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Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis

for

A Regulatory Amendment to Revise Regulations for Seabird Avoidance Measures in the Hook-and-line Fisheries off Alaska To Reduce the Incidental Catch of the Short-tailed Albatross And Other Seabird Species

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Abstract: This Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis analyzes the impacts of revisions to current seabird avoidance measures in the hook-and-line fisheries off Alaska. This proposed action is prompted for two reasons: 1) An industry request to the Council to strengthen the seabird avoidance measures, and 2) the availability of research results from a study on the effectiveness of seabird avoidance measures that suggest ways that the current seabird avoidance requirements can be improved. At the December 1998 Council meeting, industry representatives requested that the Council revise and strengthen the seabird avoidance measures that are currently required by Federal regulation. This request was made because of the incidental takes of two short-tailed albatrosses in September 1998 and because of the industry group's perception that some portions of the hook-and-line fleet may not always be using seabird avoidance measures as carefully as is required to effectively reduce seabird bycatch. At its April 1999 meeting, the Council recommended several modifications to the existing seabird avoidance regulations. In October 2000, NMFS informed the Council of its decision to await the availability of research results from a two-year study (1999 and 2000) by the Washington Sea Grant Program (WSGP) on the effectiveness of seabird avoidance measures used in hook-and-line fisheries off Alaska before proceeding with rulemaking to revise the existing regulations. Such an investigation was required in a Biological Opinion issued by the USFWS. If so warranted by the research results, NMFS would be required to modify the existing seabird avoidance regulations to improve the effectiveness of avoidance measures or devices. The final research results of the WSGP study will be presented to the Council at its October 2001 meeting. The WSGP recommendations based upon this research are reflected in Alternative 3. The Council's recommendation based on its final action from April 1999 is depicted in Alternative 2. The objective of this proposed regulatory amendment is to revise the current seabird avoidance requirements to improve their effectiveness at reducing the bycatch of short-tailed albatrosses and other seabird species. This could be achieved by: 1) providing improved requirements for the construction and/or deployment of measures, 2) adding new measures, and/or 3) deleting current measures.

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EXECUTIVE SUMMARY

The federal action is revision of seabird avoidance measures for the groundfish fisheries in the Bering Sea/Aleutian Islands management area (BSAI) and Gulf of Alaska (GOA) and the Pacific halibut fishery in U.S. Convention waters off Alaska. The purpose of this Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) is to assess the potential impacts on the human environment from the revision of the seabird avoidance measures. Portions of this EA/RIR/IRFA reference the analysis prepared on groundfish fishing under various levels of TAC (total allowable catch) which was provided in a supplemental environmental impact statement (NMFS 1998a) prepared to supplement the original Environmental Impact Statements (EISs) for the Fishery Management Plans for the GOA and BSAI area.

This proposed action is prompted for two reasons: 1) An industry request to the Council to strengthen the seabird avoidance measures, and 2) the availability of research results from a study on the effectiveness of seabird avoidance measures that suggest ways that the current seabird avoidance requirements can be improved. At the December 1998 Council meeting, industry representatives requested that the Council revise and strengthen the seabird avoidance measures that are currently required by Federal regulation. This request was made because of the incidental takes of two short-tailed albatrosses in September 1998 and because of the industry group's perception that some portions of the hook-and-line fleet may not always be using seabird avoidance measures as carefully as is required to effectively reduce seabird bycatch. At its April 1999 meeting, the Council recommended several modifications to the existing seabird avoidance regulations. In October 2000, NMFS informed the Council of its decision to await the availability of research results from a two-year study (1999 and 2000) by the Washington Sea Grant Program (WSGP) on the effectiveness of seabird avoidance measures used in hook-and-line fisheries off Alaska before proceeding with rulemaking to revise the existing regulations. Such an investigation was required in a Biological Opinion issued by the USFWS. If so warranted by the research results, NMFS would be required to modify the existing seabird avoidance regulations to improve the effectiveness of measures or devices which are required. The final research results of the WSGP study were presented to the Council at its October 2001 meeting. The WSGP recommendations based upon this research are reflected in Alternative 3. The Council's recommendation based on its final action from April 1999 is depicted in Alternative 2. The Council requested additional information be included in the analysis and recommended to release the EA/RIR/IRFA for public review with final action at its December 2001 meeting.

The objective of this proposed regulatory amendment is to revise the current seabird avoidance requirements to improve their effectiveness at reducing the bycatch of short-tailed albatrosses and other seabird species. This could be achieved by: 1) providing improved requirements for the construction and/or deployment of measures, 2) adding new measures, and/or 3) deleting current measures.

This EA/RIR/IRFA updates the information available and pertinent to revising the seabird avoidance measures required of vessel operators in hook-and-line fisheries off Alaska. Addressed in this EA/RIR/IRFA are potential impacts of the various alternatives on the human environment. The four alternatives are:

Alternative 1: Status quo: No change in the current Federal requirements for seabird avoidance measures.

Alternative 2: Revisions to existing regulations, based on the Council's final action in April 1999.

Alternative 3: Revisions to existing regulations, based on recommendations from a two-year scientific research study conducted by the WSGP on the effectiveness of seabird avoidance measures used in hook-and-line fisheries off Alaska.

The WSGP final report makes four basic types of recommendations: 1) proposed changes to existing regulations, 2) optional actions that could be included in a comprehensive seabird bycatch reduction program and that are non-regulatory in nature, 3) suggestions for future research, and 4) gear, methods, and operations which should not be allowed as seabird avoidance measures . The regulatory recommendations include some suggested guidelines to assist fishers in achieving some of the standards that would be required in regulation. Although this EA/RIR/IRFA only analyzes those alternatives that could be included in a proposed federal action, the non-regulatory components of the WSGP recommendations are presented here as they provide a context and setting for the regulatory components. See section 2.3 for a more complete description of the non-regulatory components.

Alternative 4: Minor modifications to WSGP recommendations for regulatory changes.

Alternative 4 depicts several modifications of the WSGP recommendations in Alternative 3. These modifications address the use of seabird avoidance measures on smaller vessels that were not specifically addressed in the experimental regime of the WSGP research and are components of either the existing regulatory requirements (Alternative 1) or the Council's recommendation in 1999 for seabird avoidance measures (Alternative 2).

See Table 1 for a comparison of the four alternatives that are analyzed in this EA/RIR/IRFA.

None of the alternatives is expected to result in a "significant regulatory action" as defined in E.O. 12866.

All of the proposed alternatives have the potential to impose significant adverse economic impacts on a substantial number of small entities.

None of the alternatives are likely to significantly affect the quality of the human environment, and the preparation of an environmental impact statement for the proposed action is not required by Section 102(2)(C) of NEPA or its implementing regulations.

1.0 PURPOSE AND NEED FOR ACTION

This document is an environmental assessment/regulatory impact review/initial regulatory flexibility analysis (EA/RIR/IRFA) analyzing the revisions to regulations for seabird avoidance measures in the hook-and-line fisheries off Alaska to reduce the incidental catch (i.e. bycatch) of the short-tailed albatross (*Phoebastria albatrus*) and other seabird species. This document analyzes the environmental and socioeconomic impacts of the federal action on the human environment. The main features of this document are the purpose and need of the action, the description of the alternative actions, the description of the affected environment, the impacts of the alternatives on the environment and the socioeconomic impacts of the alternatives.

1.1 Purpose and Need

The purpose of this federal action is to revise the existing seabird avoidance regulations based on results from a two-year scientific research program on the effectiveness of seabird avoidance measures currently used in the hook-and-line fisheries off Alaska (see Appendix 1). Concerns exist relating to the incidental catch of the endangered short-tailed albatross and other seabird species in the hook-and-line fisheries off Alaska. A Biological Opinion issued by the U.S. Fish & Wildlife Service (USFWS) (1999) requires that NMFS investigate the effectiveness of seabird avoidance measures currently used in Alaska's hook-and-line groundfish fishery. If so warranted by the research results, the National Marine Fisheries Service (NMFS) is required to modify the existing seabird avoidance regulations to improve the effectiveness of measures or devices which are required, and minimize the likelihood of short-tailed albatross mortalities. The objectives and alternative actions are explained in more detail in section 2.0.

