ENVIRONMENTAL ASSESSMENT

for

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

and

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

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

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

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

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Executive Summary

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

Purpose and Need

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

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

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

Environmental Assessment

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

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

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

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

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

The EA evaluated alternatives with respect to effects on:

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

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

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

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

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

1.0 ENVIRONMENTAL ASSESSMENT

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

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

1.1 Purpose and Need

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

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

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

Additional problems with current management stems from three concerns:

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

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

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

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

1.2 Description of Alternatives

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.2.4 Alternatives Considered but Not Carried Forward

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

1.3 Affected Environment

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

1.3.1 Bering Sea/Aleutian Islands Environment

Under the Magnuson-Stevens Act (16 USC 1801 *et seq.*), the United States has exclusive fishery management authority over all marine fishery resources found within the EEZ, which extends between three and 200 nautical miles from the baseline used to measure the territorial sea. The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the Regional Councils. In the Alaska Region, the Council has the responsibility for preparing fishery management plans for the marine fisheries that require conservation and management, and for submitting their recommendations to the Secretary. Upon approval by the Secretary, NMFS is charged with carrying out the federal mandates of the Department of Commerce with regard to marine and anadromous fish.

The BSAI groundfish fisheries in the EEZ off Alaska are managed under the fishery management plan for Groundfish of the BSAI. Actions taken to amend fishery management plans or implement other regulations governing these fisheries must meet the requirements of federal laws and regulations. The action area effectively covers all of the BSAI under U.S. jurisdiction, extending southward to include the waters south of the Aleutian Islands (AI) west of 170°W to the border of the EEZ (Figure 1).

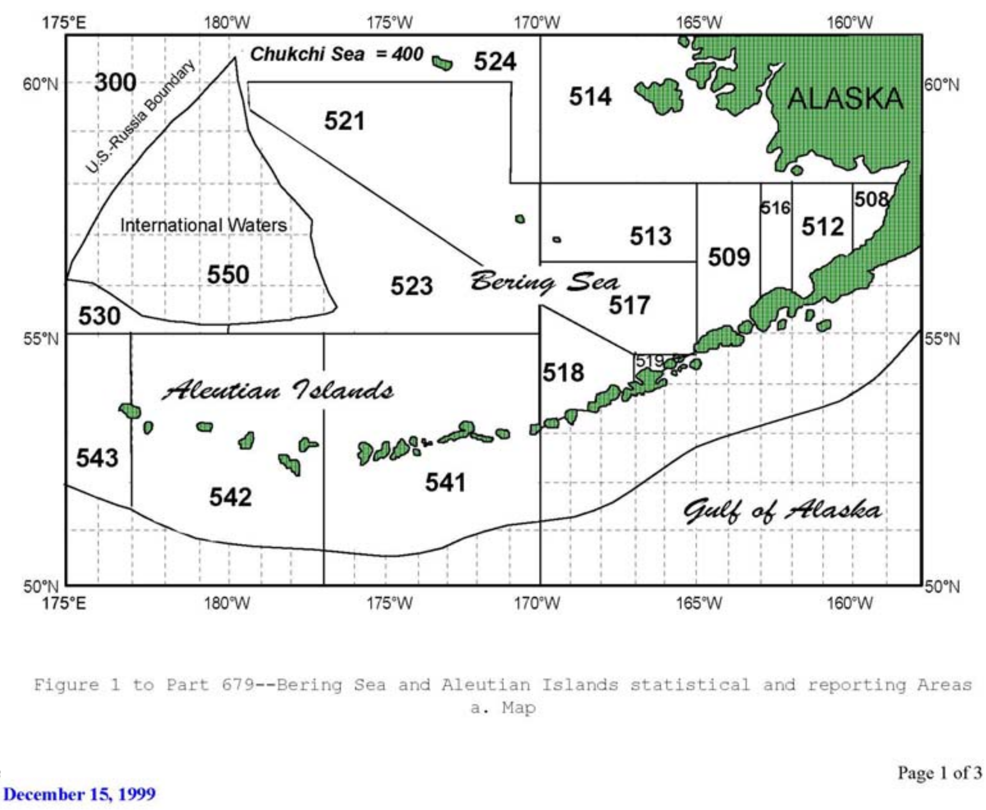

Figure 1 BSAI Management Area

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

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

Alaska Groundfish Programmatic Supplemental Environmental Impact Statement

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

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

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

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

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

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

Annual Harvest Specification Environmental Assessments

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

Periodic Harvest Specification EIS

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

TAC-Setting EIS

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

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

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

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

GOA Groundfish Fishery Management Plan Amendment 63

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

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

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

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

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

1.3.2 MRA Regulations and Management Function in BSAI Groundfish Fisheries

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

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

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

50 CFR part 679.2 defines a fishing trip as follows:

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

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

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

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

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

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

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

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

1.3.3 Biological Environment

Description, Scientific Names, and General Distribution

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

Table 1 lists the species found in the BSAI.

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

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

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

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

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

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

Management Unit

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

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

Life History and Stock Structure (General)

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

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

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

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

Life History and Stock Structure (Alaska-Specific)

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

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

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

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

Commercial Fishery

Directed Fishery

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

Bycatch and Discards

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

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

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

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

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

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

Reporting areas encompassing the EBS outer shelf and upper continental slope experienced high catch rates during 2003 through 2006 (Figure 8). Longline fisheries targeting Pacific cod take much of the incidental skate catch, and they tend to operate on the outer EBS shelf and slope, where skate species diversity is high and where Aleutian skates are more prevalent than Alaska skates. Therefore, it is possible that the species composition of the catch is not in proportion to the overall species composition (from survey data) across the BSAI. However, depth analysis of the observed catch demonstrates that most of the skate catch occurs at less than 200 m (98 percent).

1.4 Environmental Effects of the Alternatives

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

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

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

1.4.1 Effects on Target Groundfish Fisheries

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

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

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

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

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

Pacific Cod

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

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

1.4.2 Effect on Skates

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

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

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

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

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

Alternatives 2 and 3 would constrain catches to the TAC, ABC, and OFL for skates to levels appropriate for the group, rather than to the cumulative "other species" assemblage. Current incidental catches are below annual specifications that would be set for the group and are expected to have no effects on a potential target skate fishery, because catches would be allowed up to the annual specifications, and current skate harvests are below this level. Alternative 3 further limits their retention relative to target groundfish fisheries and is more precautionary.

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

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

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

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

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

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

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

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

1.4.4 Effects on "Other Species"

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

Under Alternative 2 and Alternative 3 (Preferred Alternative), OFL/ABC for the remaining "other species" assemblage would be determined following the same procedure as under Alternative 1, but would exclude skates. The OFL and ABC for skates, as a separate TAC category, and the remaining OFL and ABC for sharks, sculpins, and octopuses in the “other species” categories, are compared in Table 9. Since skates comprised roughly half of the OFL/ABC for the “other species” category, the remaining species in the category contribute the remaining half, under the revised “other species” category.

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

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

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

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

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

1.4.5 Effects on the Ecosystem

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

Fishing has the potential to influence ecosystems in several ways. Certain forage species, such as walleye pollock and Atka mackerel, are at a central position in the food web and their abundance is an indicator of prey availability for many species. Removal of top level predators is another potential effect of fishing, contributing to a “fishing-down the food web” effect. Introduction of non-native species may occur through emptying of ballast water in ships from other regions. These species introductions have the potential to cause large changes in community dynamics. Fishing may alter the amount and flow of energy in an ecosystem by removing energy and altering energetic pathways though the return of discards and fish processing offal back into the sea. The recipients, locations, and forms of this returned biomass may differ from those in an unfished system. Selective removal of species and/or sizes of organisms has the potential to change predator/prey relationships and community structure. Fishing can alter different measures of diversity. Species level diversity, or the number of species, can be altered if fishing essentially removes a species from the system. Fishing can alter functional or trophic diversity if it selectively removes a structural living habitat group or trophic guild member and changes the evenness with which biomass is distributed among a functional or trophic guild. Fishing can alter genetic level diversity by selectively removing faster growing fish or removing spawning aggregations that might have different genetic characteristics than other spawning aggregations. Fishing gear may alter bottom habitat and damage benthic organisms and communities.

Role of Skates in the Ecosystem

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

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

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

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

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

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

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

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

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

1.5 Socioeconomic Considerations

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

1.5.1 Description of the Fishery

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

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

1.5.2 Impacts of the Alternatives

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

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

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

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

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

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

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

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

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

Impacts on Groundfish Target Fisheries

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

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

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

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

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

Impacts on Bycatch and Discards

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

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

Consumer Effects

Consumer effects of changes in production will be measured by changes in consumers' surplus. The consumers' surplus is a measure of what consumers would be willing to pay to buy a given amount of a product or service at a given price, above that level which they actually must pay. A decrease in quantity supplied and an associated increase in price will reduce consumer welfare, as measured by consumers' surplus. An increase in quantity supplied and a consequent decrease in price will increase consumer welfare, as measured by consumers' surplus. A decrease in consumers' surplus is not a total loss to society, since some of that decrease is transferred to producers/suppliers (e.g., fishermen) in the form of higher prices. However, this transfer is still a loss to consumers and, if the producer gains accrue to non-U.S. fishermen and processors, there is a net welfare loss to the nation.

