

4.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

Chapter 4 discusses the environmental consequences of the alternatives for each of the three actions evaluated in this EIS: describing and identifying EFH (Section 4.1), establishing an approach for HAPC identification (Section 4.2), and minimizing adverse effects of fishing on EFH (Section 4.3). The “no action” alternatives for identifying EFH and establishing an approach for HAPCs differ from the “status quo” alternatives because this EIS is a reevaluation of the 1999 decision that first amended the FMPs to include EFH information. Hence, no action for identifying EFH or HAPCs means EFH or HAPCs would not be identified. Because the Secretary has already approved the description and identification of EFH and HAPCs for the Council’s FMPs under the Magnuson-Stevens Act (64 FR 20216; April 26, 1999), selection of the no action alternative would require new FMP amendments to remove the status quo designations. In the alternatives for minimizing adverse effects of fishing on EFH, no action and status quo are treated synonymously because the 1999 action did not include any new management measures. However, today’s conditions, including management measures adopted for other purposes between 1999 and the present (e.g., fishery closures to protect Steller sea lions), may protect EFH from potential fishing impacts to a greater degree than the measures existing in 1999 alone. As discussed above in Chapter 2, this EIS evaluates the status quo as 2003 conditions, and it also describes a pre-status quo condition for comparison.

4.1 Effects of Describing and Identifying Essential Fish Habitat

Description and identification of EFH, in accordance with Section 303(a)(7) of the Magnuson-Stevens Act, does not in and of itself have any direct environmental or socioeconomic impacts. EFH description and identification is, however, likely to result in indirect environmental and/or socioeconomic impacts because an EFH designation triggers two types of requirements under the Magnuson-Stevens Act, as discussed below.

First, every FMP must minimize adverse effects of fishing on EFH to the extent practicable. Under Section 303(a)(7) of the Magnuson-Stevens Act and the associated provisions of the EFH regulations (50 CFR 600.815[a][2]), each FMP must contain an evaluation of the potential adverse effects of fishing on EFH. The Council must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature. In determining whether it is practicable to minimize an adverse effect from fishing, the Council should consider the nature and extent of the adverse effect on EFH and the long- and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation. Subsequent amendments to an FMP or to its implementing regulations must ensure that the FMP continues to minimize adverse effects on EFH caused by fishing to the extent practicable.

Potential Council measures to minimize adverse effects of fishing on EFH may include fishing gear restrictions, time or area closures, harvest limits, or other measures. Any such measures would be designed to reduce ongoing impacts to fish habitats and/or promote recovery of disturbed habitats. These measures would likely result in economic impacts for the affected sectors of the fishing industry, but the intent behind such measures to protect EFH would be to promote sustainable fisheries and long-term economic and socioeconomic benefits. The environmental consequences of proposed actions would be evaluated in applicable NEPA documents before they are implemented. Section 4.3 of this EIS discusses the environmental consequences of alternative measures to minimize the effects of fishing on EFH. These alternatives are described in Section 2.3.3 and are currently being contemplated by the Council.

The Council may consider additional measures in the future to ensure that its FMPs continue to minimize the adverse effects of fishing on EFH to the extent practicable.

Second, federal and state agency actions that may adversely affect EFH trigger consultations and/or recommendations under Sections 305(b)(2) to (4) of the Magnuson-Stevens Act. Under Section 305(b)(2), each federal agency must consult with NMFS regarding any action authorized, funded, or undertaken by the agency that may adversely affect EFH. The EFH regulations require that federal agencies prepare EFH assessments as part of the consultation process to document anticipated effects to EFH (50 CFR 600.920[e]). Under Section 305(b)(4)(A), NMFS must provide EFH Conservation Recommendations to federal and state agencies regarding any action that would adversely affect EFH. Under Section 305(b)(3), Councils may comment on and make recommendations to federal and state agencies regarding any action that may affect the habitat, including EFH, of a fishery resource under Council authority.

EFH recommendations from NMFS or a Council to federal or state agencies are non-binding. Nevertheless, as a result of EFH coordination, consultations, and recommendations, federal or state agencies may decide to restrict various activities to avoid or minimize adverse effects to EFH. Such restrictions could result in project modifications that lead to higher costs for the applicants for federal or state permits, licenses, or funding, or for the federal or state agencies that undertake actions directly. In the present analysis, it would be speculative to predict the specific economic and socioeconomic consequences of future restrictions on development that might be imposed by agencies that authorize, fund, or undertake actions that may adversely affect EFH. However, such agencies typically evaluate economic and socioeconomic effects and other public interest factors under NEPA and other applicable laws before taking final action on any given activity. Such analyses would likely include information on the monetary costs of proposed restrictions to protect EFH, as well as the long-term ecological and socioeconomic benefits of protecting EFH and supporting sustainable fisheries. Those benefits could include the prevention of habitat damage that would have occurred in the absence of the EFH consultation process, and the associated cost of repairing environmental damage once it has occurred.

NMFS conducts approximately 500 EFH consultations and related environmental reviews in Alaska every year and is unaware of substantial project delays or significant cost increases resulting from EFH consultations. NMFS and the Council anticipate that habitat conservation resulting from EFH consultations and recommendations will support healthier fish stocks and more productive fisheries over the long term, with associated environmental, economic, and socioeconomic benefits. EFH consultations may also lead to indirect benefits for other species that use the same habitats as federally managed species of fish and shellfish.

As described further in the Environmental Assessment, Finding of No Significant Impact, and Regulatory Impact Review for the Final Regulations to Implement the Essential Fish Habitat Provisions of the Magnuson-Stevens Fishery Conservation and Management Act (NMFS 2001d), federal agencies will incur costs as a result of conducting EFH consultations, because time and resources will be required to develop EFH assessments, exchange correspondence, and engage in other coordination activities required for effective interagency consultation. In some cases, federal agencies might also request information from applicants for permits, licenses, or funding to assist the agency in completing EFH consultation. However, the EFH regulations in 50 CFR 600.920 encourage agencies to combine EFH consultations with existing environmental review procedures to promote efficiency and avoid duplication of effort. To further streamline EFH consultation, if more than one agency is responsible for a federal action, the consultation requirements may be fulfilled by a single lead agency. State agencies and other non-federal entities are not required to consult with NMFS regarding the effects of their actions on EFH.

4.1.1 Criteria for Evaluating the Effects of Describing and Identifying EFH

The effects of designating EFH are difficult to analyze because they are indirect and dependent on separate future actions by a variety of entities in addition to NMFS and the Council (e.g., federal agencies that may impose conditions on permits they issue for actions that could harm EFH). Those future actions and the associated environmental consequences are hard to predict, although reasonable conclusions about the likely effects can be drawn from experience gained since the first EFH designations took effect in January 1999 (64 FR 20216; April 26, 1999). The following sections provide a qualitative analysis of the effects of designating EFH on habitat, target species, federally managed fisheries, other fisheries and fishery resources, protected species, ecosystems and biodiversity, and non-fishing activities. Tables 4.1-1 through 4.1-7 present the criteria used in the following sections to determine whether the likely effects for each issue are negative (E-), neutral (Ø), positive (E+), or unknown (U). The analysis compares these effects to status quo conditions (i.e., Alternative 2).

In general, if the analysis suggests either a potential effect or a known effect, the EIS assigns a rating of E+ or E-. The EIS assigns a rating of Ø if the analysis suggests no discernible effect, and a rating of U if there is no basis for inferring the effect. This rating method results in fewer Ø and U ratings than the more detailed analytical approach used in Section 4.3 for the alternatives to minimize the adverse effects of fishing on EFH, and is appropriate here because the analysis of the EFH description and identification alternatives is necessarily more qualitative. In short, the analysis assumes that designating EFH affords an opportunity to identify and minimize potential adverse effects, which in turn is likely to result in certain positive or negative effects for most of the factors evaluated. The accompanying Regulatory Impact Review and Initial Regulatory Flexibility Analysis (Appendix C) does not further evaluate the regulatory, economic, and socioeconomic effects of describing and identifying EFH, because such effects are indirect consequences that may result from separate future actions and, therefore, cannot be evaluated more specifically in the present analysis.