1.2 Statutory Background

Management of the Federal groundfish fishery located off Alaska in the 3-200 nautical mile (nm) U.S. Exclusive Economic Zone (EEZ) is conducted under two Secretarial approved federal fishery management plans (FMPs), *The Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area* (BSAI) (NPFMC, 2000a) and *The Fishery Management Plan for the Groundfish of the Gulf of Alaska* (GOA) (NPFMC, 2000b). These FMPs and their amendments are developed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and other applicable Federal laws and executive orders (E.O.s). To briefly summarize, the purpose of the FMPs is to manage the groundfish fisheries for optimum yield (OY) and to allocate harvest among user groups while preventing overfishing and conserving marine resources. The FMPs, and any amendments to the FMPs, are North Pacific Fishery Management Council (Council) documents. NMFS develops federal fishing regulations (50 CFR part 679) implementing the FMPs, their amendments, and regulatory actions necessary to conserve public trust resources. The Pacific halibut Individual Fishing Quota (IFQ) fisheries are managed in the U.S. Convention wateres by regulations implementing the Northern Pacific Halibut Act of 1982 (Halibut Act).

When managing the BSAI and GOA groundfish fisheries and the Pacific halibut fishery off Alaska, NMFS must comply with a number of statutes and Executive Order 12866. NMFS must comply simultaneously with the Magnuson-Stevens Act, the American Fisheries Act (AFA), the Halibut Act, the Endangered Species Act (ESA), the National Environmental Policy Act (NEPA), the Administrative Procedure Act (APA), the Regulatory Flexibility Act (RFA), Executive Order 12866, Executive Order 13186, and other applicable laws. These statutes and EO 12866 contain the requirements and the

processes which must be applied to fisheries management actions and analyses. EO 13186 addresses the responsibilities of federal agencies to protect migratory birds. Revising seabird avoidance regulations is a federal action that affects the management of the BSAI and GOA groundfish fisheries and the Pacific halibut fishery off Alaska and, therefore, NMFS must comply with the statutes and orders listed above. Processes for developing management measures and analyzing the effects of the measures are detailed in the statutes summarized below.

1.2.1 Magnuson-Stevens Act

Under the Magnuson-Stevens Act, the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ) which extends to between 3 and 200 nautical miles from the baseline used to measure the territorial sea. The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in regional fishery management councils. In the Alaska Region, the North Pacific Fishery Management Council (Council) has the responsibility to prepare fishery management plans (FMPs) for the marine fisheries it finds that require conservation and management. NMFS is charged with carrying out the federal mandates of the Department of Commerce with regard to marine fish. The mission of NMFS is the stewardship of living marine resources for the benefit of the nation through their science-based conservation and management and promotion of the health of their environment. The goals for accomplishing this mission are sustainable fisheries, recovered protected species, and healthy living marine resource habitat. NMFS Alaska Regional Office and Alaska Fisheries Science Center provide research, analysis and technical support for management actions recommended by the Council. Conservation and management measures to reduce seabird-fishery interactions in groundfish fisheries may be implemented under authority of the Magnuson-Stevens Act.

1.2.2 Halibut Act

Management of the Pacific halibut (hereafter halibut) fishery in and off of Alaska is based on an international agreement between Canada and the United States–the "Convention between United States of America and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea," signed at Ottawa, Canada on March 2, 1953, and amended by the "Protocol Amending the Convention," signed at Washington, D.C., March 29, 1979. This Convention, administered by the International Pacific Halibut Commission (IPHC), is given effect in the United States by the Northern Pacific Halibut Act of 1982 (Halibut Act), P.L. 97-176, 16 U.S.C. 773c(c) the Halibut Act. Generally, fishery management regulations governing the halibut fisheries are developed by the IPHC and recommended to the U.S. Secretary of State. When approved, these regulations are published by NMFS in the Federal Register as annual management measures. For 2001, the annual management measures were published March 21, 2001 at 66 FR 15801.

The Halibut Act authorizes the regional fishery management councils having authority for the geographic area concerned to develop regulations governing the halibut fishery in U.S. portions of Convention waters that would apply to nationals or vessels of the U.S. Such an action by the Council is limited only to those regulations that (a) are in addition to and not in conflict with IPHC regulations, (b) are approved and implemented by the Secretary, and (c) are fair and equitable and consistent with other applicable Federal law.

1.2.3 Endangered Species Act

The Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.; ESA), provides the primary legal framework for the conservation and recovery of species in danger of or threatened with extinction. The purposes of the ESA include "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species ..." (16 U.S.C. § 1531(b)). Section 7(a)(2) of the ESA requires that each Federal agency ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species. When the action of a Federal agency may affect a protected species or its critical habitat, that agency (i.e., the "action" agency) is required to consult with either the NMFS or the U.S. Fish and Wildlife Service (USFWS), depending upon the protected species or critical habitat that may be affected. Section 7(b) of the ESA requires the Services to summarize consultations in biological opinions that detail how actions may affect threatened or endangered species and designated critical habitat.

On March 19, 1999, a biological opinion (1999 opinion) was released by USFWS for the consultation on the authorization of the groundfish fisheries in the BSAI and GOA (USFWS 1999). This was an amendment to a previous biological opinion and identified the following non-discretionary reasonable and prudent measure as necessary and appropriate to minimize the take of short-tailed albatrosses: "NMFS shall test the effectiveness of the seabird avoidance measures required by regulation in a scientifically rigorous manner as specified in the Test Plan to Evaluate the Effectiveness of Seabird Avoidance Measures Required in Alaska's Hook-and-Line Groundfish and Halibut Fisheries, and if appropriate, modify regulations to maximize effectiveness and minimize seabird bycatch." The Test Plan was a non-discretionary reasonable and prudent measure included in previous biological opinions issued by USFWS for consultations on the BSAI and GOA groundfish fisheries and on the Pacific halibut fisheries off Alaska (USFWS 1997, 1998). The terms and conditions of the 1999 opinion indicated that if based on the research modifications to regulations are warranted, such modifications are to be proposed by December 31, 2001. This federal action includes the implementation of management measures consistent with the objectives of the reasonable and prudent measure included in both those biological opinions.

1.2.4 National Environmental Policy Act

An EA is prepared pursuant to NEPA to determine whether an action will result in significant effects on the human environment. If the environmental effects of the action are determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact are the final environmental documents required by NEPA. If an analysis concludes that the action is a major Federal action significantly affecting the human environment, an environmental impact statement must be prepared.

An EA must include a discussion of the purpose and need for the action, the environmental impacts of the proposed action, and a list of agencies and persons consulted. The purpose and need are discussed in section 1. The federal action and alternatives are in section 2. Section 3 contains a description of the status of the environment. Section 4 contains the discussion of the environmental impacts that will result from the federal action on the human environment. Section 5 reviews potential cumulative effects and section 6 is the Regulatory Impact Review including socioeconomic information. Section 8 contains the list of preparers and agencies consulted.