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

Passive Use Values

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

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

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

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

Management and Enforcement Costs

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

Summary

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

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

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

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

1.6 Cumulative Effects

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

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

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

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

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

Alternative 2 proposes to manage MRAs for all skates collectively. As part of the annual specification process, the Council also will determine whether to allow directed fishing for skates in the BSAI or whether skates should continue to be managed under MRAs until such time as sufficient life history information becomes available to make reasonable species-specific estimates of productivity and/or data collection protocols are developed for the fishery. A regulatory amendment would be required to set separate MRAs for individual skate species only if the Council decides to change the status quo.

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

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

Manage Non-Target Species under an Ecosystem Component Category

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

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

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

Groundfish Plan Amendment to Comply with ACL Requirements

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

Summary

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

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

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

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

1.7 Environmental Analysis Conclusions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.0 CONSISTENCY WITH APPLICABLE LAW AND POLICY

2.1 Magnuson-Stevens Act

2.1.1 National Standards

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

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

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

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

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

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

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

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

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

National Standard 9 - Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

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

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

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

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

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

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7.0 TABLES

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

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

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

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

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

t = tons

Cv = coefficient of variance

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

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

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

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

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

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

Source: AKRO CAS.

*2008 data complete as of October 3, 2008.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 11. Other marine mammals in the BSAI.

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

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

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

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

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

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

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

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

Source: Catch accounting

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

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

Source: Catch Accounting
*Concealed for confidentiality

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

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

Source: Catch Accounting

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

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

Source: Catch Accounting

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

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

Source: Catch Accounting

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

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

Source: Catch Accounting

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

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

Source: Catch Accounting

8.0 Figures

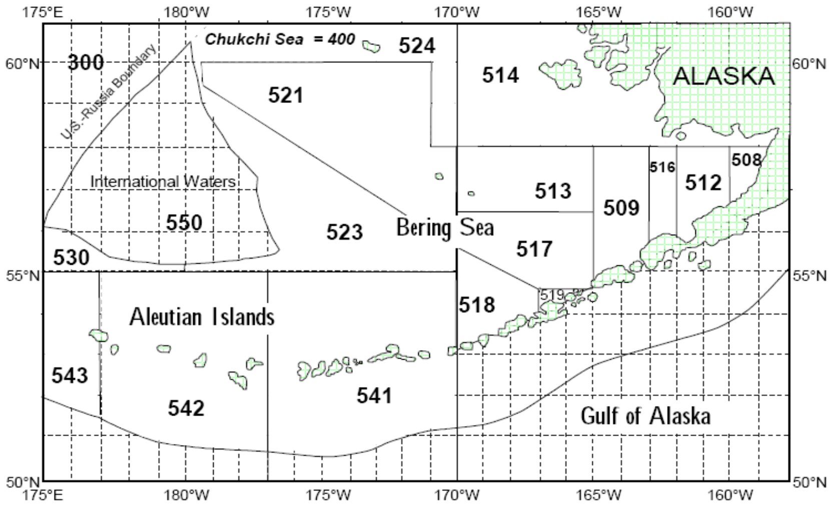


Figure 2. Bering Sea and Aleutian Islands statistical and reporting areas.

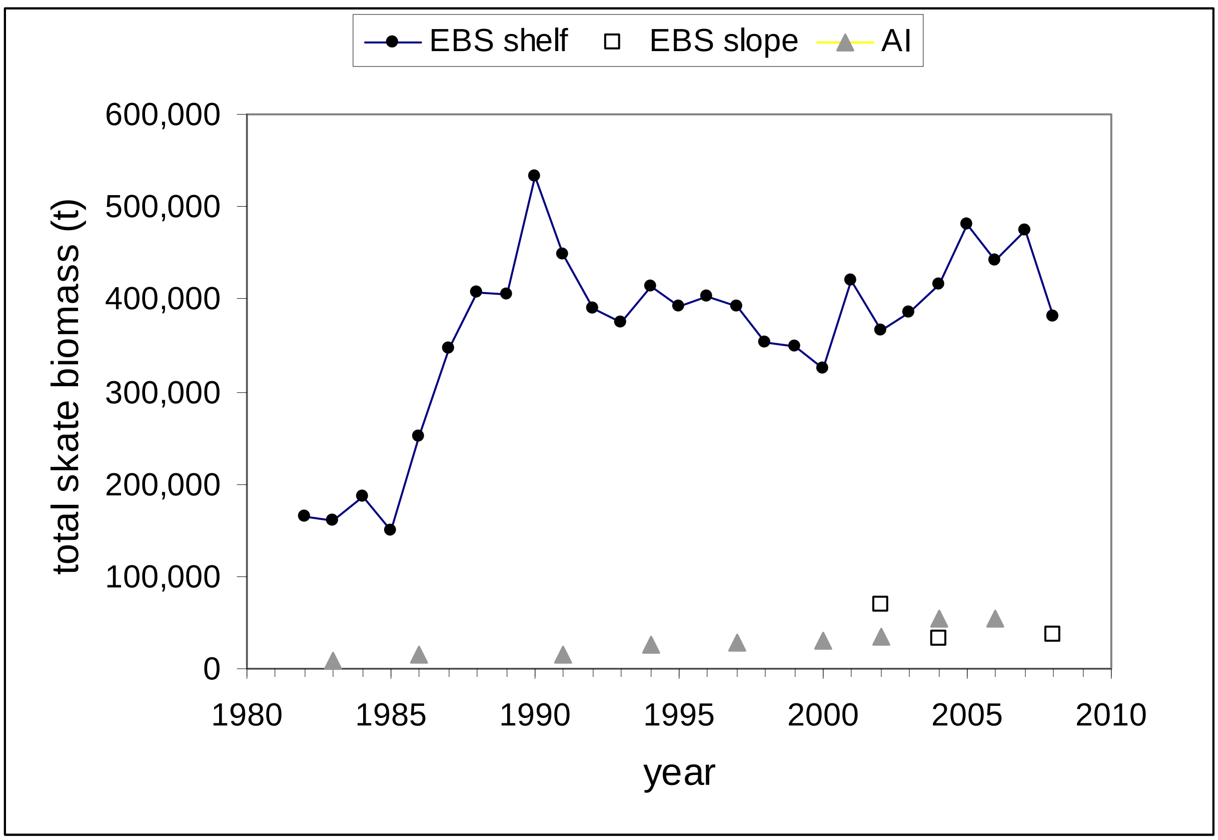
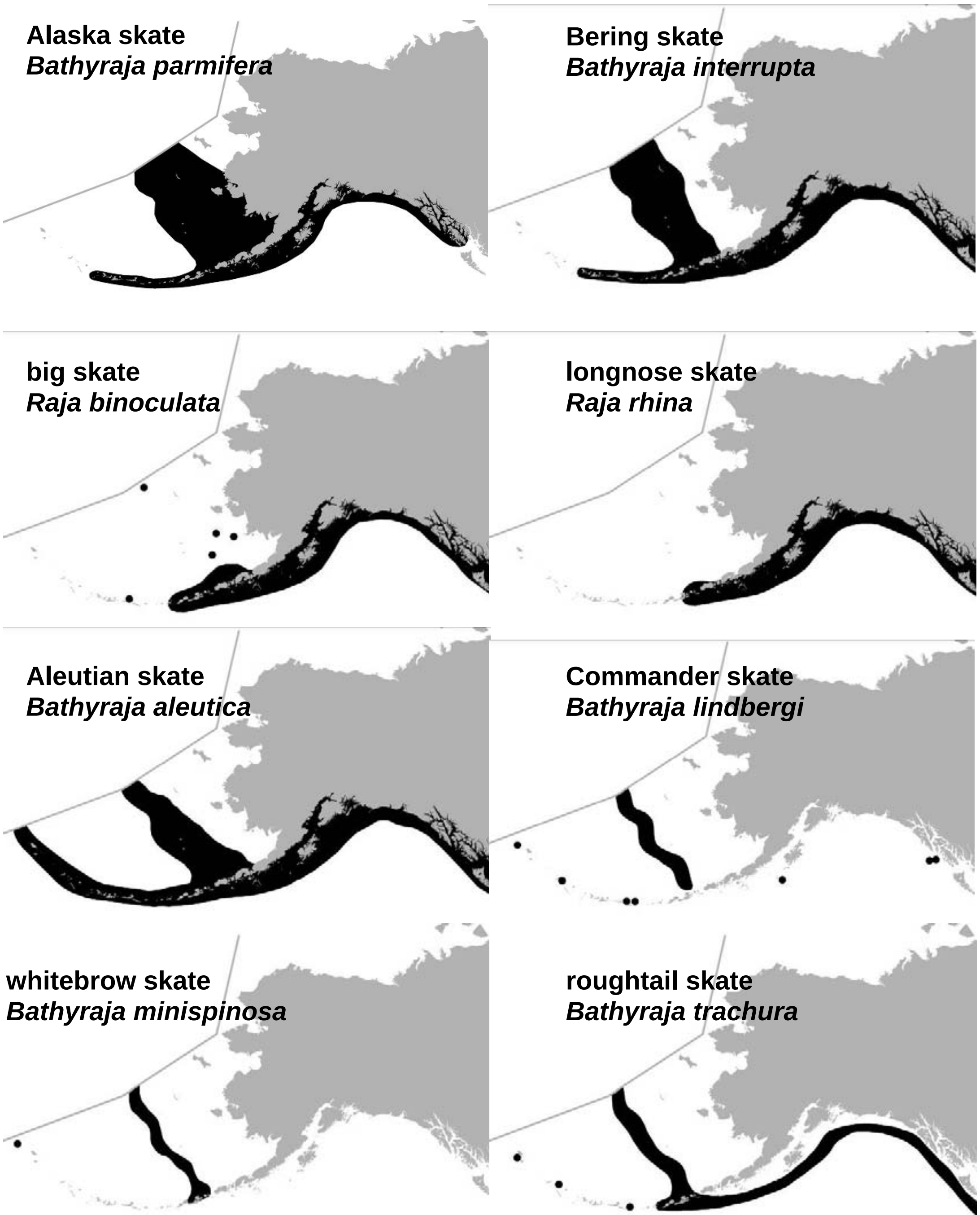
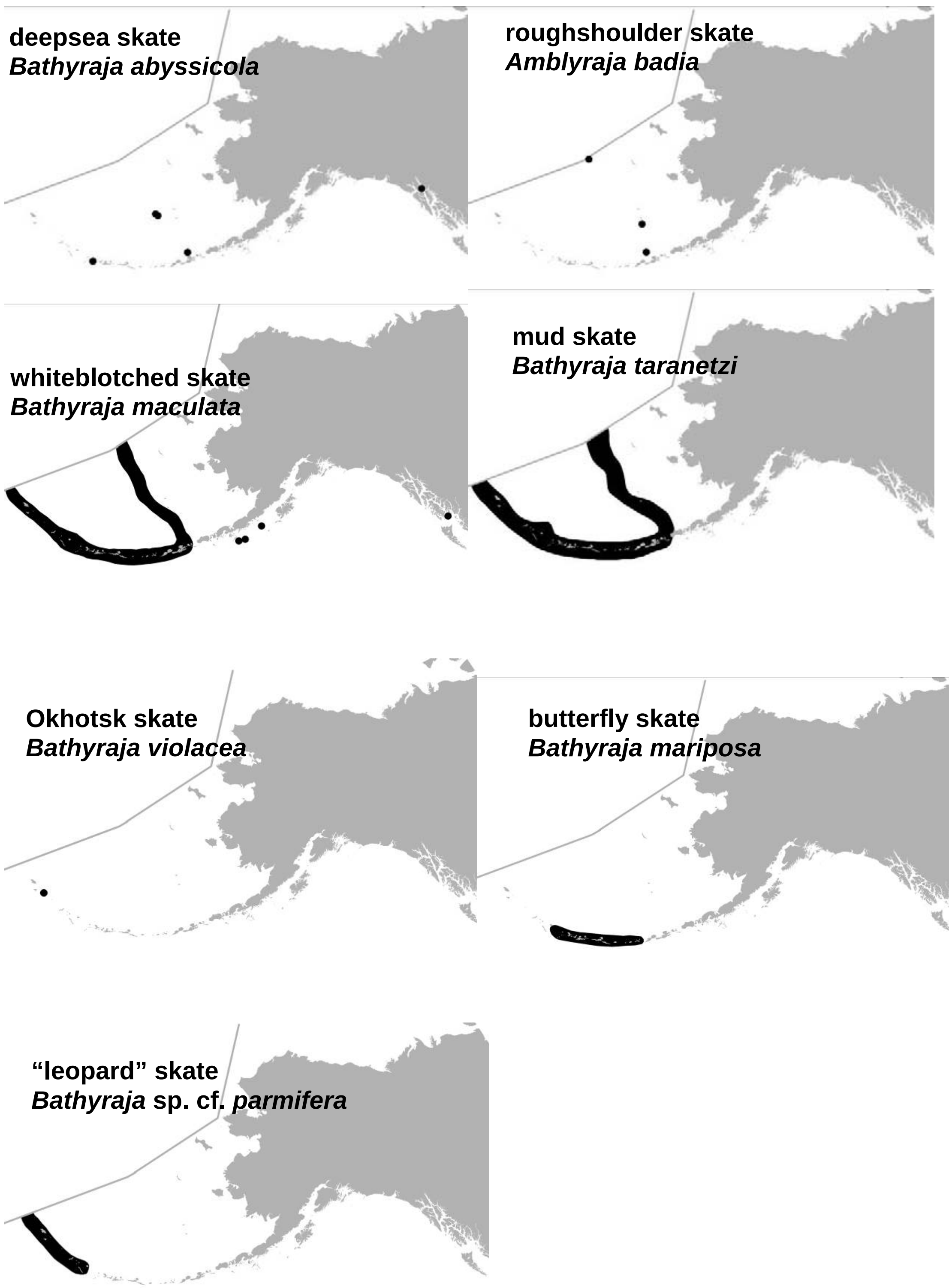


