

INITIAL REVIEW DRAFT

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**

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Abstract: This document contains an Environmental Assessment for a proposed 96th amendment to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands (BSAI) Management Area and proposed 87th amendment to FMP for Groundfish of the Gulf of Alaska (GOA). This action is necessary to comply with requirements of the Magnuson-Stevens Fishery Management Act to end and prevent overfishing, rebuild overfished stocks, 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 targeted for harvest, or likely to become overfished or subject to overfishing, and are not 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, forage fish species either in the fishery or in the ecosystem component category, prohibited species in the EC category, and 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) octopus separately “in the fishery;” 3) manage prohibited species and forage fish in an ecosystem component category; and 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.”

Technical amendments to the groundfish FMPs and to federal regulations 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). Amendments 96/87 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands (BSAI) Management Area and 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 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 ACL and AM requirements; however, those amendments to the text of 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; i.e., 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 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 FMP because these species are too poorly understood to set ACLs and AMs for them or to develop a management regime for them. 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, and 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 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 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 RIR in the appendix.

The EA addresses the statutory requirements of NEPA to predict whether the impacts to the human environment resulting from implementation of Amendments 96/87 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. 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 may become out of compliance with the MSA and revised National Standard 1 guidelines. Currently NMFS and the Council do not have the ability to separately protect sharks, sculpins, octopuses, and some 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 stock assemblage, harvest of one group could comprise 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 them being not well surveyed by bottom trawls. Sulpins 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. Several target categories may be impacted by the proposed action for sharks, octopuses, and GOA squids. The analysis found that 2008 and 2009 harvests of individual groups would not have exceeded a 2009 OFL or 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 this amendment. 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, and achieve optimum yield, and to comply with statutory requirements for ACLs and AMs. Alternatives 2 and 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 is difficult to quantify, but is discussed qualitatively in Section 1.5.

The proposed action is limited in scope and is 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 and 3, which provide more protection to the biomasses of the groups than the status quo, has 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 proposed action. Should a target fishery develop in the future, the effects of increased harvests of those species are expected to be insignificant because harvest 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 in 2005 - 2007 in a theoretical example. Alternatives 2 and 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) and prohibited species catch (PSC) limit regulations.

Additional elements under both Alternatives 2 and 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, but also would maintain requirements to designate essential fish habitat and for EFH consultation on federal actions that may adversely affect EFH. Because not enough information is available to describe forage fish EFH at this time, the impacts of Alternatives 1, 2 and 3 are the same on EFH for forage fish and not significant. Alternatives 1 and 3 may have a future beneficial impact on forage fish as NMFS will be required to review information regarding EFH for forage fish every 5 years; and once information becomes available, may designate EFH for forage fish. Any benefit is not likely significant as EFH for other species is extensive and is likely to overlap with any forage fish EFH so that EFH consultation is likely already occurring for forage fish habitat.

Alternatives 2 and 3 are likely to have beneficial effects for marine mammals, seabirds, and the ecosystem compared to Alternative 1 as other species 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 Alternative 2 and 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 provides a future potential benefit to the protection of forage fish essential fish habitat. Any protection of forage fish may lead to a modest beneficial effect for those species and the part of the ecosystem that depends on forage fish.

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). Amendments 96/87 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area and the FMP for Groundfish of the Gulf of Alaska are necessary for the groundfish FMPs to conform to revised National Standard one (NS1) guidelines and the Magnuson-Stevens Fishery Conservation and Management Act (MSA or Magnuson-Stevens Act).

1.1 Background

Magnuson-Stevens Act The Magnuson-Stevens Fishery Conservation and Management Act (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 regarding preventing and ending overfishing and rebuilding 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 National Standard 1 (NS1) of the MSA (74 FR 3178).

The MSA, as amended by MSRA, requires that a Council develop ACLs “for each of its managed fisheries” (see MSA section 302(h)(6)) and as noted earlier, 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 of 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(c)(1), (d) (defining maximum sustainable yield (MSY) and “overfish” with regard to “stock or stock complex”) and § 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)(v)(F)) (referring to OY at the “fishery” level as a possible alternative to the “stock or stock complex” level)).

Given the broad definition of the “fishery,” the 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 with regard to “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 Act (see MSA section 2(a)(11) (acknowledging that a number of Councils have demonstrated significant progress in integrating ecosystem considerations under existing authorities of the MSA)). In addition, MSRA added a new 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 Councils have the discretion to determine, on a case-by-case basis, whether changes in their stock classifications under current FMPs are needed.

Section 104(a)(10) of the MSRA established new requirements to end and prevent overfishing, including ACLs and AMs. Section 303(a)(15) was added to the MSA to read as follows: “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, and beyond.

NMFS believes that the ACL requirement should be interpreted to provide for some flexibility given scientific and management uncertainty and other factors, but at the same time, must address overfishing and facilitate rebuilding. Chronic overfishing can be prevented by ensuring that the combination of ACLs and AMs decrease the risk of future overfishing each successive time an ACL is exceeded.

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 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, which had closed directed fishing for those species and required a Commissioner’s permit for directed fishing for those 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/or 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 process was 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 better incorporated into the text of the FMPs. This action is necessary to facilitate compliance with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks, and achieve optimum yield.

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 Scientific and Statistical Committee (SSC), and the TAC is set by the Council. The OFL and ABC determination incorporates a tier system for addressing scientific uncertainty. The groundfish ABC is the ACL, 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 National Standard 1, 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, those amendments to the text of 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; i.e., 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 ecosystem (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 from requirements to implement ACLs and AMs. 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 FMP 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 FMP, 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.

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 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.

1.2 Purpose and Need

The Council adopted the following problem statement for this action.

On January 16, 2009, NMFS issued final guidelines for National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). They provide guidance on how to comply with new annual catch limit (ACL) and accountability measure (AM) requirements for ending overfishing of fisheries managed by federal fishery management plans (FMPs). Annual catch limits are amounts of fish allowed to be caught in a year. A legal review of the groundfish FMPs found there were inadequacies in the FMP texts that need to be addressed. Several work groups (e.g., ABC/ACT Control Rules, Vulnerability Evaluations) have been created to produce reports on how to carry out the more technical components of the guidelines. Statutory deadlines require compliance with the MSA by the start of the 2011 fisheries although these reports have not been finalized.

This action is necessary to facilitate compliance with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks, and achieve optimum yield.

Staff recommends the following language for Council consideration to replace the above problem statement.

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 development of target fisheries on shark, sculpin, octopus, and squid, which are currently managed in aggregate under a single ACL, requires 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, Scientific and Statistical Committee, 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 stocks, groups in the other species category, prohibited species category, forage fish category, and non-specified category among three possible approaches: in the fishery, in a new ecosystem component category, or removed from the FMPs.

Table 1 summarizes some 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. They 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/regulatory amendment analysis.

Alternative 1. No action

Alternative 2. 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/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 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.

Alternative 2. 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 ecosystem component (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 Magnuson-Stevens Act 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 Magnuson-Stevens Act 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. “Ecosystem component (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 SDC, MSY, ABC, ACL, and ACT (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 Alternatives 2 and 3, all stocks in the fishery are identified as target stocks.

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 $OFL \geq ABC \geq ACL$ (Figure 2). Because a primary goal of the MSA, and management responsibility of NMFS and the 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 § 600.310(g) of this proposed action). 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, 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 envision managing 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.

1.3.2 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 as non-target stocks that are retained or may become subject to overfishing, 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.

1.3.3 Alternatives Considered but Not Carried Forward

Six alternatives were considered and not moved forward in this EA because they do not comply with National Standard 1 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 to support further consideration (e.g., grenadiers). The rejected alternatives are:

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 species¹, 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

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 and socio-economic impacts of Amendments 96/87 are discussed in this 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 duration of impact.

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

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 proposed action is 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 EIS (NMFS 2007) because the action is not expected to change when, where, or how any commercial fisheries are conducted in the BSAI or GOA. 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 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 and in the Regional Councils. In the Alaska Region, the North Pacific Fishery Management 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 Management Area. 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. Exclusive Economic Zone (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.fakr.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 was 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 environmental assessments (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 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 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, further described below, offers a detailed analysis of the harvest specifications process. The harvest specification alternatives derive from the policy established is the preferred alternative in the PSEIS. This EA incorporates by reference information from the PSEIS, when applicable, to focus the current analysis on the issues ripe for decision and eliminate repetitive discussions.

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 back to 2000 may be found at the NMFS AKR web site at: <http://www.fakr.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 TAC 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.fakr.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 Alaska Region NMFS websites at <http://www.fakr.noaa.gov/index/analyses/analyses.asp>. This EA incorporates by reference information from the harvest specifications EIS, when applicable, to focus the current analysis on the issues ripe for decision and eliminate repetitive discussions.

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 Amendment 96/87, 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 adopted 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 (NMFS 2004) moved skates from the other species category to the target species category in the GOA FMP. Skates have 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 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 2003), which contains detailed fishery descriptions and statistics in Section 3.9, "Social and Economic Conditions." Analysis for this action is available at http://www.fakr.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 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, ABC, and TAC is specified annually for the other species category. The proposed action will 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 Fishery

NSI Guidelines requires SDC for all stocks in the fishery. 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 NPFMC 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 species² 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.

Every FMP must contain “conservation and management measures” (§303(a)(1)) and an “optimum yield” specification (§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” (§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” (§3(28)). Thus, the definitions of both “conservation and management” and “optimum yield” allow for the imposition of measures designed to maintain/protect the marine environment/ ecosystem apart from measures designed to maintain fishery resources or to produce food and recreational opportunities.

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.

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: A) a stock or group of stocks, or B) any fishing for such stocks. The context should determine which of these meanings is relevant.

Outline for structuring the FMP

- 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 Act 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/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 Act.

It is not necessary for every *stock* within a Councils’ geographical area of authority to be managed under an FMP, because not all stocks are the subjects of 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 Councils’ 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 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.

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 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 authorized under § 679.20 to split or combine the species in the other species category. Before the 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 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 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

³ FMP Amendment 95 to manage skates separately is under Secretarial review. This analysis assumes that the preferred alternative will be approved and implemented by the Secretary prior to this action under Alternative 1.

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 in terms of the amount of scientific uncertainty, but the other tiers do not).

1.4.2.1.2 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, 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) one or more indicator stocks, each of which has SDC and management objectives, with an ACL for the complex as a whole.

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.

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; (2) a particular stock should be a member of a stock complex; or (3) a stock complex should be reorganized. Indicator stocks are stocks 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 AFSC to assist the Council in its deliberations of management approaches for vulnerable stocks (Section 1.4.3).

1.4.2.1.3 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.

1.4.2.1.4 MRA Regulations and Management Function

Maximum retainable amount (MRA) regulations establish the calculation method and specifications for groundfish species that are closed to directed fishing⁴. 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;
 - (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 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 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

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

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 operators’ 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.

1.4.2.1.5 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 Alternatives 2 and 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 and/or earlier closures of target fisheries and/or seasonal allocation may occur as a result of the specification of additional ACLs for the other species component groups in each FMP.

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 additional (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.

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

The State of Alaska has assumed authority under Sec 301, 104-297, (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 are not required for those state-managed stocks. Those stocks could be placed in the ecosystem component category (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 (EO) 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 federal 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 Alternatives 2 and 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; and 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 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 GOA. Catches of the GOA other species category were dominated by Atka mackerel from 1990-1993, 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 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 - 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*). Shark catches have only been identified to the species level since 1997 and have made up from 11% to 64% of GOA other species catch from 1997–2009. Vulnerability analyses indicate that sharks were 3 of the 4 most vulnerable species (Spencer and Ormseth 2009).

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 (BC) 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).

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, CA, 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).

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% 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 (~ 1 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 2005-2008. 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 2003-2007. Estimated annual catch, including released fish, averaged about 18,000 sharks in Southeast and 36,000 sharks in Southcentral Alaska from 2003 to 2007. It has not been determined if these catches might cause closures of groundfishes in the future; however 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 140-280 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%.

Sharks would directly benefit under both Alternatives 2 and 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 Alternatives 2 and 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/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 U.S.-Japan trawl surveys identified 41 species of sculpins in the 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*, *Hemitripteris*, 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, *Hemitripteris 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 (5-8 years, Tokranov, 1985) despite being relatively short-lived (13-15 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 comm.). 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% of the 2008 GOA other species catch. Retained catch of sculpin species in the GOA has increased recently from 7% in 2003 to 20% 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% of the sculpin total observed catch. *Hemitripterus* spp. (bigmouth sculpin) constituted approximately 18% of the total sculpins. In 2008, the first year observers identified the top 5 species of sculpins to species, shows that *Hemilepidotus jordani* (yellow Irish lord) were 62% 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% 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 1998-2008, sculpins comprised 19-28% of the total other species catch during this time period (with skates comprising 70%). 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 Alternatives 2 and 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 Alternatives 2 and 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/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, 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 CPUE, 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%, however in the Southeast Alaska pot shrimp fishery octopus bycatch is limited by permit to 5% 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% 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 a 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 Alternatives 2 and 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 Alternatives 2 and 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/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) 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 all in the family Gonatidae. The more common species near the continental shelf are *Beryteuthis 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 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" *Beryteuthis 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 to earlier maturation 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 - 60,000 metric tons (Arkhipkin et al. 1995), and coastal Japanese fisheries with catches of 5,000 to 9,000 t in the late 1970's-early 1980's (Roper et al. 1982; Osaka and Murata 1983). Therefore, monitoring of 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 (~1-2%) 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% of the Other Species catch). The catch declined to 412 t in 2007 and 84 t in 2008. The 2009 catch as of October 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% to 97%, 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 & 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%) of squid catch is reported as “squid unidentified” (the remainder is identified as *Moroteuthis* spp, or “giant squid unidentified”). Squid catches from 1990-2002 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% mortality of discards is assumed.

GOA squids would directly benefit under both Alternatives 2 and 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 Alternatives 2 and 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/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 to 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 on an individual group basis.

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, respectively, except for 2006 when a 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 XX** 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 - 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 change 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

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 groundfish fisheries; the original groundfish FMPs identified these as “other species.”

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 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 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. Specifications were set for big skate, longnose skate, and other skates, beginning in 2005. 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 initiation of action to address management of other species groups 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.

Alternatives 2 and 3 The following analysis describes recent catch trends of the aggregated categories and their constituent groups relative to their proposed management benchmarks under Alternatives 2 and 3 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 benchmarks (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). These results should not be viewed as predictions, as various factors may influence future harvests. While 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, when the ABC 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, it does illustrate the inherent variability in harvests of these groups and potential for early closures of directed fisheries under group level ACLs under Alternatives 2 and 3.

Figure 9 demonstrates that shark harvests would have exceeded the 2009 OFLs, if they 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 both the 2009 OFLs and ABCs in both areas (had they been in place in the past). 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. Figure 16 shows that the highest average 2003-2009 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 2003-2009 catch occurred in hook-and-line categories for other groundfish, sablefish, and P. cod. The highest rates of shark catch occurred in the NPT target categories for rockfishes and yellowfin sole, and HAL P. cod (Figure 19).

Figure 11 and Figure 12 demonstrate that there were no theoretical overharvests of sculpins by directed groundfish fisheries relative to their respective 2009 bench marks, had they been in place in either management area. Figure 17 shows that the highest average 2003-2009 catch of sculpins occurred in the BSAI fisheries for non-pelagic trawl (NPT) yellowfin sole, HAL P. cod, NPT P. cod, and NPT rock sole and . The highest rates of sculpin catch occurred in the BSAI fisheries for NPT flathead sole, NPT other flatfish, PT other groundfish, NPT rock sole, and NPTR yellowfin sole. Figure 20 shows high catch and rates of sculpins in the GOA fisheries for NPT rock sole, and NPTR yellowfin sole.

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

Opposite trends in octopus catch occurred between the BSAI and GOA. Octopus harvests would have been under the ABCs in 2005 and 2006, under the 2007 OFL, and exceeded the 2007 through 2009 OFLs, if they had been in place for the GOA (Figure 14). The highest average 2003-2009 catch of GOA octopuses occurred in the NPT yellowfin sole fishery (Figure 21). The highest rate of incidental catch occurred in the pot P. cod fishery.

GOA squid harvests would have exceeded the 2009 OFLs, if they had been in place in 2006 (Figure 15). The highest average 2003-2009 catch of GOA octopuses occurred in the pot other category (Figure 22) and the highest rate of incidental catch occurred in the PTR other category.

Summary Sharks, sculpins, octopuses, and GOA squids would directly benefit under both Alternatives 2 and 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/stocks currently managed in aggregate. The action is not expected to change the gear types, amounts, timing or location of the groundfish fisheries under either of the alternatives compared to status quo. The increased protection is not likely significantly beneficial for other species as there is no indication that other species groups are experiencing overfishing under status quo.

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 as target species in the fishery and ACLs would be set for them. The proposed action would not automatically change the gear types, amounts, timing, or location of the groundfish fisheries under any of the alternatives compared to 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 Alternatives 2 and 3, the Council is considering which species to list in the EC category to be consistent with NS1 Guidelines. The guidelines envision that 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 Fed. Reg. 3,185; *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 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.

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: For data collection purposes; for 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; and/or to address other ecosystem issues. While EC species are not considered to be “in the fishery,” a 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 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 § 600.310(d)(5) . A Council may choose to include EC species for purposes of incorporating ecosystem approaches to fishery management, data collection, etc. Identification of EC species must be done through an FMP amendment process (see § 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)). 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. In addition, vulnerability scores for target stocks begin at 1.39 (yellowfin sole). The analyses conducted by the VEWG 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 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. 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. Octopus 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/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 as such so as 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/or 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 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; 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 this FMP, 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 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 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 it “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, MSY and SDC are not required because the stocks are in the groundfish FMP only for purposes of limiting their catch. 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, 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 harvest 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 would directly or indirectly affect the incidental take of prohibited species by the groundfish fisheries. The action would not change the gear types, amounts, timing or location of the groundfish fisheries; and 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 et al. (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 a MRA of 2% 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% 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 a total of only six vessels reported targeting any species in this proposed category from 1984-1994, no annual commercial fishery had been established, and market availability for capelin varies (Ormseth et al. 2009).