Although the remainder of this section discusses the environmental consequences of the alternatives for describing and identifying EFH, the results of the analysis are very similar for some of the alternatives, and it can be difficult to distinguish between them. Readers should refer to Section 4.5.1 for a comparison of the effects of the alternatives to highlight similarities and differences.

4.1.2 Effects of Alternative 1 (No EFH Description and Identification)

Under Alternative 1, there would be no EFH description and identification for species managed by the Council. The existing EFH designations that were approved in 1999 would be rescinded.

4.1.2.1 Effects on Habitat

4.1.2.1.1 Prey Species (E-)

Alternative 1 may have a negative effect on prey species. Without EFH description and identification, a variety of human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. Many prey species use the same habitats as managed species and, thus, would lose potential benefits that could have been derived from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of prey species, so the degree of negative effect for species such as Pacific herring is unknown.

4.1.2.1.2 Benthic Biodiversity (E-)

Alternative 1 could have a negative effect on benthic biodiversity. Without EFH description and identification, a variety of human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. The same perturbations that would decrease habitat complexity (discussed above) would be expected to result in a decrease in the number of species present in those areas that are disturbed, because biodiversity tends to be proportional to habitat complexity.

4.1.2.1.3 Habitat Complexity (E-)

Alternative 1 may have a negative effect on habitat complexity. Without EFH description and identification, there would be no means under the Magnuson-Stevens Act to identify habitats that are necessary to managed species of fish for their basic life functions. A variety of human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. Activities such as bottom trawling or navigation dredging would be expected to result in a higher rate of removal or damage of living and non-living substrates than would occur if EFH were designated, because other environmental analyses (e.g., under NEPA) might not afford as much scrutiny of potential impacts to habitat complexity for managed species of fish. This may result in a decrease in habitat suitability over time due to human activities, because reductions in habitat complexity limit the amount of suitable cover habitat available to provide shelter from predators.

4.1.2.2 Effects on Target Species

4.1.2.2.1 Fishing Mortality (Ø)

Alternative 1 would have a neutral effect on fishing mortality. The absence of EFH description and identification means there would be no required measures to minimize the effects of fishing on EFH, but the absence of such regulations does not mean total allowable catch levels would change.

4.1.2.2.2 Spatial/Temporal Concentration of Catch (E+)

Alternative 1 may have a positive effect on the spatial/temporal concentration of catch. Intensive localized harvests would be less likely to occur because there would be less potential for area closures designed to protect habitats (such closures could cause a concentration of catch in remaining open areas).

4.1.2.2.3 Productivity (E-)

Alternative 1 could have a negative effect on the reproductive success of managed fish stocks, although the magnitude of such an effect is unknown. Without EFH description and identification, there would be no trigger under the Magnuson-Stevens Act for specific protections of habitats for spawning or early life history requirements such as hatching, larval development, and rearing.

4.1.2.2.4 Prey Availability (E-)

Alternative 1 may have a negative effect on prey availability. Without EFH description and identification, a variety of human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens

Act. Many prey species use the same habitats as managed species and, thus, would lose potential benefits that could be derived from EFH protective measures, potentially leading to less prey available for managed species. EFH designations may not, however, account for the specific habitat requirements of prey species, so the degree of negative effect is unknown.

4.1.2.2.5 Growth to Maturity (E-)

Alternative 1 could have a negative effect on growth to maturity for managed species of fish, although the magnitude of such an effect is unknown. Without EFH description and identification, there would be no trigger for specific protection of habitats that are important for feeding or for shelter from predators, so there could be increased mortality at early life stages and a corresponding decrease in the survival rate of fish to reach maturity.

4.1.2.3 Effects on the Economic and Socioeconomic Aspects of Federally Managed Fisheries

4.1.2.3.1 Passive Use (E-)

Alternative 1 could have negative effects on passive use values. The lack of EFH description and identification may cause some people who do not participate in fisheries to value fisheries less if they perceive that habitats are not protected adequately.

4.1.2.3.2 Gross Revenue (U)

Alternative 1 would have unknown effects on revenues for sectors of the fishing industry. In the short term, the fishing industry might sustain current levels of earning or even experience somewhat higher revenues, because without EFH description and identification, there would be no trigger under the Magnuson-Stevens Act to reduce adverse effects of fishing on EFH, so the industry would avoid the cost of possible new regulations. In the longer term, if fishing activities diminish the productivity of habitats, there would be less fish to catch, which would cause a decrease in gross revenues and an increase in cost per unit catch for the fishing industry. Declining catches would reduce supplies of seafood to the marketplace, increasing prices and reducing consumer welfare. The likely extent of such effects is unknown.

4.1.2.3.3 Operating Costs (E+)

Alternative 1 could, at least in the short term, have a positive effect on operating costs for the fishing industry. There would be no relocation of fishing effort to avoid impacts to habitat and no additional monitoring costs. In the longer term, operating costs could increase if certain fishing activities diminish the productivity of habitats, forcing fleets to expend more to catch the same or declining numbers of fish. It would be difficult to estimate the extent of any such effects.

4.1.2.3.4 Costs to Consumers (U)

Alternative 1 would have no immediately discernable effect on costs to consumers for seafood. However, with no trigger under the Magnuson-Stevens Act to reduce adverse effects of fishing on EFH, should certain fishing activities result in substantial declines in habitat productivity, the associated diminished catch could cause higher consumer prices for seafood and other fish-based products from Alaskan waters.

4.1.2.3.5 Safety (Ø)

Alternative 1 would have no discernable effect on safety for the fishing fleet.

4.1.2.3.6 Socioeconomic Effects on Fishing Communities (E+/E-)

Alternative 1 could have a positive socioeconomic effect for fishing communities, at least in the short term. There would be no forced relocation of fishing effort to avoid impacts to habitat, and no associated costs. In the longer term, it is conceivable that operating costs could increase if fishing activities diminish the productivity of habitats and fleets have to fish harder to catch the same or declining numbers of fish. Such increased effort per unit of catch would place economic and social stresses on fishing communities, especially in the smaller, more fishery dependent and remote communities of coastal Alaska. It would be difficult to estimate the timing or extent of any such effects in the present analysis.

4.1.2.3.7 Regulatory and Enforcement Programs (E+)

Alternative 1 could have a positive effect on regulatory and enforcement programs. Without EFH description and identification, there would be no associated management measures for federally managed fisheries, thereby simplifying program administration and enforcement.

4.1.2.4 Effects on Other Fisheries and Fishery Resources (E-)

Alternative 1 could have a negative effect on fisheries for halibut and state-managed groundfish, crab, herring, salmon, and forage fish. EFH cannot be described and identified for these fisheries under the Magnuson-Stevens Act, but many of the species targeted by these fisheries use the same habitats as Magnuson-Stevens Act-managed species and, thus, would lose potential benefits that could be derived from EFH protective measures. The absence of EFH designations might also affect these fisheries indirectly insofar as some vessels and people participate in Magnuson-Stevens Act fisheries as well as fisheries managed under other authorities, but any such effects would not result in substantial changes in catch for these fisheries.

4.1.2.5 Effects on Protected Species (E-)

Alternative 1 may have a negative effect on protected species of salmon, marine mammals, and seabirds. Without EFH description and identification, a variety of human activities, including fishing and non-fishing activities, would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. Many protected species use the same habitats as managed species and, thus, would lose potential benefits that could be derived from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of protected species, so the degree of negative effect for these species is unknown.

4.1.2.6 Effects on Ecosystems and Biodiversity

4.1.2.6.1 Predator-Prey Relationships (U)

Alternative 1 would have unknown effects on predator-prey relationships. The absence of EFH description and identification may have negative consequences for prey species, as discussed above, but it is unclear whether such effects would change trophic dynamics.

4.1.2.6.2 Energy Flow and Balance (Ø)

Alternative 1 would have no discernable effect on total catch or discards and, thus, no determinable effect on energy flow in the ecosystem.

4.1.2.6.3 Biodiversity (Ø)

Alternative 1 would have no discernable effect on extinction rates, trophic level changes, or selective fishing patterns that could affect biodiversity.

