

4.2 Introduction of Analytical Framework – Example Fishery Management Plans

Four policy alternatives and a preferred alternative are analyzed in this document. In order to provide sufficient detail to the analysis of the policies, each alternative is accompanied by, and associated with, a set of example FMPs. A description of the framework concept, followed by a summary of each alternative policy and their associated FMPs, is provided below.

4.2.1 Concept of the Analytical Framework

Each alternative is composed of three elements: a management approach statement that describes the goals, rationale, and assumptions behind the alternative; a set of management objectives that complement and further refine the goals set forth in the management approach; and, except for Alternative 1 (status quo), a pair of example FMP bookends that illustrate and frame the range of implementing management measures for that alternative. The management approach statement and objectives serve to define the direction the NPFMC and NOAA Fisheries wish to take in the managing the fisheries. The example FMP bookends serve two purposes: first, they provide an additional level of analytical detail that will facilitate the comparison of the physical, biological, and socioeconomic effects of the alternatives and the status quo; second, they provide the public with an illustration of the types of management measures the NPFMC and NOAA Fisheries envision using to achieve the goals of the alternative. The preferred alternative identified in this document includes a policy statement accompanied by a set of management objectives and a set of example FMP bookends that illustrates a range of management actions for that policy. This FMP framework structure communicates to the public how NPFMC and NOAA Fisheries intend to pursue their policy objectives in the future. By providing a range of potential management measures (as illustrated by the example FMP bookends as part of the preferred alternative), management flexibility is maintained under the MSA to adaptively manage the fishery through FMP amendments.

4.2.2 Description of the Example Fishery Management Plan Frameworks

Alternative 1 – Continue Under the Current Risk-Averse Management Policy

Under Alternative 1, the groundfish fisheries would continue to be managed based upon the present risk-averse policy. Alternative 1(a) represents the policy language currently stated in the FMPs, dating from 1979 and 1985 for the BSAI and GOA FMPs, respectively (see Section 2.6.1 for the full text of the alternative). These policies, based on the best scientific information available, avoid irreversible or long-term adverse effects on fishery resources and the marine environment, while at the same time providing for optimum yield.

Alternative 1(b) is a substitute for the written policy language in the current FMPs that would include objectives that specifically address the variety of concerns that are balanced in current management considerations (see Section 2.6.2 for the full text of the alternative). Alternative 1(b) encapsulates a risk-averse conservation and management program that is based on a conservative harvest strategy. This policy assumes that fishing does result in some adverse impacts to the environment, and as these impacts become known, mitigation measures will be developed and appropriate FMP amendments will be implemented.

FMP 1 (Current BSAI and GOA Groundfish FMPs)

Alternative 1(a) and 1(b) policies are both represented by FMP 1, which is the current fisheries management program for the BSAI and the GOA and incorporates management measures approved by the NPFMC through the June 2002 meeting. FMP 1 is described in full in Table 4.2-1.

In the current FMPs, the TAC is determined annually based on a conservative harvest strategy that calculates the OFL and the ABC for each managed stock or stock complex. The current FMPs specify the OFL and maximum ABC (\max_{ABC}) by means of a six-tier system, wherein the amount and quality of information available for a given stock or stock complex determine the formula that is used to define F_{OFL} and $\max F_{ABC}$ (Tiers 1-5) or OFL and \max_{ABC} directly (Tier 6). Most stocks are currently managed under Tier 3, where $\max F_{ABC}$ equals $F_{40\%}$ if biomass is above $F_{40\%}$. Precautionary adjustments are made, including decreasing F_{OFL} and F_{ABC} linearly with biomass whenever biomass falls below a tier-specific reference level, but only Tier 1 stocks include an uncertainty variation in \max_{ABC} . The status of each stock in Tiers 1 through 3 is also examined annually with respect to the MSST, as defined in the National Standard Guidelines.

OY is specified in the current FMPs as a range that is aggregated across all stocks and does not vary with biomass. The current FMPs require the sum of the individual groundfish TACs to fall within the OY range. In the BSAI, the high end of the range, 2 million mt, acts as a cap on the TACs, as the aggregated ABCs regularly exceed this limit. In practice, although it is not required in the current FMPs, TACs are never set higher than the corresponding ABCs. Taking into account the ecosystem considerations of the food web, the current FMPs also prohibit directed fishing for forage species.

Through amendments over the last twenty years, the current FMPs have built up a network of spatial/temporal closed areas intended to protect resources of concern, as well as to minimize gear conflicts. In the BSAI, various areas around the Pribilof Islands and in Bristol Bay are closed year-round to trawling in order to protect red and blue king crab habitat, and there are chinook and chum salmon areas that are closed seasonally. Also in the BSAI, waters within 12 nautical miles (nm) of the Walrus Islands are closed to groundfish fishing to minimize disturbance near walrus haulouts. In the BSAI and the GOA, areas within 3 nm of Steller sea lion rookeries are permanently closed to fishing. Additionally, Steller sea lion protection measures impose trawl prohibitions within 10 to 20 nm of all rookeries and haulouts and prohibit fishing in Seguam Pass. In the GOA, trawling is prohibited in southeast Alaska west of 140°W longitude. Also, a 2.5 square nm (nm^2) area designated as the Sitka Pinnacles Marine Reserve in the GOA is closed to groundfish fishing to protect habitat for rockfish and lingcod (Figure 4.2-1).

The current BSAI FMP prohibits directed fishing for pollock with non-pelagic trawl gear. There is no similar restriction on pollock trawling in the current GOA FMP. Directed fishing for sailfish with longline pot gear is prohibited in the GOA. Non-pelagic trawling is prohibited in the Bristol Bay Red King Crab Savings Area in the BSAI and in the Cook Inlet in the GOA. Additionally, various areas around Kodiak Island are closed to non-pelagic trawling either year-round or seasonally to protect crab stocks (Figure 4.2-1; specific details on the FMP 1 map illustration are provided in Section 4.2.3).

Groundfish fisheries in the BSAI and GOA are required to discard any incidental catch of halibut, salmon, crab, herring, or Steelhead trout, known collectively as prohibited species. The FMPs currently set PSC limits on many of these species, with penalties ranging from closure of a particular zone or of the whole management area to closures of a directed fishery or fisheries for a specified season or for the remainder of

the year. In the BSAI FMP, staircase-based limits (i.e. the catch limit varies based on stock abundance) for trawl bycatch within specified zones are set for red king crab and *C. bairdi* crab. The BSAI FMP also specifies an absolute trawl catch limit for chinook salmon and “other salmon” within specified zones. Once the apportioned PSC limit for a trawl fishery is reached within a zone, the fishery is prohibited from fishing within that zone. The BSAI FMP specifies a trawl catch limit for herring in the BSAI at one percent of annual biomass. Catch limits on *C. opilio* crab and halibut bycatch in the BSAI are established in regulation. The *C. opilio* catch limit applies to a specified zone and is based on an adjusted percentage of biomass that must fall within a certain range. The halibut catch limit is a BSAI-wide limit measured in mt and is based on halibut mortality. In the GOA FMP, catch limits on halibut bycatch are authorized and set by the NPFMC as part of the annual procedure for setting groundfish harvest levels. There are no other PSC limits set in the GOA.