Forage fish comprise 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 which 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 2-3, when they are only 11-17 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 BS 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 2-3 (19-23 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 0-100 m except when feeding (pelagically) on crustaceans and zooplankton. Spawning is believed to occur in winter. Sand lance mature at ages 2-3 years and lengths of 10-15 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 12-25 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 euphausiids 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 6-10 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, 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 EFH and requirements for consultation with NMFS on federal actions that may adversely affect forage fish EFH. This is the key issue that distinguished Alternatives 2 and 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 five-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.fakr.noaa.gov/npfmc/current_issues/efh/EFH5yr_rev1209_appendix1.pdf), and 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.

The FMPs do contain descriptions of forage fish habitat in the appendices, and these descriptions would remain intact (as there is no action proposed to remove them). 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, 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 five-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 federal actions that may adversely affect important habitat that could someday be identified for forage fish, it cannot compel NMFS to do so. Under Alternative 2, 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 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. Alternatives 2 and 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 harvest limits or management measures on non-specified species in the groundfish FMPs. Under either Alternative 2 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 would 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; and 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. 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, NPFMC, and USFWS documents.

- The USFWS Migratory Bird Management program webpage may be accessed at: <http://alaska.fws.gov/mbmp/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 without additional conservation action are likely to become candidates for listing under the 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 chapter 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>.

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

- 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, and the U.S. Fish and Wildlife Service (FWS) is currently working on a 12-month finding for black-footed albatrosses. The FWS determined that listing of Yellow-billed loon was warranted but not a priority.

FWS 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 occurs primarily in the hook-and-line and the trawl fisheries. Hook-and-line and trawl gear accounts for up to 97% 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 affect the incidental take of seabirds by the groundfish fisheries. The action would not change the gear types, amounts, timing or location of the groundfish fisheries; and therefore, no change in the incidental takes 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 change the gear types, amounts, timing or location of the groundfish fisheries. Alternatives 2 and 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).

Alternatives 2 and 3 would reduce the potential for the groundfish fisheries from impacting 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 2006). 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 five-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.fakr.noaa.gov/npfmc/current_issues/efh/EFH5yr_rev1209_appendix1.pdf), and 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, 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 five-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.

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 in and 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 U.S. Fish and Wildlife Service. An ESA section 7 biological opinion (BiOp) 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 2001b). 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. This draft biological opinion for these species is expected to be released in spring 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 Alternatives 2 and 3 would result in different levels of incidental take or disturbance than Alternative 1. Alternatives 2 and 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 this area 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 2006). 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 Alternatives 2 and 3 would provide a measurable improvement to prey availability for marine mammals. Because it is unlikely that an 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 Alternatives 2 and 3 is not likely to be significant.

Placing forage fish in the fishery under Alternative 3 would ensure the five-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

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 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. 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.

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 National Standard 1 guidelines and do not change fishing practices that may impact habitat. 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 and/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 2007a) 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 National Standard 1 guidelines and do not 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 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. Alternatives 2 and 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 of Alaska. Detailed descriptions of the social and economic characteristics of the BSAI and GOA groundfish fisheries may be found in the following reports:

NMFS (2003) 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 non-CDQ 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 proposed action 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 lower 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 may be undertaken by the fishing fleets to respond to those additional, and smaller, ACLs for sharks, sculpins, octopuses, and GIA squids.

1.5.2.1 The Economic Benefits 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 tenant of fisheries management under the MSA (MSA Section 301, 16 U.S.C. 1851). NS1 reads as follows:

98-623: (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 defines OY as follows:

104-297: (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 improves 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 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/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/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, no longer comports with MSA requirements and NS1 Guidelines.

Impacts of Alternative 2

Under Alternative 2 and Alternative 3, sharks, sculpins, and octopuses in the BSAI and sharks, sculpins, octopuses, and squids in the GOA would be subject to biologically-based ACLs at the individual group level. No changes would occur to MRA or PSC management. Under ACLs, the Council would restrict the TACs of those groups to be at or below the ABC specified for each group. Stock assessments for other species stock complexes have been prepared for several years in preparation for the proposed action. The SSC has set OFLs and ABCs for the complexes by summing those reference points for each component group. Sculpins are based on tier 5 ($F_{ABC} \leq .75 F_{OFL}$), while sharks, octopuses, and squid are based on tier 6 ($ABC \leq .75 OFL$, where $OFL = M$ (natural mortality)).

The analysis (see Section 1.4.2.2.1) 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. Several target categories may be impacted by the proposed action for sharks, octopuses, and GOA squids. The analysis found that 2008 and 2009 harvests of individual groups would not have exceeded a 2009 OFL or 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 (Figure 9 through Figure 15). 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 this amendment. The Council can control whether a future directed fishery develops for the groups by the level at which it sets the annual TACs.

These comparisons do not account for the triggering of other management restrictions that would have been occurred first when the TAC was exceeded and second, when the ABC 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 Alternatives 2 and 3.

As previously described target fisheries also harvest and sell incidental catches of other species. These groups have not been open to directed fishing effort because they have had limited commercial interest. Catches of other species, either in aggregate, or of the component species groups, have been small compared to those of target species. It is unlikely that the observed bycatch of other species groups is having a negative effect on abundance at individual 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 them develop (under the no action alternative).

Alternative 2 and Alternative 3 would give fishery managers more control over harvests of other species groups. Under the status quo, groundfish fishermen could conceivably harvest almost the entire other species TAC as any of the component groups. As noted in Section 1.4.2.2, which described the biology and management of the groups, sharks, in particular, grow and reproduce slowly. If the stocks were fished down, they would not be expected to rebound quickly.

One class of potential impacts is the foregone value of catches of the groups that otherwise would have been allowed to be harvested under aggregate specifications set for the other species assemblage. The following is intended to quantify the maximum value of foregone target species harvests under Alternatives 2 and 3 compared to the status quo. This exercise assumes that TAC is set equal to the 2010 ABC for each group and 100 percent of the other species TAC was taken as the indicated species in 2010).

NMFS (2007) estimated earned gross revenue of \$2.1 M for harvests of BSAI other species in 2006, attributable to a catch of 26,798 mt with an ex-vessel value of approximately \$78.36/mt. Earned gross revenue in 2006 for catch of 13,856 mt of GOA other species was valued at \$300,000 and \$21.65/mt. Using these results, the theoretical maximum foregone harvest and value between the status quo and Alternatives 2 and 3 is presented in Table 17. The results for each group are not additive, but represent a gross estimate of the ex-vessel value of each group assuming that the TAC equals the ABC for each of the groups. Maximum foregone pounds were calculated as the difference between the 2010 other species ABC and the group's 2010 ABC. Maximum foregone value ranged from \$2.4M for octopuses to \$4.8M for sharks and sculpins, assuming TAC = ABC and the entire TAC was harvested (Table 17). However, these values are approximately less than one percent of the total estimated gross revenue of the groundfish fisheries in the BSAI and GOA, 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 up to the ABCs/TACs for the groups compared to the higher aggregated other species TAC, as proposed under Alternative 2 and Alternative 3, and also not profitable to harvest to the maximum permissible other species assemblage ABC/TAC.

It is unknown what TACs (relative to the ABC) that the Council would set in the future if either Alternative 2 or 3 is implemented. The Council may choose to increase the TACs above incidental catch levels to avoid directed fishery closures; this is more likely in the near term as the 2 M mt OY cap has not been constraining on TACs set in the BSAI because of lower biomasses of pollock and Pacific cod.

Therefore the above exercise may overstate maximum foregone poundage and value if the Council increases the TACs in that area.

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 four groups in the GOA are expected to have little impact on catches of prohibited species.

Sharks, sculpins, and octopuses (and squid in the GOA) are protected by an aggregate harvest cap and/or closure areas, if excessive amounts of these species are caught. New specification categories should have little impact on catches of prohibited species because the groups are not currently targeted.

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/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. 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.¹⁵ That is, people enjoy a benefit (which can be measured in economic terms) from simply knowing that some given aspect of the environment exists, for example. 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

¹⁵“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.

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 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.

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 (7 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.

Impacts of Alternative 3

The economic impacts of Alternative 3 are the same as for Alternative 2 for target species, other species groups, prohibited species, and non-specified species. The economic impacts of this action as a result of setting ACLs for forage fish are believed to be the same as under status quo. While potential specifications for forage fish have not been estimated, fishing practices are not expected to change significantly under this amendment, assuming that the TACs would be set at historic catch levels under tier 6 and directed fishing would continue to be prohibited.

Summary

Under both Alternatives 2 and 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 to constrain their harvests to protect their biomasses, if necessary. This proposed action 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 economic impacts of this action will depend upon decisions made by the Council in the annual specifications process. 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.

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. Several target categories may be impacted by the proposed action for sharks, octopuses, and GOA squids. The analysis found that 2008 and 2009 harvests of individual groups would not have exceeded a 2009 OFL or 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 most recent years' catches and potential for voluntary measures to reduce these harvests by the fleet. Overall, fishing practices are not expected to change significantly under this amendment. The Council can control whether a future directed fishery develops for the groups by the level at which it sets the annual TACs.

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.

1.6 Cumulative Effects

This section analyzes the cumulative effects of the actions considered in this environmental assessment. 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 2007a), and the supplemental information report for the groundfish harvest specifications (NMFS 2010). 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 2007a) and the supplemental information report for this EIS (NMFS 2010). No additional RFFAs have been identified for this proposed action. The RFFAs are described in the Harvest Specifications EIS section 3.3 (NMFS 2007a), 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 timeframe. 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 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 2007a).

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 extend 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 Alternatives 2 and 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 2007a.

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 2007a). 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 (VMS). 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 Alternatives 2 and 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 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 Alternatives 2 and 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 2007a). 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 VMS. 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 and 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 Alternatives 2 and 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 Alternatives 2 and 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 warming 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 km² (.57 million mi²). 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 Alternatives 2 and 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 Alternatives 2 and 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.

Summary

Considering the direct and indirect impacts of the proposed action 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 proposed action are determined to be 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, and 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 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 this EA/RIR/IRFA. 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 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 will 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 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 Section 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 Alternatives 2 and 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, and would be further constrained by the MRA and PSC limits for each.

Potential effects of Alternatives 2 and 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 to 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 Alternatives 2 and 3 on ocean or coastal habitats or EFH. The alternatives make no 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 Alternatives 2 and 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 Alternatives 2 and 3 is limited to the harvest specifications process and will not change fishing methods in any way that may affect public 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. Alternatives 2 and 3 would ensure the harvest specification process complies with National Standard 1 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 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 Alternatives 2 and 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 Alternatives 2 and 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 Magnuson-Stevens Act, and the impacts on the environment for the management of the groundfish harvest are well studied and well understood to the extent allow by the resources available. Development

of the proposed action has involved national guidance (National standard 1) 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 because of the application of the national guidance for National Standard 1 for many 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 and the Groundfish Harvest Specifications EIS, 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 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 National Standard 1 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 Section 1.1 and Chapter 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 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 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 mover 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.

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 a) participants in the fisheries and fishing communities affected by the plan or amendment; b) participants in the fisheries conducted in adjacent areas under the authority of another 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), the RIR (Section 2.5) and the IRFA (Section 3.5) of this document. The proposed 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.

3.0 REFERENCES

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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?	Section (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 <i>per se</i> - 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 isn't 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 be comprised of: 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 stock 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
<p>Would management for new shark, sculpin, squid, and octopus stock assemblages meet the standard for defining appropriate stock complexes, given their range of life histories?</p>	<p>Same as above.</p>	<p>There is no one standard for meeting MSA requirements for setting ACLs. The Councils have the authority to recommend management actions that comply with the MSA. The Council 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.</p>	<p>The Council may further refine management of stock assemblages in future actions (e.g., it may choose to manage only <i>O. dofleini</i> and remove the remaining octopus species, or set separate ACLs for large sculpins and small sculpins.</p>
<p>May skates, squid, octopus, sharks, and sculpins continue to be managed under a collective other species MRA?</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>

Issue	NS1 Guidelines	NMFS Advice	Potential Action
<p>Should grenadiers be added to the FMP and, if so, should they be in the fishery or managed in the EC category?</p>	<p>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). Councils in consultation with their SSCs, should analyze the vulnerability of stocks in stock complexes where possible.</p>	<p>NS1 Guidelines are silent on whether grenadiers should be managed under the FMP, 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 a 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 FMP). A regulatory amendment would be required if the Council deems that additional management restrictions are needed to limit the harvest of grenadiers.</p> <p>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, the Plan Teams and SSC concurred with the Council's timeline to set this proposed action as a trailing amendment, but recommended it as a high priority for future action.</p>	<p>The Council may revise management of grenadiers on its own timeline.</p>
<p>How are ACL requirements addressed for state managed fisheries?</p>		<p>ACLs are not required for state-managed stocks if they are identified in the FMP 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.</p>	<p>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.</p>

Table 2 BSAI and GOA Seabird Prey

Species	Foraging Habitats	Prey
Red-legged and black-legged Kittiwakes	Surface fish feeder	Myctophids, squid, amphipods, euphausiids, 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, euphausiids, 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	<i>Phoebastria albatrus</i>	Endangered
Yellow-billed Loon	<i>Gavia adamsii</i>	Listing warranted but not priority
Spectacled Eider	<i>Somateria fischeri</i>	Threatened
Steller's Eider	<i>Polysticta stelleri</i>	Threatened
Kittlitz's Murrelet	<i>Brachyramphus brevirostris</i>	Candidate
Black-footed Albatross	<i>Phoebastria nigripes</i>	FWS 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 2007a; 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>;
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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.

<i>Pinnipedia species and stock</i>	<i>Status under the ESA</i>	<i>Status under the MMPA</i>	<i>Population Trends</i>	<i>Distribution in action area</i>
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 30, 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 transient 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 affects 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.
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.

<i>Cetacea species and stock</i>	<i>Status under the ESA</i>	<i>Status under the MMPA</i>	<i>Population Trends</i>	<i>Distribution in action area</i>
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 Salvesson (2008) <http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/spermwhale.htm>.

Table 7 Reasonable Foreseeable Future Actions

Ecosystem-sensitive management	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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)

¹Must be returned to the sea

²TAC for each listing

³Aggregate TAC for group

⁴Management 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 roughey 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)

¹Must be immediately returned to the sea

²TAC for each listing

³Management delegated to the State of Alaska

⁴Aggregate TAC for group

⁵Management 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
Rougeye 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) 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, shorttraker rockfish, roughey 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, shorttraker, and roughey 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 (vermillion), 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

¹Section 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

¹The 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

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

8.0 FIGURES

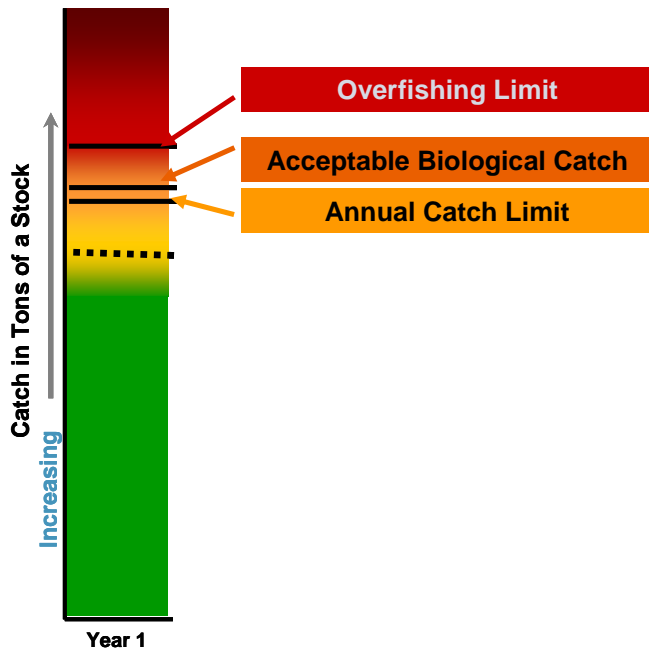


Figure 1 Definition framework for overfishing limit, acceptable biological catch, and annual catch limit.

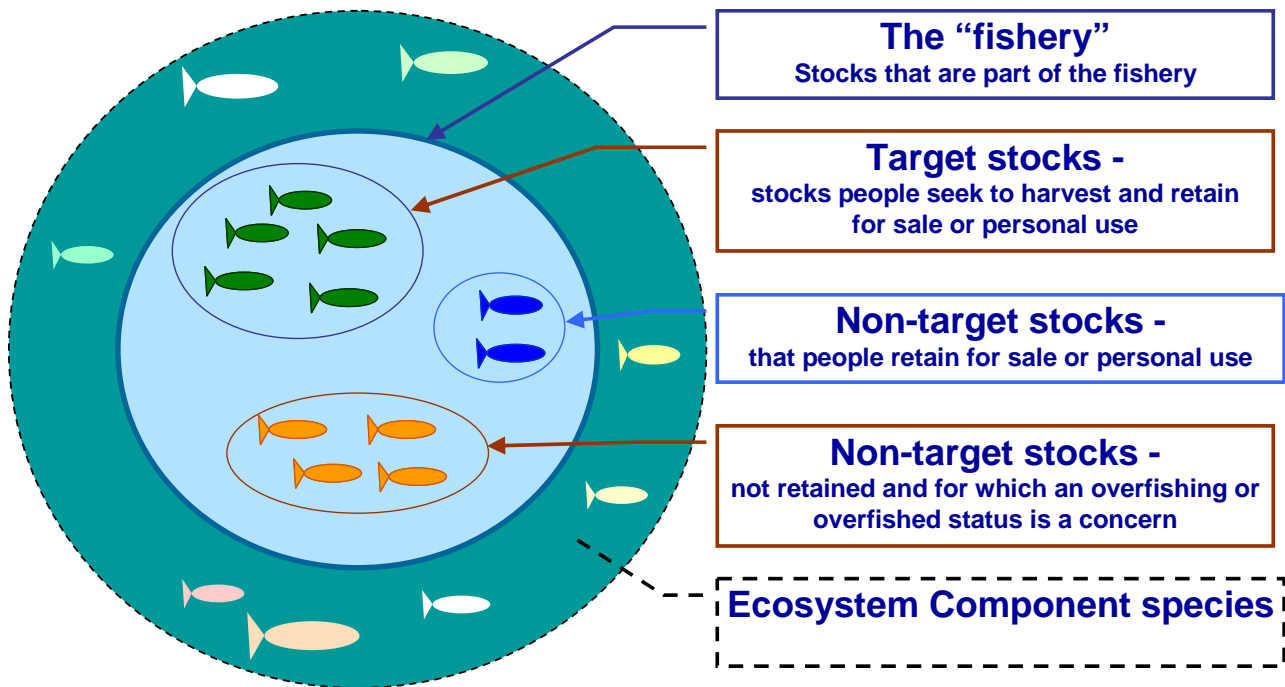


Figure 2 Classification of groundfish stocks in the fishery and in the ecosystem component category.