4.1.2.7 Effects on Non-fishing Activities

4.1.2.7.1 Costs to Federal and State Agencies (E+)

Alternative 1 could have a positive effect on costs to federal and state agencies. Without EFH description and identification, there would be no requirement for federal agencies to consult with NMFS regarding actions that may adversely affect EFH, and NMFS could not use EFH designations as the impetus to provide conservation recommendations to federal or state agencies to protect fish habitats. Nevertheless, NMFS would continue to have authority under the Fish and Wildlife Coordination Act, NEPA, and other laws to comment on non-fishing activities that impact living marine resources and their habitats.

4.1.2.7.2 Costs to Non-fishing Industries or Other Proponents of Affected Activities (E+)

Alternative 1 may have a positive effect on costs for the industries and other entities that sponsor non-fishing activities that have the potential to harm fish habitats. The absence of EFH designations and associated consultations could result in a decrease in the cost of obtaining permits or funding from federal agencies. Without the requirement for NMFS to provide conservation recommendations for actions that would harm habitats for managed species, there could be a decrease in project costs that might otherwise be required by the permitting or funding agency to protect fish habitat. However, NMFS and other agencies could still provide habitat recommendations under other authorities, and the permitting or funding agencies could still impose restrictions on development to curtail losses of valuable habitats.

4.1.2.8 Summary of the Effects of Alternative 1

Alternative 1 would result in the elimination of EFH description and identification in Alaska. Overall, Alternative 1 could have positive effects for the industries and other entities that may currently face requirements (for federally managed fishing activities) or recommendations (for non-fishing activities) that are designed to protect fish habitats. Such positive effects could be short-term for the fishing industry; longer-term effects are less certain. Alternative 1 would likely have negative effects for the habitats and species that could be protected by measures resulting indirectly from EFH description and identification. Such measures would include either required measures to minimize adverse effects of fishing on EFH or recommended measures to minimize effects of non-fishing activities on EFH. A comparison of Alternative 1 to the other EFH description and identification alternatives is presented in Section 4.5.1 and Table 4.5.1-1.

4.1.3 Effects of Alternative 2 (Status Quo EFH Description and Identification)

Under Alternative 2, EFH description and identification would remain exactly as they were approved in FMP Amendments 55/55/8/5/5 in 1999. EFH would remain described and identified as all habitats within a general distribution for a life stage of a species, for all information levels and under all stock conditions. EFH would be a subset of the geographic range of each life stage, encompassing an area that contains about 95 percent of the population.

Alternative 2 represents a continuation of status quo conditions and, therefore, would have no effect (Ø) relative to existing conditions for habitat, target species, federally managed fisheries, other fisheries and fishery resources, protected species, ecosystems and biodiversity, or non-fishing activities. This analysis includes information on the effects of all other EFH designation alternatives compared to the status quo.

Retaining the status quo EFH description and identification would continue the effects that those designations have had since 1999 (evaluated in the EA for FMP Amendments 55/55/8/5/5; NMFS 1999), which have been very similar to the anticipated effects of Alternatives 3, 4, and 5. In general, EFH designation can have negative effects for the industries and other entities that may face requirements (for federally managed fishing activities) or recommendations (for non-fishing activities) that are designed to protect fish habitats. Such negative effects could be short-term for the fishing industry; longer-term effects are less certain, especially for sectors that may benefit from enhanced habitat productivity resulting from EFH description and identification. EFH description and identification can have positive effects for the habitats and species that may be protected by measures resulting indirectly from EFH description and identification. Such measures include either required measures to minimize adverse effects of fishing on EFH or recommended measures to minimize effects of non-fishing activities on EFH. A comparison of Alternative 2 to the other EFH description and identification alternatives is presented in Section 4.5.1 and Table 4.5-1.

4.1.4 Effects of Alternative 3 (Preferred Alternative) (Revised General Distribution)

Under Alternative 3, EFH designations would be revised and, in some cases, the geographic extent of individual EFH designations would be narrower than the status quo Alternative 2. Alternative 3 uses the same basic methodology as Alternative 2, but applies the revised regulatory guidance from the EFH final rule (67 FR 2343; January 17, 2002) and incorporates recent and additional scientific information and improved mapping. Alternative 3 also provides EFH descriptions for a few species for which information was not readily available in 1998 when the existing designations were compiled. Under Alternative 3, EFH would be described and identified as all habitats within a general distribution for a life stage of a species, encompassing an area that contains about 95 percent of the population.

The effects of Alternative 3 are very similar to the effects of maintaining the status quo (Alternative 2). The only substantive difference between Alternatives 2 and 3 is that Alternative 3 applies more recent information, new analytical tools, and better mapping, which results in geographically smaller EFH description and identification for some life stages of some species. The smaller EFH designations for individual life stages of species mean that in any given location, fewer species might have EFH described and identified. However, the total aggregated area of EFH description and identification for all managed species is identical for Alternatives 2 and 3 because the limited available information results in some species having equally broad EFH designations under either alternative.

4.1.4.1 Effects on Habitat

4.1.4.1.1 Prey Species (E+)

Alternative 3 may have a positive effect on prey species. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of prey species, so the degree of positive effect for species such as Pacific herring is unknown.

4.1.4.1.2 Benthic Biodiversity (E+)

Alternative 3 could have a positive effect on benthic biodiversity. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. The resulting analyses likely would cause the Council, NMFS, and other agencies to modify certain actions to protect sensitive benthic habitats. These actions that protect bottom habitats may facilitate habitat improvements over time as previously disturbed areas gradually develop more mature and productive communities of flora and fauna, and thus may result in localized increases in the number of species present in the affected areas.

4.1.4.1.3 Habitat Complexity (E+)

Alternative 3 may have a positive effect on habitat complexity. EFH description and identification would identify habitats that are necessary to managed species of fish for their basic life functions. The Council would be required to consider the effects of fishery management measures on those habitats and minimize adverse effects to the extent practicable. Federal agencies would consult with NMFS to evaluate the effects of non-fishing activities on EFH, and federal and state agencies would receive EFH conservation recommendations from NMFS for specific proposed actions. As a result, some actions probably would be modified to reduce impacts to living and non-living substrates, thereby improving habitat complexity for managed species of fish in comparison to conditions that might occur without the EFH designations.

4.1.4.2 Effects on Target Species

4.1.4.2.1 Fishing Mortality (Ø)

Alternative 3 would have a neutral effect on fishing mortality. EFH description and identification would trigger the requirement to minimize the effects of fishing on EFH, but resulting regulations would not necessarily include changes to total allowable catch levels.

4.1.4.2.2 Spatial/Temporal Concentration of Catch (E-)

Alternative 3 may have a negative effect on the spatial/temporal concentration of catch. If area closures designed to protect identified EFH areas are implemented, they could cause fishing to become concentrated in remaining open areas, resulting in intensive localized harvests. Fishery management measures likely would be designed to minimize such unintended consequences.

4.1.4.2.3 Productivity (E+)

Alternative 3 could have a positive effect on the reproductive success of managed fish stocks, although the magnitude of such an effect is unknown. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Any resulting decisions that protect EFH areas would sustain habitat conditions that are suitable for spawning and early life history requirements, such as hatching, larval development, and rearing.

4.1.4.2.4 Prey Availability (E+)

Alternative 3 may have a positive effect on prey availability. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. EFH description and identification, however, may not account for the specific habitat requirements of prey species, so the degree of positive effect is unknown.

4.1.4.2.5 Growth to Maturity (E+)

Alternative 3 could have a positive effect on growth to maturity for managed species of fish, although the magnitude of such an effect is unknown. EFH description and identification would trigger consideration of specific protections for habitats that are important to managed species for feeding or for shelter from predators. Protecting such habitat areas could decrease mortality at early life stages and result in a corresponding increase in the survival rate of fish to reach maturity.

4.1.4.3 Effects on Economic and Socioeconomic Aspects of Federally Managed Fisheries

4.1.4.3.1 Passive Use (E+)

Alternative 3 could have positive effects on passive use values. EFH description and identification may cause some people who do not participate in fisheries to value fisheries more if they perceive that habitats are protected adequately.

4.1.4.3.2 Gross Revenue (U)

Alternative 3 would have unknown net effects on revenues for the fishing industry. In the short term, certain sectors of the fishing industry could experience decreased revenues with EFH designations because of measures resulting from the Magnuson-Stevens Act requirement to reduce adverse effects of fishing on EFH (Section 4.3). In the longer term, if reducing the effects of fishing on sensitive habitats leads those habitats to produce greater numbers of fish, fishing industry revenues could increase.