Figure 3. Aggregated skate biomass (metric tons) estimated from RACE bottom trawl surveys in each of the three major habitat areas (1982–2008).



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

Figure 4. Distribution of skate species in Alaskan waters.



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

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

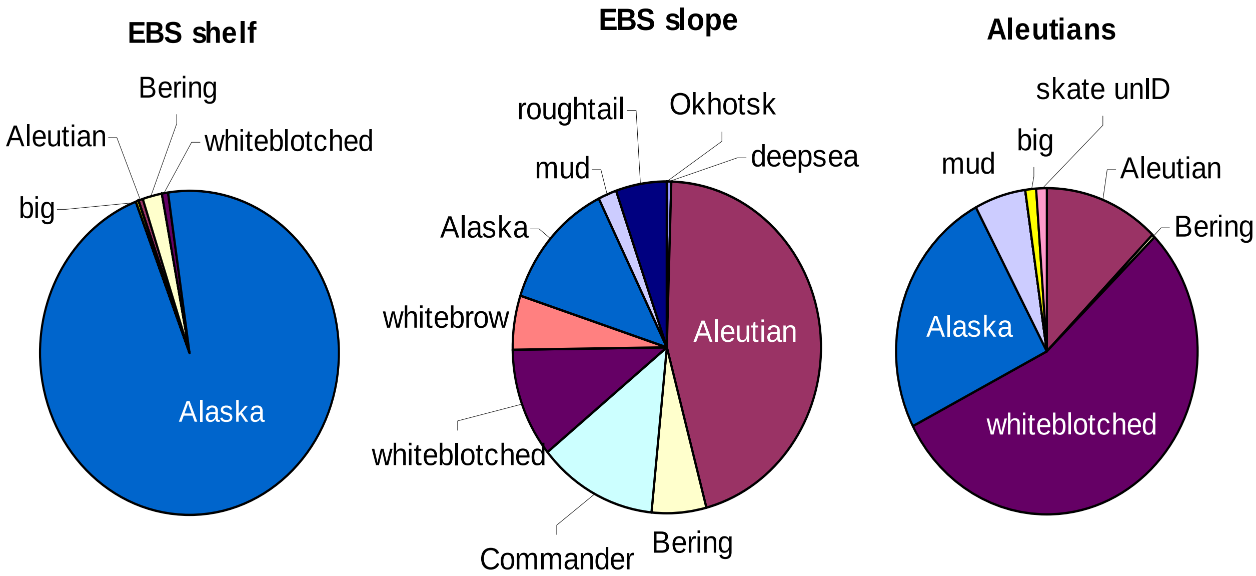
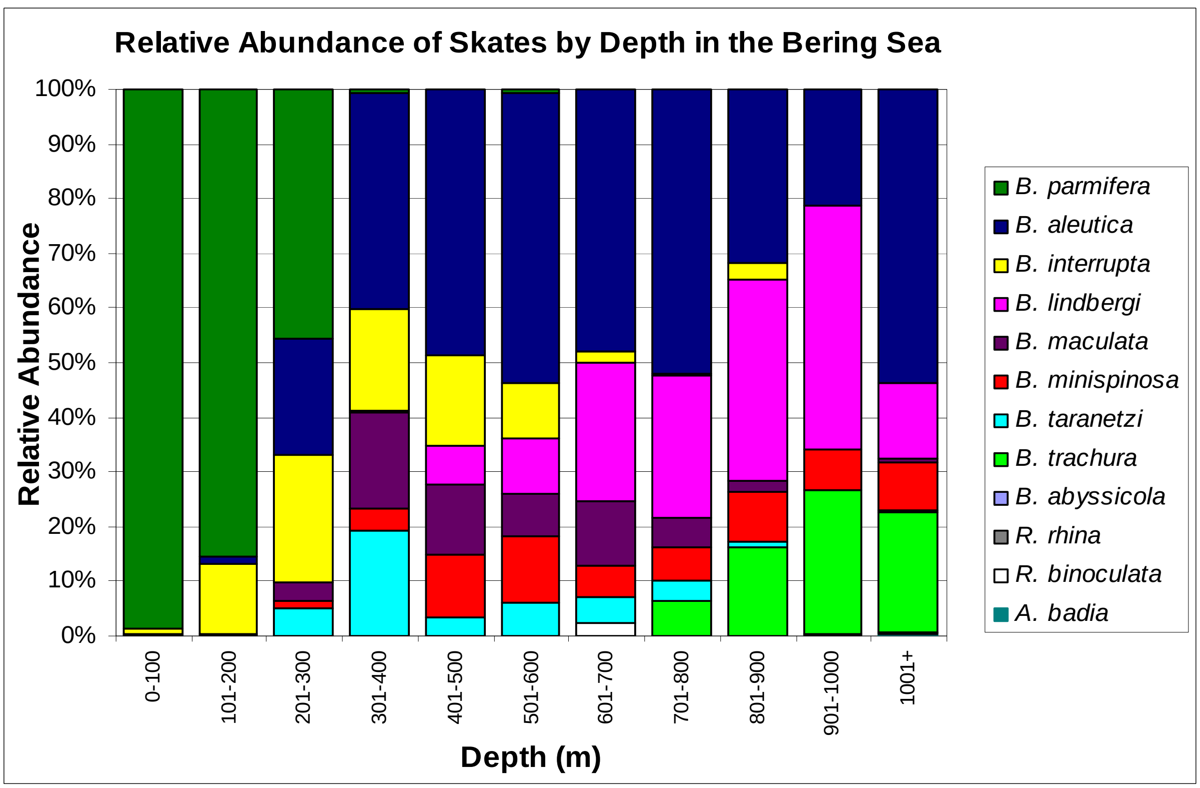