The purpose of this EA/RIR/IRFA is to analyze the impacts of revisions to the existing seabird avoidance measures. The analysis of this EA/RIR/IRFA references the broader analysis of groundfish fishing under various levels of TAC specifications which was documented in a supplemental environmental impact statement (SEIS), (NMFS 1998a) prepared to supplement the original Environmental Impact Statements (EISs) for the Fishery Management Plans for the Gulf of Alaska (GOA) (NPFMC 1978) and Bering Sea and Aleutian Islands (BSAI) (NPFMC 1981). NMFS notes that in a July 8, 1999 order, amended on July 13, 1999, the Court in Greenpeace, et al., v. NMFS. et al., Civ No. 98-0492 (W.D. Wash.) held that the SEIS did not adequately address aspects of the GOA and BSAI groundfish fishery management plans other than TAC setting, and therefore was insufficient in scope under NEPA. In response to the Court's order, NMFS prepared a draft programmatic SEIS for the GOA and BSAI groundfish fishery management plans (NMFS 2001). Notwithstanding the less expansive scope of the 1998 SEIS, NMFS believes that the discussion of impacts and alternatives in the SEIS is directly applicable to the proposed action to be analyzed in this EA/RIR/IRFA. Therefore, this EA/RIR/IRFA adopts the discussion and analysis in the SEIS (NMFS 1998a).

An initial NEPA analysis of the effects of the IFQ management system for the halibut fisheries off Alaska on the biological environment and associated effects on marine mammals, seabirds and other threatened or endangered species was done in the environmental impact statement for that action (NMFS, 1992). This EA/RIR/IRFA adopts the discussion and analysis in the IFQ EIS as well.

The draft programmatic SEIS (NMFS 2001a) also contains analysis of a fisheries management policy framework that emphasizes increased protection of marine mammals and seabirds. A draft SEIS on Steller Sea Lion Protection Measures also contains analysis of a suite of fisheries management measures proposed for BSAI and GOA groundfish fisheries in 2002 and beyond that incorporates protection of seabirds (NMFS 2001b). Several draft and final environmental assessments have been prepared to describe the impacts of implementing similar suites of fishery management measures to mitigate short-tailed albatross and seabird conservation concerns. These EAs include:

- Environmental Assessment, April 1997, for the first rule to implement seabird avoidance measures in the BSAI and GOA hook-and-line fishery (NMFS 1997a);

- Environmental Assessment, October 1997, for the first rule to implement seabird avoidance measures in the Pacific halibut fishery off Alaska and a regulatory exemption for small vessels in the Pacific halibut fishery off Alaska and the BSAI and GOA hook-and-line fishery (NMFS 1997b); and

- Environmental Assessment, March 1999, for a proposed rule to revise regulations for seabird avoidance measures in the hook-and-line fisheries off Alaska (NMFS 1999).

Each of the environmental assessments expands the previous analysis, incorporating new information and new alternatives as they became relevant.

1.2.5 Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*) requires federal agencies to assess the impacts of their proposed regulations on small entities and to seek ways to minimize economic effects on small entities that would be disproportionately or unnecessarily adverse. The most recent amendments to

the RFA were enacted on March 29, 1996, with the Contract with America Advancement Act of 1996 (Public Law 104-121). Title II of that law, the Small Business Regulatory Enforcement Fairness Act (SBREFA), amended the RFA to require federal agencies to determine whether a proposed regulatory action would have a significant economic impact on a substantial number of small entities. For a federal agency, the most significant effect of SBREFA is that it made compliance with the RFA judicially reviewable.

The assessment requirement of the RFA is satisfied by a regulatory flexibility analysis, which applies only to regulatory actions for which prior notice and comment is required under the APA. Hence, emergency or interim rules that waive notice and comment are not required to have regulatory flexibility analyses. Further, regulatory flexibility analyses are required only when an agency cannot certify that an action will not have a "significant economic impact" on a "substantial number of small entities."

For purposes of these analyses, small entities include (1) small businesses which, for commercial fishing or fish processing, are firms with receipts of up to $3 million annually or up to 500 employees, respectively, (2) small non-profit organizations, and (3) small governmental jurisdictions with a population of up to 50,000 persons. For Alaska fisheries, these criteria include most fishing firms except for the large catcher/process vessels and most coastal communities except for Anchorage. NMFS has published guidelines for RFA analysis; they include criteria for determining if the action would have a significant impact on a substantial number of small entities.

An initial regulatory flexibility analysis (IRFA) is prepared for any proposed regulatory action that meets the above criteria for having an anticipated "significant economic impact" on a "substantial number of small entities." Due to the difficulty of certifying that an action will not have significant economic impact, an IRFA is prepared routinely for most proposed fishery management measures. The IRFA usually is combined with the EA or (supplemental) EIS document required by NEPA. However, if an action is determined to not have a "significant economic impact on a substantial number of small entities," then a statement to this effect including a factual basis for the statement, must be published in the *Federal Register* and sent to the Small Business Administration. See section 7 of this EA/RIR/IRFA for the IRFA.

1.2.6 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), 16 U.S. C. 703-712, was originally enacted in 1918. In its current form, it implements bilateral treaties to protect migratory birds between the United States and Great Britain, Mexico, Japan, and the former Union of Soviet Socialists Republics. Under the MBTA it is unlawful to pursue, hunt, take, capture, kill, possess, trade, or transport any migratory bird, or any part, nest, or egg of a migratory bird. Violations of the MBTA carry criminal penalties; any equipment and means of transportation used in activities in violation of the Act may be seized by the United States government and, upon conviction, must be forfeited to it. The MBTA is administered by the Department of the Interior, which is authorized to promulgate regulations allowing activities (such as hunting) which would otherwise violate the general prohibitions of the MBTA. To date, the MBTA has been applied to the territory of the United States and coastal waters extending 3 miles from shore.

1.2.7 Executive Order 13186

On January 11, 2001, President Clinton signed an Executive Order on responsibilities of federal agencies to protect migratory birds (66 FR 3853, January 17, 2001). The E.O. requires, among other things, that a memorandum of understanding (MOU) be developed and implemented within two years between the U.S. Fish and Wildlife Service (USFWS) and each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations. The purpose of the MOU is to promote the conservation of migratory bird populations through the integration of bird conservation principles, measures, and practices into federal actions and to avoid or minimize adverse impacts on migratory bird resources to the extent practicable.

For those federal actions that result in the unintentional take of migratory birds and that has, or is likely to have a measurable negative effect on those populations, pursuant to its MOU, the agency shall develop and use principles, standards, and practices that will lessen the amount of unintentional take. These principles, standards, and practices shall be regularly evaluated and revised to ensure that they are effective in lessening the detrimental effect of agency actions on migratory bird populations. These efforts shall focus first on species of concern, priority habitats, and key risk factors. As of this date, these elements have not yet been identified and no MOU exists between NMFS and the USFWS.

1.3 Project Area

The groundfish fisheries occur in the North Pacific Ocean and Bering Sea in the EEZ from 50°N to 65°N. The subject waters are divided into two management areas; the BSAI area and the GOA. The BSAI groundfish fisheries effectively cover all the Bering Sea under U.S. jurisdiction, extending southward to include the waters south of the Aleutian Islands west of 170° W. longitude to the border of the U.S. EEZ. The GOA FMP applies to the U.S. EEZ of the North Pacific Ocean, exclusive of the Bering Sea, between the eastern Aleutian Islands at 170° W. longitude and Dixon Entrance at 132°40' W. longitude. These regions encompass those areas directly affected by fishing, and those that are likely affected indirectly by the removal of fish at nearby sites. The area effected by the fisheries necessarily includes adjacent State of Alaska and international waters. These seabird avoidance measures affect groundfish fishing with hook-and-line gear throughout the BSAI and GOA management areas.

The halibut fishery occurs in portions of Convention waters in and off Alaska. Convention waters, according to the Halibut Act, are "maritime areas off the west coast of the United States and Canada as described in Article I of the Convention".