4.1.4.3.3 Operating Costs (E-)

Alternative 3 could have a negative effect on operating costs for certain sectors of the fishing industry due to factors such as temporal displacement and spatial redistribution of fishing effort to avoid impacts to habitats identified as EFH or additional monitoring costs.

4.1.4.3.4 Costs to Consumers (U)

Alternative 3 would have no immediately discernable effect on costs to consumers for seafood. If, in the longer term, productivity is enhanced due to the designation of EFH and the adoption of associated measures to conserve important habitats, consumers may benefit from increased supplies of seafood and other related products (e.g., fish oil or meal), increased quality, and reduced prices. The extent of any such effects is unknown.

4.1.4.3.5 Safety (Ø)

Alternative 3 would have no discernable effect on safety for the fishing fleet, although temporal and spatial displacement of fishing effort could increase the distance between ports and open fishing grounds and/or the timing of openings, which could lead operators to risk fishing in more extreme weather and sea conditions.

4.1.4.3.6 Socioeconomic Effects on Fishing Communities (E-)

Alternative 3 may lead to negative socioeconomic effects for some fishing communities. Depending on the nature of any management measures adopted to minimize effects of fishing on EFH, there could be spatial and temporal dislocation of fishing effort to avoid impacts to habitat, which would impose associated costs on the affected communities. In the longer term, it is conceivable that adverse social and economic effects on Alaska fishing communities as a whole could decrease if protecting sensitive areas of EFH results in higher production rates of target species, thereby making fisheries more profitable and efficient.

4.1.4.3.7 Regulatory and Enforcement Programs (E-)

Alternative 3 could have a negative effect on regulatory and enforcement programs. EFH description and identification would trigger the requirement to minimize adverse effects of fishing on EFH. Any resulting management measures could increase the complexity and cost of administering and enforcing fishery management.

4.1.4.4 Effects on Other Fisheries and Fishery Resources (E+)

Alternative 3 could have a positive effect on fisheries for halibut and state-managed groundfish, crab, herring, salmon, and forage fish. EFH cannot be described and identified for these fisheries under the Magnuson-Stevens Act, but many of the species targeted by these fisheries use the same habitats as Magnuson-Stevens Act-managed species and, thus, could benefit from EFH protective measures. EFH designations might also affect these fisheries indirectly insofar as some vessels and people participate in Magnuson-Stevens Act fisheries as well as fisheries managed under other authorities, but any such effects would not result in substantial changes in catch for these fisheries.

4.1.4.5 Effects on Protected Species (E+)

Alternative 3 may have a positive effect on protected species of salmon, marine mammals, and seabirds. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many protected species use the same habitats as managed species and, thus, could benefit from EFH protective measures.

EFH designations, however, may not account for the specific habitat requirements of protected species, so the degree of positive effect for these species is unknown.

4.1.4.6 Effects on Ecosystems and Biodiversity

4.1.4.6.1 Predator-Prey Relationships (U)

Alternative 3 would have unknown effects on predator-prey relationships. EFH description and identification may indirectly benefit prey species, as discussed above, but it is unclear whether such effects would change trophic dynamics.

4.1.4.6.2 Energy Flow and Balance (Ø)

Alternative 3 would have no discernable effect on total catch or discards and, thus, no determinable effect on energy flow in the ecosystem.

4.1.4.6.3 Biodiversity (Ø)

Alternative 3 would have no discernable effect on extinction rates, trophic level changes, or selective fishing patterns that could affect biodiversity.

4.1.4.7 Effects on Non-fishing Activities

4.1.4.7.1 Costs to Federal and State Agencies (E-)

Alternative 3 could have a negative effect on costs to federal and state agencies. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for non-fishing activities. Federal agencies would be required to consult with NMFS regarding actions that may adversely affect EFH, and NMFS would provide conservation recommendations to federal and state agencies to protect fish habitats. Federal agencies would be required by the Magnuson-Stevens Act to provide detailed written responses to such recommendations from NMFS. However, to reduce duplication and promote efficiency, NMFS would combine most EFH consultations with environmental reviews required under other laws, as encouraged by the EFH regulations in 50 CFR 600.920.

4.1.4.7.2 Costs to Non-fishing Industries or Other Proponents of Affected Activities (E-)

Alternative 3 may have a negative effect on costs for the industries and other entities that sponsor non-fishing activities that have the potential to harm fish habitats. EFH description and identification would trigger interagency consultations regarding the effects of proposed actions on EFH. In some cases, permitting or funding agencies may ask applicants to provide pertinent information to facilitate such consultations, which could increase the cost of obtaining the permits or funding. When federal or state agencies deny or condition permits or funding to protect EFH, project costs for the proponents could increase. However, NMFS and other agencies can provide habitat recommendations under other authorities, and permitting or funding agencies can impose restrictions on development for environmental reasons other than EFH conservation, so the monetary costs specifically attributable to EFH can be difficult to discern.

4.1.4.8 Summary of the Effects of Alternative 3

Alternative 3 would result in relatively minor changes to the existing EFH description and identification (Alternative 2) to incorporate more recent information, improved mapping, and new EFH descriptions for a few species for which information was not readily available when the existing description and identification were compiled. Overall, Alternative 3 could have negative effects for the industries and other entities that may face requirements (for federally managed fishing activities) or recommendations (for non-fishing activities) that are designed to protect fish habitats. Such negative effects could be short-term for the fishing industry; longer-term effects are less certain, especially for sectors that may benefit from enhanced habitat productivity resulting from EFH description and identification. Alternative 3 would likely have positive effects for the habitats and species that could be protected by measures resulting indirectly from EFH description and identification. Such measures would include either required measures to minimize adverse effects of fishing on EFH or recommended measures to minimize effects of non-fishing activities on EFH. A comparison of Alternative 3 to the other EFH designation alternatives is presented in Section 4.5.1 and Table 4.5-1.

4.1.5 Effects of Alternative 4 (Presumed Known Concentration)

Under Alternative 4, EFH designations would be revised and, in many cases, the geographic extent of individual EFH designations would be smaller than designations under Alternatives 2 and 3. Alternative 4 uses a narrower interpretation of the best available scientific information, resulting in somewhat narrower EFH designations for species and life stages for which sufficient information exists to identify possible areas of higher habitat function. For species and life stages with Level 1 information, EFH would be described and identified as all habitats within a general distribution for a life stage of a species, encompassing an area that contains about 95 percent of the population. For species and life stages with Level 2 or higher information, EFH would be described and identified as the areas of presumed concentration, representing about 75 percent of the population.

The effects of Alternative 4 are very similar to the effects of Alternatives 2 and 3, although the smaller EFH designations for individual life stages of species mean that in any given location, fewer species might have EFH designated. Measures to minimize the effects of fishing on EFH might therefore need to be responsive to habitat considerations for a smaller array of species than under Alternatives 2 or 3. Likewise, EFH consultations for non-fishing activities might need to address habitat requirements for fewer species than under Alternatives 2 or 3. The total aggregated area of EFH designations for all managed species, however, would be identical for Alternatives 2, 3, and 4 because the limited available information results in some species having equally broad EFH designations under any of these three alternatives.

4.1.5.1 Effects on Habitat

4.1.5.1.1 Prey Species (E+)

Alternative 4 may have a positive effect on prey species. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of prey species, so the degree of positive effect for species such as Pacific herring is unknown.

4.1.5.1.2 Benthic Biodiversity (E+)

Alternative 4 could have a positive effect on benthic biodiversity. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. The resulting analyses likely would cause the Council, NMFS, and other agencies to modify certain actions to protect sensitive benthic habitats. These actions that protect bottom habitats may facilitate habitat improvements over time as previously disturbed areas gradually develop more mature and productive communities of flora and fauna, and thus may result in localized increases in the number of species present in the affected areas.

