FMP by the statutory requirement that OY shall not exceed 2 million mt (2004 Consolidated Appropriations Act). The OY may be adjusted downward for the BSAI groundfish fisheries. The amendments to the groundfish FMPs would describe the location in the FMPs of the description of ecological factors that may be considered in the adjustment of OY from MSY. For example, Section 4.6 in the GOA FMP describes the ecosystem consideration for management of the groundfish fisheries and the ongoing consideration of this information in the development of the SAFE reports. Section 4.6.2 and 4.6.3 of the GOA Groundfish FMP (NPFMC 2009b) describes climate implicated changes and ecosystem interactions that may be considered an ecological factor that may affect the setting of OY. These sections can be referenced in Section 3.2.3, where the optimum yield for the groundfish complex is described. A similar reference would be added to the BSAI Groundfish FMP.

5. How the tier levels for Acceptable Biological Catch (ABC) and Overfishing Level (OFL) are based on the scientific knowledge about the stock/complex and the scientific uncertainty in the estimate of OFL and any other scientific uncertainty.

50 C.F.R. § 600.310(f)(4) requires that the ABC control rule must articulate how ABC will be set compared to the OFL based on the scientific knowledge about the stock or stock complex and the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. The FMP amendments would describe how the Tier levels for ABC and OFL are based on scientific knowledge about the stock or stock complex and on the scientific uncertainty in the estimate of OFL and any other scientific uncertainty.

The control rule used for setting specifications for target groundfish is intended to account for scientific uncertainty in two ways. First, the control rule is structured explicitly in terms of the type of information available, which is related qualitatively to the amount of scientific uncertainty. Second, the size of the buffer between the maximum fishing mortality rate (maxF) and ABC in Tier 1 of the ABC control rule and F and OFL in Tier 1 of the OFL control rule varies directly with the amount of scientific uncertainty. For the information levels associated with the remaining tiers, relating the buffer between maxF/ABC and F/OFL to the amount of scientific uncertainty is more difficult because the amount of scientific uncertainty is harder to quantify, so buffers of fixed size are used instead.

For Tiers 2-6, the buffer between OFL and ABC established by the ABC control rule is explicitly based on the quantity and type of scientific information about the stock. The risk of overfishing due to scientific uncertainty in the estimate of OFL is arguably reduced by this buffer. This buffer is set at a constant level for all stocks within a tier, irrespective of the amount of uncertainty in the estimate of OFL.

6. How the stock assessments account for all catch

50 C.F.R. § 600.310(e)(3)(v)(C) requires that all catch must be counted against OY, including that resulting from bycatch, scientific research, and all fishing activities. The FMP would be amended to include the accounting for all commercial and research catch in the annual stock assessment process. All types of catch, including bait, state waters, and research catch (scientific research permits, letters of acknowledgement and exempted fishing permits), are estimated each year and provided to the stock assessment authors for use in stock assessment models for recommending OFLs and ABCs for the following year. This will ensure that all catch is accounted for in the stock assessment process and will result in OFLs and ABCs that take into account all types of harvests.

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Mbrown: 5/10/10
Gaberle: 5/12/10
Cjernigan: 5/27/10
Bmuse: 6/1/10, 6/4/10, 6/10/10
Cried: 7/5/10

Finding of No Significant Impact for the Environmental Assessments for Amendments 95 and 96 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and Amendment 87 to the Fishery Management Plan for Groundfish of the Gulf of Alaska

September 2010

One of the purposes of an environmental assessment is to provide the evidence and analysis necessary to decide whether an agency must prepare an environmental impact statement (EIS). The Finding of No Significant Impact (FONSI) is the decision maker's determination that the action will not result in significant impacts to the human environment, and therefore, further analysis in an EIS is not needed. The Council on Environmental Quality regulations at 40 CFR 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." An action must be evaluated at different spatial scales and settings to determine the context of the action. Intensity is evaluated with respect to the nature of impacts and the resources or environmental components affected by the action. NOAA Administrative Order (NAO) 216-6 provides guidance on the National Environmental Policy Act (NEPA) specifically to line agencies within NOAA. It specifies the definition of significance in the fishery management context by listing criteria that should be used to test the significance of fishery management actions (NAO 216-6 §§ 6.01 and 6.02). These factors form the basis of the analysis presented in the environmental assessments (EAs) for this action. The results of these analyses are summarized here for those criteria. Alternative 3 for Amendment 95 and Alternative 2 for Amendments 96 and 87 are the preferred alternatives for this proposed action.