2.0 ACTION AND ALTERNATIVES TO THE ACTION

This action is prompted for two reasons: 1) An industry request to the Council to strengthen the seabird avoidance measures, and 2) the availability of research results from a study on the effectiveness of seabird avoidance measures that suggest ways that the current seabird avoidance requirements can be improved. At the December 1998 Council meeting, industry representatives requested that the Council revise and strengthen the seabird avoidance measures that are currently required by Federal regulation. This request was made because of the incidental takes of two short-tailed albatrosses in September 1998 and because of the industry group's perception that some portions of the hook-and-line fleet may not always be using seabird avoidance measures as carefully as is required to effectively reduce seabird bycatch. At its April 1999 meeting, the Council recommended several modifications to the existing seabird avoidance regulations. In October 2000, NMFS informed the Council of its decision to await the availability of research results from a two-year study (1999 and 2000) by the Washington Sea Grant Program (WSGP) on the effectiveness of seabird avoidance measures used in hook-and-line fisheries off Alaska before proceeding with rulemaking to revise the existing regulations. Such an investigation was required in a Biological Opinion issued by the USFWS. If so warranted by the research results, NMFS would be required to modify the existing seabird avoidance regulations to improve the effectiveness of avoidance measures or devices.

October 2001 Council Meeting The final research results of the WSGP study were presented to the Council and its advisory committees at its October 2001 meeting.

Science and Statistical Committee (SSC) Comments and Recommendations: The SSC found that the WSGP research study was excellent in its conception, execution and analysis, as pertains to the reduction of seabird bycatch by large vessels involved with the Pacific cod and the sablefish and halibut Individual Fishing Quota (IFQ) longline fisheries. The SSC noted that the proposed changes to existing regulations, while appropriate and useful for reduction of seabird bycatch by the large vessels in the longline fishery, may not be appropriate for application on smaller vessels, particularly small vessels fishing in the inside waters of southeast Alaska. The SSC suggested that the inside waters of southeast Alaska are not frequented by short-tailed albatrosses at present, and therefore less stringent regulations to avoid seabird bycatch may be appropriate. The SSC identified a need for additional study of the necessity for bycatch reduction on small vessels and on the best ways to achieve this, if bycatch reduction is required. They queried whether small vessels may not be able to deploy streamer lines as specified for the larger vessels of the longline fleet. The SSC suggested that members of the small-vessel segment of the industry cooperate in developing new information, equivalent to that now available from the larger vessels on the frequency of bycatch and the most appropriate methods for bycatch reduction.

Advisory Panel (AP) Recommendations and Council Initial Action: The Council took action on the AP recommendations and voted to release the EA/RIR on seabird avoidance measures for public review with final action in December. The Council requested the following additional information and options be included, to the extent possible, prior to release:

1. Add a section discussing monitoring and enforcement issues with particular reference to performance standards, the role of observers, and ability to modify confidentiality restrictions to allow for industry use of peer pressure,
2. Expand the description of vessels to include gear type, crew size and setting speed by vessel size,

3. Expand the economic discussion to include the cost of rigging small vessels to deploy 2 streamer lines,
4. Add the following options to Alternative 4:
    a. Allow single streamer lines on vessels based on gear type or vessel size, or area, with specific reference to 35 to 60 feet vessels, broken down into increments of 5 feet (i.e., 35, 40, 45, etc);
    b. Allow for modification of the performance standard based on gear type and/or vessel size,
5. Require a seabird avoidance plan aboard every vessel in the groundfish and IFQ fisheries.
6. Vessels 32 ft (9.8 m) LOA or less fishing halibut in IPHC Area 4E would be exempted from seabird avoidance regulations. Vessels fishing in the "internal waters" of Southeast Alaska (NMFS Area 659; Southeast Inside District), Prince William Sound (NMFS Area 649), and State waters of Cook Inlet would also be exempted.

The WSGP scientific research-based recommendations are reflected in Alternative 3. The Council's recommendation based on its final action from April 1999 is depicted in Alternative 2. Alternative 4 depicts modifications to Alternative 3 that include considerations for small vessels and an option that addresses exemptions for vessels less than 32 ft (9.8 m) LOA in specified areas.

Goal of the Proposed Action

The goal of this proposed regulatory amendment is to reduce the bycatch of the short-tailed albatross and other seabird species. This potentially could benefit the endangered short-tailed albatross population, populations of other seabird species, and also reduce the risk of potential serious economic impacts to the Alaska hook-and-line fisheries if the incidental take limit under the section 7 ESA consultation were exceeded and fishery closures became an option for consideration under the section 7 consultation process.

Objective of the Proposed Action

The objective of this proposed regulatory amendment is to revise the current seabird avoidance requirements to improve their effectiveness at reducing the bycatch of short-tailed albatrosses and other seabird species. This could be achieved by: 1) providing improved requirements for the construction and/or deployment of measures, 2) adding new measures, and/or 3) deleting current measures.

NMFS issued final regulations for seabird avoidance measures in the GOA and BSAI groundfish hook-and-line fisheries on April 29, 1997 (62 FR 23176) and in the Pacific halibut fishery off Alaska on March 6, 1998 (63 FR 11161). The current seabird avoidance regulations apply to operators of Federally-permitted vessels fishing for groundfish with hook-and-line gear in the GOA and the BSAI, and Federally-permitted vessels fishing for groundfish with hook-and-line gear in waters of the State of Alaska that are shoreward of the GOA and the BSAI, and to operators of vessels fishing for Pacific halibut in U.S. Convention waters off Alaska. Currently, all applicable hook-and-line fishing operations must be conducted in the following manner:

1. Use hooks that when baited, sink as soon as they are put in the water.

2. If offal is discharged while gear is being set or hauled, it must be discharged in a manner that distracts seabirds from baited hooks, to the extent practicable. The discharge site on board a vessel must either be aft of the hauling station or on the opposite side of the vessel from the hauling station.

3. Make every reasonable effort to ensure that birds brought aboard alive are released alive and that wherever possible, hooks are removed without jeopardizing the life of the bird.

4. For a vessel longer than or equal to 26 ft (7.9m) length overall (LOA), the operator of the vessel must employ one or more of the following seabird avoidance measures:

    a. Tow a streamer line or lines during deployment of gear to prevent birds from taking hooks;

    b. Tow a buoy, board, stick or other device during deployment of gear at a distance appropriate to prevent birds from taking hooks. Multiple devices may be employed;

    c. Deploy hooks underwater through a lining tube at a depth sufficient to prevent birds from settling on hooks during deployment of gear; or

    d. Deploy gear only during the hours specified in regulation ["hours of darkness" §679.24(e)(3)(iv)], using only the minimum vessel's lights necessary for safety.

Applicability of All Alternatives

Management of the Federal groundfish fishery located off Alaska in the 3-200 nm U.S. EEZ is conducted under the BSAI and GOA FMPs. The State of Alaska manages groundfish fisheries off Alaska from 0 to 3 nm. State groundfish management occurs either through its fishery management plans or as "parallel" fisheries. Parallel groundfish fisheries refer to groundfish harvests in State waters that are managed concurrently with federal season openings and closures. Harvests from these parallel fisheries are accounted for under the federal TACs. See section 3.10 of the Draft SSL Protection Measures SEIS for additional detail about the state-managed fisheries (NMFS, 2001b). Management of the IFQ and CDQ halibut fishery occurs in U.S. Convention waters off Alaska, which is from 0-200 nm offshore.

As noted previously, the current seabird avoidance regulations apply to operators of Federally-permitted vessels fishing for groundfish with hook-and-line gear in the GOA and the BSAI, and Federally-permitted vessels fishing for groundfish with hook-and-line gear in waters of the State of Alaska that are shoreward of the GOA and the BSAI, and to operators of vessels fishing for Pacific halibut in U.S. Convention waters off Alaska. Since the inception of requirements for seabird avoidance measures off Alaska, NMFS has intended for all hook-and-line vessel operators at risk of incidentally taking short-tailed albatross and/or other seabird species to use these measures, regardless of geographic area fished (i.e. EEZ, state waters, inside waters) or target fishery (i.e. groundfish, halibut, IFQ, CDQ). As new information becomes available the applicability of the requirements could be revised as appropriate. To more closely reflect the respective fishery management authorities and policies of federal and state governments, regulations implementing any of the alternatives would apply to operators of vessels fishing for:

1. Pacific halibut in the IFQ and CDQ management programs (0 to 200 nm),
2. IFQ sablefish in EEZ waters (3 to 200 nm) and waters of the State of Alaska (0 to 3 nm), except waters of Prince William Sound and areas in which sablefish fishing is managed under a State of Alaska limited entry program (Clarence Strait, Chatham Strait), and
3. Groundfish (except IFQ sablefish) with hook-and-line gear in the U.S. EEZ waters off Alaska (3-200 nm).