Bering Sea and Aleutian Islands

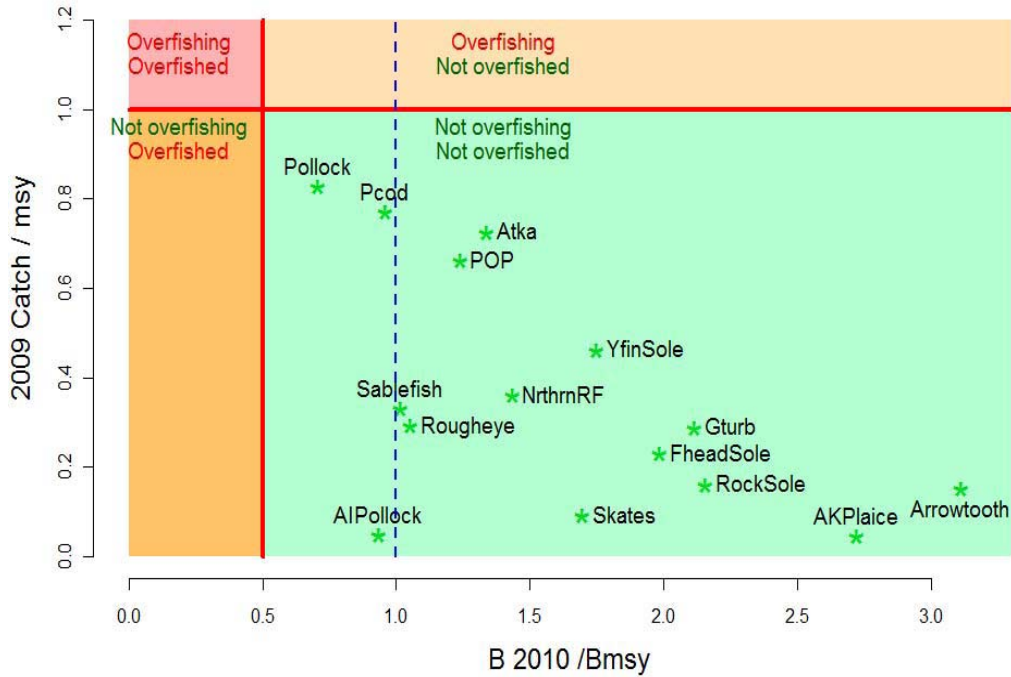


Figure 3 Summary status of age-structured BSAI species relative to 2009 catch levels (vertical axis) and projected 2010 spawning biomass relative to B_{msy} levels. Note that the 2009 MSY level is taken as the 2009 OFL (which is defined as the catch at F_{msy}).

Gulf of Alaska

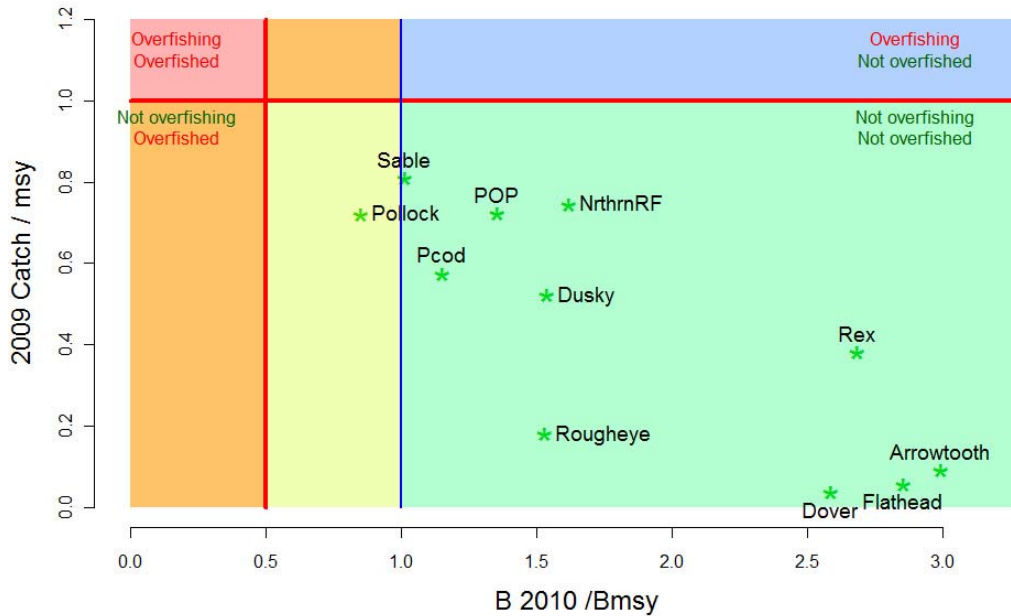


Figure 4 Summary status of age-structured GOA species relative to 2009 catch levels (vertical axis) and projected 2010 spawning biomass relative to B_{msy} levels. Note that the 2009 MSY level is taken as the 2009 OFL (which is defined as the catch at F_{msy}).

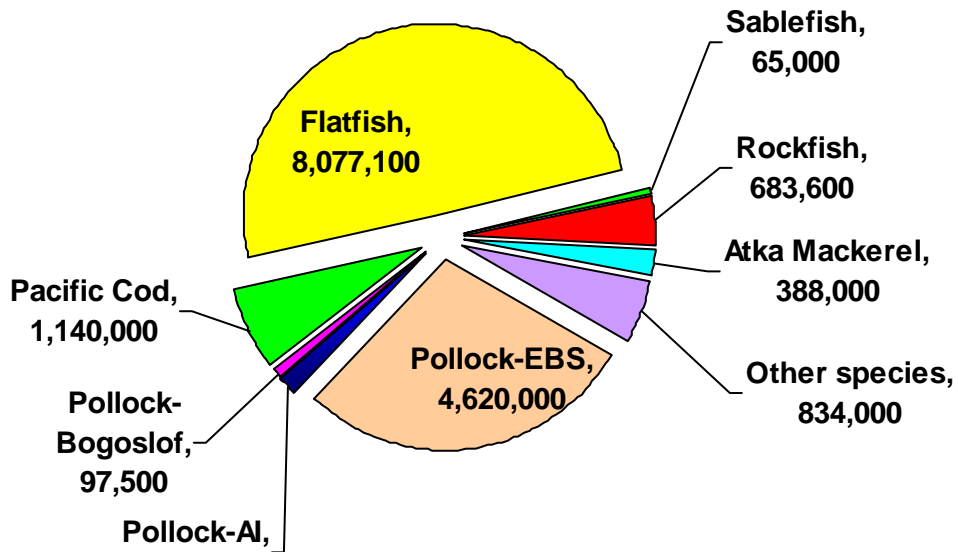


Figure 52009 BSAI biomass by target category in metric tons.

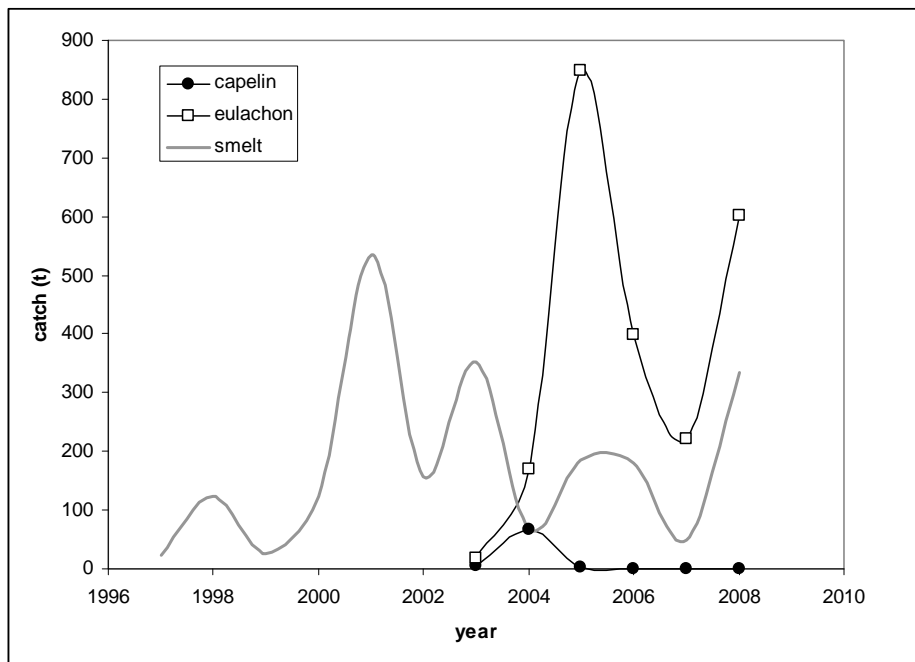


Figure 6 Incidental catches of eulachon and capelin in the GOA, 1997-2008. Eulachon and capelin are often identified as “smelts”; consistent species identification began in 2005. Data source: AKRO Blend and CAS. [From Ormseth et al 2008]

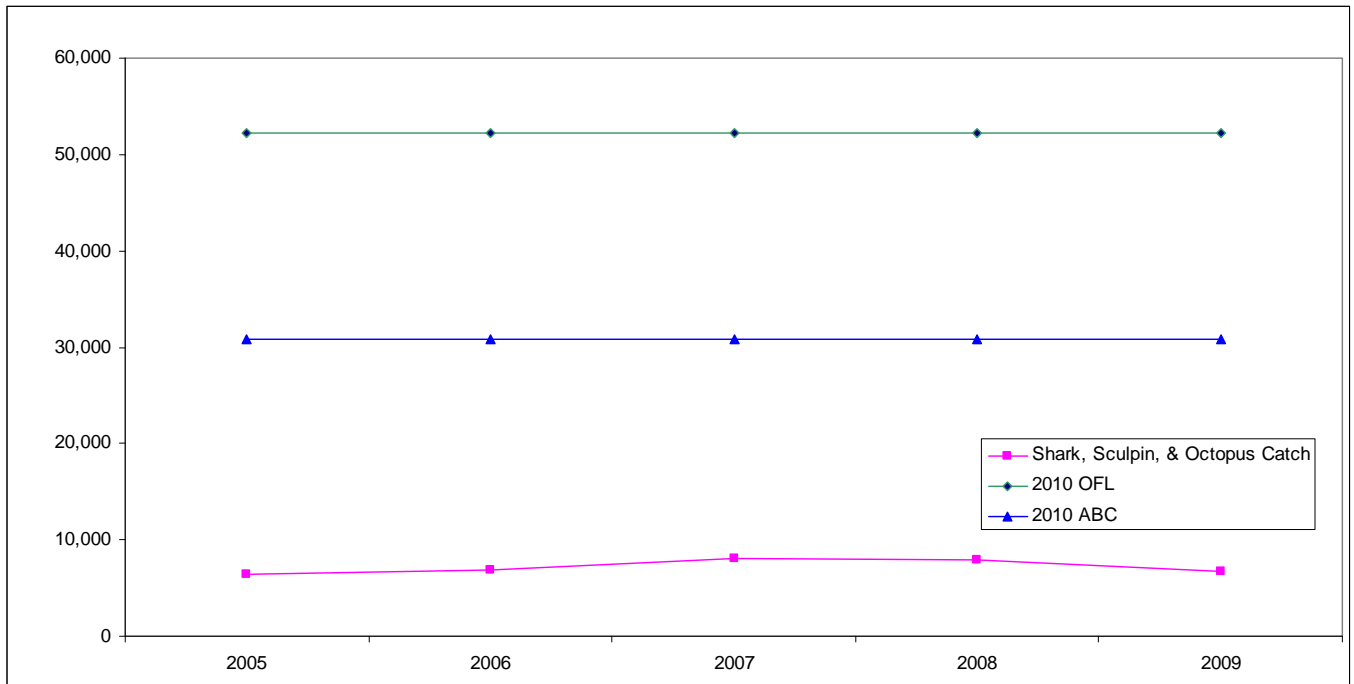


Figure 7 Cumulative Catch (mt) by Year (2005-09) for BSAI Other Species

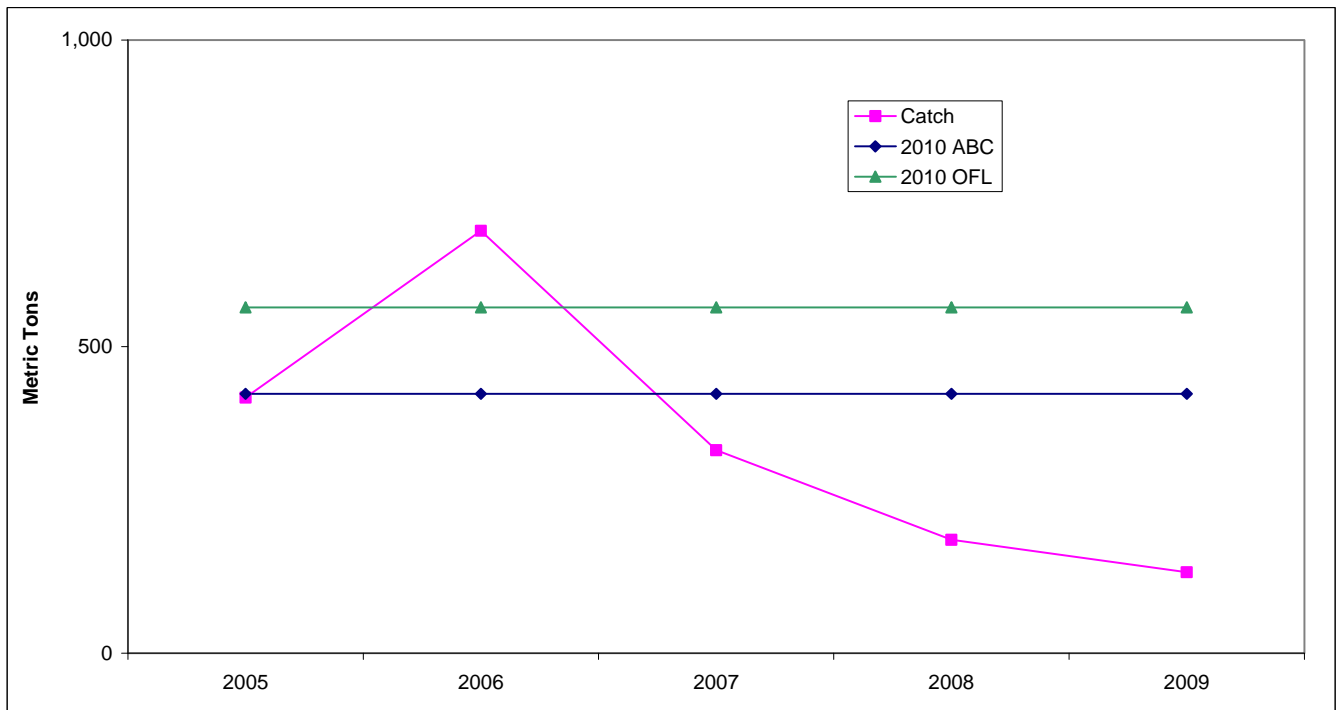


Figure 8 Cumulative Catch (mt) by Year (2005-09) for GOA Other Species

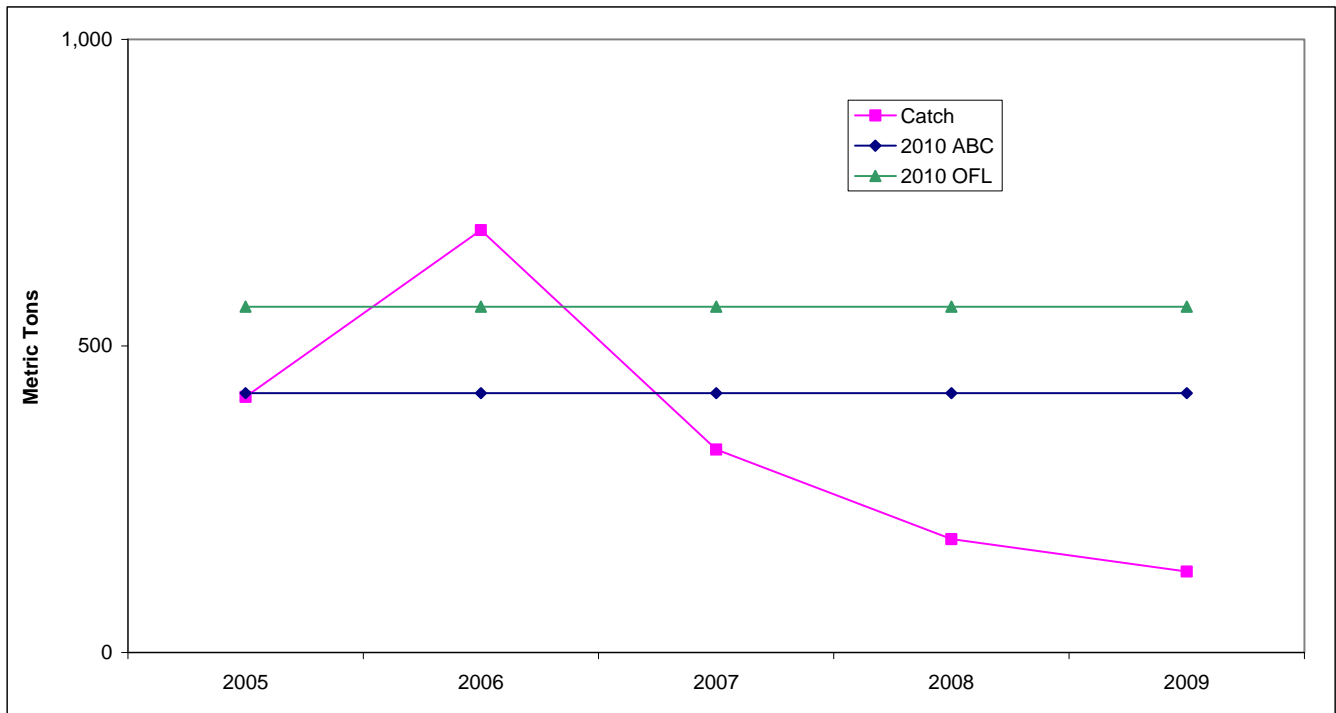


Figure 9 Cumulative Catch (mt) by Year (2005-09) for BSAI Sharks.