4.1.5.1.3 Habitat Complexity (E+)

Alternative 4 may have a positive effect on habitat complexity. EFH description and identification would identify habitats that are necessary to managed species of fish for their basic life functions. The Council would be required to consider the effects of fishery management measures on those habitats and minimize adverse effects to the extent practicable. Federal agencies would consult with NMFS to evaluate the effects of non-fishing activities on EFH, and federal and state agencies would receive EFH conservation recommendations from NMFS for specific proposed actions. As a result, some actions probably would be modified to reduce impacts to living and non-living substrates, thereby improving habitat complexity for managed species of fish in comparison to conditions that might occur without the EFH designations.

4.1.5.2 Effects on Target Species

4.1.5.2.1 Fishing Mortality (Ø)

Alternative 4 would have a neutral effect on fishing mortality. EFH description and identification would trigger the requirement to minimize the effects of fishing on EFH, but resulting regulations would not necessarily include changes to total allowable catch levels.

4.1.5.2.2 Spatial/Temporal Concentration of Catch (E-)

Alternative 4 may have a negative effect on the spatial/temporal concentration of catch. If area closures designed to protect identified EFH areas are implemented, they could cause fishing effort to become concentrated in remaining open areas, resulting in intensive localized harvests. Fishery management measures likely would be designed to minimize such unintended consequences.

4.1.5.2.3 Productivity (E+)

Alternative 4 could have a positive effect on the reproductive success of managed fish stocks, although the magnitude of such an effect is unknown. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Any resulting decisions that protect EFH areas would sustain habitat conditions that are suitable for spawning and early life history requirements such as hatching, larval development, and rearing.

4.1.5.2.4 Prey Availability (E+)

Alternative 4 may have a positive effect on prey availability. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of prey species, so the degree of positive effect is unknown.

4.1.5.2.5 Growth to Maturity (E+)

Alternative 4 could have a positive effect on growth to maturity for managed species of fish, although the magnitude of such an effect is unknown. EFH description and identification would trigger consideration of specific protections for habitats that are important to managed species for feeding or for shelter from predators. Protecting such habitat areas could decrease mortality at early life stages and result in a corresponding increase in the survival rate of fish to reach maturity.

4.1.5.3 Effects on Economic and Socioeconomic Aspects of Federally Managed Fisheries

4.1.5.3.1 Passive Use (E+)

Alternative 4 could have positive effects on passive use values. EFH description and identification may cause some people who do not participate in fisheries to value fisheries more if they perceive that habitats are protected adequately.

4.1.5.3.2 Gross Revenue (U)

Alternative 4 would have unknown net effects on revenues for the fishing industry. In the short term, certain sectors of the fishing industry could experience decreased revenues with EFH designations, because of measures resulting from the Magnuson-Stevens Act requirement to reduce adverse effects of fishing on EFH (Section 4.3). In the longer term, if reducing the effects of fishing on sensitive habitats leads those habitats to produce greater numbers of fish, fishing industry revenues could increase.

4.1.5.3.3 Operating Costs (E-)

Alternative 4 could have a negative effect on operating costs for certain sectors of the fishing industry due to factors such as temporal displacement and spatial redistribution of fishing effort to avoid impacts to habitats identified as EFH or additional monitoring costs.

4.1.5.3.4 Costs to Consumers (U)

Alternative 4 would have no immediately discernable effect on costs to consumers for seafood. If, in the longer term, productivity is enhanced due to the description and identification of EFH and the adoption of associated measures to conserve important habitats, consumers may benefit from increased supplies of seafood and other related products (e.g., fish oil or meal), increased quality, and reduced prices. The extent of any such effects is unknown.

4.1.5.3.5 Safety (Ø)

Alternative 4 would have no discernable effect on safety for the fishing fleet, although temporal and spatial displacement of fishing effort could increase the distance between ports and open fishing grounds and/or the timing of openings, which could lead operators to risk fishing in more extreme weather and sea conditions.

4.1.5.3.6 Socioeconomic Effects on Fishing Communities (E-)

Alternative 4 may lead to negative socioeconomic effects for some fishing communities. Depending on the nature of any management measures adopted to minimize effects of fishing on EFH, there could be spatial and temporal dislocation of fishing effort to avoid impacts to habitat, which would impose associated costs on the affected communities. In the longer term, it is conceivable that adverse social and economic effects on Alaska fishing communities as a whole could decrease if protecting sensitive areas of EFH results in higher production rates of target species, thereby making fisheries more profitable and efficient.

4.1.5.3.7 Regulatory and Enforcement Programs (E-)

Alternative 4 could have a negative effect on regulatory and enforcement programs. EFH description and identification would trigger the requirement to minimize adverse effects of fishing on EFH. Any resulting management measures could increase the complexity and cost of administering and enforcing fishery management.

4.1.5.4 Effects on Other Fisheries and Fishery Resources (E+)

Alternative 4 could have a positive effect on fisheries for halibut and state-managed groundfish, crab, herring, salmon, and forage fish. EFH cannot be described and identified for these fisheries under the Magnuson-Stevens Act, but many of the species targeted by these fisheries use the same habitats as Magnuson-Stevens Act-managed species and, thus, could benefit from EFH protective measures. EFH description and identification might also affect these fisheries indirectly insofar as some vessels and people participate in Magnuson-Stevens Act fisheries as well as fisheries managed under other authorities, but any such effects would not result in substantial changes in catch for these fisheries.

4.1.5.5 Effects on Protected Species (E+)

Alternative 4 may have a positive effect on protected species of salmon, marine mammals, and seabirds. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many protected species use the same habitats as managed species and, thus, could benefit from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of protected species, so the degree of positive effect for these species is unknown.

4.1.5.6 Effects on Ecosystems and Biodiversity

4.1.5.6.1 Predator-Prey Relationships (U)

Alternative 4 would have unknown effects on predator-prey relationships. EFH description and identification may indirectly benefit prey species, as discussed above, but it is unclear whether such effects would change trophic dynamics.

4.1.5.6.2 Energy Flow and Balance (Ø)

Alternative 4 would have no discernable effect on total catch or discards and, thus, no determinable effect on energy flow in the ecosystem.

4.1.5.6.3 Biodiversity (Ø)

Alternative 4 would have no discernable effect on extinction rates, trophic level changes, or selective fishing patterns that could affect biodiversity.

4.1.5.7 Effects on Non-fishing Activities

4.1.5.7.1 Costs to Federal and State Agencies (E-)

Alternative 4 could have a negative effect on costs to federal and state agencies. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for non-fishing activities. Federal agencies would be required to consult with NMFS regarding actions that may adversely affect EFH, and NMFS would provide conservation recommendations to federal and state agencies to protect fish habitats. Federal agencies would be required by the Magnuson-Stevens Act to provide detailed written responses to such recommendations from NMFS. However, to reduce duplication and promote efficiency, NMFS would combine most EFH consultations with environmental reviews required under other laws, as encouraged by the EFH regulations in 50 CFR 600.920.

4.1.5.7.2 Costs to Non-fishing Industries or Other Proponents of Affected Activities (E-)

Alternative 4 may have a negative effect on costs for the industries and other entities that sponsor non-fishing activities that have the potential to harm fish habitats. EFH description and identification would trigger interagency consultations regarding the effects of proposed actions on EFH. In some cases, permitting or funding agencies may ask applicants to provide pertinent information to facilitate such consultations, which could increase the cost of obtaining the permits or funding. When federal or state agencies deny or condition permits or funding to protect EFH, project costs for the proponents could increase. However, NMFS and other agencies can provide habitat recommendations under other authorities, and permitting or funding agencies can impose restrictions on development for environmental reasons other than EFH conservation, so the monetary costs specifically attributable to EFH can be difficult to discern.

4.1.5.8 Summary of the Effects of Alternative 4

Alternative 4 would result in changes to the existing EFH designations (Alternative 2) to incorporate a narrower interpretation of the best available science, as well as more recent information, improved

mapping, and new EFH descriptions for a few species for which information was not readily available when the existing designations were compiled. Overall, Alternative 4 could have negative effects for the industries and other entities that may face requirements (for federally managed fishing activities) or recommendations (for non-fishing activities) that are designed to protect fish habitats. Such negative effects could be short-term for the fishing industry; longer-term effects are less certain, especially for sectors that may benefit from enhanced habitat productivity resulting from EFH description and identification. Alternative 4 would likely have positive effects for the habitats and species that could be protected by measures resulting indirectly from EFH description and identification. Such measures would include either required measures to minimize adverse effects of fishing on EFH or recommended measures to minimize effects of non-fishing activities on EFH. For some life stages of some species, Alternative 4 would result in geographically smaller EFH description and identification than Alternatives 2 and 3. However, the total aggregated area of EFH designations for all managed species is identical for Alternatives 2, 3, and 4. A comparison of Alternative 4 to the other EFH description and identification alternatives is presented in Section 4.5.1 and Table 4.5-1.