Context: For this action, the setting is the Bering Sea and Aleutian Islands Management Area and the Gulf of Alaska. Any effects of this action are limited to this area. The effects of this action on society within this area are on individuals directly and indirectly participating in the Federal Alaska groundfish fisheries and on those who use the ocean resources. Because this action concerns the use of a present and future resource, this action may have impacts on society as a whole or regionally.

Intensity: Considerations to determine intensity of the impacts are set forth 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 NMFS Instruction 30-124-1 dated July 22, 2005, Guidelines for Preparation of a FONSI. The sections of the EAs that address the considerations are identified.

1) Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?

(Amendment 95 EA Section 1.4.1, Amendment 96/87 EA Section 1.3.2.1.2). No. No significant adverse impacts on target species were identified for the preferred alternatives in the EAs. This action would improve the sustainable management of the species groups (octopus, shark, skate, sculpin, and squid) that are currently managed in aggregate under the "other species category." A species group currently in the other species category could be harvested up to the total allowable catch (TAC) for the entire other species category, which could result in overfishing of a single group, even though the TAC for the other species category was not exceeded. By removing the other species category from the FMPs, each group would be managed separately to ensure overfishing does not occur.

2) *Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?*

(Amendment 95 EA Section 1.4.4 and Amendments 96/87 EA Sections 1.3.3.1.1 and 1.3.4). No. Potential effects of the alternatives on non-target/prohibited species were expected to be insignificant and similar to status quo because no overall harvest changes to target species were expected that may impact non-target species. Because no overall changes in target species harvests under the alternatives are expected to impact non-target species, the alternatives are not likely to jeopardize the sustainability of any non-target species.

3) *Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in the fishery management plans (FMPs)?*

(Amendment 95 EA Section 1.4.5 and Amendments 96/87 EA Sections 1.3.7). No. No significant adverse impacts were identified for the alternatives on ocean or coastal habitats or EFH. The alternatives would not affect the current habitat protection measures implemented for the groundfish fisheries and would not change fishing in a manner that would impact EFH or coastal habitat beyond those effects already considered and analyzed for the groundfish fisheries.

4) *Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?*

(Amendment 95 EA Section 1.1 and Amendments 96/87 EA Section 1.1). No. Public health and safety will not be affected in any way not evaluated under previous actions or disproportionately as a result of the proposed action. The proposed action will not change fishing methods (including gear types), timing of fishing, or quota assignments to gear groups, which are based on previously established seasons and allocation formulas in regulations.

5) *Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?*

(Amendment 95 EA Section 1.4.5 and Amendments 96/87 EA Sections 1.3.5 and 1.3.6). No. This action would not change fishing practices in a manner that would adversely affect endangered or threatened species, marine mammals, or critical habitat for these species. This action is more likely to be protective of prey resources for some marine mammals as the potential to overfish for some prey species is reduced with improved management of groups in the other species category.

6) *Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?*

(Amendment 95 EA Section 1.4.5 and Amendments 96/87 EA Section 1.4.2). No significant adverse impacts on biodiversity or ecosystem function were identified for this action. The alternatives would provide protection to biodiversity and ecosystem function by improving the sustainable management of species groups that are currently managed in aggregate in the other species category. This action would reduce the potential for overfishing these species group which would reduce the potential for impacts on biodiversity or ecosystem function.