Other bycatch reduction measures are required under FMP 1. The Improved Retention/Improved Utilization (IR/IU) program requires that vessels fishing for groundfish fully retain all pollock and Pacific cod fit for human consumption, as well as fully utilizing the two species by inshore processors. A minimum utilization standard of 15 percent is set for all at-sea processors. The NPFMC is also adopting a policy to require full retention of demersal shelf rockfish by hook-and-line and jig vessels in the Southeast Outside District of the GOA. A Vessel Incentive Program (VIP) encourages bycatch reduction by setting bycatch reduction standards biannually. Vessels that fail to meet these standards can be penalized. Inseason bycatch management measures establish fishing seasons for bycatch management and give the NOAA Fisheries, Alaska Regional Administrator the authority to close areas with high bycatch.

The Reasonable and Prudent Alternative (RPA) measures adopted from the most recent USFWS biological opinion on the short-tailed albatross stipulate the use of certain seabird avoidance measures and require that the take of more than four short-tailed albatross within 2 years trigger consultation with the USFWS and the potential closure of fisheries. To further reduce the possibility of the fisheries’ take of albatross, the NPFMC in 2001 required all longline vessels to adopt more stringent seabird avoidance methods.

A Licence Limitation Program (LLP) for groundfish vessels over 32 ft in length (with certain jig gear exceptions) and a moratorium on entry into the groundfish fisheries is in place for the BSAI and the GOA. An IFQ program is in place for sablefish in the BSAI and GOA, which includes provisions for community purchase of quota share. In the BSAI, the directed fishery for pollock is organized into cooperatives as authorized under the AFA. A multi-species CDQ program apportions 7.5 to 10 percent of all BSAI groundfish quota to 65 eligible western Alaska communities.

FMP 1 monitors the groundfish fishing effort through federal and state reporting requirements and through the use of the North Pacific Groundfish Observer Program. All vessels between 60 ft and 125 ft in length are required by regulation to have an observer on board 30 percent of the time; for vessels over 125 ft in length this increases to 100 percent. For AFA and CDQ catcher boats greater than 60 ft in length, one observer must be on board at all times, and for catcher processors and motherships, two observers must be on board at all times. The program also requires observers at inshore processing plants. An additional monitoring tool is the reporting requirements for BSAI and GOA vessels to submit daily or weekly logbooks that include information on the composition of catch and the locations of the hauls. The ADF&G also collects data from fish tickets at the point that catch is sold. Mandatory Vessel Monitoring Systems (VMS) verify vessel locations for all directed Atka mackerel, pollock, and Pacific cod fishing.

Alternative 2 – Adopt a More Aggressive Harvest Management Policy

Alternative 2 would maximize biological and economic yield from the resource while still preventing overfishing of the groundfish stocks. Such a management approach would be based on the best scientific information available, would take into account individual stock and ecosystem variability, and would continue to work with other agencies in protecting threatened and endangered species. A more aggressive harvest strategy would be implemented based upon the concept that the present policy is overly conservative and that larger harvests can be taken without overfishing the target groundfish stocks. This policy assumes that fishing at the recommended levels would have no adverse impact on the environment, except in specific cases that are known and mitigated. For the full text of the alternative, see Section 2.6.3.

Example FMP 2.1

Example FMP 2.1 illustrates a more aggressive harvest strategy than Alternative 1 by removing many of the existing constraints from the fisheries. Example FMP 2.1 is described in full in Table 4.2-1. As the policy is based on an assumption that the impacts of fishing on the environment are generally known and mitigated, the precautions currently built into the existing TAC-setting process would be alleviated. The buffer between the ABC level and the OFL would be removed, and the maximum OY for the groundfish stocks in the BSAI would be released from its 2 million mt cap and allowed to float as the sum of the OFLs for the BSAI groundfish stocks. Additionally, example FMP 2.1 removes the precautionary element included in the current FMPs that decreases F_{ABC} linearly with biomass when the biomass falls below a specific reference level.

Example FMP 2.1 would also remove physical constraints from the fisheries by repealing the various closure areas currently in place. The fishery would be returned to an open-access scenario, where time and area closures, gear restrictions, and prohibited species catch restrictions are repealed. The potential impact of the groundfish fisheries on Steller sea lions, however, means that the current mitigating suite of protection measures that constrain fishing around rookeries and haulouts and protect Steller sea lion prey species (pollock, Pacific cod and Atka mackerel) when at low biomass levels would remain in place (Figures 4.2-2 and 4.6-1; specific details on the example FMP 2.1 map are provided in Section 4.2.3). This is required by the ESA to avoid determinations of jeopardy and adverse modification to Steller sea lions. The same applies to the impact of groundfish fishing on short-tailed albatross, where the current take limits would remain in effect.

The federally-mandated effort limitation program for the directed BSAI pollock fishery, enacted under the AFA, would remain in place, with its accompanying CDQ allocation, but all other effort limitation programs (such as the sailfish IFQ program and the multi-species CDQ program) would be repealed. Reporting requirements would remain in place, but the observer program, except as federally mandated by the AFA, would be repealed, as would VMS requirements.

Example FMP 2.2

A more moderate illustration of Alternative 2, example FMP 2.2, also represents a more aggressive harvest strategy than Alternative 1. Example FMP 2.2 is described in full in Table 4.2-1. In this case, the mechanisms for setting ABC and TAC remain the same as in the current FMPs (see FMP 1 for further detail), but the existing regulatory capped maximum OY of 2 million mt in the BSAI would be removed in favor of a maximum OY equaling the sum of individual groundfish ABCs in the BSAI. Additionally, bycatch reduction

incentives and bycatch restrictions would be repealed, other than those related to PSC limits or IR/IU. Under the assumption that fishing does not have an impact on the environment other than what is generally known and mitigated, the more stringent seabird avoidance measures enacted in 2001 would be repealed, leaving only the mitigation measures recommended by USFWS to avoid jeopardy or adverse modification for short-tailed albatross. Closure areas in example FMP 2.2 are the same as those in FMP 1 (Figure 4.2-3; specific details on the example FMP 2.2 map are provided in Section 4.2.3).

Alternative 3– Adopt a More Precautionary Management Policy

Alternative 3 would seek to increase the existing precautionary management measures through community or rights-based management, ecosystem-based management principles, and, where appropriate and practicable, increased habitat protection and additional bycatch constraints. Under this approach, additional conservation and management measures would be implemented as necessary to respond to social, economic or conservation needs, or if scientific evidence indicates that the fishery was negatively impacting the environment. This policy recognizes the need to balance many competing uses of marine resources and different social and economic goals for fishery management. For the full text of the alternative, see Section 2.6.4.

Example FMP 3.1

Example FMP 3.1 illustrates a management approach that accelerates precautionary management measures by increasing conservation-oriented constraints on the fisheries where necessary, formalizing precautionary practices in the FMPs, and initiating scientific review of existing practices as a precursor to the decision of how to best incorporate adequate precautions. Example FMP 3.1 is described in full in Table 4.2 1.

Example FMP 3.1 implements changes to the TAC-setting process following a comprehensive review. Precautionary measures such as setting TAC less than or equal to the ABC and specifying MSSTs for Tiers 1 through 3 in accordance with National Standard Guidelines, would be formalized in the FMP. Sharks and skates would be removed from the Other Species management category and given their own TACs, and criteria to do the same for other target stocks would be developed. Efforts would be accelerated to develop ecosystem indicators for setting TAC limits, as per ecosystem management principles,.