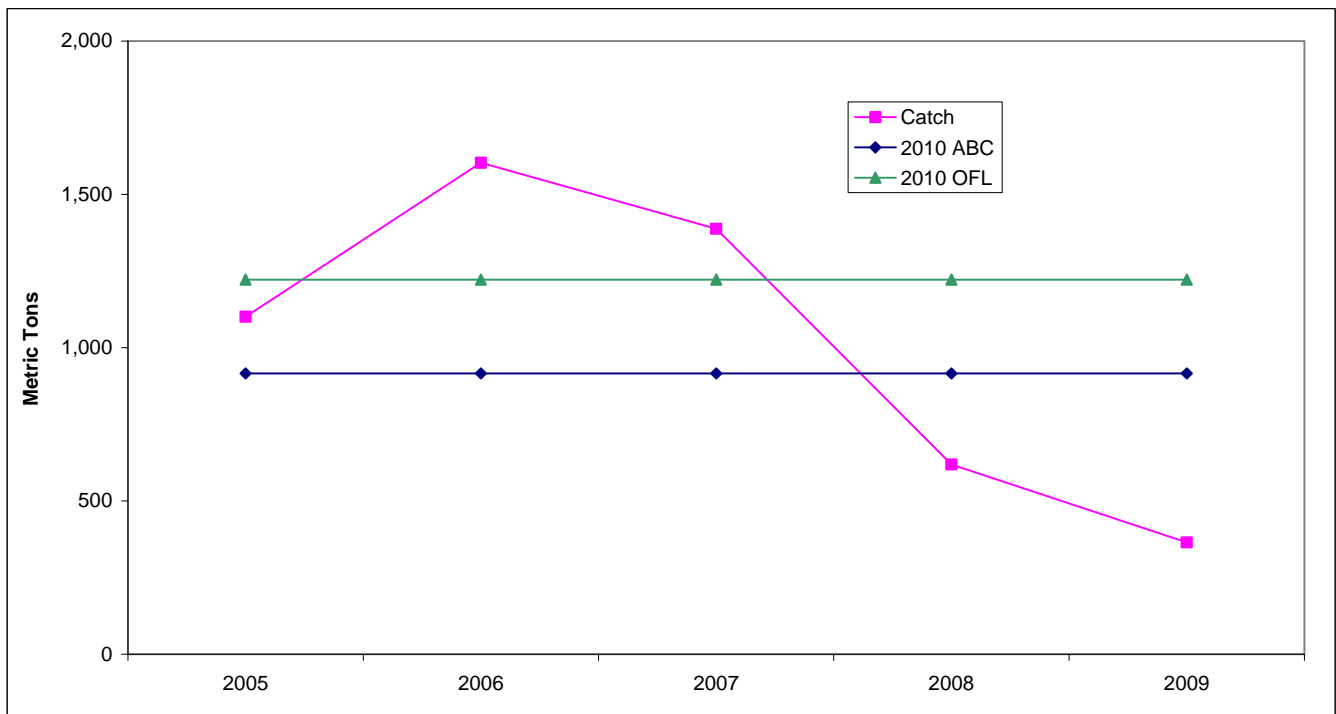


Figure 10 Cumulative Catch (mt) by Year (2005-09) for GOA Sharks.

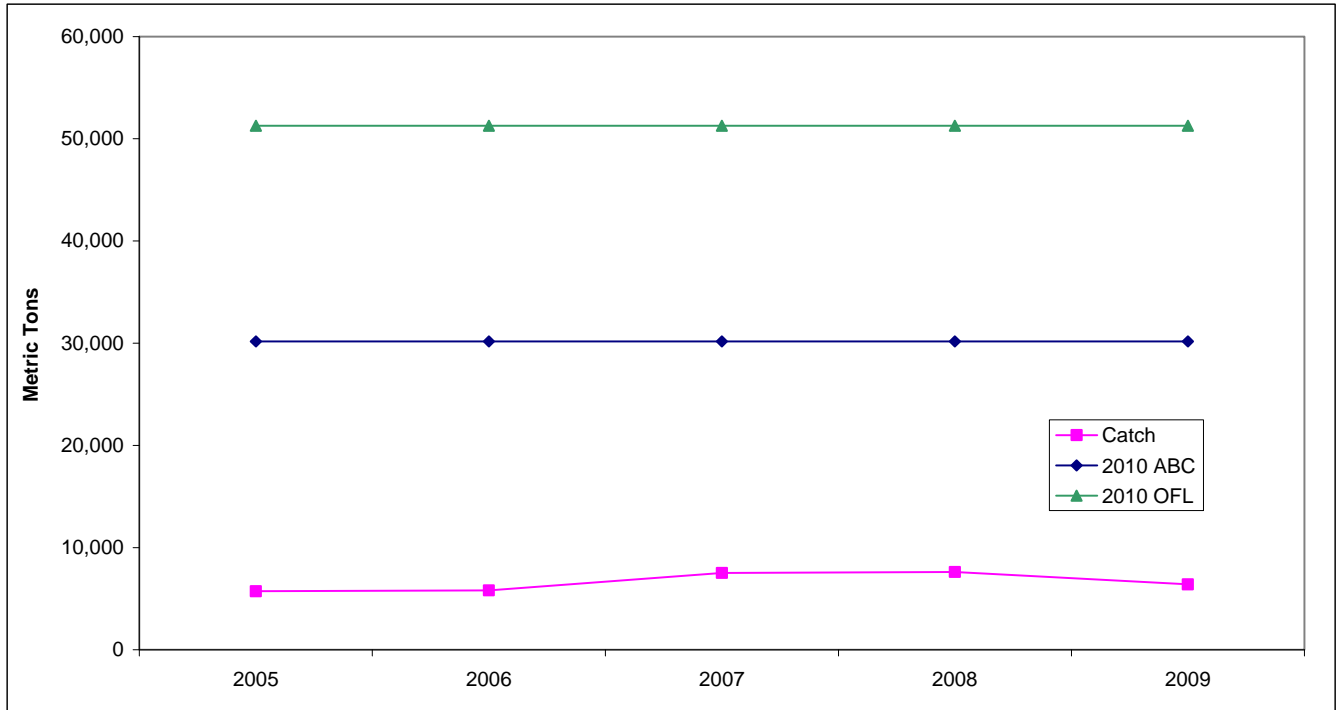


Figure 11 Cumulative Catch (mt) by Year (2005-09) for BSAI Sculpins.