Figure 5. Skate species composition (by weight) by habitat area. (Source: Ormseth et al. 2008.)



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

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

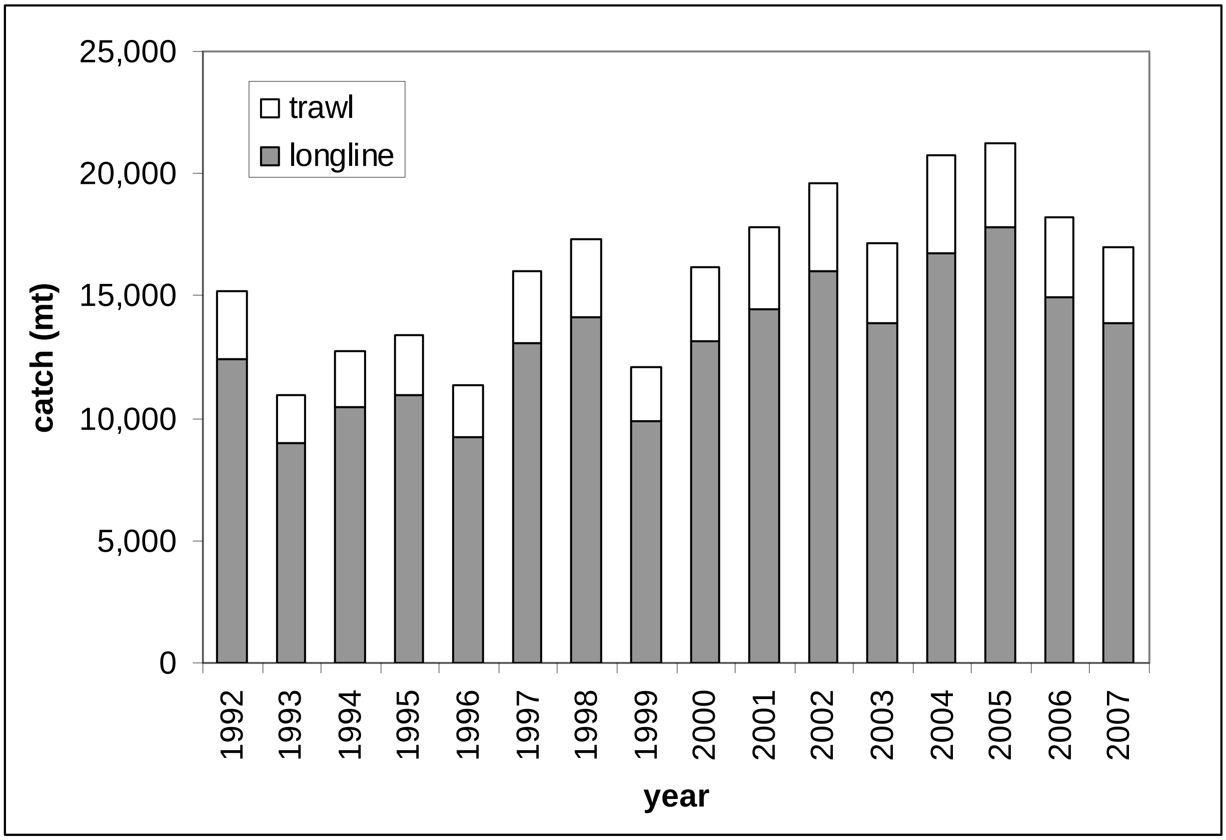
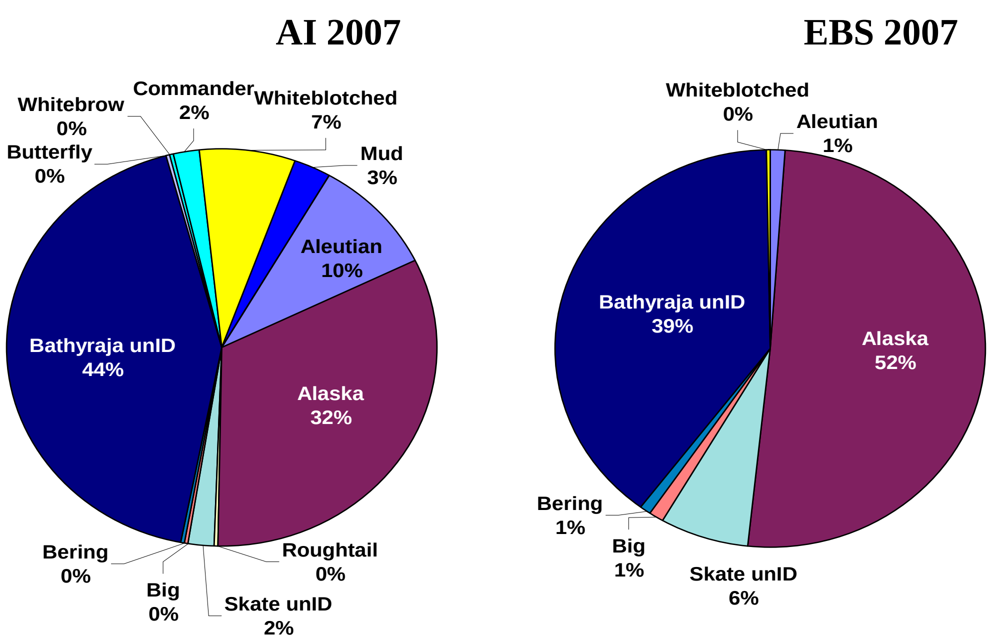
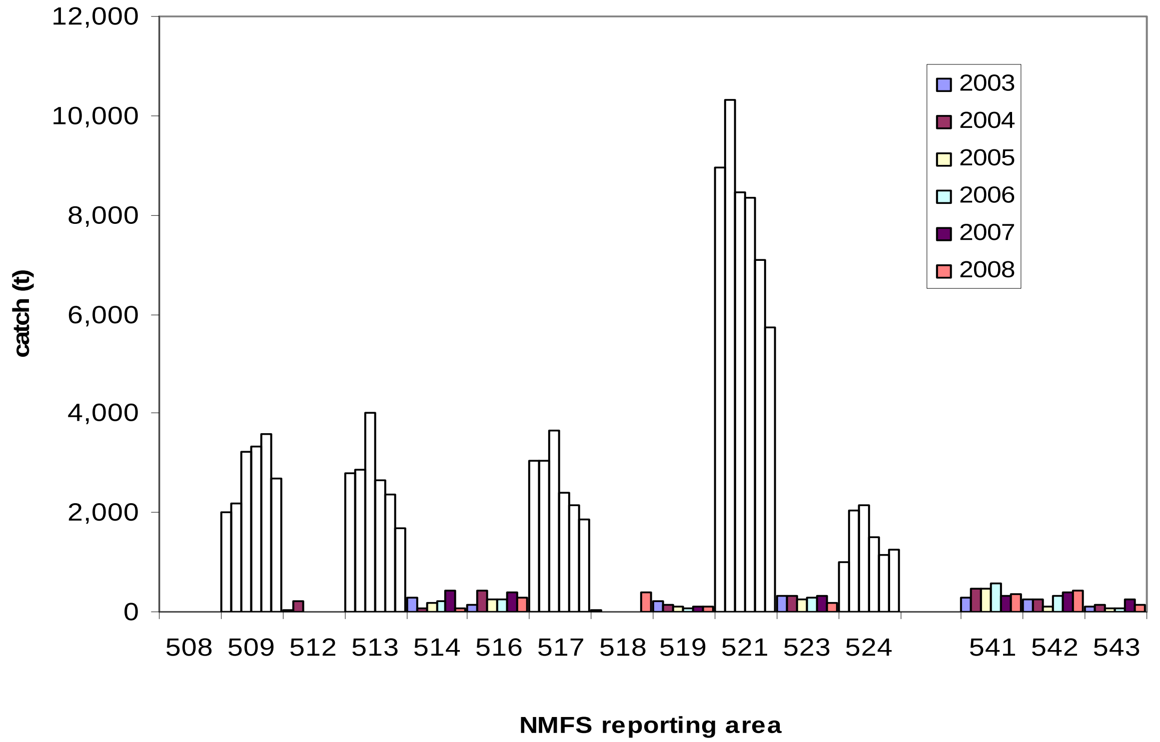


Figure 7. Estimated catch of Alaska skates (t) in the BSAI from 1992 to 2007. Data were obtained from the Blend system and AKRO CAS.