4.1.6 Effects of Alternative 5 (Eco-region Strategy)

Alternative 5 represents a very different approach to EFH description and identification, as compared to Alternatives 2, 3, and 4. Under Alternative 5, EFH would be described in eight eco-regions (freshwater, nearshore and estuarine, inner and middle shelf, outer shelf, upper slope, middle slope, lower slope, and basin) by characterizing the species that use each eco-region and the habitat types present. The overall approach is to identify distinct ecological areas along with the species that rely upon those habitats.

The effects of Alternative 5 are very similar to the effects of Alternatives 2, 3, and 4. EFH description and identification under Alternative 5 would be broader for individual life stages and species, and the total aggregated area of EFH designations for all managed species would be broader because Alternative 5 includes basin habitats in deeper waters than those identified in Alternatives 2, 3, or 4.

4.1.6.1 Effects on Habitat

4.1.6.1.1 Prey Species (E+)

Alternative 5 may have a positive effect on prey species. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of prey species, so the degree of positive effect for species such as Pacific herring is unknown.

4.1.6.1.2 Benthic Biodiversity (E+)

Alternative 5 could have a positive effect on benthic biodiversity. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. The resulting analyses likely would cause the Council, NMFS, and other agencies to modify certain actions to protect sensitive benthic habitats. These actions that protect bottom habitats may facilitate habitat improvements over time as previously disturbed areas gradually develop more mature and productive communities of flora and fauna, and thus may result in localized increases in the number of species present in the affected areas.

4.1.6.1.3 Habitat Complexity (E+)

Alternative 5 may have a positive effect on habitat complexity. EFH description and identification would identify habitats that are necessary to managed species of fish for their basic life functions. The Council would be required to consider the effects of fishery management measures on those habitats and minimize adverse effects to the extent practicable. Federal agencies would consult with NMFS to evaluate the effects of non-fishing activities on EFH, and federal and state agencies would receive EFH conservation recommendations from NMFS for specific proposed actions. As a result, some actions probably would be modified to reduce impacts to living and non-living substrates, thereby improving habitat complexity for managed species of fish in comparison to conditions that might occur without the EFH designations.

4.1.6.2 Effects on Target Species

4.1.6.2.1 Fishing Mortality (Ø)

Alternative 5 would have a neutral effect on fishing mortality. EFH description and identification would trigger the requirement to minimize the effects of fishing on EFH, but resulting regulations would not necessarily include changes to total allowable catch levels.

4.1.6.2.2 Spatial/Temporal Concentration of Catch (E-)

Alternative 5 may have a negative effect on the spatial/temporal concentration of catch. If area closures designed to protect identified EFH areas are implemented, they could cause fishing effort to become concentrated in remaining open areas, resulting in intensive localized harvests. Fishery management measures likely would be designed to minimize such unintended consequences.

4.1.6.2.3 Productivity (E+)

Alternative 5 could have a positive effect on the reproductive success of managed fish stocks, although the magnitude of such an effect is unknown. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Any resulting decisions that protect EFH areas would sustain habitat conditions that are suitable for spawning and early life history requirements such as hatching, larval development, and rearing.

4.1.6.2.4 Prey Availability (E+)

Alternative 5 may have a positive effect on prey availability. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of prey species, so the degree of positive effect is unknown.

4.1.6.2.5 Growth to Maturity (E+)

Alternative 5 could have a positive effect on growth to maturity for managed species of fish, although the magnitude of such an effect is unknown. EFH description and identification would trigger consideration of specific protections for habitats that are important to managed species for feeding or for shelter from

predators. Protecting such habitat areas could decrease mortality at early life stages and result in a corresponding increase in the survival rate of fish to reach maturity.

4.1.6.3 Effects on Economic and Socioeconomic Aspects of Federally Managed Fisheries

4.1.6.3.1 Passive Use (E+)

Alternative 5 could have positive effects on passive use values. EFH description and identification may cause some people who do not participate in fisheries to value fisheries more if they perceive that habitats are protected adequately.

4.1.6.3.2 Gross Revenue (U)

Alternative 5 would have unknown net effects on revenues for the fishing industry. In the short term, certain sectors of the fishing industry could experience decreased revenues with EFH designations because of measures resulting from the Magnuson-Stevens Act requirement to reduce adverse effects of fishing on EFH (Section 4.3). In the longer term, if reducing the effects of fishing on sensitive habitats leads those habitats to produce greater numbers of fish, fishing industry revenues could increase.

4.1.6.3.3 Operating Costs (E-)

Alternative 5 could have a negative effect on operating costs for certain sectors of the fishing industry due to factors such as temporal displacement and spatial redistribution of fishing effort to avoid impacts to habitats identified as EFH, or additional monitoring costs.

4.1.6.3.4 Costs to Consumers (U)

Alternative 5 would have no immediately discernable effect on costs to consumers for seafood. If, in the longer term, productivity is enhanced due to the designation of EFH and the adoption of associated measures to conserve important habitats, consumers may benefit from increased supplies of seafood and other related products (e.g., fish oil or meal), increased quality, and reduced prices. The extent of any such effects is unknown.

4.1.6.3.5 Safety (Ø)

Alternative 5 would have no discernable effect on safety for the fishing fleet, although temporal and spatial displacement of fishing effort could increase the distance between ports and open fishing grounds, and/or the timing of openings, which could lead operators to risk fishing in more extreme weather and sea conditions.

4.1.6.3.6 Socioeconomic Effects on Fishing Communities (E-)

Alternative 5 may lead to negative socioeconomic effects for some fishing communities. Depending on the nature of any management measures adopted to minimize effects of fishing on EFH, there could be spatial and temporal dislocation of fishing effort to avoid impacts to habitat, which would impose associated costs on the affected communities. In the longer term, it is conceivable that adverse social and economic effects on Alaska fishing communities as a whole could decrease if protecting sensitive areas of EFH results in higher production rates of target species, thereby making fisheries more profitable and efficient.

4.1.6.3.7 Regulatory and Enforcement Programs (E-)

Alternative 5 could have a negative effect on regulatory and enforcement programs. EFH description and identification would trigger the requirement to minimize adverse effects of fishing on EFH. Any resulting management measures could increase the complexity and cost of administering and enforcing fishery management.

4.1.6.4 Effects on Other Fisheries and Fishery Resources (E+)

Alternative 5 could have a positive effect on fisheries for halibut and state-managed groundfish, crab, herring, salmon, and forage fish. EFH cannot be described and identified for these fisheries under the Magnuson-Stevens Act, but many of the species targeted by these fisheries use the same habitats as Magnuson-Stevens Act-managed species and, thus, could benefit from EFH protective measures. EFH description and identification might also affect these fisheries indirectly insofar as some vessels and people participate in Magnuson-Stevens Act fisheries as well as fisheries managed under other authorities, but any such effects would not result in substantial changes in catch for these fisheries.

4.1.6.5 Effects on Protected Species (E+)

Alternative 5 may have a positive effect on protected species of salmon, marine mammals, and seabirds. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many protected species use the same habitats as managed species and, thus, could benefit from EFH protective measures. EFH designations, however, may not account for the specific habitat requirements of protected species, so the degree of positive effect for these species is unknown.

4.1.6.6 Effects on Ecosystems and Biodiversity

4.1.6.6.1 Predator-Prey Relationships (U)

Alternative 5 would have unknown effects on predator-prey relationships. EFH designations may indirectly benefit prey species, as discussed above, but it is unclear whether such effects would change trophic dynamics.

4.1.6.6.2 Energy Flow and Balance (Ø)

Alternative 5 would have no discernable effect on total catch or discards and, thus, no determinable effect on energy flow in the ecosystem.