The IFQ and CDQ federal management programs have a consistent and comprehensive history of application of federal regulations in state waters. The federal management of the groundfish resource off Alaska has a long history of cooperation with the State of Alaska. The Council, USFWS, and NMFS could pursue adoption of seabird avoidance regulations by the State of Alaska for hook-and-line fisheries for groundfish in State waters. At its March 2002 meeting, the Alaska Board of Fisheries (Board) will consider a Board-generated proposal that would change state groundfish regulations to parallel federal regulations governing seabird avoidance measure requirements for operators in hook-and-line fisheries.

Under any of the alternatives, existing regulations would be revised to clarify that seabird avoidance regulations apply as originally intended to all operators of vessels of a specified length that are fishing in U.S. Convention waters off Alaska for Pacific halibut, whether under the auspices of the IFQ program or the more recently developed CDQ program. At the time the seabird avoidance measures were required in the Pacific halibut fishery (63 FR 11161 March 6, 1998), the fixed gear halibut CDQ allocations were managed as part of the IFQ program and implementing regulations were found at Part 679 Subpart D (§ 679.40). In 1999, regulations governing halibut CDQ fishing were revised to clarify which elements of the halibut IFQ regulations applied to the halibut CDQ fishery (64 FR 20210 April 26, 1999). These regulations are found at Part 679 Subpart C (§ 679.30) and inadvertently did not include reference to the seabird avoidance gear and methods requirements.

This EA/RIR/IRFA considers the following alternatives:

2.1 Alternative 1: No Action: No change in the current Federal requirements for seabird avoidance measures.

2.2 Alternative 2: Revisions to existing regulations, based on the Council's final action in April 1999.

All operators of applicable vessels greater than 35 ft (10.7m) LOA using hook-and-line gear would conduct fishing operations in the following manner:

1. Use groundlines which are weighted to cause the baited hooks to sink out of reach of seabirds immediately after the groundline is set;

2. If offal is discharged while gear is being set or hauled, it must be discharged in a manner that distracts seabirds from baited hooks, to the extent practicable. The discharge site on board a vessel must either be aft of the hauling station or on the opposite side of the vessel from the hauling station. Hooks must be removed from any offal (i.e. fish heads) that is discharged; and

3. Make every reasonable effort to ensure that birds brought aboard alive are released alive and that wherever possible, hooks are removed without jeopardizing the life of the bird.

4. Employ one of the following seabird avoidance measures:

   a. Tow a bird scaring line during deployment of the gear to prevent birds from taking baited hooks. The bird scaring line would be towed directly over the baited hooks and would be of a sufficient length and attached to the vessel at a sufficient height to protect the entire area behind the stern of the vessel where baited hooks are accessible to seabirds. If multiple bird scaring lines are used, they would be immediately adjacent, on each side, of the groundline bearing the baited hooks. Towed buoy bags, float devices, or bird streamer lines would qualify as bird scaring lines if they are properly constructed to effectively deter and prevent seabirds from accessing baited hooks. Towing a board or stick during deployment of gear no longer would qualify as an acceptable seabird avoidance measure.

   b. In addition to 4a above, deploy hooks underwater through a lining tube at a depth sufficient to prevent birds from settling on hooks during deployment of gear.

   c. Deploy gear only during the hours specified in regulation ["hours of darkness" §679.24(e)(3)(iv)], using only the minimum vessel's lights necessary for safety.

In summary, Alternative 2 would explicitly specify that weights must be added to the groundline. Currently, the requirement is that baited hooks must sink as soon as they enter the water. It is assumed that fishermen are weighting the groundlines to achieve this performance standard. The offal discharge regulation would be amended by requiring that prior to any offal discharge, embedded hooks must be removed. Streamer lines and towed buoy bags and float devices may all qualify as bird scaring lines. Specific instructions are provided for proper placement and deployment of bird scaring lines. Towed boards and sticks would no longer qualify as seabird avoidance measures. The use of bird scaring lines would be required in conjunction to using a lining tube. Night-setting would continue to be an option and would not require the concurrent use of a bird scaring line.

2.3 Alternative 3: Revisions to existing regulations, based on recommendations from a two-year scientific research study conducted by the WSGP on the effectiveness of seabird avoidance measures used in hook-and-line fisheries off Alaska.

The WSGP final report makes four basic types of recommendations: 1) proposed changes to existing regulations, 2) optional actions that could be included in a comprehensive seabird bycatch reduction program and that are non-regulatory in nature, 3) suggestions for future research, and 4) gear, methods, and operations which should not be allowed as seabird avoidance measures . The regulatory recommendations include some suggested guidelines to assist fishers in achieving some of the standards that would be required in regulation. Although this EA/RIR/IRFA only analyzes those alternatives that could be included in a proposed federal action, the non-regulatory components of the WSGP recommendations are presented here as they provide a context and setting for the regulatory components. These other components are more fully described in the WSGP final report (Melvin et al 2001).

I. Regulatory Recommendations

A. Gear:

Based on the results of the WSGP research program, the existing requirements for seabird avoidance measures at § 679.24(e)(3) would be replaced with the following requirements. All operators of applicable vessels using hook-and-line gear must:

1. Paired Streamer Lines: Deploy a minimum of two streamer lines while setting hook-and-line gear. If both streamer lines cannot be deployed prior to the first hook, at least one streamer line must be deployed before the first hook and both streamers must be fully deployed within 90 seconds. Exceptions: In conditions of wind speeds exceeding 30 knots (near gale or Beaufort 7 conditions), it is acceptable to fly a single streamer from the windward side of the vessel. In winds exceeding 45 knots (storm or Beaufort 9 conditions), the safety of crew supersedes deployment of streamer lines.

2. Performance Standard: Streamer lines must be deployed in such a way that streamers are in the air for a minimum of 131.2 ft (40 m) aft of the stern for vessels under 100 ft (30.5 m) and 196.9 ft (60 m) aft of the stern for vessels 100 ft (30.5 m) or over. The performance standard can be achieved in several ways: by increasing the height off the water at the stern [recommended minimum is 20 ft (6.1 m)], minimizing the weight of streamer line components, and/or increasing drag at the far end of the streamer line with combinations of drogues, weights and buoys.

3. Materials Standard**:** The minimum streamer line specifications are as follows:

Length: 300 feet (91.4 m)

Spacing of streamers: Every 5 meters until performance standard is achieved.

Streamer material: Brightly colored, UV-protected plastic tubing or 3/8 inch polyester line or material of an equivalent density. An individual streamer must hang from the mainline to 0.25 meters of the water in the absence of wind.

Line material: discretionary

Terminal end: discretionary

Breakaways: discretionary, but highly recommended.

B. Operations: Based on the results of the WSGP research program, the existing requirements for seabird avoidance methods at § 679.24(e)(2)(ii) would be amended to include the following for All operators of applicable vessels using hook-and-line gear:

1. Directed Discharge During the Set: Directed discharge (through chutes, pipes, or other similar devices suited for purpose of offal discharge) of residual bait or offal from the stern of the vessel while setting gear is prohibited. This does not include baits falling off the hook or offal discharges from other locations that parallel the gear and subsequently drift into the wake zone well aft of the vessel. For vessels not deploying gear from the stern (i.e. gear is deployed from the side of the vessel or amidship), directed discharge of residual bait or offal over sinking longlines while gear is being deployed is prohibited.