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

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



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

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

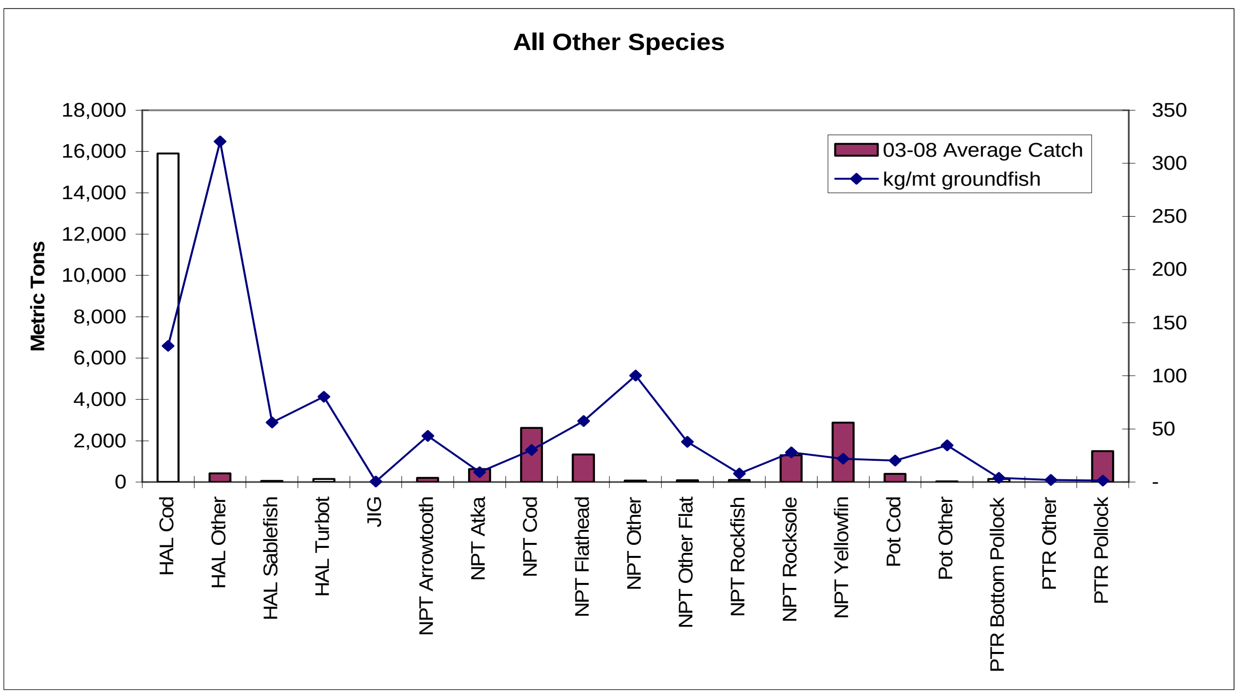


Figure 10. Average catch (kg) of BSAI "other species" (2003–2008) by target fishery and gear type (mt).

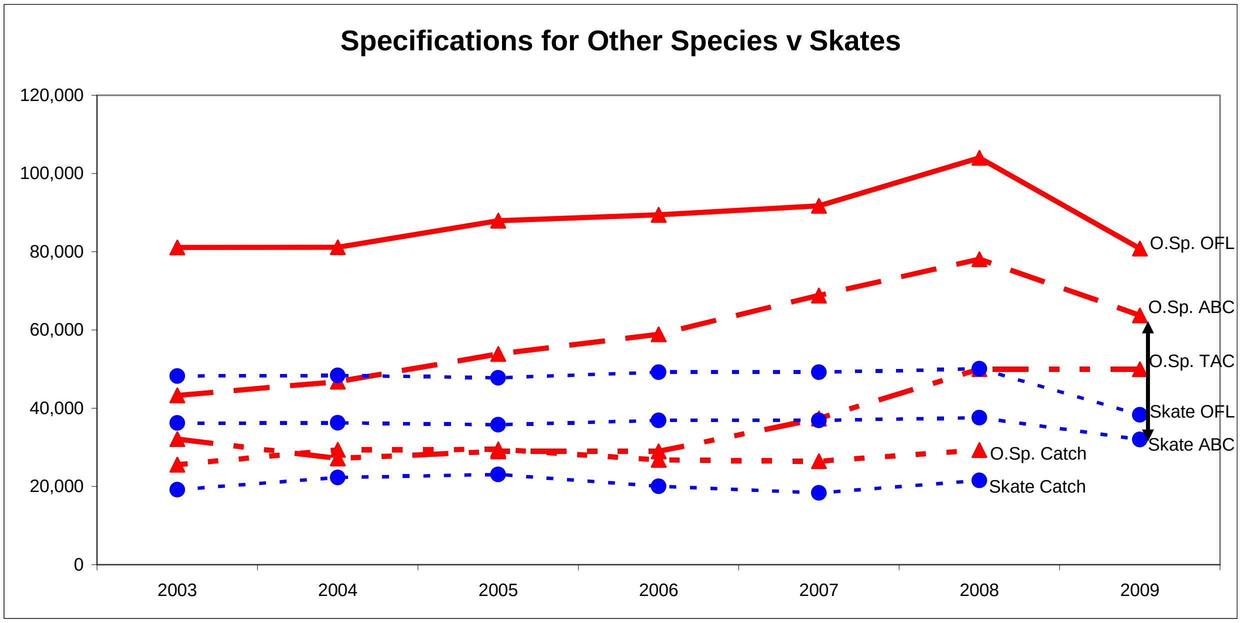


Figure 11. Total catch (mt) by year (2003–2008) for BSAI "other species."

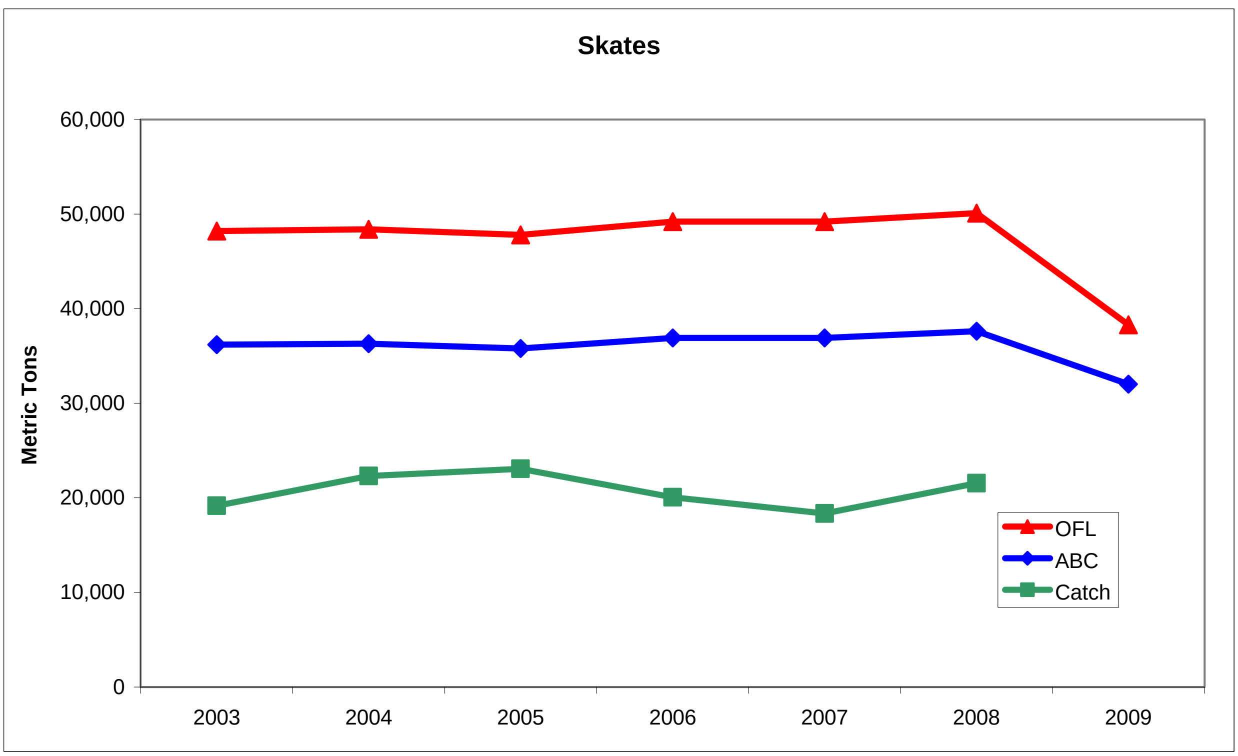


Figure 12. Total catch (mt) by year (2003–2008) for BSAI skates.