4.1.6.6.3 Biodiversity (Ø)

Alternative 5 would have no discernable effect on extinction rates, trophic level changes, or selective fishing patterns that could affect biodiversity.

4.1.6.7 Effects on Non-fishing Activities

4.1.6.7.1 Costs to Federal and State Agencies (E-)

Alternative 5 could have a negative effect on costs to federal and state agencies. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for non-fishing activities. Federal agencies would be required to consult with NMFS regarding actions that may adversely affect EFH, and NMFS would provide conservation recommendations to federal and state agencies to protect fish habitats. Federal agencies would be required by the Magnuson-Stevens Act to provide detailed written responses to such recommendations from NMFS. However, to reduce duplication and promote efficiency, NMFS would combine most EFH consultations with environmental reviews required under other laws, as encouraged by the EFH regulations in 50 CFR 600.920.

4.1.6.7.2 Costs to Non-fishing Industries or Other Proponents of Affected Activities (E-)

Alternative 5 may have a negative effect on costs for the industries and other entities that sponsor non-fishing activities that have the potential to harm fish habitats. EFH description and identification would trigger interagency consultations regarding the effects of proposed actions on EFH. In some cases, permitting or funding agencies may ask applicants to provide pertinent information to facilitate such consultations, which could increase the cost of obtaining the permits or funding. When federal or state agencies deny or condition permits or funding to protect EFH, project costs for the proponents could increase. However, NMFS and other agencies can provide habitat recommendations under other authorities, and permitting or funding agencies can impose restrictions on development for environmental reasons other than EFH conservation, so the monetary costs specifically attributable to EFH can be difficult to discern.

4.1.6.8 Summary of the Effects of Alternative 5

Alternative 5 would result in substantial changes to the existing EFH designations (Alternative 2) to incorporate a habitat based approach. Overall, Alternative 5 could have negative effects for the industries and other entities that may face requirements (for federally managed fishing activities) or recommendations (for non-fishing activities) that are designed to protect fish habitats. Such negative effects could be short-term for the fishing industry; longer-term effects are less certain, especially for sectors that may benefit from enhanced habitat productivity resulting from EFH designation. Alternative 5 would likely have positive effects for the habitats and species that could be protected by measures resulting indirectly from EFH designations. Such measures would include either required measures to minimize adverse effects of fishing on EFH or recommended measures to minimize effects of non-fishing activities on EFH. Alternative 5 would result in geographically broader EFH designations for many species as compared to other alternatives, and the total aggregated area of EFH designations for all managed species would be larger. A comparison of Alternative 5 to the other EFH description and identification alternatives is presented in Section 4.5.1 and Table 4.5-1.

4.1.7 Effects of Alternative 6 (EEZ Only)

Under Alternative 6, EFH designations would be revised using the updated general distribution information from Alternative 3, but EFH would be limited to waters and substrate within the EEZ. There would be no EFH designations in freshwater areas, estuaries, or nearshore marine waters under

jurisdiction of the State of Alaska. In other words, Alternative 6 is the same as the EEZ portion of Alternative 3.

The effects of Alternative 6 differ from the effects of the other alternatives insofar as there would be no EFH designations in state waters. Thus, the Magnuson-Stevens Act requirements to minimize effects of federally managed fishing activities on habitat and to consult regarding effects of non-fishing activities on habitat would not apply in state waters. Because the vast majority of non-fishing actions that could affect fish habitat happen in the coastal zone (wetland fill, dredging, pollutant discharges, coastal construction, etc.), Alternative 6 would lead to far fewer EFH consultations between NMFS and other agencies and fewer opportunities to ensure such actions minimize the loss or degradation of fish habitat. EFH designations in federal waters would be identical to those in Alternative 3, so the requirement to minimize adverse effects of fishing on EFH would continue to apply to most federally managed fishing activities.

4.1.7.1 Effects on Habitat

4.1.7.1.1 Prey Species (E+/E-)

Alternative 6 may have a positive effect on prey species in federal waters. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. Such benefits, however, would not apply in state waters, where a variety of human activities would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. In state waters, prey species would lose the potential benefits that could have been derived from EFH protective measures. EFH designations may not account for the specific habitat requirements of prey species, so the degree of positive (in federal waters) or negative (in state waters) effect for species such as Pacific herring is unknown.

4.1.7.1.2 Benthic Biodiversity (E+/E-)

Alternative 6 could have a positive effect on benthic biodiversity in federal waters. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. The resulting analyses likely would cause the Council, NMFS, and other agencies to modify certain actions to protect sensitive offshore benthic habitats. These actions that protect bottom habitats may facilitate habitat improvements over time as previously disturbed areas gradually develop more mature and productive communities of flora and fauna, and thus may result in localized increases in the number of species present in the affected areas. However, such benefits would not apply in state waters, where a variety of human activities would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. The same perturbations that would decrease habitat complexity (discussed above) would be expected to result in a decrease in the number of species present in those areas that are disturbed, because biodiversity tends to be proportional to habitat complexity.

4.1.7.1.3 Habitat Complexity (E+/E-)

Alternative 6 may have a positive effect on habitat complexity in federal waters. EFH description and identification would identify habitats in federal waters that are necessary to managed species of fish for their basic life functions. The Council would be required to consider the effects of fishery management

measures on those habitats and minimize adverse effects to the extent practicable. Federal agencies would consult with NMFS to evaluate the effects of non-fishing activities on EFH, and federal agencies would receive EFH conservation recommendations from NMFS for specific proposed actions occurring in federal waters (e.g., offshore mineral development). As a result, some actions probably would be modified to reduce impacts to living and non-living substrates, thereby improving habitat complexity for managed species of fish in comparison to conditions that might occur without the EFH designations. However, these benefits would not apply in state waters, where a variety of human activities would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. Navigation dredging, coastal construction, and other activities would lead to a higher rate of removal or damage of living and non-living substrates than would occur if EFH were designated in state waters.

4.1.7.2 Effects on Target Species

4.1.7.2.1 Fishing Mortality (Ø)

Alternative 6 would have a neutral effect on fishing mortality. EFH description and identification would trigger the requirement to minimize the effects of fishing on EFH, but resulting regulations would not necessarily include changes to total allowable catch levels.

4.1.7.2.2 Spatial/Temporal Concentration of Catch (E-)

Alternative 6 may have a negative effect on the spatial/temporal concentration of catch. If area closures designed to protect identified EFH areas are implemented, they could cause fishing effort to become concentrated in remaining open areas, resulting in intensive localized harvests. Fishery management measures likely would be designed to minimize such unintended consequences.

4.1.7.2.3 Productivity (E+/E-)

Alternative 6 could have a positive effect on the reproductive success of managed fish stocks that reproduce in federal waters and a negative effect for those stocks that reproduce in state waters, although the magnitude of such effects is unknown. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Any resulting decisions that protect EFH areas would sustain habitat conditions that are suitable for spawning and early life history requirements such as hatching, larval development, and rearing. Without EFH designations in state waters, however, there would be no trigger for specific protections of such habitats, which could lead to reductions in stock productivity.

4.1.7.2.4 Prey Availability (E+/E-)

Alternative 6 may have a positive effect on prey availability in federal waters. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many prey species use the same habitats as managed species and, thus, may derive ancillary benefits from EFH protective measures. Such benefits, however, would not apply in state waters, where a variety of human activities would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. In state waters, prey species would lose the potential benefits that could be derived from EFH protective measures. EFH designations may not account for the specific habitat requirements of prey species, so the degree of positive (in federal waters) or negative (in state waters) effect is unknown.

4.1.7.2.5 Growth to Maturity (E+/E-)

Alternative 6 could have a positive effect on growth to maturity for managed species of fish in federal waters, although the magnitude of such an effect is unknown. EFH description and identification would trigger consideration of specific protections for habitats that are important to managed species for feeding or for shelter from predators. Protecting such habitat areas could decrease mortality at early life stages and result in a corresponding increase in the survival rate of fish to reach maturity. However, such benefits would not apply in state waters, where a variety of human activities would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. Navigation dredging, coastal construction, and other activities occurring without habitat conservation measures could lead to increased mortality at early life stages and a corresponding decrease in the survival rate of fish to reach maturity.