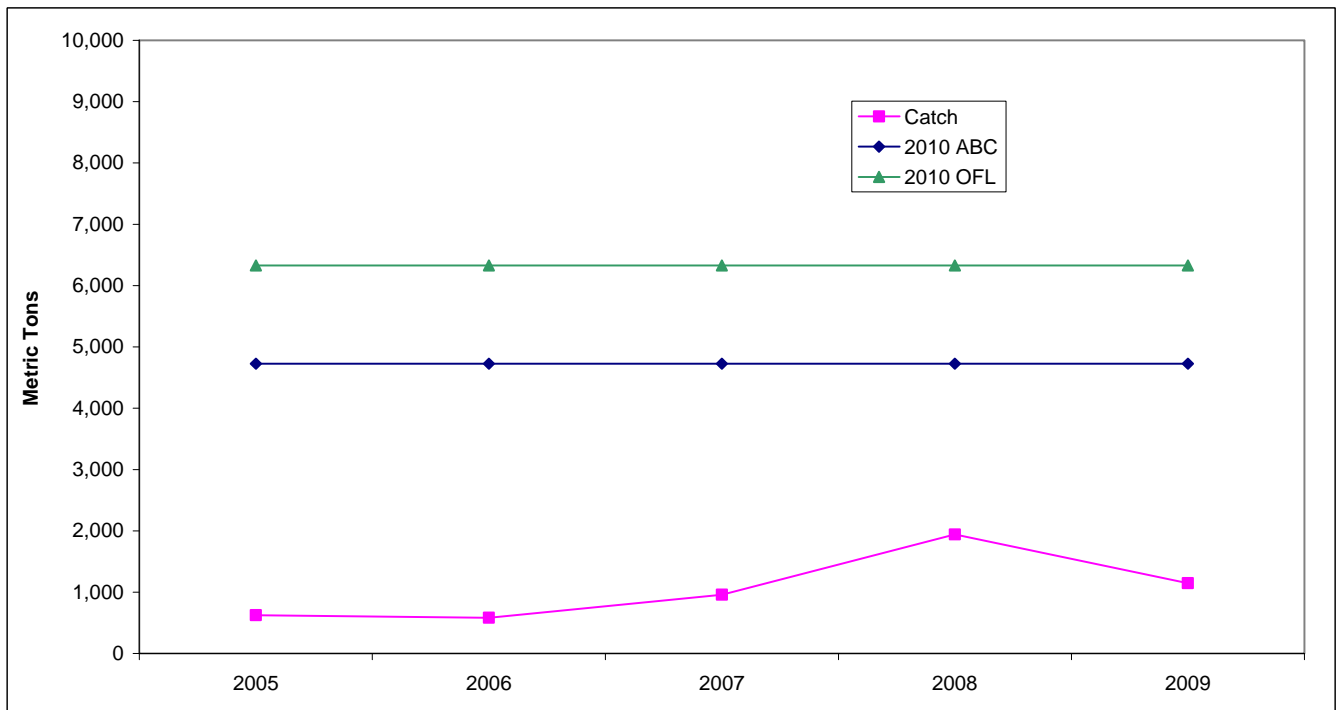


Figure 12 Cumulative Catch (mt) by Year (2005-09) for GOA sculpins

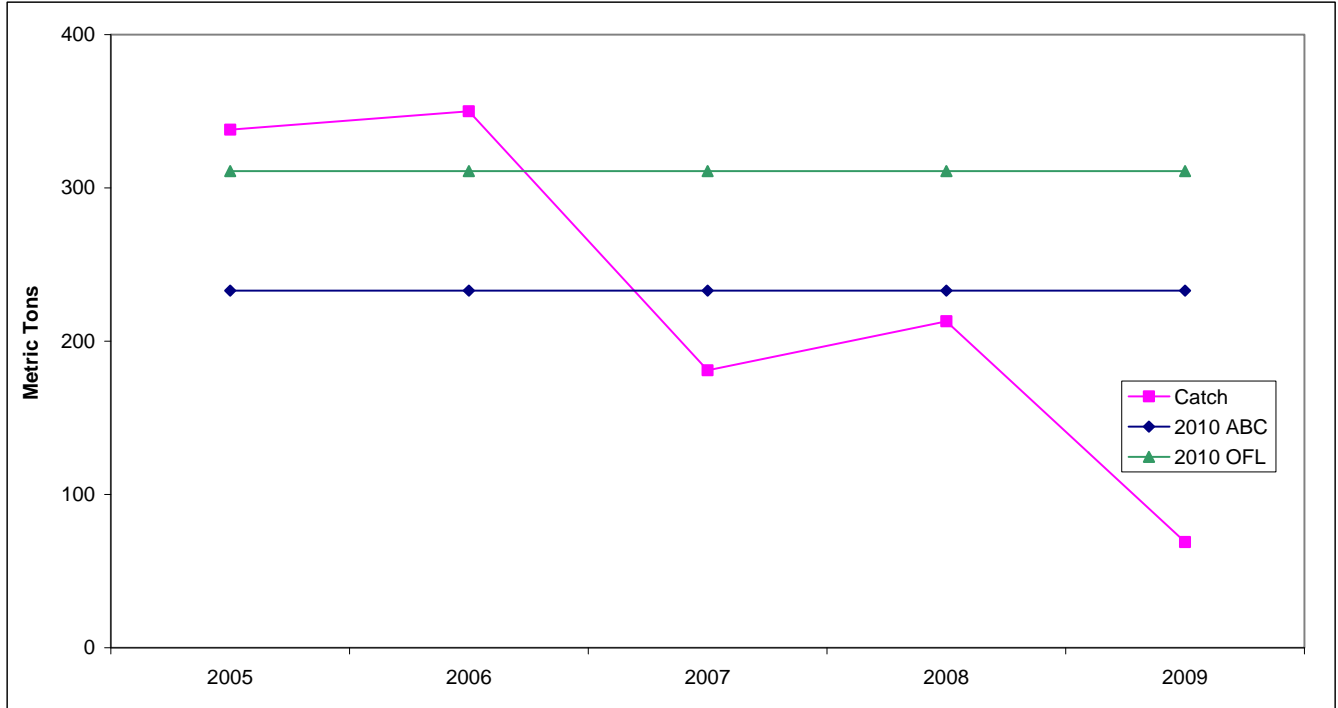


Figure 13 Cumulative Catch (mt) by Year (2005-09) for BSAI Octopuses

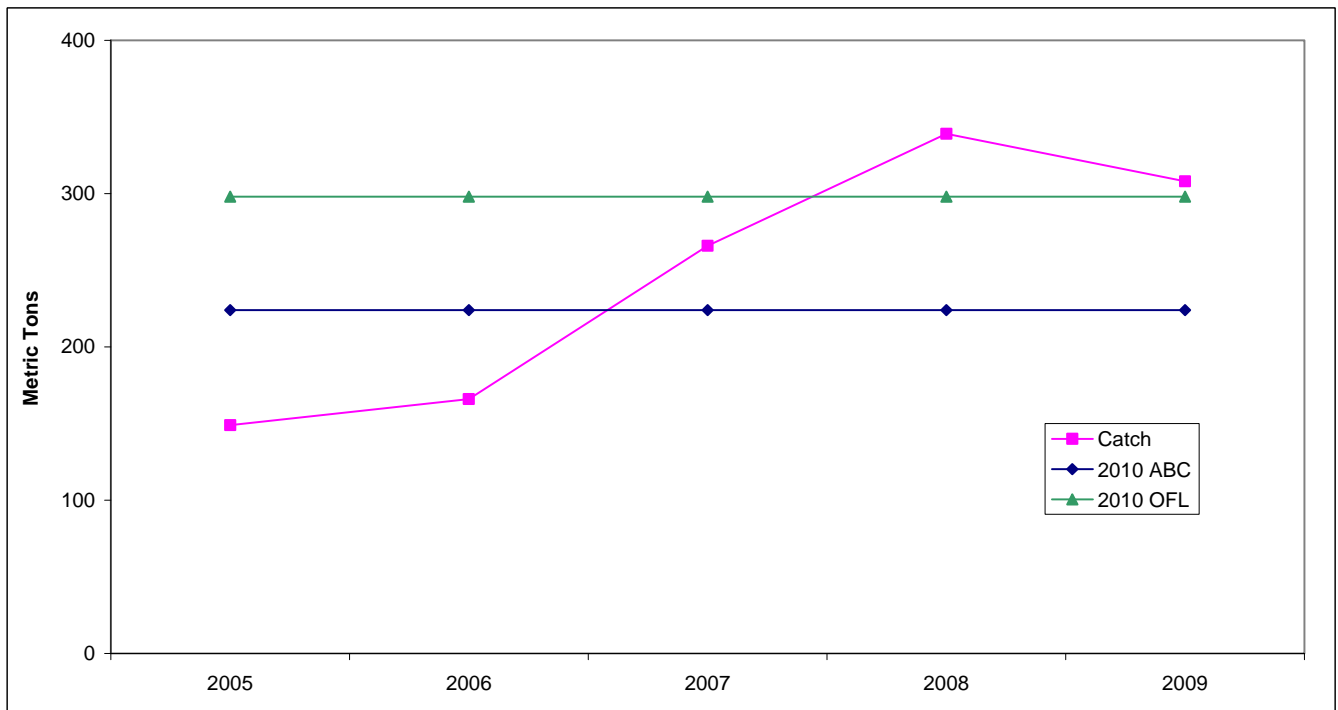


Figure 14 Cumulative Catch (mt) by Year (2005-09) for GOA Octopuses

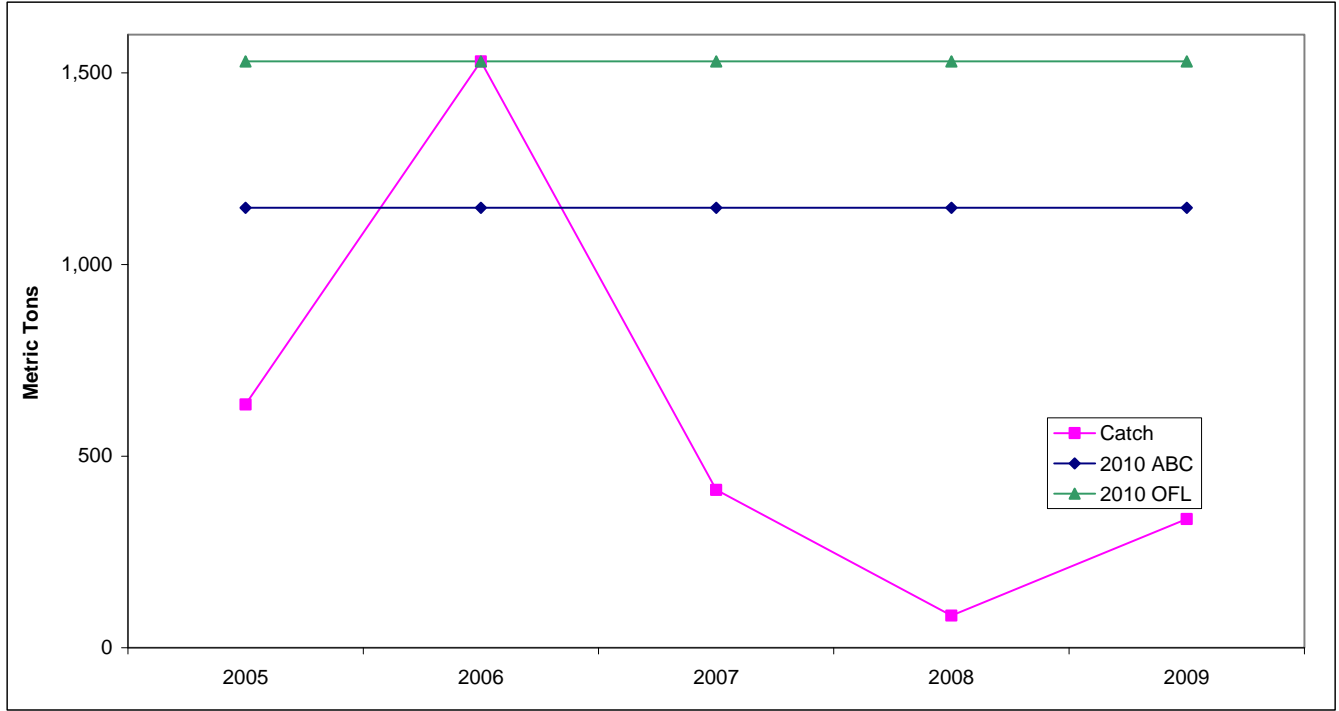


Figure 15 Cumulative Catch (mt) by Year (2005-09) for GOA Squids

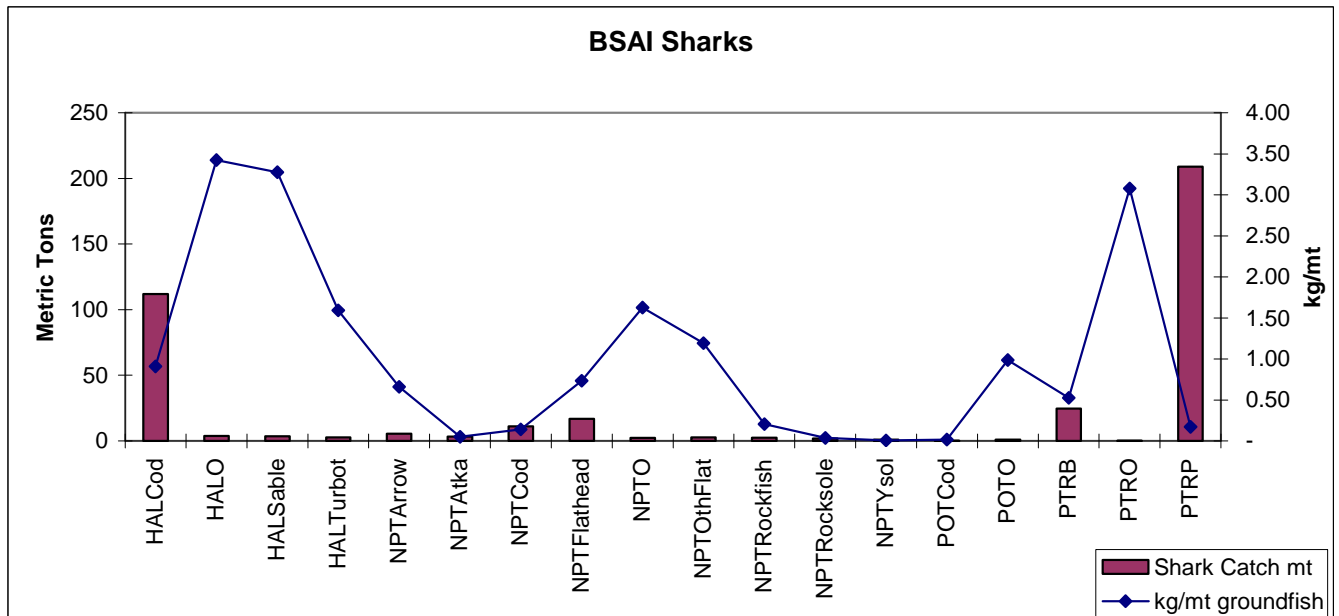


Figure 16 Average Catch (kg) of BSAI Sharks (2003-09) by Target Fishery and Gear Type (mt)

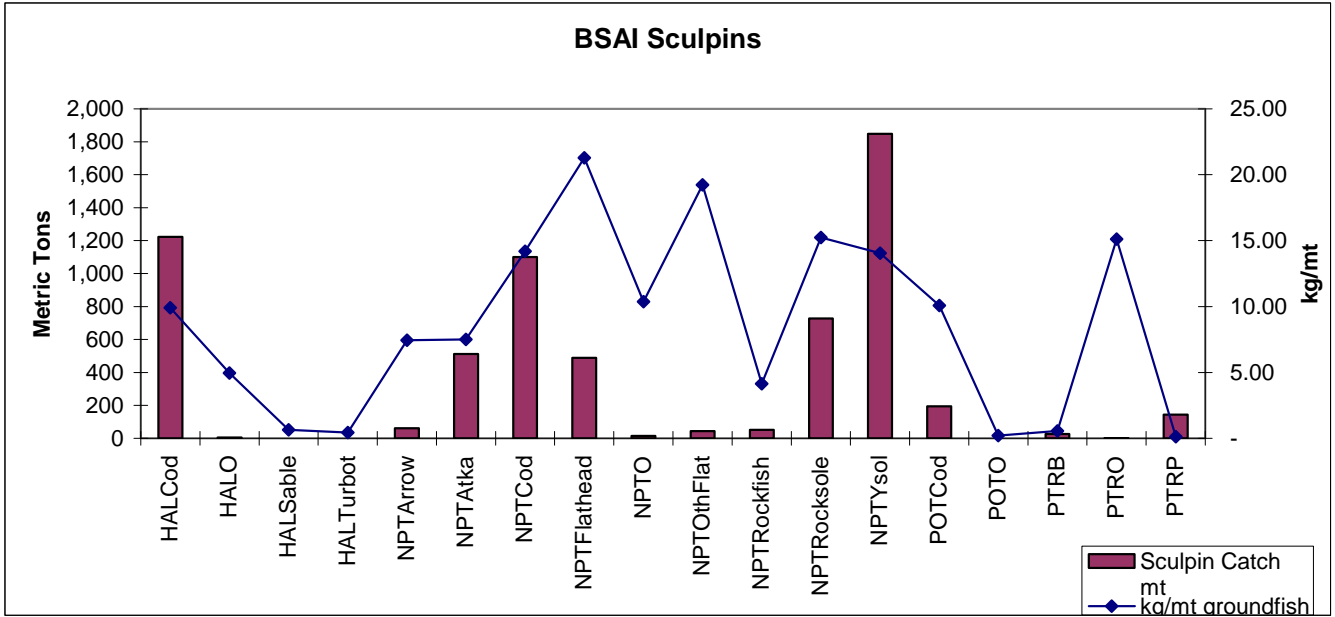


Figure 17 Average Catch (kg) of BSAI Sculpins (2003-09) by Target Fishery and Gear Type (mt)

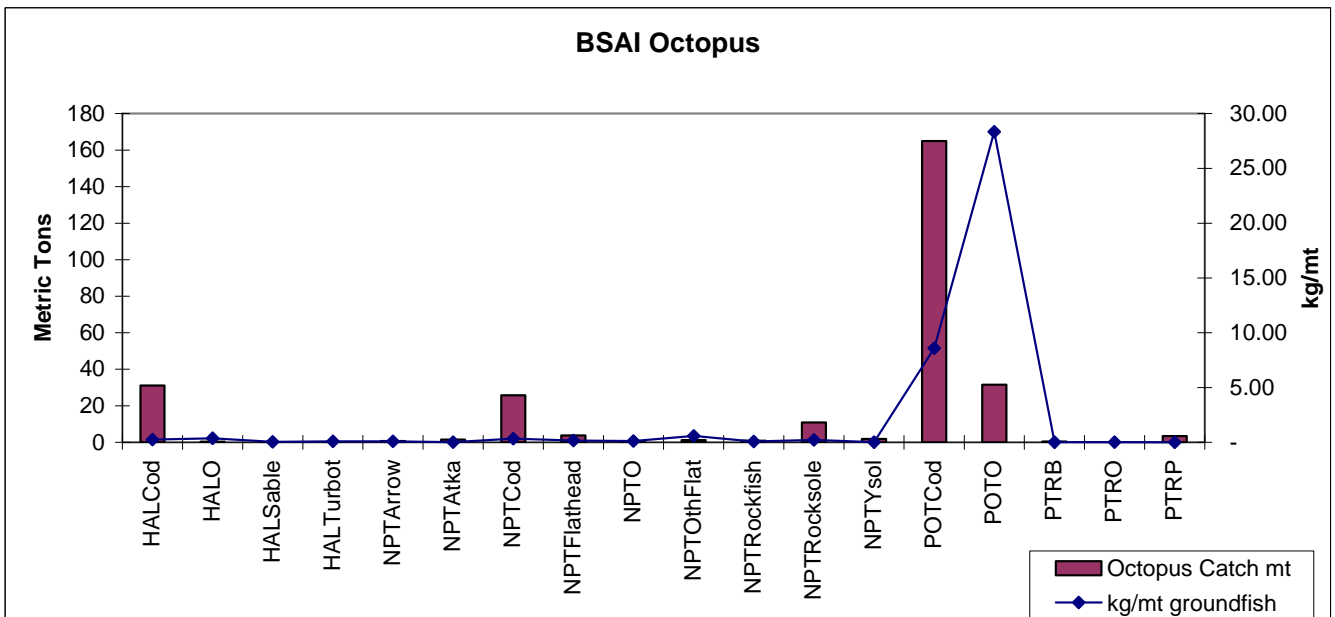


Figure 18 Average Catch (kg) of BSAI Octopuses (2003-09) by Target Fishery and Gear Type (mt)

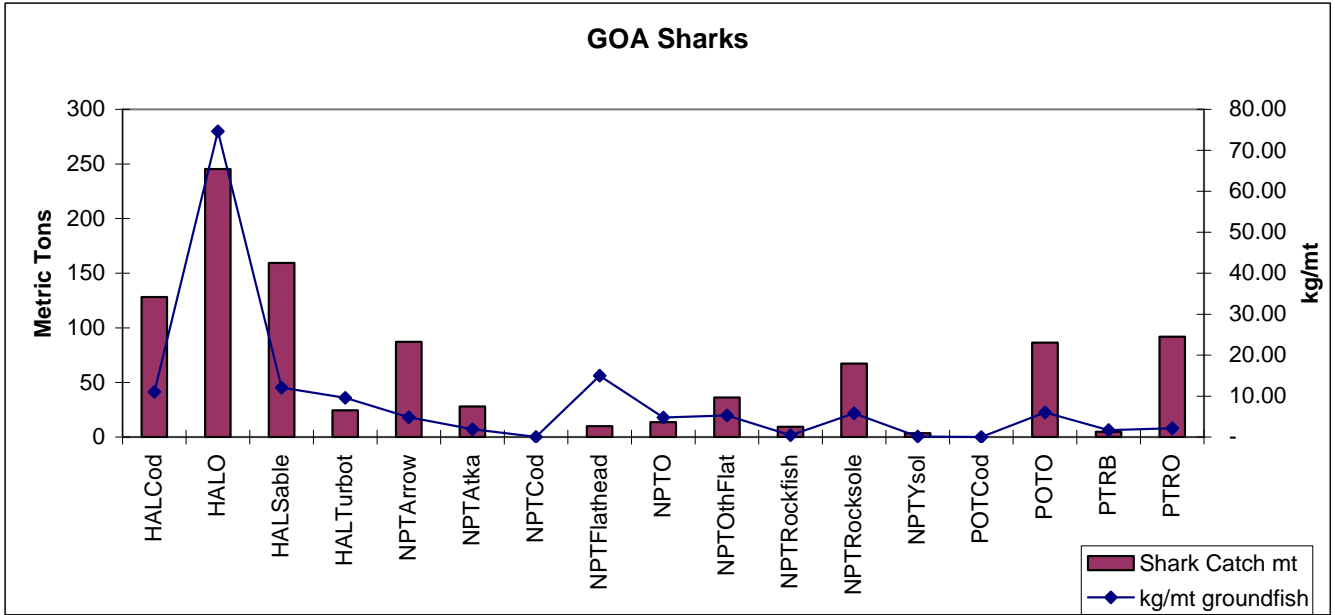


Figure 19 Average Catch (kg) of GOA Sharks (2003-09) by Target Fishery and Gear Type (mt)

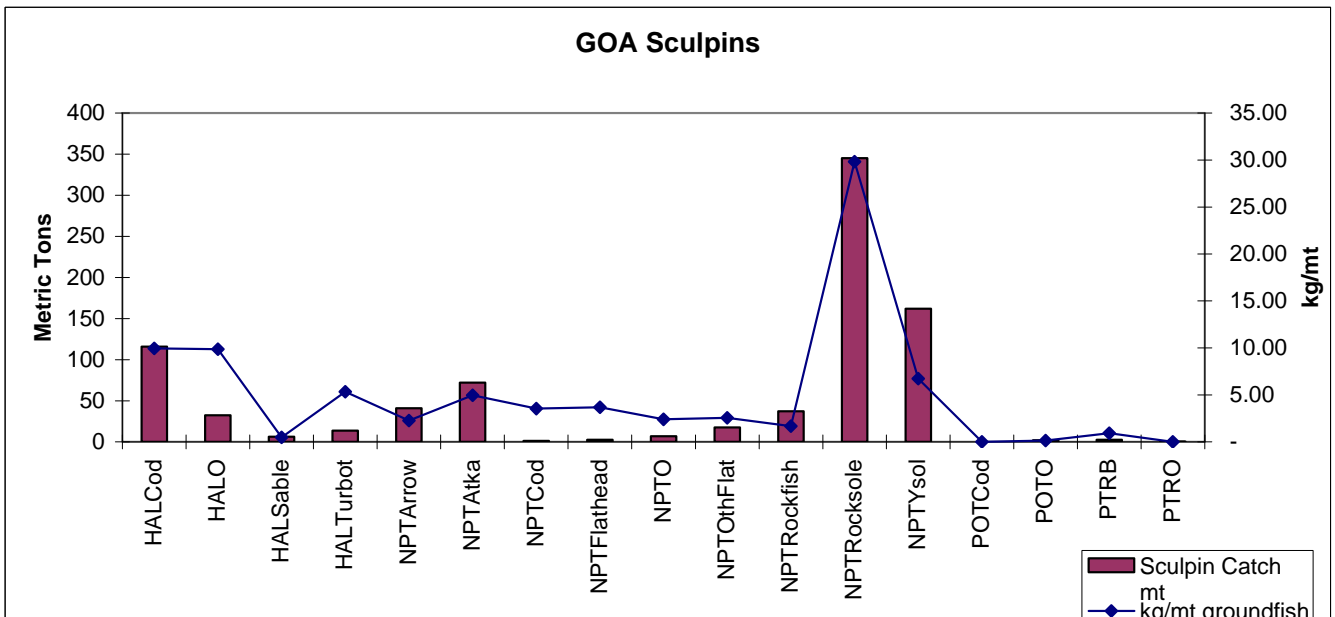


Figure 20 Average Catch (kg) of GOA Sculpins (2003-09) by Target Fishery and Gear Type (mt)

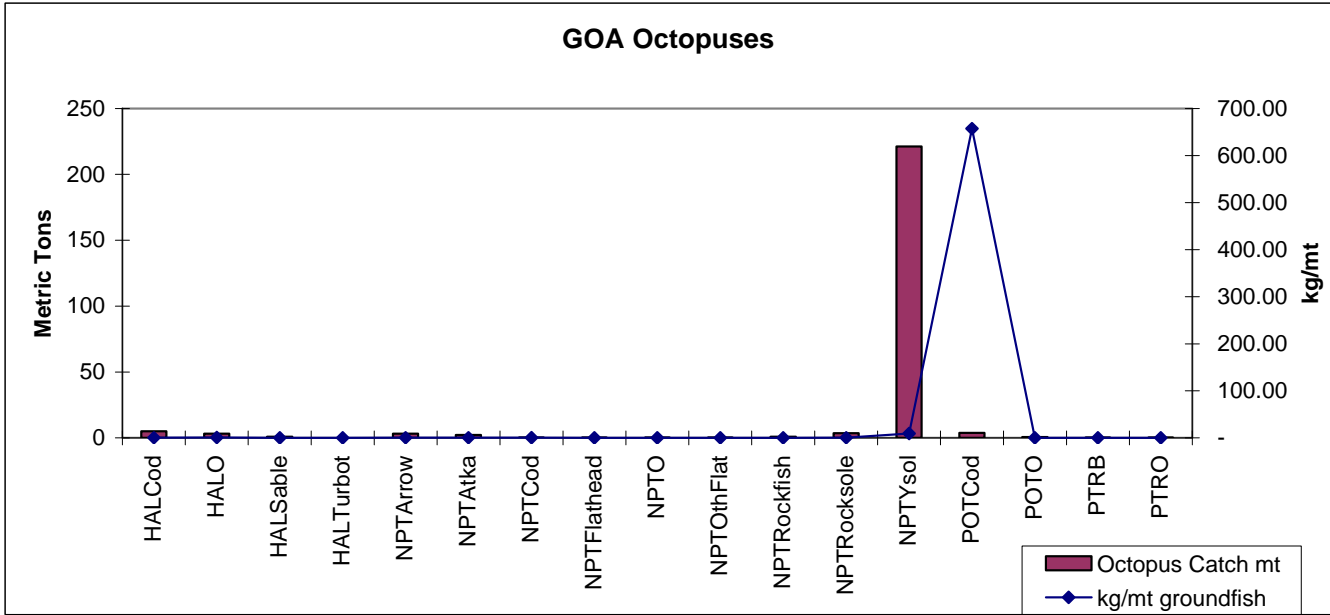


Figure 21 Average Catch (kg) of GOA Octopuses (2003-09) by Target Fishery and Gear Type (mt)