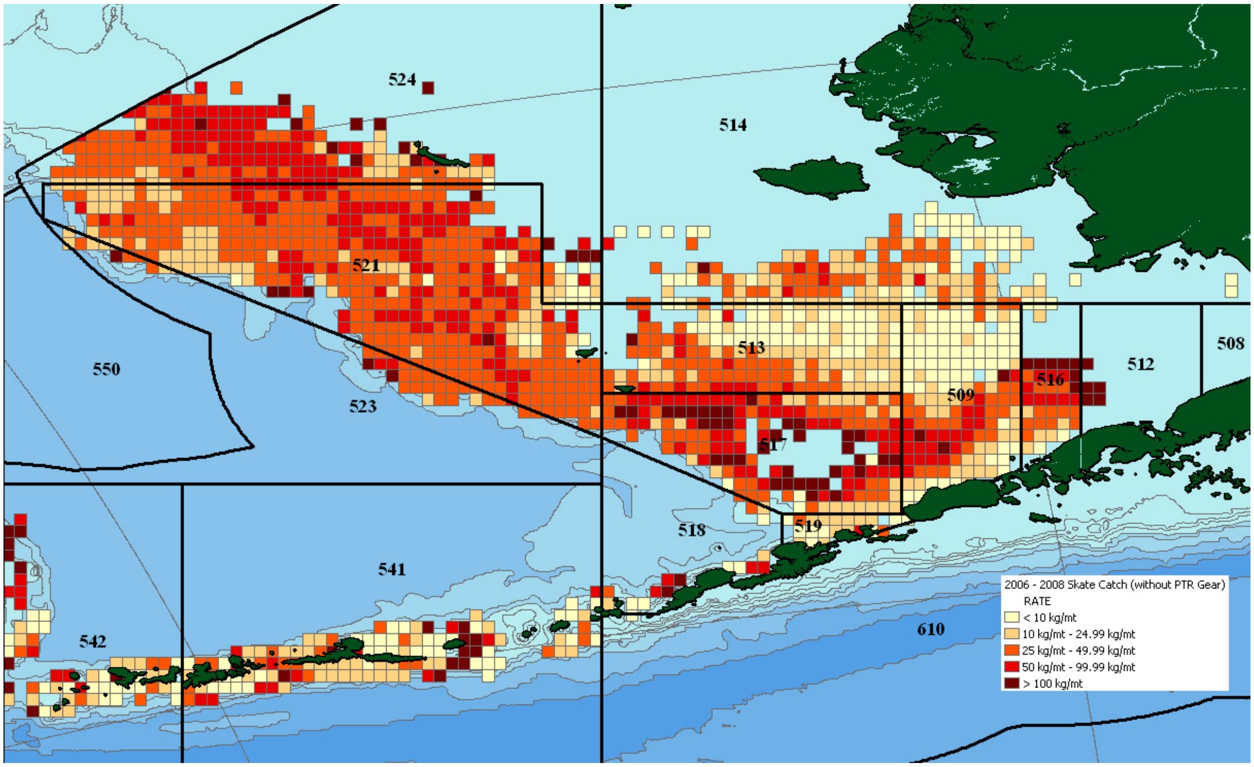


Figure 13. BSAI skates catch density (kg/mt groundfish) 2006–2008.

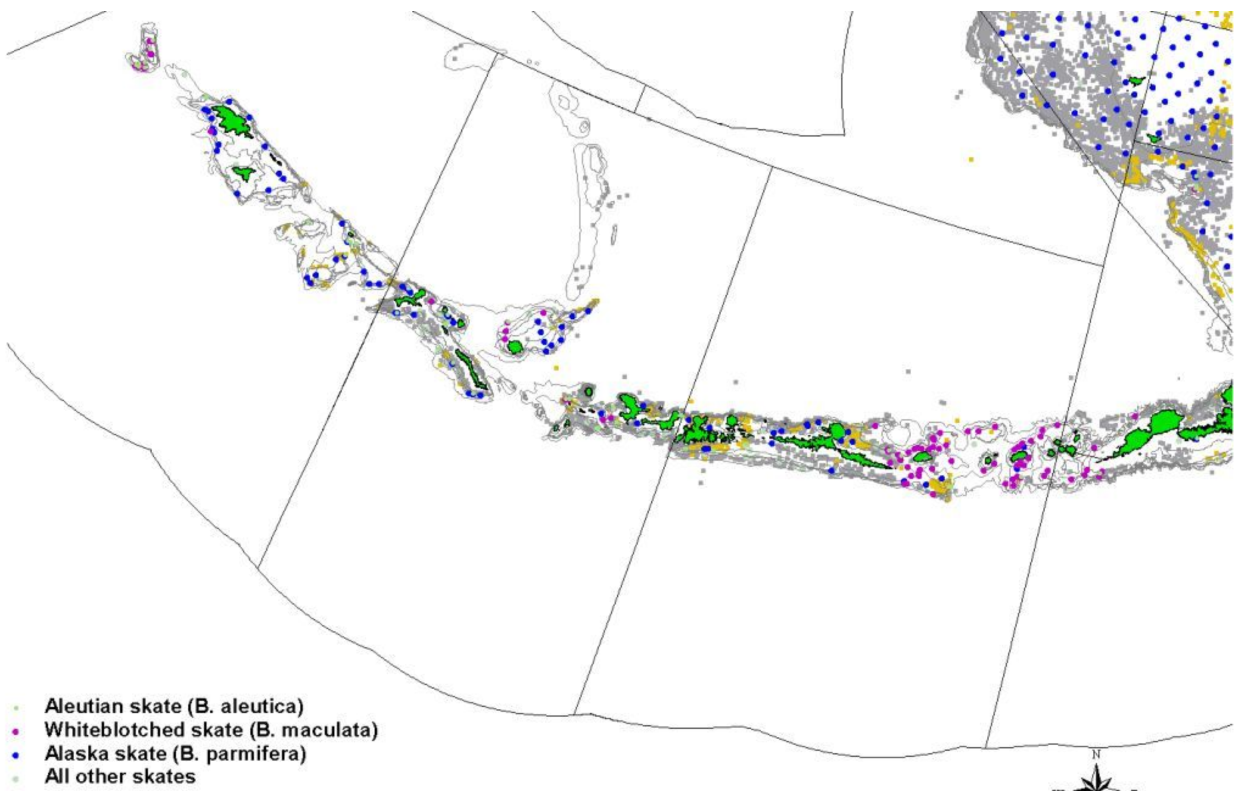


Figure 14(a). Skate distribution in the AI from NMFS bottom trawl surveys.

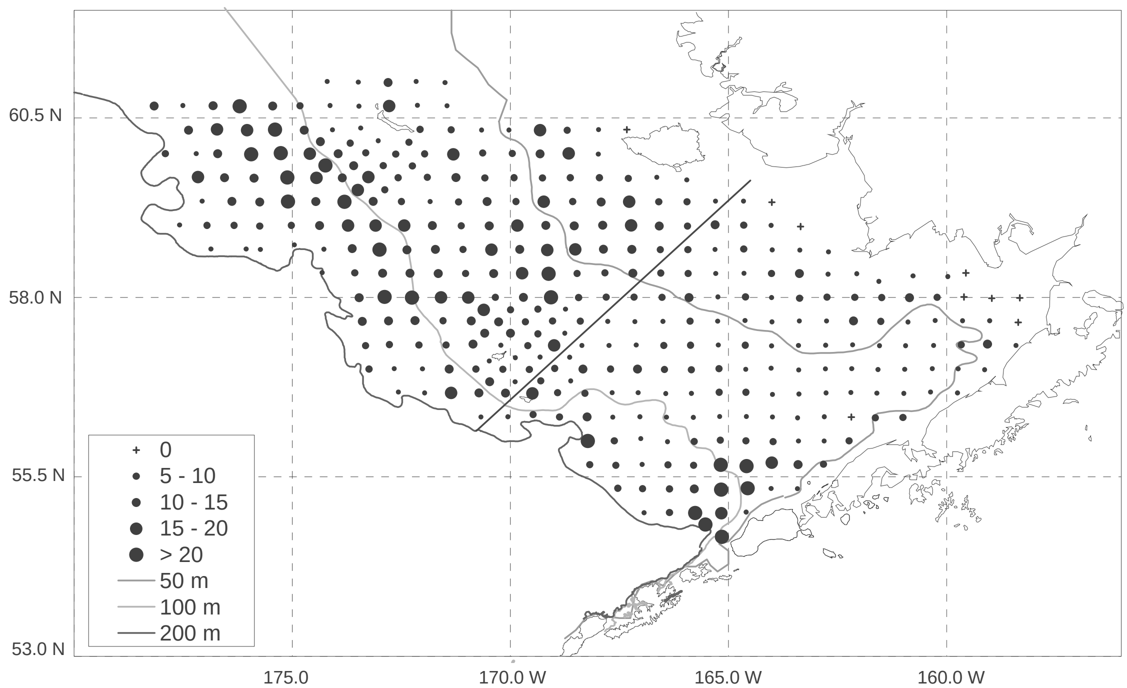


Figure 15(b). Alaska skate distribution from 2001–2004 RACE Bering Sea Groundfish Surveys (kg/ha for each station).