4.1.7.3 Effects on Economic and Socioeconomic Aspects of Federally Managed Fisheries

4.1.7.3.1 Passive Use (E+/E-)

Alternative 6 could have both positive and negative effects on passive use values. EFH designations in federal waters may cause some people who do not participate in fisheries to value fisheries more if they perceive that habitats are protected adequately. However, the lack of EFH designations in state waters may cause some people who do not participate in fisheries to value fisheries less if they perceive that nearshore and riverine habitats are not protected adequately.

4.1.7.3.2 Gross Revenue (U)

Alternative 6 would have unknown net effects on revenues for the fishing industry. In the short term, certain sectors of the fishing industry could experience decreased revenues with EFH designations because of measures resulting from the Magnuson-Stevens Act requirement to reduce adverse effects of fishing on EFH (Section 4.3). In the longer term, if reducing the effects of fishing on sensitive habitats leads those habitats to produce greater numbers of fish, fishing industry revenues could increase.

4.1.7.3.3 Operating Costs (E-)

Alternative 6 could have a negative effect on operating costs for certain sectors of the fishing industry due to factors such as temporal displacement and spatial redistribution of fishing effort to avoid impacts to habitats identified as EFH or additional monitoring costs.

4.1.7.3.4 Costs to Consumers (U)

Alternative 6 would have no immediately discernable effect on costs to consumers for seafood. If, in the longer term, productivity is enhanced due to the designation of EFH and the adoption of associated measures to conserve important habitats, consumers may benefit from increased supplies of seafood and other related products (e.g., fish oil or meal), increased quality, and reduced prices. The extent of any such effects is unknown.

4.1.7.3.5 Safety (Ø)

Alternative 6 would have no discernable effect on safety for the fishing fleet, although temporal and spatial displacement of fishing effort could increase the distance between ports and open fishing grounds,

and/or the timing of openings, which could lead operators to risk fishing in more extreme weather and sea conditions.

4.1.7.3.6 Socioeconomic Effects on Fishing Communities (E-)

Alternative 6 may lead to negative socioeconomic effects for some fishing communities. Depending on the nature of any management measures adopted to minimize effects of fishing on EFH, there could be spatial and temporal dislocation of fishing effort to avoid impacts to habitat, which would impose associated costs on the affected communities. In the longer term, it is conceivable that adverse social and economic effects on Alaska fishing communities as a whole could decrease if protecting sensitive areas of EFH results in higher production rates of target species, thereby making fisheries more profitable and efficient.

4.1.7.3.7 Regulatory and Enforcement Programs (E-)

Alternative 6 could have a negative effect on regulatory and enforcement programs. EFH description and identification would trigger the requirement to minimize adverse effects of fishing on EFH. Any resulting management measures could increase the complexity and cost of administering and enforcing fishery management.

4.1.7.4 Effects on Other Fisheries and Fishery Resources (E+)

Alternative 6 could have a positive effect on fisheries for halibut and state-managed groundfish, crab, herring, salmon, and forage fish. EFH cannot be described and identified for these fisheries under the Magnuson-Stevens Act, but to the extent that some of the species targeted by these fisheries use habitats in federal waters, they could benefit from EFH protective measures. EFH description and identification might also affect these fisheries indirectly insofar as some vessels and people participate in Magnuson-Stevens Act fisheries as well as fisheries managed under other authorities, but any such effects would not result in substantial changes in catch for these fisheries.

4.1.7.5 Effects on Protected Species (E+)

Alternative 6 may have a positive effect in federal waters for protected species of salmon, marine mammals, and seabirds. EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for both fishing and non-fishing activities. Many protected species use the same habitats as managed species and, thus, could benefit from EFH protective measures offshore. However, such benefits would not apply in state waters, where a variety of human activities would proceed without explicit consideration of potential adverse effects on fish habitats under the Magnuson-Stevens Act. EFH designations may not account for the specific habitat requirements of protected species, so the degree of positive effect for these species is unknown.

4.1.7.6 Effects on Ecosystems and Biodiversity

4.1.7.6.1 Predator-Prey Relationships (U)

Alternative 6 would have unknown effects on predator-prey relationships. EFH description and identification in federal waters may indirectly benefit prey species, as discussed above, but it is unclear whether such effects would change trophic dynamics.

4.1.7.6.2 Energy Flow and Balance (Ø)

Alternative 6 would have no discernable effect on total catch or discards and, thus, no determinable effect on energy flow in the ecosystem.

4.1.7.6.3 Biodiversity (Ø)

Alternative 6 would have no discernable effect on extinction rates, trophic level changes, or selective fishing patterns that could affect biodiversity.

4.1.7.7 Effects on Non-fishing Activities

4.1.7.7.1 Costs to Federal and State Agencies (E+/E-)

Alternative 6 could have a positive effect on costs to most federal and state agencies. Without EFH description and identification in state waters, there would be no requirement for federal agencies to consult with NMFS regarding actions that may adversely affect EFH, and NMFS could not use EFH description and identification as the impetus to provide conservation recommendations to federal or state agencies to protect fish habitats. Nevertheless, NMFS would continue to have authority under the Fish and Wildlife Coordination Act, NEPA, and other laws to comment on non-fishing activities that impact living marine resources and their habitats. In federal waters, EFH description and identification would trigger Magnuson-Stevens Act requirements to consider potential adverse effects on fish habitats for non-fishing activities. Federal agencies would be required to consult with NMFS regarding actions that may adversely affect EFH, and NMFS would provide conservation recommendations to federal agencies to protect fish habitats. Federal agencies would be required by the Magnuson-Stevens Act to provide detailed written responses to such recommendations from NMFS. To reduce duplication and promote efficiency, NMFS would combine most EFH consultations with environmental reviews required under other laws, as encouraged by the EFH regulations in 50 CFR 600.920.

4.1.7.7.2 Costs to Non-fishing Industries or Other Proponents of Affected Activities (E+/E-)

Alternative 6 may have a positive effect on costs for the industries and other entities that sponsor non-fishing activities that have the potential to harm fish habitats in state waters. The absence of EFH designations and associated consultations in state waters could result in a decrease in the cost of obtaining permits or funding from federal agencies. Without the requirement for NMFS to provide conservation recommendations for actions that would harm habitats for managed species in state waters, there could be a decrease in project costs that might otherwise be required by the permitting or funding agency to protect fish habitat. However, NMFS and other agencies could still provide habitat recommendations under other authorities, and the permitting or funding agencies could still impose restrictions on development to curtail losses of valuable habitats. In federal waters, EFH description and identification would trigger interagency consultations regarding the effects of proposed actions on EFH, which would have a negative effect on costs for the industries and other entities that sponsor certain non-fishing activities. In some cases, permitting or funding agencies may ask applicants to provide pertinent information to facilitate such consultations, which could increase the cost of obtaining the permits or funding. When federal agencies deny or condition permits or funding to protect EFH, project costs for the proponents could increase. However, NMFS and other agencies can provide habitat recommendations under other authorities, and permitting or funding agencies can impose restrictions on development for environmental reasons other than EFH conservation, so the monetary costs specifically attributable to EFH can be difficult to discern.

4.1.7.8 Summary of the Effects of Alternative 6

Alternative 6 would result in the elimination of EFH description and identification in Alaska state waters and would result in relatively minor changes to the existing EFH description and identification in the EEZ to incorporate more recent information, improved mapping, and new EFH descriptions for a few species for which information was not readily available when the existing designations were compiled. Overall, Alternative 6 could have negative effects for the industries and other entities that may face requirements (for federally managed fishing activities) or recommendations (for non-fishing activities) that are designed to protect fish habitats in the EEZ. Such negative effects could be short term for the fishing industry; longer-term effects are less certain, especially for sectors that may benefit from enhanced habitat productivity resulting from EFH designation. Alternative 6 would likely have positive effects for the habitats and species in the EEZ that could be protected by measures resulting indirectly from EFH description and identification. Such measures would include either required measures to minimize adverse effects of fishing on EFH or recommended measures to minimize effects of non-fishing activities on EFH. Alternative 6 would result in geographically smaller EFH description and identification than Alternatives 2, 3, 4, or 5, because EFH would be limited to federal waters only. A comparison of Alternative 6 to the other EFH description and identification alternatives is presented in Section 4.5.1 and Table 4.5-1.