In order to balance the needs of social and economic stability with habitat protection and resource conservation, a review would be conducted of the existing closure areas in the BSAI and the GOA (for closure areas under FMP 3.1, see Figure 4.2-4 and Section 4.2.3). The closure areas would be evaluated against a Marine Protected Area (MPA) methodology, which would be developed as part of this alternative. The NPFMC and NOAA Fisheries would also seek to initiate joint consultation and research with USFWS to develop fishing methods that reduce incidental take of threatened and endangered species. To mitigate any adverse impacts of fisheries management decisions on fishing communities, and to comply with other national directives, formal procedures would be implemented to encourage increased participation of Alaska Natives in fishery management.

Example FMP 3.1 recognizes that the anticipated community or rights-based management programs may ultimately address bycatch reduction objectives (a review of bycatch rates under current programs has been initiated) but, a moderate reduction of PSC limits will be initiated as an intermediary step. Additionally, PSC limits for crab, herring, and salmon would be authorized in the GOA, in addition to the halibut PSC limits

authorized under the current GOA FMP. Effective monitoring and timely reaction to change in the environment and the fisheries would be enhanced through improvements in the observer program and third party verification of economic data.

Example FMP 3.2

Example FMP 3.2 implements the increase of existing precautionary measures on a more rapid timeline than example FMP bookend 3.1. Example FMP 3.2 is described in full in Table 4.2-1. Rather than reviewing existing practices prior to incorporating increased precautions, this bookend implements changes to many aspects of the FMPs concurrently with the initiation of scientific research efforts necessary to bring management measures in line with a precautionary policy.

Example FMP 3.2 significantly accelerates precautionary management by incorporating an uncertainty correction into the estimation of ABC for all species. Additionally, OY would be specified separately for each stock or stock complex rather than for the groundfish complex as a whole (i.e., OY would be set as a formula rather than as a range, eliminating the BSAI 2 million mt OY cap), and would be set equal to the respective stock or stock complex's TAC. The current precautionary practice of setting TAC less than or equal to ABC would be formalized in the FMP. Example FMP 3.2 would also incorporate stock-specific biological reference points in the tier system where scientifically justifiable. This could result in Tier 3 rockfish stocks, for example, being capped at $F_{60\%}$ rather than $F_{40\%}$. In implementing this bookend, criteria would be developed for specifying MSSTs for Tiers 4 through 6, along with a list of priority candidate stocks; and the development of criteria for moving stocks from the Other Species and Nonspecified Species management categories would minimally result in sharks and skates being given their own TACs.

Example FMP 3.2 also reexamines the existing closure system in the BSAI and the GOA. The bookend sets a guideline of 0 to 20 percent of the EEZ (3 to 200 nm) to be closed as an MPA, of which no more than 5 percent should be completely closed to commercial fishing as a designated No-Take Marine Reserve. The remainder of the closed area would be designated as a no-bottom-contact MPA. The objective of these measures would be to provide greater protection to a full range of marine habitats within the 1,000 m bathymetric line (Figure 4.2 5; specific details on the example FMP 3.2 map are provided in Section 4.2.3). The guideline aims to provide greater protection for a wide range of species, from Steller sea lions to slope rockfish to prohibited species, while at the same time respecting traditional fishing grounds and maintaining open area access for coastal communities. Additionally, the bookend would extend the existing bottom-trawl ban on pollock to the GOA.

Additional conservation benefits would be realized in example FMP 3.2 through the comprehensive rationalization of all fisheries (except those already part of a cooperative or IFQ program.) In adopting rationalization programs such as cooperative-style programs with built-in community protections, habitat and bycatch concerns would also be addressed by reducing concentrated effort in the fisheries. To increase precautions regarding bycatch, PSC limits would be significantly reduced (and set for all prohibited species in the GOA), but would not be expected to act as a proportionate restraint on the fisheries due to the incentives for bycatch reduction under cooperatives, or other bycatch incentive programs implemented as necessary under this bookend.

In accordance with ecosystem principles, the NPFMC and NOAA Fisheries would seek to initiate joint consultation and research with USFWS to develop fishing methods that reduce incidental take of all seabird

species. Formal procedures would also be implemented to increase consultation with and representation of Alaska Natives in fishery management.

Effective monitoring and timely reaction to change in the environment and the fisheries would be enhanced through increase of observer coverage and improvements to the observer program, as well as an increase in the use of VMS and the range of economic data collected from industry.

Alternative 4 – Adopt a Highly Precautionary Management Policy

Alternative 4 represents an extremely precautionary approach to managing fisheries under scientific uncertainty. This type of management policy shifts the burden of proof to the users of the resource and the NPFMC/NOAA Fisheries to demonstrate that the intended use would not have a detrimental effect on the environment. It would involve a strict interpretation of the precautionary principle. Management discussions would involve and be responsive to the public, but would decrease emphasis on industry and community concerns in favor of ecosystem processes and principles. This policy assumes that fishing does produce adverse impacts on the environment, but we have little information regarding these impacts. The initial restrictive and precautionary conservation and management measures would be modified or relaxed when additional, reliable scientific information becomes available. For the full text of the alternative, see Section 2.6.5.

Example FMP 4.1

Example FMP 4.1 illustrates an FMP where current levels of fishing are reduced and other precautionary restrictions are implemented until scientific research shows that the fisheries have no adverse effect on the sustainability of the resource and the environment. Example FMP 4.1 is described in full in Table 4.2-1.

Example FMP 4.1 would substantially reduce the potential of the fisheries to have adverse environmental impacts on the environment. A modified TAC-setting process would create a more substantial buffer between ABC and the OFL by setting the fishing mortality rate at $F_{75\%}$ for all Steller sea lion prey species (pollock, Pacific cod, and Atka mackerel) and for rockfish (a long-lived, slow-growing species). Also, the $\max F_{ABC}$ for each stock or stock complex in Tiers 1 through 5 would be adjusted downward based on the lower bound of a confidence interval surrounding the survey biomass estimate. OY would be specified separately for each stock or stock complex rather than for the groundfish complex as a whole (i.e., OY would be set as a formula rather than as a range, eliminating the BSAI 2 million mt OY cap), and would be set equal to the respective stock or stock complex TAC. The current precautionary practice of setting TAC less than or equal to ABC would be formalized in the FMP. For species managed as members of a stock complex, rather than setting TAC as the aggregate of the individual members' ABCs, the \max_{ABC} value for each stock would be determined and the TAC set equal to the lowest value. Where sufficient biological information is available, such as with EBS pollock, TAC would be distributed on a smaller spatial scale. MSSTs would be determined for all tiers.

To further mitigate the possibility of the fisheries having a detrimental biological and ecosystem impact, 20 to 50 percent of the EEZ would be designated as a No-Take Marine Reserve (i.e., no commercial fishing), covering the full range of marine habitats within the 1,000-m bathymetric line (Figure 4.2-6; specific details on the example FMP 4.1 maps are provided in Section 4.2.3). As part of this area in the Aleutian Islands, a Special Management Area would be established to protect coral and other live bottom habitats. The closed

area would include spawning reserve areas for intensively fished species. Under the FMP 4.1 example, comprehensive trawl exclusion zones would be set to protect all Steller sea lion critical habitat, and trawling would be restricted to only those fisheries that cannot be prosecuted with other gear types (i.e., the flatfish fisheries).

In an effort to reduce waste and the risk of adverse impact to the environment, existing PSC limits would be halved under this bookend, as would bycatch (discard) and incidental catch rates. IR/IU would be extended to all target species. Stringent PSC limits would be set for salmon, crab, and herring in the GOA, and as information becomes available, bycatch limits would be set for non-target species also. Protection measures would be set for all seabird species.