II. Non-regulatory Recommendations

Based on qualitative observations from the WSGP research program, the following actions are recommended for the purposes of: minimizing seabird interactions with hook-and-line gear, promoting stewardship within the fishing fleet, and addressing seabird bycatch at national and international levels;

A. Gear

1. Hand-Bait Chutes: Develop methods to deploy weights in a way that prevents longlines from going taut while setting gear. Actions might include a modification to the chute by adding a setting shelf that would prevent the need to lift weights from the deck up the full height of the chute thereby minimizing tension to deployed gear.

2. Auto-Bait Systems: Encourage companies that manufacture and sell auto-bait systems to refine designs to minimize hook foulings.

B. Education and Outreach

1. Report Card: Institute a system to inform the owners and operators of hook-and-line fishing vessels annually of their seabird bycatch numbers and rates (per 1,000 hooks) relative to their fleet using NORPAC data sources. Fleets include IFQ sablefish, Pacific cod, and Greenland turbot. The Pacific halibut should be included if observer data become available.

2. Peer System: Develop an industry-based peer system to reward vessels that successfully avoid seabird bycatch. Encourages dialog among fishers to share information and methods to minimize the incidental capture of seabirds.

3. Fleet Education: Develop and deliver an education program targeting vessel owners, operators, and crew, illustrating the proper deployment and use of streamer lines, as well as the need for seabird conservation and related regulations.

4. National Action: Encourage other U.S. fishery management councils including the Pacific Fishery Management Council and the NMFS Northwest Region to extend recommended regulatory measures to demersal hook-and-line fleets in their jurisdiction.

5. International Action: Encourage other longlining nations in the Pacific Rim to require seabird bycatch deterrents in their longline fisheries (demersal and pelagic). Specifically, all demersal fisheries should fly paired streamer lines and eliminate directed discharge of residual bait and/or offal over sinking longlines.

III. Future Research

Research programs testing seabird deterrent strategies are limited by existing technologies. Continued innovation and technology development are required in Alaska fisheries and worldwide to minimize seabird bycatch in hook-and-line fisheries. Accordingly, the WSGP research program recommends the following:

A. *Fleet Innovation:* Encourage continued development of seabird bycatch avoidance measures by the Alaska fleet.

B. *Novel Technologies*: Encourage the development of designs and technologies that eliminate the need to fly streamer lines. These include:

   1. Underwater Setting: Technologies that deploy longlines below the surface beyond the reach of seabirds (tubes and chutes or novel hull designs).

2. Line Weighting: Fishing line that sinks quickly below the surface but also maintains the handling qualities valued by fishers.

IV. Recommendations of Methods Not to Use for Seabird Bycatch Reduction

A. Setting gear at night as a sole deterrent method.
B. Area- and season-based management as a seabird bycatch reduction strategy.
C. Use of single streamer lines, except as conditions prevent the use of paired streamer lines.
D. Until further investigations are undertaken to determine the optimum weighting regimes for reducing seabird bycatch and the methods to improve the practicality of line weighting, requiring that vessel operators add weight to groundlines for seabird avoidance is not recommended.
E. Use of a line shooter as a seabird bycatch reduction device.
F. Use of a lining tube as a sole deterrent method.

2.4 Alternative 4: Modifications to WSGP recommendations for regulatory changes.

1. Seabird avoidance measures would be required of operators of all applicable vessels (see section 2.0). Operators of vessels that are less than 26 ft (7.9 m) LOA, would still be required to comply with §679.24(e)(2) but not with §679.24(e)(3). Unless as revised below, other aspects of alternative 3 would apply to alternative 4.

2. Offal Discharge Requirement: In addition to offal discharge requirements under Alternative 3, operators of applicable vessels would also be required to remove embedded hooks in offal that is to be discharged.

3. Bird Line Requirements (see Table 1a):
   Inside Waters (Area 649, 659, state waters of Cook Inlet):
   a. A minimum of 1 buoy bag line of a specified performance standard is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
   b. A minimum of 1 streamer line of a specified performance standard is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
   c. A minimum of 1 streamer line of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

   EEZ:
   a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
   b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
   c. A minimum of paired streamer lines of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

   Vessels using Snap Gear:
   a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or

equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.

b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.

c. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels greater than 45 (13.7 m) ft LOA.

4. Performance Standards for Bird Line Requirements are as follows (Table 1a):

a. Buoy Bag Line Standard: A single streamer line (40 m length) with no streamers attached; buoy bag line to be deployed within 2m of either side of main groundline.

b. Single Streamer Standard: A single streamer line deployed in such a way that streamers are in the air for a minimum of 40 m aft of the stern and within 2m of either side of main groundline.

c. Paired Streamer Standard: Paired streamer lines deployed in such a way that streamers are in the air for a minimum of 40 m aft of the stern and within 5m of either side of main groundline.

d. Snap Gear Streamer Standard: A single streamer line (45 m length) deployed in such a way that streamers are in the air for 20 m aft of the stern and within 2m of either side of main groundline.

The performance standards can be achieved in several ways: by increasing the height off the water at the stern [recommended minimum is 20 ft (6.1 m)], minimizing the weight of streamer line components, and/or increasing drag at the far end of the streamer line with combinations of drogues, weights and buoys.

5. Other Devices include the following:

a. Add specified weights to groundline.

b. Use a buoy bag line or streamer line, of specified performance standards.

c. Strategic offal discharge to distract birds away from the setting of baited hooks: Discharge fish, fish parts (i.e. offal) or spent bait while setting gear on the opposite side of the vessel from where the gear is being set.

6. Requirements for All Operators of Applicable Vessels:

a. Seabird avoidance devices as described above must:

i. Be onboard in the possession of the vessel operator.

ii. Be made available for inspection upon request by an authorized officer (USCG, NMFS Enforcement Officer or other designated official)

iii. Meet certain specified standards.

iv. Be used while hook-and-line gear is being deployed.

v. A functioning and effective spare bird line must also be onboard.

b. Seabird Avoidance Plan must be:

i. Completed.

ii. Onboard the vessel.

iii. Made available for inspection upon request by an authorized officer (USCG, NMFS Enforcement Officer or other designated official).

7. Alternative 4 Option for Small Vessel Exemption in Specified Areas: Vessels 32 ft (9.8 m) LOA or less fishing halibut in IPHC Area 4E would be exempted from seabird avoidance regulations.

Vessels fishing in the "internal waters" of Southeast Alaska (NMFS Area 659; Southeast Inside District), Prince William Sound (NMFS Area 649), and State waters of Cook Inlet would also be exempted.

See Table 1 for a comparison of the four alternatives that are analyzed in this EA/RIR/IRFA.

3.0 AFFECTED ENVIRONMENT

The marine environment of the BSAI and GOA is made up of physical, biological and human components that may be affected by the groundfish fisheries and the halibut fishery off Alaska. The physical components include geological, oceanographic and climatic conditions. None of the alternatives have the potential to affect the physical component of the marine environment since they are limited to management mesures in the hook-and-line fisheries. The most recent, detailed discussion of the physical environment of the BSAI and GOA is in the draft programmatic SEIS (NMFS 2001a), section 3.1. The most recent, detailed discussion of the marine habitat, including essential fish habitat (EFH) is in the draft SSL Protection Measures SEIS in section 3.8 (NMFS, 2001b). The effects of fishing on the marine habitat and EFH are analyzed in section 4.8. The proposed alternatives address revisions to seabird avoidance measures, all above-water modifications to hook-and-line fishing operations. Because these alternatives would not impact benthic marine habitat or EFH, no additional analysis on habitat or EFH has been conducted.