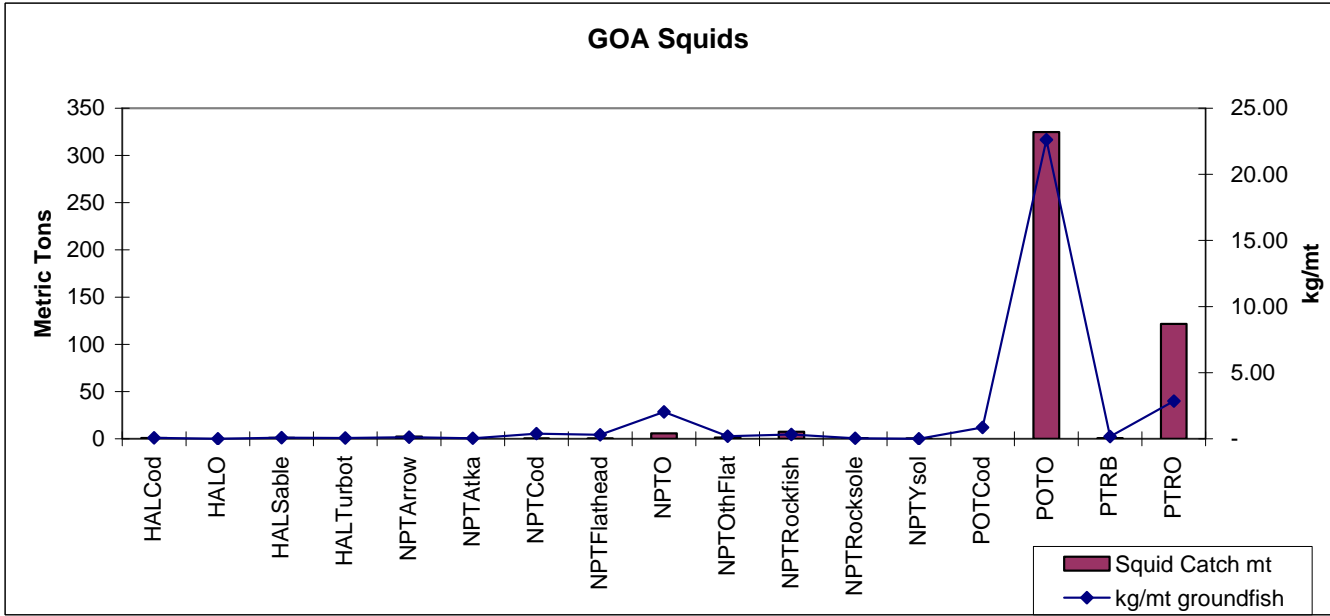


Figure 22 Average Catch (kg) of GOA Squids (2003-09) by Target Fishery and Gear Type (mt)

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 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 FMP 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 an Fofl and Fmsy that will rebuild the stock within an appropriate time frame.

Whether a stock is experiencing overfishing or not 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 FMPs (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 FMP still must address them in its OY specification. The Council is constrained in the OY specification for the BSAI by the statutory requirement that OY shall not exceed 2 million mt for the BSAI (2004 Consolidated Appropriations Act). OY can be adjusted downward for the BSAI groundfish fisheries. The amendment to the groundfish FMPs would describe the location in the FMPs 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 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 referred to in the section 3.2.2.2 where the optimum yield for the groundfish complex is described.

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 add text to the FMPs to 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.

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. Starting in 2010, all types of catch, including bait, state waters, and research catch (scientific research permits, letters of acknowledgement and exempted fishing permits), is estimated each year and provided to the stock assessment authors for use in their catch modeling 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.

**Amendment 87 to the Fishery Management Plan for Groundfish of the Gulf of Alaska.
Draft Language prepared by AFSC and AKR SFD 1/12/10. Not reviewed by GCAK.**

The following changes would be needed under Amendment 87 if Alternative 2 was selected for implementation.

1. Revise the following sections of Table ES-2 to read as follows:

Table ES- 1 Summary of Management Measures for the GOA Groundfish Fishery

Stocks	All finfish, except salmon, steelhead, halibut, herring, and tuna, which are distributed or exploited in the management area, and are listed in Table 3-1. Those stocks and stock complexes that are commercially important and for which an annual TAC is established include: walleye pollock, Pacific cod, sablefish, shallow and deep water flatfish, rex sole, flathead sole, arrowtooth flounder, Pacific ocean perch, shortraker/rougheye rockfish, northern rockfish, "other slope" rockfish, pelagic shelf rockfish, demersal shelf rockfish, thornyhead rockfish, Atka mackerel, sculpins, octopus, sharks, squid, and skates.
Optimum Yield (OY) and Maximum Sustainable Yield (MSY)	The OY of the GOA groundfish complex (consisting of stocks listed in the 'target species' and 'other species' categories, as listed in Table 3-1) is in the range of 116,000 to 800,000 mt. The upper end of the range is derived from historical estimates of MSY.
Procedure to set Total Allowable Catch (TAC)	Based on the annual Stock Assessment and Fishery Evaluation (SAFE) report, the Council will recommend to the Secretary of Commerce TACs and apportionments thereof for each target species. TAC for the "other species" category will be set at 5% of the summed target species TACs. Up to two years of TACs may be established for certain species. Reserve: 20% of the TAC for pollock, Pacific cod, flatfish, sculpins, octopus, sharks, and squid and the "other species" category is set aside to form the reserve, which may be reapportioned to these fisheries at any time and in any amount by the Regional Administrator.

2. Revise paragraph 2 of ES.3 to read as follows

Chapter 3 contains the conservation and management measures that regulate the GOA groundfish fisheries. Section 3.1 denotes the area and stocks governed by the FMP, and describes the three ~~five~~ categories of species or species groups likely to be taken in the groundfish fishery. Section 3.2 specifies the procedures for determining harvest levels for the groundfish species, and includes the maximum sustainable yield and optimum yield of the groundfish complex. Sections 3.3 to 3.6 contain permit and participation, gear, time and area, and catch restrictions for the groundfish fisheries, respectively. Section 3.7

describes the specific management measures for the quota share program in place in the fixed gear sablefish fishery. Measures that allow flexible management authority are addressed in Section 3.8, and Section 3.9 designates monitoring and reporting requirements for the fisheries. Section 3.10 describes the schedule and procedures for review of the FMP or FMP components.

3. Revise the Table of Contents and List to correspond with this FMP amendment

4. Revise section 3.1.2 to read as follows:

Stocks

Stocks governed by the FMP include all finfish, except salmon, steelhead, halibut, herring, and tuna, which are distributed or are exploited in the area described in Section 3.1.1, and which are listed in Table 3-1. Harvest allocations and management are based on the calendar year.

Three ~~Five~~ categories of species or species groups are likely to be taken in the groundfish fishery. Species may be split or combined within the “target species” category according to procedures set forth in Section 3.2.3 without amendments to this FMP, notwithstanding the designation listed in the FMP. The species categories are listed either within the fishery or within the ecosystem component. The optimum yield concept and essential fish habitat requirements are applied to the species category within the fishery ~~all except the “prohibited species” category~~. These categories are tabulated in Table 3-1 and are described as follows:

1. Within the Fishery:

- a. Target species – are those species that support a single species or mixed species target fishery, are commercially important, and for which a sufficient data base exists that allows each to be managed on its own biological merits. Accordingly, a specific total allowable catch (TAC) is established annually for each target species. Catch of each species must be recorded and reported. This category includes walleye pollock, Pacific cod, sablefish, shallow and deep water flatfish, rex sole, flathead sole, arrowtooth flounder, Pacific ocean perch, shortraker/rougheye rockfish, northern rockfish, “other slope” rockfish, pelagic shelf rockfish, demersal shelf rockfish, thornyhead rockfish, Atka mackerel, squid, sculpin, sharks, octopus, and skates.

2. Ecosystem Component:

- a. Prohibited Species – are those species and species groups the catch of which must be avoided while fishing for groundfish, and which must be immediately returned to sea with a minimum of injury except when their retention is authorized by other applicable law (see also Prohibited Species Donation Program described in Section 3.6.1.1. Groundfish species and species groups under the FMP for which the quotas have been achieved shall be treated in the same manner as prohibited species.
- b. Forage fish species – are those species listed in Table 3-1, which are a critical food source for many marine mammal, seabird and fish species. The forage fish

species category is established to allow for the management of these species in a manner that prevents the development of a commercial directed fishery for forage fish. Management measures for this species category will be specified in regulations and may include such measures as prohibitions on directed fishing, limitations on allowable bycatch retention amounts, or limitations on the sale, barter, trade or any other commercial exchange, as well as the processing of forage fish in a commercial processing facility.

- ~~3. Nonspecified species are those species and species groups of no current economic value taken by the groundfish fishery only as an incidental catch in the target fisheries. Virtually no data exist which would allow population assessments. No record of catch is necessary. The allowable catch for this category is the amount that is taken incidentally while fishing for target and other species, whether retained or discarded.~~

Table 3-1 Species and Species Groups in the FMP Species Categories

In the Fishery	
Target Species²	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 roughey rockfish, other slope rockfish, pelagic shelf rockfish, demersal shelf rockfish ³ , thornyhead rockfish) Atka mackerel Skates (big and longnose skates, other skates) Squid Sculpins Sharks Octopus
Ecosystem Component	
Prohibited Species¹	Pacific halibut Pacific herring Pacific salmon Steelhead trout King crab Tanner crab
Forage Fish Species⁴	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)

¹Must be immediately returned to the sea

²TAC for each listing. Species and species groups may or may not be targets of directed fisheries.

³Management delegated to the State of Alaska

⁴Management measures for forage fish are established in regulations implementing the FMP

5. Revise the introduction to Section 3.2, delete sections 3.2.5 and 3.2.7, renumber Section 3.2.6 to 3.2.3.4.3 and its corresponding subsection numbers for the new subsection numbers, and revise Sections 3.2.1-3.2.4 to read as follows:

Section 3.2 Determining Harvest Levels

This section of the FMP provides the basis for determining harvest levels in the groundfish fisheries. Section 3.2.1 defines terms used in the harvest specification process. Maximum sustainable yield and optimum yield, which are specified indefinitely for the groundfish fishery as a whole, are addressed in Section 3.2.2. Harvest specifications that are made annually, such as the overfishing limit, acceptable biological catch, and total allowable catch, are described in Section 3.2.3. Section 3.2.4 describes accountability measures.

The Council's harvest strategy was reviewed in 2002 by Goodman et al. The report contains a historical overview of the Council's approach to fishery harvest management, and an analysis of single-species, multispecies and ecosystem issues relating to the harvest strategy. The report is available by request from the Council office.

3.2.1 Definitions of Terms

Maximum sustainable yield (MSY) is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions, [fishery technological characteristics \(e.g., gear selectivity\), and distribution of catch among fleets.](#)

Optimum yield (OY) is 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 MSY 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 MSY in such fishery.

Maximum fishing mortality threshold (MFMT), also called the “OFL control rule”) is the level of fishing mortality (F), on an annual basis, used to compute the smallest annual level of catch that would constitute overfishing. Overfishing occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. The MFMT may be expressed either as a single number (i.e., a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.

Overfishing limit (OFL) is the annual amount of catch that results from applying the MFMT to a stock or stock complex's abundance. The OFL is the catch level above which overfishing is occurring.

Minimum stock size threshold (MSST) is the level of biomass below which the stock or stock complex is considered to be overfished. 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 MFMT.

Acceptable biological catch (ABC) is a level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. The ABC is set below the OFL.

Annual catch limit (ACL) is the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures. ACL cannot exceed the ABC, and may be divided into sector-ACLs.

Total allowable catch (TAC) is the annual catch target for a stock or stock complex, derived from the ABC by considering social and economic factors and management uncertainty (i.e., uncertainty in the ability of managers to constrain catch so the ACL is not exceeded, and uncertainty in quantifying the true catch amount).

3.2.2 Maximum Sustainable Yield and Optimum Yield for the Groundfish Fishery

MSY and OY are specified as fixed ranges in the FMP, and apply to the groundfish fishery as a whole. The harvest specifications and status determinations are made annually, and apply to individual stocks and stock complexes within the "target species" category.

3.2.2.1 Maximum Sustainable Yield

The groundfish complex and its fishery are a distinct management unit of the Gulf of Alaska. This complex forms a large subsystem of the GOA ecosystem with intricate interrelationships between predators and prey, between competitors, and between those species and their environment. Ideally, concepts such as productivity and MSY should be viewed in terms of the groundfish fishery as a unit rather than for individual stocks or stock complexes. Due to the difficulty of estimating the parameters that govern interactions between species, however, estimates of MSY for the groundfish fishery have sometimes been computed by summing MSY estimates for the individual stocks and stock complexes.

Early studies estimated MSY for the GOA groundfish complex ranging from 804,950 mt in 1983 to 1,018,750 mt for the 1987 fishing year. This range was obtained by summing the MSY ranges for each stock or stock complex in the fishery (see Section 4.3.1, History of Exploitation). However, current multi-species models suggest that the sum of single-species MSYs provides a poor estimate of MSY for the groundfish complex as a whole (Walters et al. 2005) because biological reference points for single stocks, such as F_{MSY} , may change substantially when multi-species interactions are taken into account (Gislason 1999; Collie and Gislason 2001). Fishing mortality rates for prey species that are consumed by other marine predators should be conditioned on the level of predation mortality, which may change over time depending on predator population levels.

An ecosystem perspective suggests that the MSY of the groundfish fishery may change if an environmental regime shift occurs or if the present mix of species is altered substantially. Also, as new data are acquired and as statistical methodology evolves over time, it is to be expected that estimates of MSY will change, even if the ecosystem has remained relatively stationary. Therefore, estimates of MSY contained in this section should be viewed in context, as historical estimates that guided development of the FMP.

3.2.2.2 Optimum Yield

The range of optimum yield specified in the FMP is 116,000-800,000 mt of groundfish for the target species, to the extent this can be harvested consistently with the management measures specified in this FMP. This range was established in 1987 by Amendment 15 based on the examination of historical and recent catches, recent determinations of ABC, and recent and past estimates of MSY for each major groundfish species. This derivation from historical estimates of MSY and fishery performance reflects the combined influence of biological, ecological, and socioeconomic factors. The end points of the range were derived as described below.

For the minimum value, 116,000 mt was approximately equal to the lowest historical groundfish catch during the 21-year period 1965-1985 (116,053 mt in 1971, NPFMC 1986). In that year catches of pollock, Pacific cod and Atka mackerel were all at very low levels. Given the status of the groundfish resources and the present management regime, it was considered extremely unlikely that future total harvest would fall below this level. Thus, the TACs must be established so as to result in a sum of at least 116,000 mt.

The upper end of the OY range, 800,000 mt, was derived from MSY information. The MSY for all species of groundfish (excluding the other species category) between 1983 and 1987 ranged from 804,950 mt in 1983 to 1,137,750 mt for the 1987 fishing year. The average MSY over the five-year period was 873,070 mt. Therefore, the upper end of the range is approximately equal to 92 percent of the mean MSY for the five-year period. The ABC summed for all species ranged from 457,082 mt in 1985 to 814,752 mt in 1987. Most of the variation in the ABC and catch over the five-year interval resulted from changes in the status of two species: pollock and flounder. Pollock ABC ranged from 112,000 mt in 1987 to 516,600 mt in 1984; while flounder ABC ranged from 33,500 mt in 1985 to 537,000 mt in 1987. Therefore, the 800,000 mt upper end of the OY range was selected in consideration of the volatility in pollock and flounder ABC, and the potential for harvesting at MSY.

In 1987, the OY specification for GOA groundfish fishery was established as part of Amendment 15 to the GOA Groundfish FMP. The lower end of OY is equal to the lower end of MSY, 116,000 mt. The upper end of the range for OY were set with 800,000 mt being 92 percent of the MSY five-year average at that time. This eight percent reduction provides some allowance to ensure OY does not exceed MSY. The EA for Amendment 15 stated that environmental impacts of managing under the GOA-wide OY were difficult to measure but likely insignificant compared to natural perturbations (NPFMC 1986). Establishing the GOA-wide OY allowed for management that could prevent overfishing and provided for more effective management than having individual stock OYs that could only be changed with FMP amendments.

A programmatic supplemental environmental impact statement (PSEIS) was completed in June, 2004. The preferred alternative identified in the PSEIS retained the existing OY range. In addition to impacts on the stocks and stock complexes in the “target species” category the PSEIS analyzed impacts on prohibited species, forage fish, non-specified species, habitat, seabirds, and marine mammals. Ecosystem-level variables analyzed were pelagic forage availability, removal of top predators, introduction of non-native species, energy removal, energy redirection, species diversity, functional diversity (in terms of both trophic relationships and structural habitat), and genetic diversity. Effects were partitioned into direct and indirect effects, persistent past effects,

reasonably foreseeable future external effects, and cumulative effects. For the preferred alternative, approximately half of the ecosystem-level effects were determined to be insignificant, conditionally significant/positive, or significant/positive; none were determined to be significant/negative.

The ecological factors that may be considered in the reduction of OY from MSY are described in Section 4.6, ecosystem consideration for management of the groundfish fisheries, and is addressed in the ongoing consideration of this information in the development of the SAFE reports. Section 4.6.2 and 4.6.3 describes climate implicated changes and ecosystem interactions that may be considered an ecological factor that may affect the setting of OY.

The important social and economic factors may be summarized as follows:

1. The OY range is not likely to have any significant detrimental impact on the industry. On the contrary, specification of OY as a constant range helps to create a stable management environment in which the industry can plan its activities consistently, with an expectation that each year's total groundfish catch will be at least 116,000 mt.
2. The OY range encompasses the annual catch levels taken in the period immediately prior to its implementation, during which the fishery operated profitably.

The Magnuson-Stevens Act requires Councils to “review on a continuing basis, and revise as appropriate, the assessments and specifications made ... with respect to the optimum yield.” In particular, OY may need to be respecified in the future if major changes occur in the estimate of MSY for the groundfish complex. Likewise, OY may need to be respecified if major changes occur in the ecological, social, or economic factors governing the relationship between OY and MSY.