7) *Are significant social or economic impacts interrelated with natural or physical environmental effects?*

(Amendment 95 EA Sections 1.4.1, 1.4.3, and 1.6 and Amendments 96/87 EA Section 1.5 and Regulatory Impact Review). No. Socioeconomic impacts of this action are limited to changes in fishing behavior in response to preventing the harvest of shark, squid, and octopus from reaching the acceptable biological catch or overfishing level. Some time, area, or gear closures may be necessary to prevent overfishing of these groups, but the socioeconomic impact of these closures is not expected to be significant based on the ability to fully harvest target species and regulatory and industry methods available to avoid prohibited catch.

8) Are the effects on the quality of the human environment likely to be highly controversial?

(Amendment 95 EA Section 1.4 and Amendments 96/87 EA Section 1.1). No. Development of the proposed action has involved participants from the scientific and fishing communities, and the potential impacts on the human environment are well understood. No issues of controversy were identified in the process.

9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

(Amendment 95 EA Section 1.4 and Amendments 96/87 EA Section 1.1). No. This action would not affect any categories of areas on shore. This action takes place in the geographic area of the Exclusive Economic Zone (EEZ) off Alaska. The land adjacent to this marine area may contain archeological sites of native villages. This action would occur in adjacent marine waters so no impacts on these cultural sites are expected. The marine waters where the fisheries occur contain ecologically critical areas. Effects on the unique characteristics of these areas are not anticipated to occur with this action because the amount of fish removed by vessels are within the TAC specified harvest levels and the action maintains the current protections to EFH and ecologically critical nearshore areas

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

(Amendment 95 EA Section 1.4 and Amendments 96/87 EA Section 1.1). No. The potential effects of the action are well understood because of the fish species, harvest method involved, stock assessment process, long time period of fisheries management, and area of the activity.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

(Amendment 95 EA Section 1.6 and Amendments 96/87 EA Section 1.6). No. Beyond the cumulative impact analyses in the 2006 and 2007 harvest specifications EA, the Groundfish Harvest Specifications EIS, and the Programmatic Supplemental EIS for the Alaska Groundfish Fisheries, no other additional past or present cumulative impact issues were identified. Reasonably foreseeable future impacts in this analysis include potential effects of climate change. The combination of effects from the cumulative effects and this proposed action are not likely to result in significant effects for any of the environmental component analyzed and are therefore not significant.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

(Amendment 95 EA Section 1.4 and Amendments 96/87 EA Section 1.1). No. 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. Because this action extends from nearshore waters to 200 nm at sea, this consideration is not applicable to this action

13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

(Amendment 95 EA Section 1.4 and Amendments 96/87 EA Section 1.1). No. This action poses no effect on the introduction or spread of nonindigenous species into the EEZ beyond those previously identified because it does not change fishing, processing, or shipping practices in a manner that may lead to the introduction of nonindigenous species.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

(Amendment 95 EA Section 1.1 and Amendments 96/87 EA Section 1.1). No. This action would make changes to the FMPs to describe current practices for determining harvest levels for fisheries management and would provide for enhanced sustainable management for species groups currently in the other species category. This action does not establish a precedent for future action because any additional changes to the harvest specifications process and fisheries management would require analysis to support the action. Pursuant to NEPA for all future action, appropriate environmental analysis documents will be prepared to inform the decision makers of potential impacts to the human environment and to implement mitigation measures to avoid significant adverse impacts.

15) Can the proposed action reasonably be expected to threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment?

(Amendment 95 EA Section 1.1 and Amendments 96/87 EA Sections 1.1 and 2). No. This action poses no known violation of federal, state, or local laws or requirements for the protection of the environment. The proposed action 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.

16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

(Amendment 95 EA Section 1.6 and Amendments 96/87 EA Section 1.6). No. The effects on target and non-target species from this action are mostly beneficial effects by improving the sustainable management of species groups in the other species category. No cumulative effects were identified that added to the direct and indirect effects on target and nontarget species which would result in significant effects.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessments prepared for Amendments 95 and 96 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Island Management Area and and Amendment 87 to the Fishery Management Plan for Groundfish of the Gulf of Alaska, it is hereby determined that Amendments 87, 95, and 96 will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessments. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

for Robert D Mecum 9/17/10

James W. Balsiger, Ph.D. Date
Administrator, Alaska Region