Because this policy alternative necessitates greater research and data-gathering efforts, example FMP 4.1 would expand observer coverage to 100 percent for all vessels over 60 ft in length and require 30 percent observer coverage on vessels presently exempted from observer coverage (i.e., vessels under 60 ft in length). VMS would be made mandatory for all groundfish vessels, as would motion-compensated scales for weighing all catches at sea or at shore-based processors. Cooperative research and data-gathering programs would be initiated as well to expand the use of traditional knowledge in fisheries management.

Example FMP 4.2

Example FMP 4.2 expands the precautionary principles of Alternative 4 by suspending all fishing until the fisheries can be shown to have no adverse effect on the resource and its environment. The TAC for all species would be set at zero. All areas of the EEZ would be closed to all types of fishing (e.g., commercial, recreational, and subsistence) (Figure 4.2-7; specific details on the example FMP 4.2 map are provided in Section 4.2.3); bycatch and incidental catch, as well as the take of seabirds and marine mammals, would then be reduced to zero. Example FMP 4.2 is described in full in Table 4.2-1.

Scientific research and data-gathering efforts would continue. When a fishery can be shown to pose no significant threat of adverse biological and environmental impacts, or if adverse effects can be successfully mitigated through use of fishery-specific regulations, fishing would be allowed to resume.

Under this FMP illustration, it is assumed that each groundfish fishery currently conducted in federal waters in the BSAI and GOA would be individually reviewed by the NPFMC and NOAA Fisheries. Upon completion of this review (which may take up to 2 years), the agency would certify those fisheries that have no significant adverse impacts on the environment and authorize fishing under a specific set of regulations. If a fishery is found by this review to produce significantly adverse environmental effects, and mitigation measures can not be designed to mitigate those effects, that fishery would not be certified and would remain closed until more scientific information is known.

The Preferred Alternative

The preliminary Preferred Alternative represents a management approach that incorporates forward looking conservation measures that address differing levels of uncertainty. This management approach has, in recent years, been labeled the precautionary approach. As part of its policy, appropriate measures would be considered and adopted that accelerate the precautionary, adaptive management approach through community or rights-based management, ecosystem-based management principles that protect managed species from

overfishing, and, where appropriate and practicable, increased habitat protection and bycatch constraints. This management approach recognizes the need to balance many competing uses of marine resources and different social and economic goals for fishery management, and will utilize and improve upon the NPFMC and NOAA Fisheries' existing open process to involve the public in decision-making. For the full text of the alternative, see Section 2.6.9.

Example FMP PA.1

Example FMP PA.1 illustrates a conservative management approach that continues current risk-averse management practices, increases conservation-oriented constraints on the fisheries as appropriate, formalizes precautionary practices in the FMPs, and initiates scientific review of existing practices in order to assess and improve fishery management. Example FMP PA.1 is described in full in Table 4.2-2.

Example FMP PA.1 builds on the existing conservative procedure for determining ABC and annual quotas. The example FMP would implement changes to the TAC-setting process following a comprehensive review. Precautionary practices, such as setting TAC less than or equal to the ABC, and specifying MSSTs for Tiers 1 through 3 in accordance with National Standard Guidelines, would be formalized in the FMP. The NPFMC and NOAA Fisheries would continue to use and improve harvest control rules to maintain a spawning stock biomass with the potential to produce sustained yields on a continuing basis, and to distribute allocations by area, season, and gear as appropriate. Efforts to develop ecosystem indicators to be used in TAC-setting, as per ecosystem management principles, would be continued.

In order to balance the needs of social and economic stability with habitat protection and resource conservation, the NPFMC would develop an MPA efficacy methodology, including the development of definitions, program goals, objectives, and criteria for establishing MPAs. Additionally, existing habitat and bycatch area restrictions would be maintained. Measures to protect ESA-listed species would also be retained. To minimize bycatch, a moderate reduction of PSC limits in the BSAI would be initiated, and PSC limits or other appropriate measures for the protection of crab, herring, and salmon would be authorized in the GOA. Effective monitoring and timely reaction to change in the environment and the fisheries would be enhanced through improvements in the observer program and existing reporting requirements.

Existing programs to address excess capacity and overcapitalization would be maintained under this example FMP, with continued development of rights-based management to be undertaken as needed. In order to mitigate any adverse impacts of fisheries management decisions on fishing communities, and to comply with other national directives, procedures to encourage increased participation of Alaska Natives in fishery management would be pursued.

Example FMP PA.2

Example FMP PA.2 accelerates adaptive, precautionary management by increasing conservation measures that provide a buffer against uncertainty, instituting research and review of existing measures, and expanding data collection and monitoring programs. Example FMP PA.2 is described in full in Table 4.2-2.

Example FMP PA.2 significantly increases precautionary management by incorporating an uncertainty correction into the estimation of ABC for all species. The current precautionary practice of setting TAC less than or equal to ABC would be formalized in the FMP. The calculation of the OY caps would be periodically

reviewed to determine their relevancy to current environmental conditions and stock levels. Example FMP PA.2 would also develop and implement criteria for using key ecosystem indicators in TAC-setting, and other precautionary practices such as developing appropriate harvest strategies for rockfish stocks. In implementing this bookend, analysis and data collection would allow for specification of MSSTs for priority stocks in Tiers 4 and 5. The development of criteria to manage target and non-target species consistently, and for moving stocks from the Other Species and Non-specified Species management categories, would initially consider moving sharks (in the BSAI and GOA) and skates (in the BSAI) out of the Other Species group for setting TAC limits.

Example FMP PA.2 also re-examines area restrictions in the BSAI and the GOA by reviewing existing closure areas (for closure areas under example FMP PA.1, see Figure 4.2-8 and Section 4.2.3), and evaluating them in conjunction with the development of MPAs. The example FMP would adopt MPAs, based on a designation guideline of 0 to 20 percent of the EEZ (3 to 200 nm). The objective of these measures is to provide greater protection to a full range of marine habitats within the 1,000 m bathymetric line (Figure 4.2-9; specific details on the example FMP PA.2 map are provided in Section 4.2.3). This MPA would incorporate an Aleutian Islands management area to protect coral and live bottom habitat, and would also include any modification to the 2002 Steller sea lion closures. The guideline aims to provide greater protection for a wide range of species, from Steller sea lions to slope rockfish to prohibited species, while at the same time respecting traditional fishing grounds and maintaining open area access for coastal communities. Additionally, the bookend would extend the existing BSAI bottom-trawl ban on pollock to the GOA.

To increase precautions regarding bycatch, existing PSC limits would be reduced, and limits would be set for all prohibited species in the GOA with appropriate in-season closure areas. The achievement of these bycatch reductions would be realized through the comprehensive rationalization of all fisheries (except those already part of a cooperative or IFQ program), which reduces concentrated effort in the fisheries, or through bycatch incentive programs implemented in this example FMP.

In accordance with ecosystem principles, the NPFMC and NOAA Fisheries would seek to cooperate with USFWS to develop fishing methods that reduce incidental take of all seabird species in the longline and trawl fleets. Procedures would also be pursued to increase consultation with and representation of Alaska Natives in fishery management.

Increases in observer coverage and improvements to the observer data that are collected would enhance effective monitoring and improve the ability to react to change in the environment and the fisheries. Additionally, the bookend explores programs that would expand mandatory economic data collected from industry.