3.2.3 Annual Specifications and Status Determinations for Stocks and Stock Complexes

In contrast to MSY and OY, many harvest specifications and status determinations are made annually rather than indefinitely, and for individual stocks and stock complexes rather than for the groundfish fishery as a whole. This subsection describes the information and procedures used to make such specifications and determinations.

3.2.3.1 Information and Procedures Applicable in General

Information and procedures that are applicable to annual harvest specifications in general are presented in this subsection. Information and procedures specific to each of the various management measures are presented in their respective subsections.

3.2.3.1.1 Identification of Stocks and Stock Complexes for Which Specifications are Made

Notwithstanding designated stocks or stock complexes listed by category in Table 3-1, the Council may recommend splitting or combining stocks or stock complexes in the “target species” category for purposes of establishing a new harvest specification unit if such action is desirable based on commercial importance of a stock or stock complex or if sufficient biological

information is available to manage a stock or stock complex on its own merits. Use of a particular harvest specification unit for one management measure (e.g., OFL) does not limit the Council's ability to establish a different harvest specification unit for some other management measure (e.g., separate TACs could be specified for the GOA statistical areas while OFL is specified for the entire GOA).

3.2.3.1.2 Stock Assessment and Fishery Evaluation Report

Scientists from the Alaska Fisheries Science Center, the Alaska Department of Fish and Game, other agencies, and universities prepare a Stock Assessment and Fishery Evaluation (SAFE) report annually. The SAFE report is scientifically based, citing data sources and interpretations. The SAFE report provides information to the Council for determining annual harvest specifications, documenting significant trends or changes in the stocks, marine ecosystem, and fisheries over time; and assessing the relative success of existing State and Federal fishery management programs. This document is reviewed first by the Groundfish Plan Team, then by the SSC and AP, and then by the Council. The review by the SSC constitutes the official scientific review for purposes of the Information Quality Act. Upon review and acceptance by the SSC, the SAFE report and any associated SSC comments constitute the best scientific information available for purposes of the Magnuson-Stevens Act.

The SAFE report consists of three volumes: a volume containing stock assessments, a volume containing economic analysis, and a volume describing ecosystem considerations.

The 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 SAFE report 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; bycatch taken in other fisheries; state commercial, recreational, and subsistence fisheries; catches taken during scientific research; and catches taken during the prosecution of exempted fisheries.

The other two volumes contain additional economic, social, community, essential fish habitat, and ecological information pertinent to the success of management or the achievement of FMP objectives.

3.2.3.1.3 Process and Timeline of Council Recommendations, Public Review, and Secretarial Decision

The Council will develop its harvest specifications recommendations for Secretarial consideration using the following: 1) recommendations of the Plan Team and Council's SSC and information presented by the Plan Team and SSC in support of these recommendations; 2) information presented by the Council's Advisory Panel and the public; and 3) other relevant information.

In consultation with the Council, the Secretary will establish harvest specifications, including TACs and apportionments thereof, and reserves for each target species category, by January 1 of the new fishing year, or as soon as practicable thereafter, by means of regulations published in the Federal Register. Harvest specifications may be effective for up to two fishing years. Final

harvest specifications are implemented by mid-February each year to replace those already in effect for that year, based on new information contained in the latest SAFE report.

As soon as practicable after its October meeting, the Council will recommend proposed harvest specifications to the Secretary. The Council's recommendation will include proposed harvest specifications for each stock or stock complex within the "target species" category, the basis for each proposed harvest specification, and a description of developing information that may be relevant to the final harvest specifications. As soon as practicable after the October meeting and after considering the Council's recommended proposed harvest specifications, the Secretary will publish in the Federal Register a notice of proposed harvest specifications and make available for public review and comment all information regarding the basis for the harvest specifications. The notice of proposed harvest specifications will identify whether and how harvest specifications are likely to be affected by developing information unavailable at the time the notice is published. The public review and comment period on the notice of proposed harvest specifications will be a minimum of 15 days.

At its December meeting, the Council will review the final SAFE report, recommendations from the Groundfish Plan Team, SSC, AP, and comments received. The Council will make final harvest specification recommendations to the Secretary. As soon as practicable thereafter and after considering the Council's recommendation, the Secretary will publish final harvest specifications for the groundfish fishery. New final harvest specifications will supersede current harvest specifications on the effective date of the new harvest specifications. However, if the Secretary determines that the notice of final specifications would not be "a logical outgrowth" of the notice of proposed harvest specifications (i.e., the notice of proposed harvest specifications was inadequate to afford the public opportunity to comment meaningfully on the issues involved), the Secretary will either: (1) publish a revised notice of proposed harvest specifications in the Federal Register, solicit public comment thereon, and publish a notice of final harvest specifications, as soon as is practicable; or (2) if "good cause" pursuant to the Administrative Procedure Act exists, waive the requirements for notice and comment and 30-day delayed effectiveness and directly publish a notice of final harvest specifications with a post-effectiveness public comment period of 15 to 30 days.

3.2.3.2 Overfishing Limit

Specification of OFL begins with the MFMT (also known as the OFL control rule). The MFMT is prescribed through a set of six tiers which are listed below in descending order of preference, corresponding to descending order of information availability. The Council's Science and Statistical Committee (SSC) will have final authority for determining whether a given item of information is "reliable" for the purpose of this definition, and may use either objective or subjective criteria in making such determinations.

For tier (1), a "pdf" refers to a probability density function. For tiers 1 and 2, if a reliable pdf of B_{MSY} is available, the preferred point estimate of B_{MSY} is the geometric mean of its pdf. For tiers 1 to 5, if a reliable pdf of B is available, the preferred point estimate is the geometric mean of its pdf. For tiers 1 to 3, the coefficient α is set at a default value of 0.05. This default value was established by applying the 10 percent rule suggested by Rosenberg et al. (1994) to the $1/2 B_{MSY}$ reference point. However, the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific information. For tiers 2 to 4, a designation of the form " $F_{X\%}$ " refers to the fishing mortality rate (F) associated with an equilibrium level of spawning per recruit equal to $X\%$ of the equilibrium level of spawning per recruit in the absence of any fishing. If reliable information sufficient to characterize the entire maturity schedule of a

species is not available, the SSC may choose to view spawning per recruit calculations based on a knife-edge maturity assumption as reliable. For tier 3, the term $B_{40\%}$ refers to the long-term average biomass that would be expected under average recruitment and $F=F_{40\%}$.

Tier 1 Information available: reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY} .

1a) Stock status: $B/B_{MSY} > 1$
 $F_{OFL} = mA$, the arithmetic mean of the pdf

1b) Stock status: $\alpha < B/B_{MSY} \leq 1$
 $F_{OFL} = mA \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

1c) Stock status: $B/B_{MSY} \leq \alpha$
 $F_{OFL} = 0$

Tier 2 Information available: reliable point estimates of B , B_{MSY} , F_{MSY} , $F_{35\%}$, and $F_{40\%}$.

2a) Stock status: $B/B_{MSY} > 1$
 $F_{OFL} = F_{MSY}$

2b) Stock status: $\alpha < B/B_{MSY} \leq 1$
 $F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

2c) Stock status: $B/B_{MSY} \leq \alpha$
 $F_{OFL} = 0$

Tier 3 Information available: reliable point estimates of B , $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.

3a) Stock status: $B/B_{40\%} > 1$
 $F_{OFL} = F_{35\%}$

3b) Stock status: $\alpha < B/B_{40\%} \leq 1$
 $F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

3c) Stock status: $B/B_{40\%} \leq \alpha$
 $F_{OFL} = 0$

Tier 4 Information available: reliable point estimates of B , $F_{35\%}$, and $F_{40\%}$.

$F_{OFL} = F_{35\%}$

Tier 5 Information available: reliable point estimates of B and natural mortality rate M .

$F_{OFL} = M$

Tier 6 Information available: reliable catch history from 1978 through 1995.

OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information

With the exception of Tier 6, the MFMT is applied to the best estimate of stock size (which may or may not be age structured) for the coming year to produce the OFL, which is expressed in units of catch biomass. In the case of Tier 6, the MFMT is already expressed in units of catch biomass, meaning that the MFMT and the OFL are identical.

3.2.3.3 Acceptable Biological Catch and Annual Catch Limit

3.2.3.3.1 Acceptable Biological Catch

Specification of ABC is similar to specification of OFL, in that both involve harvest control rules with six tiers relating to various levels of information availability. However, somewhat more flexibility is allowed in specifying ABC, in that the control rule prescribes only an upper bound. The steps are as follow:

1. Determine the appropriate tier (this will be the same tier used to specify OFL).
2. Determine the maximum permissible ABC fishing mortality rate from the appropriate tier of the ABC control rule (see below).

3. Except for stocks or stock complexes managed under Tier 6, compute the maximum permissible ABC by applying the maximum permissible ABC fishing mortality rate to the best estimate of stock size (which may or may not be age structured); for stocks and stock complexes managed under Tier 6, the control rule automatically produces a maximum permissible ABC, so application of a fishing mortality rate is unnecessary.
4. Determine whether conditions exist that warrant setting ABC at a value lower than the maximum permissible value (such conditions may include—but are not limited to—data uncertainty, recruitment variability, and declining population trend) and, if so:
 - a. document those conditions,
 - b. recommend an ABC lower than the maximum permissible value, and
 - c. explain why the recommended value is appropriate.

The above steps are undertaken first by the assessment authors in the individual chapters of the SAFE report. The Plan Team then reviews the SAFE report and makes its own recommendation. The SSC then reviews the SAFE report and Plan Team recommendation, and makes its own recommendation to the Council. The Council then reviews the SAFE report, Plan Team recommendation, and SSC recommendation; then makes its own recommendation to the Secretary, with the constraint that the Council’s recommended ABC cannot exceed the SSC’s recommended ABC.

The ABC control rule is as follows (definitions of terms and information requirements for the six tiers are identical to those used in the OFL control rule):

Tier 1 Information available: reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY} .

1a) Stock status: $B/B_{MSY} > 1$
 $maxF_{ABC} = mH$, the harmonic mean of the pdf

1b) Stock status: $\alpha < B/B_{MSY} \leq 1$
 $maxF_{ABC} = mH \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

1c) Stock status: $B/B_{MSY} \leq \alpha$
 $maxF_{ABC} = 0$

Tier 2 Information available: reliable point estimates of B , B_{MSY} , F_{MSY} , $F_{35\%}$, and $F_{40\%}$.

2a) Stock status: $B/B_{MSY} > 1$
 $maxF_{ABC} = F_{MSY} \times (F_{40\%}/F_{35\%})$

2b) Stock status: $\alpha < B/B_{MSY} \leq 1$
 $maxF_{ABC} = F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

2c) Stock status: $B/B_{MSY} \leq \alpha$
 $maxF_{ABC} = 0$

Tier 3 Information available: reliable point estimates of B , $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.

3a) Stock status: $B/B_{40\%} > 1$
 $maxF_{ABC} = F_{40\%}$

3b) Stock status: $\alpha < B/B_{40\%} \leq 1$
 $maxF_{ABC} = F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

3c) Stock status: $B/B_{40\%} \leq \alpha$
 $maxF_{ABC} = 0$

Tier 4 Information available: reliable point estimates of B , $F_{35\%}$, and $F_{40\%}$.

$maxF_{ABC} = F_{40\%}$

Tier 5 Information available: reliable point estimates of B and natural mortality rate M .

$maxF_{ABC} = 0.75 \times M$

Tier 6 Information available: reliable catch history from 1978 through 1995.

$$\text{maxABC} = 0.75 \times \text{OFL}$$

The above control rule 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 $\text{max}F_{ABC}$ in Tier 1 of the ABC control rule and F_{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 $\text{max}F_{ABC}$ 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 groundfish species identified as key prey of Steller sea lions (i.e., walleye pollock, Pacific cod, and Atka mackerel), directed fishing is prohibited in the event that the spawning biomass of such a species is projected in the stock assessment to fall below $B_{20\%}$ in the coming year. However, this does not change the specification of ABC or OFL.

3.2.3.3.2 Annual Catch Limit

The ACL is equal to the ABC for each stock and stock complex in the “target species” category.

3.2.3.4 Total Allowable Catch, Reserves, and Apportionments

3.2.3.4.1 Total Allowable Catch

The following procedure is used to specify TACs for every groundfish stock and stock complex managed by the FMP:

1. Determine the ABC for each managed stock or stock complex. ABCs are recommended by the Council’s SSC based on information presented by the Plan Team.
2. Determine a TAC based on biological and socioeconomic information. The TAC must be lower than or equal to the ABC. The TAC may be lower than the ABC if warranted on the basis of bycatch considerations, management uncertainty, or socioeconomic considerations; or if required in order to cause the sum of the TACs to fall within the OY range.
3. Sum TACs for “target species” to assure that the sum is within the optimum yield range specified for the groundfish complex in the FMP. If the sum falls outside this range, the TACs must be adjusted.

3.2.3.4.2 Reserves

Reserves are set at 20 percent of the TAC of pollock, Pacific cod, flatfish, [sculpins](#), [sharks](#), [squid](#), and [octopus](#) and “other species”. At any time, the Regional Administrator may assess these fisheries and apportion to them any amounts from the reserves that is determined will be harvested.

Any additional in-season allocation from reserves may carry with it an additional prohibited species catch (PSC) limit amount proportional to that reserve release and the respective bycatch rates in the affected fisheries.

3.2.3.4.3 Apportionment of Total Allowable Catch

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3.2.3.5 Status Determinations

To the extent practicable, two status determinations are made annually for each stock and stock complex. The first is the “overfishing” status, which describes whether *catch* is too *high*. The second is the “overfished” status, which describes whether *biomass* is too *low*.

3.2.3.5.1 Determination of “Overfishing” Status

The OFL for a given calendar year is specified at the end of the preceding calendar year on the basis of the most recent stock assessment. For each stock and stock complex, a determination of status with respect to “overfishing” is made inseason as the fisheries are monitored to prevent exceeding the TAC and annually as follows: If the catch taken during the most recent calendar year exceeded the OFL that was specified for that year, then overfishing occurred during that year; otherwise, overfishing did not occur during that year.

In the event that overfishing is determined to have occurred, an inseason action, an FMP amendment, a regulatory amendment or a combination of these actions will be implemented to end such overfishing immediately.

3.2.3.5.2 Determination of “Overfished” Status

A stock or stock complex is determined to be “overfished” if it falls below the MSST. According to the National Standard Guidelines definition, the MSST equals 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 MFMT.

The above definition raises two questions: 1) How is the definition to be applied when “the MSY level” cannot be estimated? 2) In the context of an age-structured assessment, what is the meaning of the phrase, “the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years?” These questions are addressed in this FMP as follows:

1) 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 4-6, 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 4-6 is *undefined*.

2) For a stock assessed with an age-structured model (as is typically the case for stocks and stock complexes managed under Tiers 1-3), there is more than one stock size or numbers-at-age vector at which rebuilding to the MSY level would be expected to occur in exactly 10 years. Generally, there is no limit to the range of numbers-at-age vectors that satisfy this constraint, and each of these vectors corresponds to a stock size. Therefore, stock status in Tiers 1-3 is determined annually as follows: The determination of “overfished” status begins with an estimate of the stock’s “current spawning biomass,” which is defined as the estimated spawning biomass for the “current year,” which in turn is defined as the most recent year from which data are used in the assessment. Given these definitions, and with the understanding that $B_{35\%}$ is used as a proxy for B_{MSY} in Tier 3, the determination proceeds as follows:

- a. If current spawning biomass is estimated to be below $\frac{1}{2} B_{MSY}$, the stock is below its MSST.
- b. If current spawning biomass is estimated to be above B_{MSY} the stock is above its MSST.
- c. If current spawning biomass is estimated to be above $\frac{1}{2} B_{MSY}$ but below B_{MSY} , then conduct a large number of stochastic simulations by projecting the numbers-at-age

vector from the current year forward under the assumption that it will be fished at the MFMT in every year, and determine status as follows:

1. If the mean spawning biomass in the 10th year beyond the current year is below B_{MSY} , the stock is below its MSST.
2. Otherwise, the stock is above its MSST.

Within two years of such time as a stock or stock complex is determined to be overfished, an FMP amendment or regulations will be designed and implemented to rebuild the stock or stock complex to the MSY level within a time period specified at Section 304(e)(4) of the Magnuson-Stevens Act. If a stock is determined to be in an overfished condition, a rebuilding plan would be developed and implemented for the stock, including the determination of an F_{off} and F_{msy} that will rebuild the stock within an appropriate time frame.

The Magnuson-Stevens Act also requires identification of any fisheries that are “approaching a condition of being overfished,” which is defined as a determination that the fishery “will become overfished within two years.” The “approaching overfished” determination is made by projecting the numbers-at-age vector from the current year forward two years under the assumption that the stock will be fished at $maxF_{ABC}$ in each of those years, then determining whether the stock would be considered “overfished” at that time. In more detail, the determination proceeds as follows:

- a. If the mean spawning biomass for two years beyond the current year is below $\frac{1}{2} B_{MSY}$, the stock is approaching an overfished condition.
- b. If the mean spawning biomass for two years beyond the current year is above B_{MSY} , the stock is not approaching an overfished condition.
- c. If the mean spawning biomass for two years beyond the current year is above $\frac{1}{2} B_{MSY}$ but below B_{MSY} , then conduct a large number of stochastic simulations by projecting the numbers-at-age vector from the current year forward under the assumption that it will be fished at $maxF_{ABC}$ for two years, then at the MFMT for ten years, and determine status as follows:
 1. If the mean spawning biomass in the 12th year beyond the current year is below B_{MSY} , the stock is approaching an overfished condition.
 2. Otherwise, the stock is not approaching an overfished condition.

In the event that a stock or stock complex is determined to be approaching a condition of being overfished, an inseason action, an FMP amendment, a regulatory amendment or a combination of these actions will be implemented to prevent overfishing from occurring.