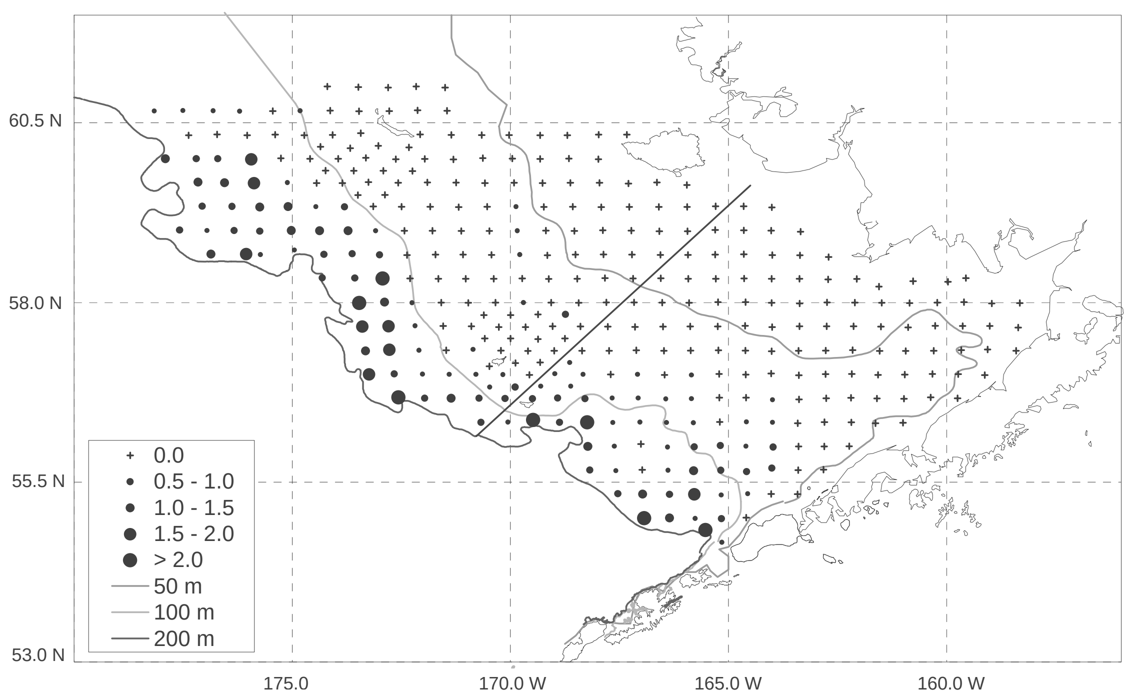


Figure 16(c). Bering skate distribution from 2001–2004 RACE Bering Sea Groundfish Surveys (kg/ha for each station).

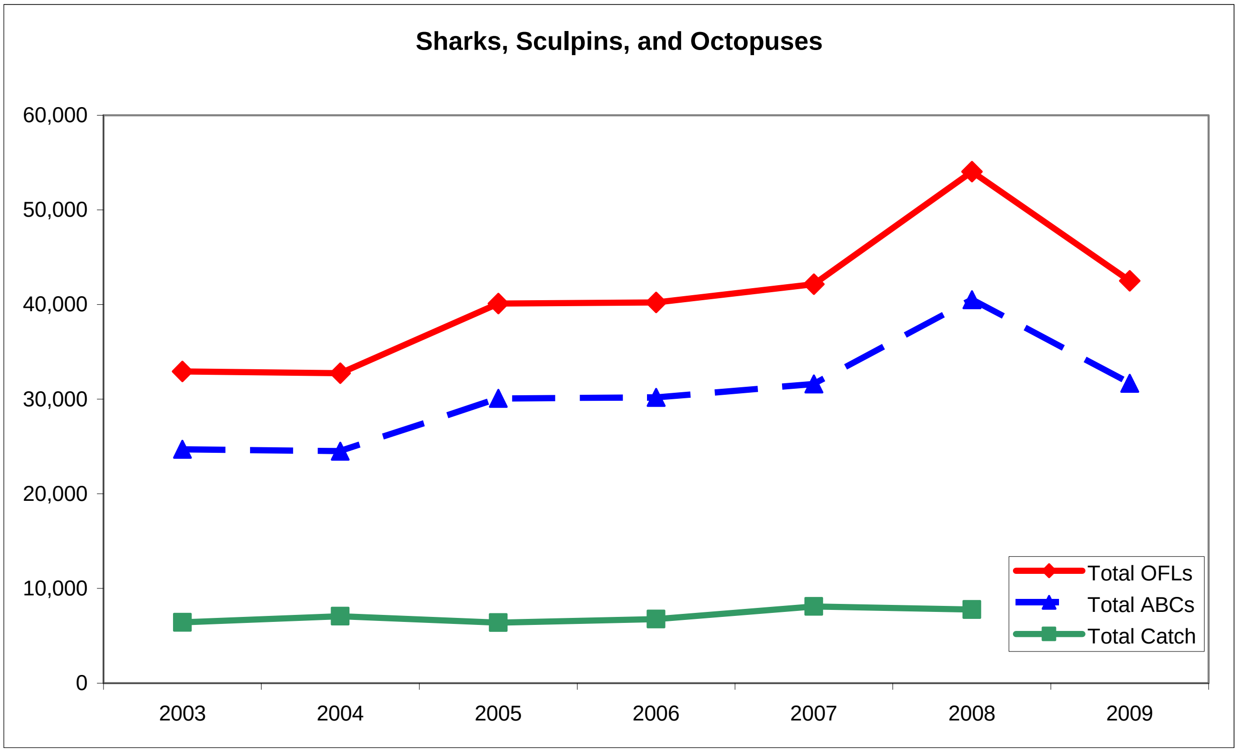


Figure 17. Total catch (mt) by year (2003–2008) for remaining BSAI "other species."