The alternatives are more likely to potentially affect the biological and human components of the marine environment since the alternatives manage the use of fishery bycatch reduction measures and affect the socioeconomic condition of those participating in the fishery. The parts of the biological environment that may be potentially affected by each alternative are: endangered species (short-tailed albatross) and other non-target species (numerous seabird species). The effect on a part of the environment could be either direct or indirect and beneficial or adverse. All of the alternatives could have a direct effect on seabird species and on the socioeconomic components of the environment.

As stated in Section 1.0, this EA/RIR/IRFA incorporates information presented in the 1998 SEIS (NMFS 1998a). To reduce length of descriptive information about the affected environment, readers are referred to that SEIS for description of the environmental and economic background as follows: seabirds at 3.5, ESA considerations for seabirds at 3.8.5, and the socioeconomic environment at 3.10. An initial analysis of the effects of the IFQ management system for the halibut fisheries off Alaska on the biological environment and associated effects on marine mammals, seabirds, and other threatened or endangered species was done in the environmental impact statement for the action (NMFS 1992). New information that is available since that analysis is summarized in this EA/RIR/IRFA and tiers off the analysis presented in the SEIS.

Information collected subsequently to the 1998 TAC setting SEIS on ESA considerations for seabirds and the status of seabirds may be found in the draft SEIS (NMFS 2001a) in sections 2.9.5 and 3.5 and in sections 3.2 through 3.4 of this EA/RIR/IRFA. This EA/RIR/IRFA will incorporate material from these documents as appropriate.

3.1 Status of Seabird Species

The seabird component of the environment affected by the Bering Sea and Aleutian Islands (BSAI) Groundfish FMP and Gulf of Alaska (GOA) Groundfish FMP was described in detail in section 3.5 of the Draft Programmatic SEIS (NMFS, 2001a).

The Draft Programmatic SEIS identified how BSAI and GOA groundfish fisheries activities may affect, directly or indirectly, seabird populations. A direct effect on some seabird species may include incidental take (in fishing gear and vessel strikes) and is more fully described in section 3.5.4 of the Draft

Programmatic SEIS (NMFS, 2001a). Indirect effects on some species may include: prey (forage fish) abundance and availability, benthic habitat, processing waste and offal, contamination by oil spills, nest predators in islands, and plastics ingestion. These indirect effects are more fully described in sections 3.5.2, 3.5.3, 3.5.5, and 3.5.6 of the Alaska Groundfish Fisheries Draft Programmatic SEIS (NMFS, 2001a).

Thirty-eight species of seabirds breed in Alaska. More than 1,600 colonies have been documented, ranging in size from a few pairs to 3.5 million birds. The U.S. Fish and Wildlife Service (USFWS) is the lead federal agency for managing and conserving seabirds and is responsible for monitoring the distribution and abundance of populations. Breeding populations are estimated to contain 36 million individual birds in the Bering Sea and 12 million in the GOA; total population size (including subadults and nonbreeders) is estimated to be approximately 30 percent higher. Five additional species that breed elsewhere but occur in Alaskan waters during the summer months contribute another 30 million birds.

As noted in the Draft Programmatic SEIS, a major constraint on seabird breeding is the distance between the breeding grounds on land and the feeding zones at sea, thus seabird populations are usually limited by food availability. The availability of prey to seabirds depends on a large number of factors and differs among species and seasons. Prey availability may also depend on the ecology of food species, including productivity, other predators, food-web relationships of the prey, and prey behavior. Once prey is captured, its value depends on its energy content. Many factors that influence prey availability are relatively unknown, including stock size and fishery harvests.

Access to prey is limited by each bird's foraging behavior and range, and by prey size, depth, and behavior. Prey availability and density within each seabird species' foraging range is likely a principal factor that determines whether seabird populations are stable, increasing, or declining.

3.1.1 ESA Listed Seabirds

Three species of seabirds that range into the BSAI and/or GOA are listed under the Endangered Species Act (ESA): the endangered short-tailed albatross (*Phoebastria albatrus*), the threatened spectacled eider (*Somateria fischeri*) and the threatened Steller's eider (*Polysticta stelleri*). The current population status, history of ESA section 7 consultations, and NMFS actions carried out as a result of those consultations are described in section 2.9.5 of the Draft Programmatic SEIS (NMFS, 2001a) and section 3.4 of this EA/RIR/IRFA. The life history, population biology, and foraging ecology of these three species are described in sections 3.5.1.3 and 3.5.1.15 of the Draft Programmatic SEIS (NMFS, 2001a).

Based on new information from site visits to the two known breeding colonies of the short-tailed albatross, the current world total population is estimated at 1500 individuals--200 birds at Minami-kojima in the Senkaku Islands and 1300 birds at Torishima Island, both islands in Japan.[1]

The USFWS published final rules designating critical habitat for the spectacled eider (66 FR 9146; February 6, 2001) and the Steller's eider (66 FR 8850; February 2, 2001). The marine areas designated as critical habitat are reduced from the areas that were proposed and discussed in sections 2.9.5.2 and 2.9.5.3 of the Draft Programmatic SEIS (NMFS, 2001a).

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3.1.2 Other Seabirds

Breeding and non-breeding seabird populations ranging into the BSAI and/or GOA include: the northern fulmar (*Fulmarus glacialis*), storm petrels, albatrosses and shearwaters (non-breeders in Alaska), cormorants, jaegers, gulls, kittiwakes, terns, murres, guillemots, auklets, murrelets, puffins, and eiders. Most of these species rely primarily on forage fish, although several auklets are more planktivorous and eiders take more crustacea.

The life history, population biology, and foraging ecology of these species and species groups are described in detail in section 3.5.1 of the Draft Programmatic SEIS and estimated seabird populations are found in Table 3.3-6 (NMFS, 2001a).

3.2 Overview of the Incidental Catch of Seabirds in Hook-and-Line Fisheries

Additional information on this topic is available in sections 3.5 and 4.5 of the DPSEIS (NMFS 2001a). The presence of "free" food in the form of offal and bait attract many birds to fishing operations. In the process of feeding, birds sometimes come into contact with fishing gear and are accidentally killed. For example, most birds taken during hook-and-line operations are attracted to the baited hooks when the gear is being set. These birds become hooked at the surface, and are then dragged underwater where they drown. The probability of a bird being caught is a function of many interrelated factors including: type of fishing operation and gear used; length of time fishing gear is at or near the surface of the water; behavior of the bird (feeding and foraging techniques); water and weather conditions (e.g., sea state); size of the bird; availability of food (including bait and offal); and physical condition of the bird (molt, migration, health). Almost any species which occurs in these waters is susceptible to interactions with fishing gear.

Description of the Gear: **Groundfish**
Hook-and-line gear in Alaska is fished demersally, (i.e., the gear is designed to sink to the seafloor). In 1996, the average set length was 9 km for the sablefish fishery, 16 km for the Pacific cod fishery, and 7 km for Greenland turbot. Twelve-inch gangions with hooks are attached to the groundline at regular intervals. The average hook spacing in these 3 fisheries is 1.2 m, 1.4 m, and 1.3 m, respectively. Therefore, the average number of hooks per set for the 3 fisheries is 7,500; 11,428; and 5,385; respectively. The gear is baited by hand or by machine, with smaller vessels generally baiting by hand and larger vessels by machine. Most of the hook-and-line vessels in the BSAI targeting Pacific cod are freezer/longliners, many of which use autobaiting systems (Sigler, NMFS pers. comm.).

Circle hooks are usually used, except for modified J-hooks on some vessels with machine baiters. In the Pacific cod fishery, typically two lines are set and hauled in a day. The vessel travels at a speed of approximately five to seven knots and the gear is usually deployed from the vessel's stern during a two-hour set. A few vessels in the groundfish fishery deploy gear from amidship. Radar-reflecting buoys are connected to both ends of the groundline.

Hook-and-line vessels targeting sablefish or Greenland turbot set gear in deeper water, on the continental slope. Many smaller vessels participate in both the BSAI and GOA fisheries, and fewer are equipped with autobaiting machines.