4.2.3 Description of the Example Fishery Management Plan Maps

FMP 1 Map

FMP 1 (Figure 4.2-1) illustrates different types of spatial management areas across the BSAI and GOA. All of these areas currently comprise the spatial management regime for 2003. These areas are color-coded on the map; bathymetry contours to 1,000 m are also color-coded, ranging from dark green (0 m) to a pale beige (1,000 m). In the legend, titles for measures developed specifically for protection of Steller sea lions are

printed in blue. Bycatch closures that are triggered once a PSC limit is reached are not included on the map or in the spatial analysis, since in recent years some of these limits are no longer reached.

FMP 1 illustrates the current Steller sea lion-related closures west of 144°W longitude necessary for the Alaska groundfish fisheries to avoid a determination of jeopardy and adverse modification for Steller sea lions under the ESA. The Steller sea lion population west of 144°W longitude has been listed as endangered under the ESA since 1990. The portion of the Steller sea lion population found east of 144°W longitude is currently listed as threatened. Closures related to protection of Steller sea lions are color-coded as follows:

Yellow:	3 nm No-Transit Zones (No-Take Reserves)
Blue:	No Hook-and-Line and Pot or Trawl for the Steller Sea Lion Prey Species
Red:	No Trawling for Steller Sea Lion Prey Species
Red Hatching:	Seasonal and Harvest Limit Closures for Atka Mackerel and Pacific Cod
Tan Hatching:	Additional Atka Mackerel Closures
Blue Hatching:	Additional Pollock Closures

The No-Transit Zones shown on the map have been in effect since 1992, and serve to restrict all water-born vessel traffic year-round, unless under a federal scientific permit.

Areas designated as “No Hook-and-Line and Pot or Trawl for Steller Sea Lion Prey Species” are those areas that currently restrict the harvest of Steller Sea lion prey species by hook-and-line and pot and bottom and pelagic trawl gear. These restrictions are in effect year-round.

Areas labeled “No Trawling for Steller Sea Lion Prey Species” restrict both bottom and pelagic trawl fishing for Steller sea lion prey species and are in effect year-round.

In the BSAI, areas designated as “Seasonal and Harvest Limit Closures for Atka Mackerel and Pacific Cod” are those areas where Atka mackerel fishing is closed all year within 20 nm of Steller sea lion rookeries and haulout sites in waters east of 178°W longitude. In waters west of 178°W longitude, constraints on Atka mackerel harvest are triggered once 40 percent of the Aleutian Islands Atka Mackerel TAC is reached. After the 40 percent threshold is reached in the Aleutian Islands, all other Atka mackerel fishing must occur at least 20 nm from Steller sea lion rookeries and haulout sites. To prevent localized depletion of prey species, Pacific cod (which are managed under a single TAC for the BSAI) may not be targeted west of 178°W longitude after 40 percent of that BSAI TAC is reached.

Additional closures include those areas closed to directed fishing of Atka mackerel and pollock, The GOA west of 144°W longitude is closed year-round to directed fishing for Atka mackerel. The entire Aleutian Islands subarea is closed year-round to directed fishing of pollock, and both the GOA and the Bering Sea have additional seasonal pollock restrictions.

Non-Steller sea lion related spatial closures, including areas closed to all trawl, non-pelagic trawl, and all fishing, are presented in the example FMP 1, FMP 2.2, and FMP 3.1 maps (Figures 4.2-1, 4.2-3, and 4.2-4, respectively). These closures include the following areas:

Closed to All Trawl

- Nearshore Bristol Bay Closure Area: Bering Sea area closed year-round since 1996.
- Pribilof Islands Area Habitat Conservation Zone: Bering Sea area closed year-round since 1994.
- Southeast Outside Closed Area: closed year-round since 1997.
- Chiniak Gully Research Area: closed from August 1 through September 20.

Closed to Non-Pelagic Trawl

- Red King Crab Savings Area: Bering Sea area closed year-round since 1996.
- Kodiak Type I Crab Closure Areas: GOA area closed year-round.
- Kodiak Type II Crab Closure Areas: GOA area closed between February 15 to June 15.

Closed to All Fishing

- Cape Edgecumbe (Sitka) Pinnacles: closed to groundfish fishing year-round since 1997.

All of these spatial measures (closures) combined protect 10.7 percent of the EEZ (Table 4.2-3). Because groundfish resources and EFH are usually found to be associated with the continental shelf and continental slope, for purposes of this analysis we have defined “fishable area” as those waters over the continental shelf and continental slope, or all waters to a depth of 1,000 m. When examined in this way, the spatial measures described for example FMP 1 protect 28.8 percent of the fishable area of the BSAI and GOA. (Table 4.2-3).

Example FMP 2.1 Map

The map for example FMP 2.1 (Figure 4.2-2) illustrates six different types of spatial management areas across the BSAI and GOA. Example FMP 2.1 includes only the current Steller sea lion-related closures west of 144°W longitude, necessary for the Alaska groundfish fisheries to avoid a jeopardy determination for Steller sea lions under the ESA. These closure areas are color-coded on the map; bathymetry contours to 1,000 m are also color-coded, ranging from dark green (0 m) to a pale beige (1,000 m). Closures related to protection of Steller sea lions are color-coded as follows:

Yellow:	3 nm No-Transit Zones (No-Take Reserves)
Blue:	No Hook-and-Line and Pot or Trawl for the Steller Sea Lion Prey Species
Red:	No Trawling for Steller Sea Lion Prey Species
Red Hatching:	Seasonal and Harvest Limit Closures for Atka Mackerel and Pacific Cod
Tan Hatching:	Additional Atka Mackerel Closures
Blue Hatching:	Additional Pollock Closures

Descriptions of these six spatial management areas do not deviate from those presented under the FMP 1 map at the beginning of this section. All of these spatial measures (closures) combined protect 4.2 percent of the EEZ, and 14.6 percent of the fishable area of the BSAI and GOA (Table 4.2-4).

Example FMP 2.2 and Example 3.1 Maps

The maps for examples FMP 2.2 and FMP 3.1 are identical to the map for example FMP 1 (Figures 4.2-3 and 4.2-4). See Tables 4.2-5 and 4.2-6 for descriptive statistics on FMPs 2.2 and 3.1, respectively.

Example FMP 3.2 Map

The map for example FMP 3.2 (Figure 4.2-5) illustrates six color-coded spatial management areas. Bathymetry contours to 1,000 m are also color-coded, running from dark green (0 m) to pale beige (1,000 m). In the legend, titles for measures developed specifically for protection of Steller sea lions are printed in blue. Closures are color-coded as follows:

Yellow:	3 nm No-Transit Zones (No-Take Reserves)
Blue:	No-Take Marine Reserves
Dark Green:	No Steller Sea Lion Prey Species Hook-and-Line, Pot, or Trawl Fishing MPA
Purple:	No Steller Sea Lion Prey Species Trawling MPA
Light Green:	Eastern GOA No Steller Sea Lion Prey Species Hook-and-Line, Pot, or Trawl MPA
Pink:	No-Bottom-Contact Trawling MPA

The map has been developed from the following information and data sources: bathymetry; EFH from the 1997 EFH EA (NMFS 1997); Steller sea lion critical habitat; 2002 Steller sea lion closures; survey and bycatch data for coral and sponge distribution; historical commercial fisheries catch data; location of ports; locations of test and study areas; and review of various alternatives and potential mitigation measures being developed by the NPFMC EFH Committee. Using the latest data to determine Steller sea lion foraging behavior, a 15 nm buffer from the coastline in the GOA and Bering Sea was applied, as were 15 nm buffers from Steller sea lion rookeries and haulouts in the Aleutian Islands.