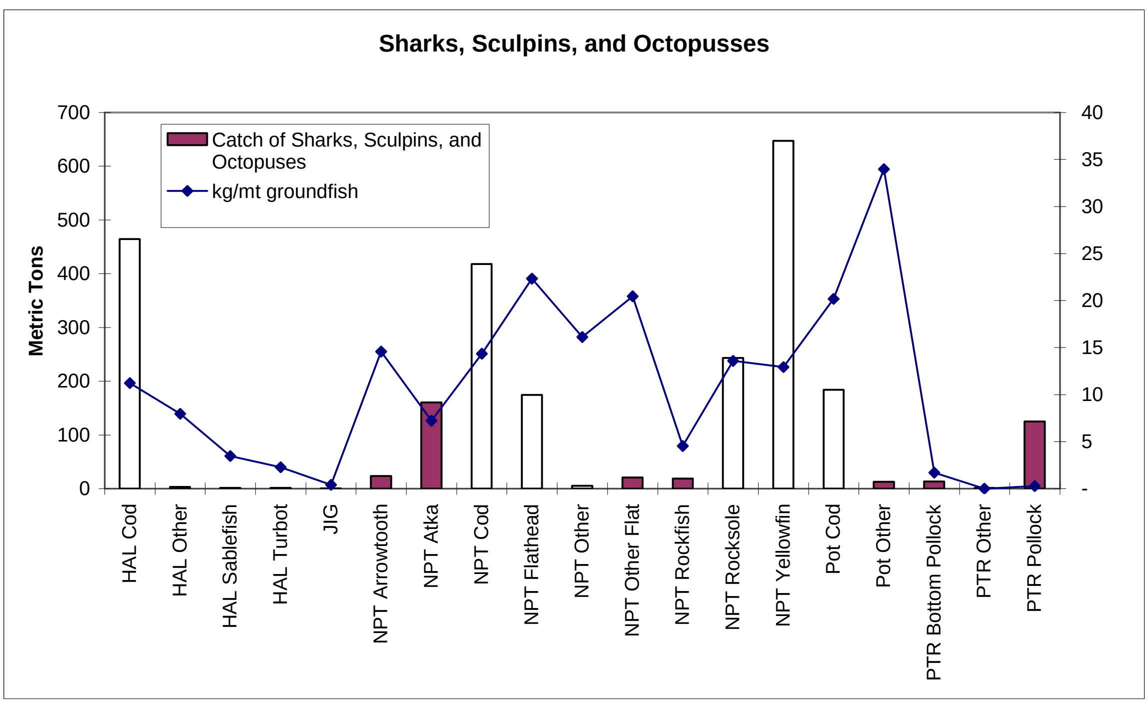
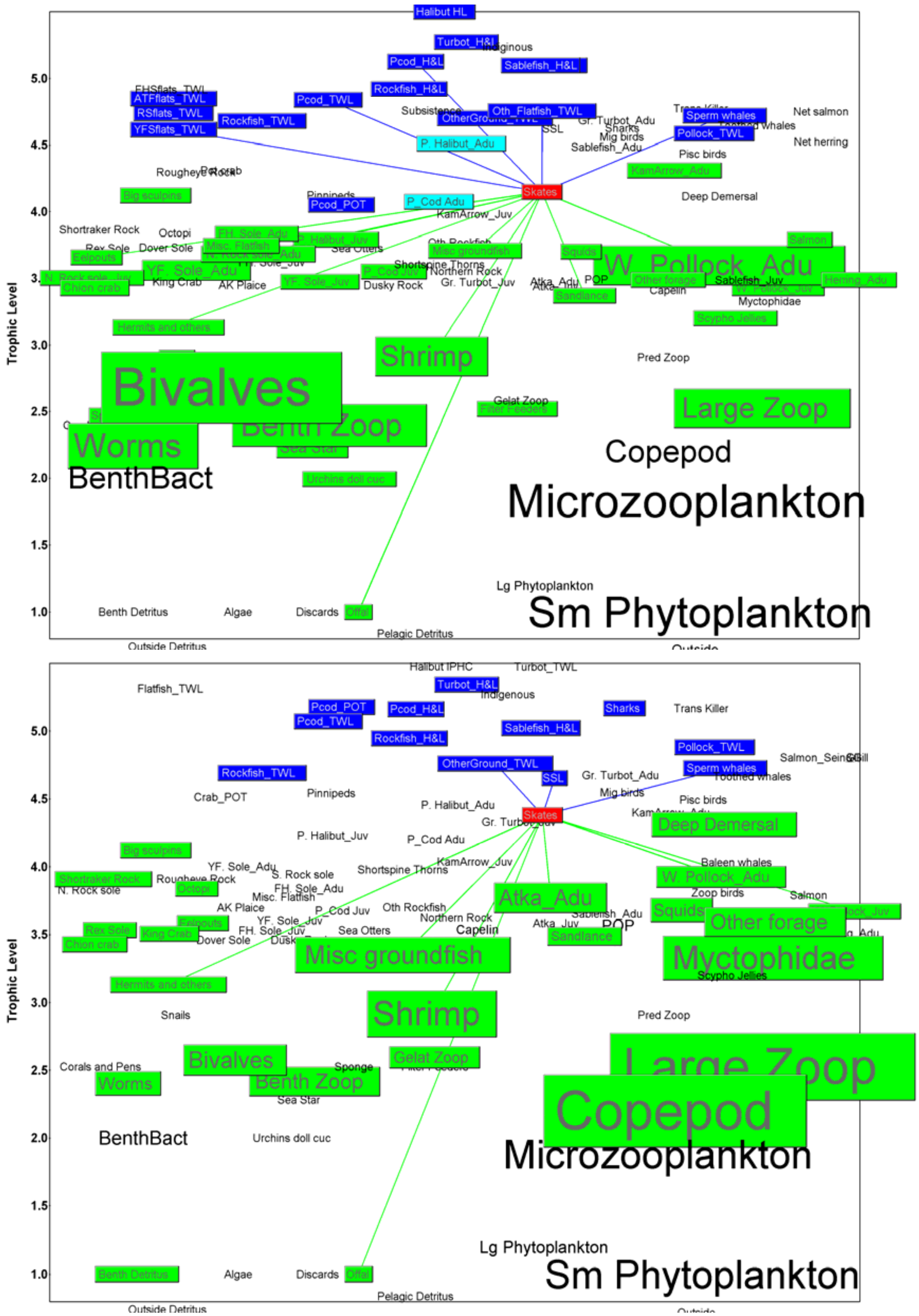


Figure 18. Average catch (kg) of remaining "other species" (2003–2008) by target fishery and gear type (mt).



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

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

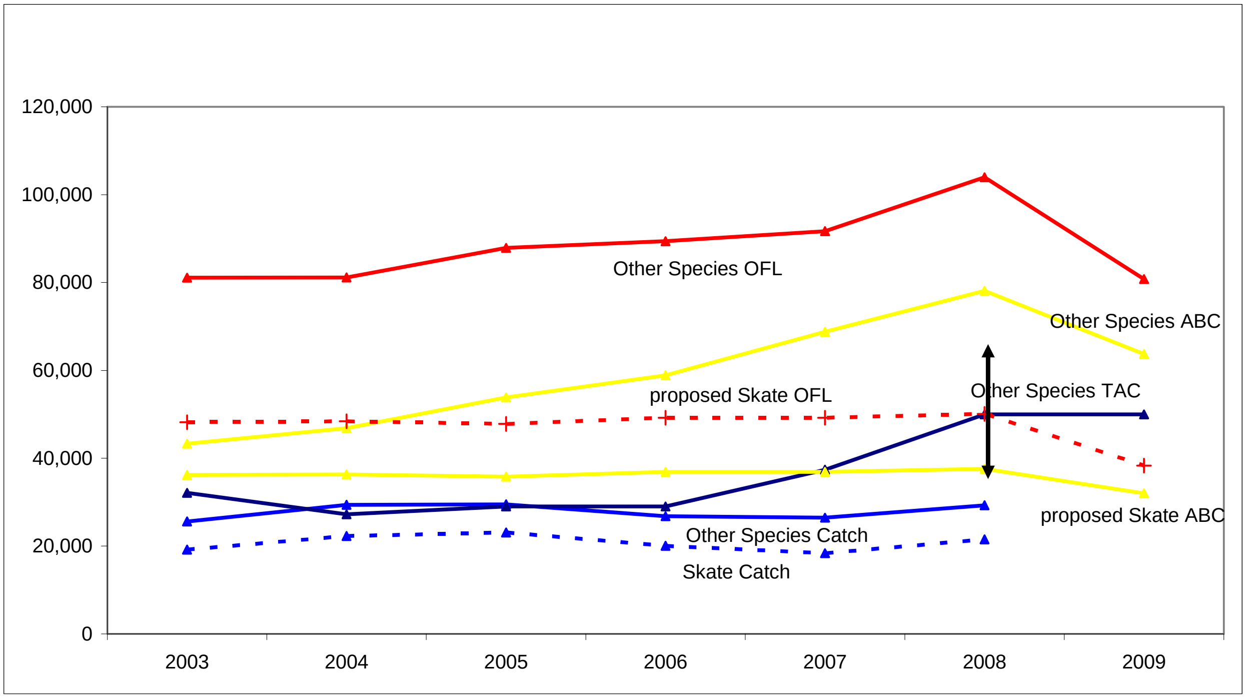


Figure 20. Comparison between proposed skate specifications and "other species" specifications in mt (2003–2009). (2009 TAC projection for BSAI skates was not available.)

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

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

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

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

Species Description	Code
Atka mackerel (greenling)	193
Flatfish, miscellaneous (flatfish species without separate codes)	120
FLOUNDER	
Alaska plaice	133
Arrowtooth and/or Kamchatka	121
Starry	129
Octopus, North Pacific	870
Pacific cod	110
Pollock	270
ROCKFISH	
Aurora (*Sebastes aurora*)	185
Black (BSAI) (*S. melanops*)	142
Blackgill (*S. melanostomus*)	177
Blue (BSAI) (*S. mystinus*)	167
Bocaccio (*S. paucispinis*)	137
Canary (*S. pinniger*)	146
Chilipepper (*S. goodei*)	178
China (*S. nebulosus*)	149
Copper (*S. caurinus*)	138
Darkblotched (*S. crameri*)	159
Dusky (*S. variabilis*)	172
Greenstriped (*S. elongatus*)	135
Harlequin (*S. variegatus*)	176
Northern (*S. polyspinis*)	136
Pacific Ocean Perch (*S. alutus*)	141
Pygmy (*S. wilsoni*)	179
Quillback (*S. maliger*)	147
Redbanded (*S. babcocki*)	153
Redstripe (*S. proriger*)	158
Rosethorn (*S. helvomaculatus*)	150
Rougheye (*S. aleutianus*)	151
Sharpchin (*S. zacentrus*)	166
Shortbelly (*S. jordani*)	181
Shortraker (*S. borealis*)	152
Silvergray (*S. brevispinis*)	157
Splitnose (*S. diploproa*)	182
Stripetail (*S. saxicola*)	183
Thornyhead (all *Sebastolobus* species)	143
Tiger (*S. nigrocinctus*)	148
Vermilion (*S. miniatus*)	184
Widow (*S. entomelas*)	156
Yelloweye (*S. ruberrimus*)	145
Yellowmouth (*S. reedi*)	175
Yellowtail (*S. flavidus*)	155
Sablefish (blackcod)	710
Sculpins	160
SHARKS	
Other (if salmon, spiny dogfish or Pacific sleeper shark – use specific species code)	689
Pacific sleeper	692
Salmon	690
Spiny dogfish	691
SKATES	
Aleutian	704
Alaska	703
Big	702
Longnose	701
Other (Use specific species code for skate species listed above)	700
Whiteblotched	705
SOLE	
Butter	126
Dover	124
English	128
Flathead	122
Petrale	131
Rex	125
Rock	123
Sand	132
Yellowfin	127
Squid, magestic	875
Turbot, Greenland	134

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Jdicosimo: 4-10
Mbrown: 4-7-10, stripped out RIR and IRFA, other minor edits
Gaberle: 4/10, technical edits
Cjernigan: 6/15/10