3.2.4 Accountability Measures

The Magnuson-Stevens Act requires FMPs to include accountability measures to ensure that overfishing does not occur in the fishery. The following paragraphs describe some of the accountability measures in place for the GOA groundfish fishery. Accountability measures have been used and further developed for the management of the GOA groundfish fisheries since the inception of this FMP. These accountability measures serve many purposes, including prevention of overfishing. Further details regarding monitoring and reporting requirements are provided in Section 3.9.

3.2.4.1 Observer Program

At the core of the North Pacific monitoring system is a comprehensive, industry-funded, on-board observer program, coupled with requirements for total weight measurement of most fish harvested. Except for small vessels less than 60 feet and halibut vessels, all vessels fishing for groundfish in federal waters are required to carry observers, at their own expense, for at least a portion of their fishing time. The largest vessels, those 125 feet or longer, are generally required

to carry observers 100% of the time, with multiple observers required on catcher/processors and in certain fisheries.

Used in conjunction with reporting and weighing requirements, the information collected by observers provides the foundation for inseason management and for tracking species-specific catch and bycatch amounts.

3.2.4.2 Catch Accounting System

Each year, accounts are established in the Alaska Catch Accounting System (CAS) that match the annual harvest specification tables. A combination of observer data, dealer landing reports, and at-sea production reports are used to provide an integrated source for fisheries monitoring and in-season decision making. The purposes of the CAS are to: manage the groundfish fishery, establish accounts that match the annual harvest specification tables, allow catch reporting from multiple data sources without duplication, debit reported catch from the appropriate account, and estimate prohibited species catch and at-sea discards.

An important aspect of the CAS is to provide near real-time delivery of accurate data for inseason management decisions. To meet this objective, data from industry are reported through the Electronic Reporting System and fed into the NMFS database every hour. Data from observers are sent to the Alaska Fisheries Science Center electronically and are transmitted into the CAS every night.

3.2.4.3 Inseason Management

NMFS Alaska Region's Inseason Management Branch determines the amount of an individual TAC necessary as incidental catch in other target fisheries. The target fishery is usually closed before reaching the TAC, allowing for bycatch in other fisheries up to the amount of TAC for a species. A directed fishery closure limits retention of a species to a portion of other species TACs open to directed fishing. That portion is called the maximum retainable amount (MRA). The MRA is expressed as a percentage of an alternate target fishery. 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. All 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 portion of other fisheries. If the ABC is taken and the trajectory of catch indicates the OFL may be approached, additional closures are imposed. To prevent overfishing, specific fisheries identified by gear and area that incur the greatest incidental catch are closed. Closures expand to other fisheries if the rate of take is not sufficiently slowed.

A fishery may also be closed if a PSC limit is reached. Except for scientific purposes or the prohibited species donations program, prohibited species cannot be retained in the groundfish fisheries.

6. Add to Literature Cited the following citations in alphabetical order:

Walters, C. J., V. Christensen, S. J. Martell, and J. F. Kitchell. 2005. Possible ecosystem impacts of applying MSY policies from single-species assessment. *ICES Journal of Marine Science* 62:448-568.

NPFMC. 1986. Environmental Assessment for Amendment 15 to the Fishery Management Plan for the Groundfish Fishery of the Gulf of Alaska. October 2006. North Pacific Fishery Management Council, 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.

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APPENDIX B

Regulatory Impact Review

Secretary of Commerce Review Draft

Regulatory Amendment to Clarify Certain Provisions Pertaining to the Harvest Specifications for Other Species

Regulatory Impact Review

February 2010

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Abstract: This document contains a Regulatory Impact Review of regulatory amendments in response to the new treatment of “other species” categories under Amendment 96 to the Fishery Management Plan 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 (GOA). This amendment will be adopted to clarify regulations in response to new guidelines for National Standard 1 for annual catch limit requirements. Amending the regulations involves (a) removing the words “and the ‘other species’ category” where they are no longer appropriate; (b) in the GOA, eliminating initial reserves for the “other species” grouping, and creating initial reserves for squid, octopus, sharks, and sculpins; and (c) in the GOA and BSAI, treating the remaining relevant species as a grouping for the purposes of maximum retainable amount and prohibited species catch management. The analysis in this document addresses the requirements of Executive Order 12866.

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Executive Summary

The North Pacific Fishery Management Council has amended its groundfish fishery management plans (FMPs) to comply with the new annual catch limit (ACL) and accountability measure (AM) guidelines issued by NMFS for National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

The action analyzed in this RIR amends fishery management regulations to improve their clarity given the FMP amendments. This regulatory impact review (RIR) provides a cost-benefit analysis of proposed revisions. The analysis in this document addresses the statutory requirements of the Presidential Executive Order 12866 (E.O. 12866).

The analysis considers “no action” and “action” alternatives. The key changes under the action alternatives involve (a) removing the words “and the ‘other species’ category” where they are no longer appropriate; (b) in the Gulf of Alaska (GOA), eliminating initial reserves for the “other species” grouping, and creating initial reserves for squid, octopus, sharks, and sculpins; and (c) in the GOA and Bering Sea and Aleutian Islands (BSAI), treating the remaining relevant species as a grouping for the purposes of maximum retainable amount (MRA) and prohibited species catch (PSC) management.

The proposed changes are needed to clarify regulations, following the amendment of the FMPs for Groundfish of the GOA and for the FMP for Groundfish of the BSAI. They do not impose, increase, relax, or remove substantive restrictions on any entity. They create some benefits by making regulations easier to follow, without creating more than *de minimus* administrative costs.

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1 Regulatory Impact Review

Introduction

The North Pacific Fishery Management Council has amended its groundfish fishery management plans (FMPs) to comply with the new annual catch limit (ACL) and accountability measure (AM) guidelines issued by NMFS for National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

The action analyzed in this RIR amends fishery management regulations to improve their clarity given the FMP amendments. This regulatory impact review (RIR) provides a cost-benefit analysis of proposed revisions. The analysis in this document addresses the statutory requirements of the Presidential Executive Order 12866 (E.O. 12866).

This RIR is required under Presidential Executive Order (E.O.) 12866 (58 FR 51735, September 30, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

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

E.O. 12866 further requires that the Office of Management and Budget review proposed regulatory programs that are considered to be “significant.” A significant regulatory action is one that is likely to –

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

Statutory Authority

The National Marine Fisheries Service (NMFS) manages the U.S. groundfish fisheries of the GOA, Bering Sea, and Aleutian Islands in the Exclusive Economic Zone (EEZ) under the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area and the FMP for Groundfish of the Gulf of Alaska. The FMPs were prepared by the North Pacific Fishery Management Council (Council) under the MSA. Regulations implementing the FMPs appear at 50 CFR part 679 and part 680. General regulations that pertain to U.S. fisheries appear at subpart H of 50 CFR part 600.

Problem Statement

On January 16, 2009, NMFS issued final guidelines for National Standard 1 (NS 1) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (74 FR 3178). They provide guidance on how to comply with new annual catch limit (ACL) and accountability measure (AM) requirements for ending overfishing of fisheries managed by federal fishery management plans. ACL is the amount of fish allowed to be caught in a year.

A NMFS Alaska Region review of the BSAI and GOA Groundfish FMPs found there were inadequacies in the FMP texts that needed to be addressed. Several work groups (e.g., ABC/ACT Control Rules, Vulnerability Evaluations) have been created to produce reports on how to carry out the more technical components of the NS 1 guidelines. Statutory deadlines require compliance with the overfishing requirements by the start of the 2011 fisheries. In April 2010, the Council adopted Amendments 96 to the FMP for groundfish in the BSAI and 87 to the FMP for groundfish in the GOA, revising the FMPs to comport with the final guidelines.

Among the key changes to the FMPs is the reassignment of species now grouped as “other species” in the BSAI and GOA groundfish FMPs as target species. These species include squid, sculpins, sharks, and octopus in the GOA, and sculpins, sharks, and octopus in the BSAI. Although these species become target species, they continue to be grouped within each region for the purpose of maximum retainable amount (MRA) and prohibited species catch (PSC) management. The FMPs incorporate other changes, as well.

The **purpose** of this action is to clarify regulatory language to more accurately reflect the intent of the BSAI and GOA groundfish FMPs as amended by Amendments 96 and 87. This action is **needed** to clarify regulatory text, following the adoption by the Council and Secretary of NS1 amendments to the groundfish FMPs. The **objective** of this action is to revise the regulatory text to more clearly describe the treatment of “other species” categories under the FMPs for the purpose of harvest specifications.

The Alternatives

The alternatives under consideration for this action are:

Alternative 1. No action

Alternative 2. Revise regulations to more precisely reflect the FMPs as modified by Council action to implement the ACL provisions. The detailed regulatory changes involved in this alternative are listed in the appendix to this RIR-IRFA.

The key changes under Alternative 2 involve (a) removing the words “...and the ‘other species’ category...” where they are no longer appropriate; (b) in the GOA, eliminating initial reserves for the “other species” grouping, and creating initial reserves for squid, octopus, sharks, and sculpins; and (c) in the GOA and BSAI, treating the species currently in the “other species” category as a grouping for the purposes of MRA and PSC management.

Given the objective of this action, no additional alternatives are available.

Cost and benefit analysis

The proposed regulatory changes do not impose, increase, relax, or remove substantive restrictions on any entity. They are not necessary for the Council's FMP to have effect.

- a) The deletion of the words “‘other species’ category” amends the language when it is used to refer to total allowable catches (TACs) under the harvest specifications. The Council's action would leave the “other species” category empty. Although leaving the category would not create a need to set a positive TAC for the species that were formerly in the group, it could be confusing.
- b) Section 679.20(b)(2) requires 20 percent of each TAC for pollock, Pacific cod, flatfish, and the “other species” category be set aside in reserves for possible apportionment at a later date during the fishing year. NMFS “reapportions” these reserves in advance of the fishing season. For 2009 and 2010, NMFS proposed reapportionment of all the reserves in the proposed 2009 and 2010 harvest specifications, published in the *Federal Register* on December 2, 2008 (73 FR 73222). NMFS received no public comments on the proposed reapportionments. For the final 2009 and 2010 harvest specifications, NMFS reapportioned, as proposed, all the reserves for pollock, Pacific cod, flatfish, and “other species.” Initial reserves have been reapportioned in this way in the GOA for over 20 years (since 1988). TACs in the published harvest specifications reflect reapportionment of reserve amounts for these species and species groups. Thus, eliminating reserves for “other species” and creating them for sharks, squid, octopus, and sculpins, has no impact on fishing operations or fishery management.
- c) Treating the species, formerly in the “other species” category, as a grouping for the purposes of MRA and PSC management means that they will continue to be treated exactly as they are now.

The proposed changes will clarify regulations, if the FMPs are amended. They thus create some direct, and immediate, benefits by making regulations easier to follow, without creating more than *de minimus* administrative costs.

2 Appendix

Regulations that may be impacted by NS 1 FMP Amendments. Prepared on December 8, 2009, by NMFS Sustainable Fisheries.

These draft regulations assume that the FMP amendment would remove the other species category and manage species under this category as separate target species groups and that management of these species for purposes of the MRA and PSC would remain unchanged.

The following notes show the proposed changes to regulations:

679.2 Definitions

Groundfish means

- (1) FMP species as listed in Table 2a to this part.
- (2) Target species ~~and the “other species” category~~, specified annually pursuant to § 679.20(a)(2) (See also the definitions for: License limitation groundfish; CDQ species; and IR/IU species of this section).

License limitation groundfish means target species ~~and the “other species” category~~, specified annually pursuant to § 679.20(a)(2), except that demersal shelf rockfish east of 140° W. longitude and sablefish managed under the IFQ program, and pollock allocated to the Aleutian Islands directed pollock fishery and harvested by vessels 60 feet (18.3 m) LOA or less, are not considered license limitation groundfish.

Non-allocated or nonspecified species means those fish species, other than prohibited species, for which TAC has not been specified (e.g., grenadier, prowlfish, lingcod).

Do we need or want this nonspecified species definition in the regulations? I think it is OK for now. Will need to change if grenadiers become a target species?

Other species is a category of target species for the purpose of MRA and PSC management, including management for MRAs in the GOA rockfish program under Table 30 to this part, and for BSAI Halibut PSC Sideboard Limits for AFA Catcher/Processors and AFA Catcher Vessels in Table 40 to this part that consists of groundfish species in each management area that are not specified as target species. These target species are managed as an other species group and identified in ~~(see Tables 10 and 11 to this part pursuant to § 679.20(e)).~~

Target species are those species or species groups, ~~except the “other species” category,~~ for which a TAC is specified pursuant to § 679.20(a)(2).

679.20 Management Measures

(a) Harvest limits

(1) ~~OY~~ (i) BSAI and GOA. The OY for BSAI and GOA target species ~~and the “other species” category~~ is a range or specific amount that can be harvested consistently with this part, plus the amounts of “nonspecified species” taken incidentally to the harvest of target species ~~and the “other species” category~~. The species categories are defined in Table 1 of the specifications as provided in paragraph (c) of this section.

(A) The OY for groundfish in the BSAI regulated by this section and by part 600 of this chapter is 1.4 million to 2.0 million mt.

(B) The OY for groundfish in the GOA regulated by this section and by part 600 of this chapter is 116,000 to 800,000 mt.

(ii) Arctic Management Area. The OY for each target fish species identified in the Fishery Management Plan for Fish Resources of the Arctic Management Area regulated by this section and by part 600 of this chapter is 0 mt.

* * * * *

(2) TAC. NMFS, after consultation with the Council, will specify and apportion the annual TAC and reserves for each calendar year among the GOA and BSAI target species ~~and the “other species” categories~~. TACs in the target species category may be split or combined for purposes of establishing new TACs with apportionments thereof under paragraph (c) of this section. The sum of the TACs so specified must be within the OY range specified in paragraph (a)(1) of this section.

(3) Annual TAC determination. The annual determinations of TAC for each target species ~~and the “other species” category~~, and the reapportionment of reserves may be adjusted, based upon a review of the following:

(i) Biological condition of groundfish stocks. Resource assessment documents prepared annually for the Council that provide information on historical catch trend; updated estimates of the MSY of the groundfish complex and its component species groups; assessments of the stock condition of each target species ~~and the “other species” category~~; assessments of the multispecies and ecosystem impacts of harvesting the groundfish complex at current levels, given the assessed condition of stocks, including consideration of rebuilding depressed stocks; and alternative harvesting strategies and related effects on the component species group.

* * * * *

(b) Reserves

(1) BSAI.

(i) Nonspecified reserve. Fifteen percent of the BSAI TAC for each target species ~~and the “other species” category~~, except pollock, the hook-and-line and pot gear allocation for sablefish, and the Amendment 80 species, which includes Pacific cod, is automatically placed in the nonspecified reserve before allocation to any sector. The remaining 85 percent of each TAC is apportioned to the initial TAC for each target species that contributed to the nonspecified reserve ~~and the “other species” category~~. The nonspecified reserve is not designated by species or

species group. Any amount of the nonspecified reserve may be apportioned to target species that contributed to the nonspecified reserve ~~or the “other species” category~~, provided that such apportionments are consistent with paragraph (a)(3) of this section and do not result in overfishing of a target species ~~or the “other species” category~~.
* * * * *

(2) GOA. Initial reserves are established for pollock, Pacific cod, flatfish, squid, octopus, sharks, and sculpins ~~and “other species,”~~ which are equal to 20 percent of the TACs for these species or species groups.

(c) Annual specifications.

(1) Proposed specifications.

* * * * *

(iii) GOA. The proposed specifications will specify for up to two fishing years the annual TAC for each target species ~~and the “other species” category~~ and apportionments thereof, halibut prohibited species catch amounts, and seasonal allowances of pollock and Pacific cod.

(iv) BSAI. The proposed specifications will specify for up to two fishing years the annual TAC for each target species ~~and the “other species” category~~ and apportionments thereof, PSQ reserves and prohibited species catch allowances, seasonal allowances of pollock, Pacific cod, and Atka mackerel TAC (including pollock, Pacific cod, and Atka mackerel CDQ), and CDQ reserve amounts.

(3) Final specifications.

* * * * *

(ii) GOA. The final specifications will specify for up to two fishing years the annual TAC for each target species ~~and the “other species” category~~ and apportionments thereof, halibut prohibited species catch amounts, and seasonal allowances of pollock and Pacific cod.

(iii) BSAI. The final specifications will specify for up to two fishing years the annual TAC for each target species ~~and the “other species” category~~ and apportionments thereof, PSQ reserves and prohibited species catch allowances, seasonal allowances of pollock (including pollock, Pacific cod, and Atka mackerel CDQ), and CDQ reserve amounts.

(d) Fishery closures.

(1) Directed fishing allowance.

(i) General. If the Regional Administrator determines that any allocation or apportionment of a target species ~~or “other species” category~~ specified under paragraph (c) of this section has been or will be reached, the Regional Administrator may establish a directed fishing allowance for that species or species group.
* * *

(iii) Directed fishing closure.

* * * * *

(B) Retention of incidental species. Except as described in § 679.20(e)(3)(iii), if directed fishing for a target species ~~or species group, or the “other species” category~~ is prohibited, a vessel may not retain that incidental species in an amount that exceeds the maximum retainable amount, as calculated under paragraphs (e) and (f) of this section, at any time during a fishing trip.
* * * * *

(2) Groundfish as prohibited species closure.

When the Regional Administrator determines that the TAC of any target species ~~or the “other species” category~~ specified under paragraph (c) of this section, or the share of any TAC assigned to any type of gear, has been or will be achieved prior to the end of a year, NMFS will publish notification in the *Federal Register* requiring that target species ~~or the “other species”~~ be treated in the same manner as a prohibited species, as described under § 679.21(b), for the remainder of the year.

§ 679.25 Inseason adjustments.

(a) General

(2) Determinations.

(iii) * * *

(D) Reopening of a management area or season to achieve the TAC or gear share of a TAC for any of the target species or the ~~"other species" category~~.

3 Sources

National Marine Fisheries Service (NMFS). 2007. Alaska Groundfish Harvest Specifications Final Environmental Impact Statement. Juneau, AK. January 2007.

NMFS 2009. Environmental Assessment/Regulatory Impact Review/Final Regulatory Flexibility Analysis For the Arctic Fishery Management Plan And Amendment 29 to the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. Juneau, AK. August 2009.

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