The ADF&G groundfish statistical areas were applied as management units to designate five different types of management areas including No-Take Marine Reserves; No Steller Sea Lion Trawling MPA; No Bottom Trawling MPA; No Steller Sea Lion Hook-and-Line, Pot or Trawl MPA; and, in the eastern GOA, No Steller Sea Lion Hook-and-Line, Pot or Trawl and No-Trawl MPA.

The ADF&G statistical areas are approximately 35 nm wide and 30 nm tall. ADF&G subdivides their statistical areas at 3 nm from the shoreline. These management units, when grouped into larger spatial regions, are presumably large enough to 1) prevent habitat fragmentation; 2) protect large portions of HAPC; 3) form clearly defined, manageable, navigable, and enforceable alternatives; 4) provide contiguous fishing restrictions for protecting spawning populations, key critical habitat, demersal and pelagic fish species, and marine mammals; and 5) where possible, provide open areas near fishing ports.

From a biological and fishery point of view, the ADF&G groundfish statistical area boundaries are arbitrary and do not always line up with the spatial distribution of significant biological and habitat resources. Therefore, a 40 percent rule was applied: when 40 percent of a statistical area had a significant concern as

determined by a weighted qualitative factor, the area was tagged as a “No-Take Marine Reserve”, or one of the other MPAs. This effect was normalized to a certain extent during the analysis because a statistical area that did not quite meet the benchmark would not be designated as an MPA (e.g., an area where less than 40 percent was of concern would be left entirely open). In some cases, areas would be totally closed to create a contiguous closure necessary to capture a broad range of inshore to offshore habitats.

The benthic fishing habitat used in this analysis generally follows the continental shelf and goes out to a depth of 1,000 m (500 fathoms), which we consider here to constitute the fishable bottom habitat. Blocks of closures extend from the shore to a 1,000-m depth, protecting a full range of habitat types. Area protected by FMP 3.2 spatial measures, when combined, constitutes 17.8 percent of the EEZ, and 47.8 percent of the fishable area of the BSAI and GOA (Table 4.2-7).

Aleutian Islands

The Aleutian Islands subarea merits special attention since the fishing grounds are all relatively nearshore. Example FMP 3.2 defines a 5 percent No-Take Reserve and 15 percent MPA rule across a full range of habitat types. Where in the Bering Sea and GOA, 15 nm buffers from shore were described in the frameworks, in the Aleutian Islands, a 15 nm buffer was applied to each of the Steller sea lion rookeries and haulouts. This buffer does not specifically implement a No-Take Reserve or other MPA, but is likely to be a weighting factor in any future development of restrictions.

Due to the narrow continental shelf along the Aleutian Island chain, and the fact that state statistical areas are utilized in this Programmatic SEIS, a much higher percentage of fishable area (79.9 percent) is afforded protection in the example FMP 3.2 in the Aleutian Islands area compared to the Bering Sea (32.6 percent) and western/central GOA (65.6 percent).

Thirty-nine Steller sea lion rookeries fall within Steller sea lion critical habitat, 19 of which are located in the Aleutian Islands. All rookeries carry a 3 nm No Transit area with an additional 10 nm (or more) designated as a No Trawling for Steller Sea Lion Prey Species area. The No Transit areas are the only No-Take reserves in the Aleutian Islands. These closures have been in effect since 1992, all of which are logical candidates for no-take marine reserves or MPAs. Many of these Steller sea lion No Transit/No-Trawl areas are clustered and transfer easily to corresponding ADF&G statistical areas. Although other non-Steller sea lion prey species fisheries such as rockfish fisheries, occur inside No Steller Sea Lion Prey Species Trawl areas, these no-trawl areas were weighted heavily in the analysis as representing conceptual No-Take reserves and less so for gear-specific MPAs. Coral data from bycatch and trawl survey data, as well as from NOAA dive test areas, were used in the development of the No-Take marine reserve examples.

The MPAs considered for analysis of example FMP 3.2 include No Steller Sea Lion Prey Species Hook-and-Line, Pot, and Trawling MPAs; No Steller Sea Lion Prey Species Trawling MPAs; and No Bottom Contact Trawling MPAs. To encompass existing closures areas, the Pacific cod Hook-and-Line and Pot and Trawling restrictions were extended to constitute No Steller Sea Lion Prey Species Hook-and-Line and Pot MPAs, if not already closed as No-Take Reserves. Other current Steller sea lion prey species restrictions include closing trawl fisheries for Atka mackerel, pollock (the entire Aleutian Islands subarea), and Pacific cod. To better protect habitat, a suite of MPAs for No Bottom Contact Trawling (currently defined simply as non-pelagic trawling) were created around areas of low and medium fishing intensity areas where bycatch

or trawl survey data contained coral and sponge. Some of these low intensity areas can be seen on Bowers Ridge, west of Attu Island, and west of the Bogoslof District.

Through the development of these no-take reserves and MPAs, the 40 percent rule was applied to ADF&G statistical areas in order to illustrate a contiguous and fairly non-fragmented environment available for marine mammals, benthic habitats, seabird avoidance, and spawning fish populations without jeopardizing commercial fisheries.

Bering Sea

Guidelines in the example FMP 3.2 MPAs and EFH component define a 5 percent No-Take Reserve and a 15 percent MPA rule across a full range of habitat types. Bering Sea benthic habitat is much different than the habitat Aleutian Islands, due to its broad, muddy, and sandy shelf. The Bering Sea also contains many legacy areas established for habitat protection, such as the Near Shore Bristol Bay No-Trawl area, the Red King Crab No Non-Pelagic Trawl area, the Pribilof Habitat No-Trawl area, and a full suite of No Steller Sea Lion Prey Species Hook-and-Line and Pot and Trawl Areas. Other existing closures in the Bering Sea have been used for the creation of No-Take Reserves and MPAs (i.e., five No Transit zones and their associated 10 nm No Steller Sea Lion Prey Species Trawling areas with various sized hook-and-line and pot closures). A large section of the Steller sea lion conservation area (the Bogoslof District) is closed to all Steller sea lion prey species fishing (with a small exemption area near Dutch Harbor for catcher vessels less than 60 ft in length).

A buffer from the shore of 15 nm was used to help determine designation of the No-Take Reserves and the MPAs. As in the Aleutian Islands, we have applied a 40 percent rule to ADF&G statistical areas to illustrate contiguous and fairly non-fragmented environments.

The Bogoslof District currently contains significant amount of No-Take Reserves, along with many No Steller Sea Lion Prey Species Hook-and-Line and Pot and Trawling areas. More No Steller Sea Lion Hook-and-Line and Pot Trawling areas develop to the east along the lower Bering Sea shelf. The 3 nm statistical areas around the land bordering the rookeries are listed as No-Take Marine reserves. Other No-Take Reserves include a large area around the Cape Pierce Walrus Protection area and the Walrus Island Steller sea lion rookery in the Pribilof Islands.

The Pribilof Habitat Conservation and Nearshore Bristol Bay areas remain closed to trawling, and the Red King Crab Savings Area remains closed to non-pelagic trawling. The two northernmost haulouts and the haulouts in the Pribilofs are closed to Steller Sea Lion Prey Species Hook-and-Line and Pot and Trawling.

Along the northwestern shelf of the Bering Sea, three large No-Bottom-Contact Trawling MPAs were developed to coincide with the no-bottom-trawling areas the EFH Committee is considering to protect benthic habitat. These general areas are being considered as potential sites for a rotational MPA, where areas are periodically opened and closed to particular types of fishing.

GOA – West of 144°W

Similar to the BSAI area, example FMP 3.2 sets a 5 percent No-Take Reserve and a 15 percent MPA rule across a full range of habitat types in the GOA (west of 144°W) . Unlike the Bering Sea, however, the GOA

is somewhat more restrictive as to where effective closures can be designated and leaves areas open near fishing ports.

Fifteen Steller sea lion rookeries are listed in the GOA, 13 of which include 3 nm No Transit areas and 10 nm No Steller Sea Lion Prey Species Trawling areas. These areas, along with other existing Steller sea lion restrictions (such as the 15 nm buffers from the shore, the Type I & II No-Trawl areas (areas that are closed year round to all trawling but pelagic gear, and areas that are closed to pelagic gear from Feb 15-June 15, respectively), and the Chiniak Gully Research Area); known locations of Steller sea lions and other marine mammals (such as harbor seals); pollock spawning areas; bycatch and survey data of coral and sponges; the shelf's gullies, canyons, and breaks; and EFH, were used as weighted measures for the illustration of the No-Take Reserves and MPAs in FMP 3.2.

The 40 percent rule was again applied to the ADF&G statistical areas to illustrate large, non-fragmented environments.

In order to protect a full range of habitat, perpendicular tracks of No-Take Marine Reserves were created from the shoreline to a depth of 1,000 m. Where possible, the No-Take Reserves were created at Steller sea lion rookeries and where existing No Hook-and-Line and Pot and Trawl for Steller Sea Lion Prey Species closures coexist, such as at Marmot Island, south Chignik in RPA District 4, selected Steller sea lion rookeries and haulouts, and RPA Districts 10 and 11 (below the Bogoslof District). Other areas that were designated No-Take Reserves for purposes of our analysis included a section of the shelf and slope below the Shumagin islands and Portlock Banks, and smaller sections of the shelf below Prince William Sound (PWS).

When Steller sea lion restrictions were dominant but did not reach the benchmark for creating No-Take Reserves, there were no Steller Sea Lion Prey Species Hook-and-Line and Pot and Trawl closure areas created using the weighted measure. Instead, No-Trawl for Steller Sea Lion Prey Species and No-Bottom-Contact Trawling closures were created using these same sets of weighted criteria.

GOA – East of 144°W

As in the BSAI, example FMP 3.2 for the GOA (east of 144°W longitude) defined a 5 percent No-Take Reserve and a 15 percent MPA rule across a full range of habitat types.

Currently there are no Steller sea lion closures east of 144°W. The Steller sea lion population east of 144°W is listed as threatened; therefore, we included an example measure to provide some protection to this part of the population. The No-Trawl closure east of 140°W was strengthened in this illustration to include an MPA for No Hook-and-Line and Pot or Trawl for Steller Sea Lion Prey Species. The MPA also includes a smaller area near Icy Bay and Cape Yakataga.

The example No-Take Reserves were developed to protect habitat in areas with low to medium fishing intensity and within 3 nm of three Steller sea lion rookeries. The Sitka Pinnacles are located within one of the example No-Take Reserves.

Example FMP 4.1 Map

There are two versions of the example FMP 4.1 map, both of which illustrate the same suite of spatial closures. Figure 4.2-6 provides a map illustration using the same color scheme used in maps for example FMPs 1 through 3.2, so that the maps may be easily compared. Figure 4.2-11 uses the same color scheme (magenta) as the map for example FMP 4.2 map (Figure 4.2-7). Both example FMPs 4.1 and 4.2 illustrate a major shift in management policy from current policy. Unlike current management practice, where any type of fishing is generally permitted unless specifically prohibited (e.g., the maps are blank unless closures/restrictions are shown), the maps for example FMP 4.1 illustrates a management policy where all areas and types of fishing are closed unless shown otherwise. Bathymetry contours to 1,000 m are also color-coded, ranging from dark green (0 m) to pale beige (1,000 m). In the legend, titles for measures developed specifically for protection of Steller sea lions are printed in blue. Figure 4.2-11 illustrates four types of spatial management areas that are color-coded as follows:

Yellow:	3 nm No Transit Zones (No-Take Reserve)
White:	Open to Fishing
Magenta Hatching:	Open to Commercial Fishing Except Trawling
Magenta (solid):	No-Take Marine Reserves

The map has been developed from the following information and data sources: bathymetry; EFH from the 1997 EFH EA (NMFS 1997); Steller sea lion critical habitat; 2002 Steller sea lion closures; survey and bycatch data for coral and sponge distribution; historical commercial fisheries catch data; location of ports; locations of test and study areas; the Aleutian Islands special management area; public comments; and the legacy closures and restricted areas identified in Table 4.2-1.

ADF&G statistical areas were applied as management units to designate open fishing areas, No-Trawling areas (all species, all types of trawls), and No-Take Marine Reserves (where commercial fishing is prohibited). The ADF&G groundfish statistical areas are approximately 35 nm wide and 30 nm tall. ADF&G subdivides their statistical areas at 3 nm from the shoreline. These management units, when grouped into larger spatial regions, are presumably large enough to 1) prevent habitat fragmentation; 2) protect large portions of HAPC; 3) form clearly defined, manageable, navigable, and enforceable alternatives; 4) provide contiguous fishing restrictions for protecting spawning populations, critical habitat, demersal, and pelagic fish species, and marine mammals; and 5) where possible, provide open areas near fishing ports.

From a biological and fishery point-of-view, the ADF&G statistical areas are arbitrary and do not always represent the spatial distribution of significant biological and habitat resources. Therefore, a 25 percent rule was applied in the following manner: when 25 percent of a state statistical area had a significant concern, the area was designated as either a No-Take Marine Reserve or a No-Trawl MPA. This effect was normalized to a certain extent during the analysis because a statistical area that did not quite meet the benchmark would not be designated as an MPA (e.g., an area where less than 25 percent was of concern would be left entirely open, as was the case when attempting to close Steller sea lion critical habitat). In some cases, areas were totally closed, even if the 25 percent benchmark was not reached, to create a contiguous closure that captured a broad range of inshore to offshore habitats.

Area protected by example FMP 4.1 spatial measures, when combined, is 19.0 percent of the EEZ, and 51.1 percent of the fishable area of the BSAI and GOA (Table 4.2-8). The primary difference between this map

and the FMP 3.2 map is that most of the spatial closures used in this illustration are No-Take Marine Reserves where all commercial fishing is prohibited. This form of closure is intended as an extremely precautionary policy that places emphasis on protecting marine mammals, target groundfish stocks, and EFH.

Aleutian Islands

The Aleutian Islands subarea merits special attention since the fishing grounds are near the shore. Example FMP guidelines specify that 20 to 50 percent of each management area, including all representative habitats contained therein, should be managed as a No-Take Marine Reserve. The Aleutian Islands Special Management Area illustrated in example FMP 4.1 covers a contiguous area specifically to protect coral and other living substrates; and Steller sea lion critical habitat. Although the Aleutian Islands Special Management Area was originally intended to encapsulate the entire Aleutian Islands subarea, excluding a swath of fishable area at Unimak Pass, this is not shown on the map since the Bogoslof District and RPA Districts 10 and 11 are already analyzed as No-Take Marine Reserves in their own regions.

Benthic fishing habitat to a depth of 1,000 m (500 fathoms) was used in this analysis, which we considered fishable bottom habitat. In most cases, perpendicular blocks of closures extend from one side of the 1,000 m contour to the other, protecting a full and broad range of habitat.

Thirty-nine Steller sea lion rookeries are located within designated Steller sea lion critical habitat; 19 of which are contained in the Aleutian Islands. All rookeries have a 3 nm No-Transit Zone and an additional 10 nm No Steller Sea Lion Prey Species Trawling area. These closures have been in effect since 1992, all of them making excellent candidates for No-Take Marine Reserves under Alternative 4 policy. Many of these areas are clustered and would transfer easily to the corresponding ADF&G statistical areas. Areas that currently have high densities of no-trawl, hook-and-line, and pot fishing were designated No-Take Marine Reserves in the example FMP 4.1 illustration. A good example of this can be seen in the area from 170°W to Seguam Pass. Blocks on the Petrel Banks were closed due to high coral bycatch. A string of closed statistical areas are located along the Petrel Banks because these areas have had at least some coral bycatch and are relatively unstudied. One block on the southeastern side of Petrel Banks (north slope) was left open. Historically high catch rates in this area and a need to create at least some open areas for fishing prompted this action. No-take reserves along Steller sea lion critical habitat and the 1,000 m contour created significant contiguous benthic and biologic protection in the Aleutian Islands.

Bering Sea

Example FMP 4.1 guidelines specify that 20 to 50 percent of each management area, including all representative habitats contained therein, should be managed as No-Take Reserves. Specifically mentioned in example FMP 4.1 are submarine canyons, Unimak Pass, old Crab Pot Sanctuary, areas near the Pribilof Islands, area southwest of St. George, Misty Moons, and the Red King Crab Savings Area. These examples were recommended by public stakeholders as candidate areas for analysis in this Programmatic SEIS.

Steller sea lion critical habitat (including the entire Steller Sea Lion Conservation Area) was closed to trawling as an illustration of a No-Trawl MPA, or designated as No-Take Marine Reserves, as were other legacy closures such as the Nearshore Bristol Bay No-Trawl area. And since the Bering Sea has a much broader benthic plane, more options were available to analysts for illustrating a management scenario

meeting the criteria of example FMP 4.1 by protecting a full range of habitat types using a combination of both No-Trawl MPAs and No-Take Marine Reserves.

For purposes of this analysis, we designated the Bogoslof District (RPA District 9) as a No-Take Marine Reserve, with blocks of reserve leading east to include large portions of old Crab Pot Sanctuary Area, thereby illustrating continued protection of this important crab spawning area. A tract of No-take Marine Reserve leaves the old Crab Pot Sanctuary area running north to intercept the coast near Cape Pierce and the Walrus Islands closures. A track of No-Trawl MPA extends from Cape Pierce to the west, intercepting the No-Trawl Marine Reserve formed by the Pribilof Conservation Area. Below the Pribilof Conservation Area is Misty Moon canyon; a No-Take Marine Reserve was designated here because of historically high bycatch of corals and sponges. An open fishing area was created both to the north and south of the Misty Moon area to permit groundfish fishing where catches have been historically good, but with lower bycatch. For purposes of illustrating this policy, other large No-Take Marine Reserves were designated along the inner, middle, and outer Bering Sea shelf breaks. The five northern Steller sea lion haulouts became No-Take Marine Reserves using coincident ADF&G statistical areas. Unlike the Aleutian Islands, the area analysis includes only that part of the ADF&G statistical area that coincides with 1,000 m bathymetry. The exception is that the Bogoslof foraging area is included in the percentage of Bering Sea EEZ calculation.

GOA – West of 144°W

As with the BSAI, GOA (west of 144°W) guidelines suggest that 20 to 50 percent of each management area, including all representative habitats contained therein, should be managed as No-Take Marine Reserves. Specific areas mentioned for analysis are the Davidson Banks, Shumagin Islands, the Type I & II area to the southeast of Kodiak Island, and the Gulf shelf breaks. Unlike the Bering Sea, the GOA is somewhat more restrictive as to where effective closures can be created, while leaving some areas open.

Steller sea lion critical habitat, current Steller sea lion-related closures (trawl, hook-and-line, and pot), pollock spawning areas, fishing ports, and the shelf's gullies, canyons and breaks, were taken into account in the creation of No-Take Marine Reserves and No-Trawl MPAs. In order to protect a full range of habitat, perpendicular tracks of No-Take Marine Reserves were created using ADF&G statistical areas from the shoreline to the 1,000-m break. Where possible, these No-Take Marine Reserves were created at Steller sea lion rookeries and where current Steller sea lion no-trawl and no hook-and-line and pot closures coexist, such as Marmot Island and RPA Districts 4, 10, and 11. Other areas that were designated as No-Take Marine Reserve in this example FMP included the Shumagin Islands (an important pollock spawning area and high catch area), a portion of Davidson Bank, Portlock Banks shelf break, and blocks of areas in and around PWS. Unlike the Aleutian Islands, the area analysis in the GOA (west of 144°W) includes only that part of the ADF&G statistical area that coincides with 1,000 m bathymetry.

GOA – East of 144°W

Because the Southeast Outside District does not include Steller sea lion critical habitat but currently has a trawl ban east of 140°W, this area was analyzed separately from the western and central GOA. Again, a suggested 20 to 50 percent of each management area, including all representative habitats contained therein, should be managed as No-Take Marine Reserves. The Sitka Pinnacles are the only area currently designated as No-Take among the example FMPs. Coral and sponge bycatch, shelf breaks, and proximity to ports were used in the illustration of No-Take Marine Reserves. The No-Take Marine Reserves protect

a full range of habitat from the coast to the 1,000 m (fishable area) shelf break. Unlike the Aleutian Islands, the area analysis for the GOA (east of 144°W) includes only that part of the ADF&G statistical area that coincides with 1,000 m bathymetry.

Example FMP 4.2 Map

The map for example FMP 4.2 (Figure 4.2-7) illustrates a management plan that completely closes the EEZ to groundfish fishing until such time that NPFMC and NOAA Fisheries have reviewed each fishery and determined whether the fishery will result in any significant adverse impacts on the physical or biological environment. The process of review, certification, and development of fishery-specific regulations could take up to two years, at which time those fisheries authorized to harvest groundfish would be permitted. This map would then change for those fisheries, with certain areas opening to them. Some fisheries may never receive authorization. As fisheries are authorized, their fishery-specific maps would begin to look similar to the example FMP 4.1 map illustrations, depending on the fishery (Table 4.2-9).

For purposes of this programmatic analysis, the map for example FMP 4.2 provides an opportunity to estimate the economic and social value of the commercial groundfish fisheries and realize the impact of a temporary suspension of groundfish fishing. Such a management plan serves as a useful bookend for comparing this example FMP scenario with example FMP 4.1, which illustrates a significantly reduced fishery in lieu of total suspension.

Example FMP PA.1

The map for example FMP PA.1 (Figure 4.2-8) is identical to the map for example FMP 3.1.

Example FMP PA.2

The map for example FMP PA.2 (Figure 4.2-9) is identical to the map for example FMP 3.2.