Description of the Gear: **Halibut**

Halibut gear may vary from gear used for groundfish. Traditionally, a unit of gear, or "skate", consists of groundline, gangions, and hooks; the standard "skate" being 0.54 km long with 100 hooks spaced at 5.4 m intervals (hook spacing may vary from 1.5m to 7m). The number of skates deployed in a string varies from 4 to 12, and depends on factors such as the size of the fishing area and the likelihood of snagging on the bottom. Short branch lines (gangions) 1 to 1.5 m long are attached to the groundline and a hook is attached to the end of the gangion. Hooks in the halibut fishery are typically size 16/0 circle hooks. Since the inception of the IFQ fishery, more fishermen are combining halibut fishing with other target species and use a smaller 13/0 hook in the mixed fisheries. Each end of the string is attached to an anchor and buoy line and marked at the surface for detection when gear is retrieved. The skates with baited hooks are set over a chute at the stern of the vessel. Average soak time is 12 hours per skate, but can vary according to fishing area, time of year, and bait used. Baits used in the halibut fishery are either fresh or frozen and historically have included herring and squid.

Traditionally, gangions have been tied to or spliced into the groundline at a set spacing (conventional gear) and the gear is set and retrieved in coils. More recently, gangions may be attached to the groundline with a metal snap fastener (snap-on gear). Snap-on gear is used commonly on small vessels and is described more fully below.

Description of Snap Gear: Groundfish and Halibut

Snap gear is hook-and-line gear where the hook and gangion are attached to the groundline using a mechanical fastener or snap. This contrasts to hook-and-line conventional gear (sometimes called 'stuck' gear) and autoline gear. Snap gear is typically deployed from smaller sized vessels (less than 60 ft LOA), with fewer crew, and setting at slower speeds than other types of hook-and-line gear (Table 9). IPHC collects logbook data on gear type and snap gear is reported to be used on vessels mostly in the 26 to 55 ft range and in areas 2C, 3A, and 3B (Table 16b). Snap gear is deployed either from a drum or pre-snapped from tubs.

Snap Gear Deployed from a Drum: The groundline is cut into pre-measured lengths (generally 50, 100, or 300 fathoms) which are tied together and stored on the drum. Many vessels store the buoy line in separate tubs or coils to allow for the use of heavier line, but some use the groundline on the drum for buoy line as well. When setting, the flag and buoy(s) go out first. The bottom end of the buoy line coil is pre-tied onto the groundline on the drum along with an anchor. Depending on the length of the buoy line, the bird bag may be set once the flag is far enough behind the vessel to avoid tangling, or the skipper may choose to wait until after the anchor goes out. It takes about 1 to 2 minutes to set the buoy line in shallow water (50 fathoms or less) and about 5 min in deep water (300 fathom). Buoy line can be set at almost any speed but generally is set between 3 and 4 knots. On vessels with only 1 crew, their primary job is to keep snarls out of the buoy line.

After the anchor comes the running line. This is a length of line with no hooks on it which helps minimize setting snarls near the anchor. The running line can be short (50 fathom) when halibut fishing or 100 to 200 fathoms when in deep water (i.e. for sablefish). Most vessels deploy the bird bags when setting the running line. After the appropriate amount of running line has gone out, the skipper signals the crew to begin snapping hooks onto the line at the appropriate spacing. The speed of setting is varied to get the correct hook spacing and for safety considerations. When fishing for sablefish, hook spacing of 3 to 6 ft is common and setting speeds are very slow (1.5 to 2 knots). Hook spacing for halibut is further apart (9 to 20 ft) and speeds can be increased to about 3 knots. Setting speeds above about 4

knots may be dangerous (D. Falvey, pers. comm.). Weights are added to the line at irregular intervals depending on the bottom conditions. The vast majority of vessels have 1 or 2 people snapping on baited hooks. A few vessels have modified setting trays that can accommodate 3 or 4 people snapping on gear but the setting speed is similar (1.5 to 3 knots).

At the end of a set, a weight is snapped on and the second end running line is deployed. At the end of the running line, the vessel must stop, untie the running line from the drum, and tie in the second anchor and buoy line. During this operation the running line is usually tied off on the skipper backs down on the set to gain slack. Slack must be kept in the line during the 1 to 5 min it takes to untie the knots and tie in the anchor and buoy line. This is the time when there is a risk of getting the bird bag caught in the vessel's propeller unless the bird bag is pulled in (D. Falvey, pers. comm.). To avoid this potential problem, the bird bag may be pulled in by hand while setting the second running line. After the buoy line is tied on, the anchor is set and the buoy line and flag run out. If a second set is to be made, the buoy line and flag for that set are made ready and the process is repeated.

Pre-snapped Gear Deployed from Tubs: Some vessels, especially small halibut vessels with 1 person crews, "pre-snap" their gear. In these operations there are no drums, instead the groundline is stored in tubs (trash cans) in 300 to 400 fathom coils. Before leaving port, the gear is baited, snapped onto the groundline and coiled into the tubs similar to conventional gear. Setting is similar to conventional gear except that the speed is generally kept slower than 3 to 4 knots to avoid snarls. Because the groundline is baited into tubs, the second buoy line can be tied in while setting without having to stop the vessel and maintain slack. This eliminates some of the concern over backing down on a towed bird line.

3.2.1 Efforts to Address and Reduce Seabird Bycatch in Alaska's Hook-and-line Fisheries

Several national and international initiatives highlight the need to address fisheries bycatch issues, including seabird bycatch. The United Nation's Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries was adopted in 1995 and contains an article (7.6.9) that calls for States to "take appropriate measures to minimize waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species,...and promote, to the extent practicable, the development and use of selective, environmentally safe and cost effective gear and techniques." NMFS' strategic document *Managing the Nation's Bycatch: Programs, Activities, and Recommendations for the National Marine Fisheries Service* (NMFS Bycatch Plan) (NMFS 1998b) includes national objectives, goals, and recommendations, all intended to address current programs and future efforts to reduce bycatch and bycatch mortality of marine resources, including protected species and seabirds. Consistent with the Code of Conduct for Responsible Fisheries, the FAO recently adopted, an *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (IPOA)* (FAO 1999). In February 2001, NMFS issued the United States' *National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (NPOA)* (Appendix 2). The IPOA calls for FAO member states to develop a national plan if a seabird bycatch problem exists in any of its longline fisheries. NMFS believes that its complementary implementation of the Code of Conduct for Responsible Fisheries, the NMFS Bycatch Plan, and the NPOA should result in the reduction of seabird bycatch in the Alaska hook-and-line fisheries. This will require the joint and cooperative efforts of NMFS, the Council, USFWS, the affected commercial longline fishing industry, environmental non-governmental organizations, and other interested individuals and groups.

The NPOA outlines several action items that can be used to address seabird bycatch problems in longline

fisheries:

- periodic regional assessments of seabird interactions with longline fishing gear
- seabird bycatch data collection
- prescription of mitigation measures
- research and development of mitigation measures and methods
- outreach, education, and training about seabird bycatch (see Appendix 3 of this EA/RIR/IRFA)
- reporting on status of seabird mortality for longline fisheries
- collaboration between NMFS and FWS on seabird issues

Many of these items have been addressed in the hook-and-line fisheries off Alaska and are described in section 3.5 of the DPSEIS (NMFS 2001a). A few of these efforts and initiatives are outlined below.

Monitoring Seabird Incidental Catch and Seabird and Fishery Interactions

Data collection regarding seabird and fishery interactions by NMFS in the groundfish fisheries began in 1990 and was expanded during the 1993, 1997, 1999, and 2000 seasons. The collection of seabird incidental catch data was integrated into an existing comprehensive data-gathering observer program designed to collect data for a wide variety of management and research purposes. Data include total catch and effort, catch composition, prohibited species bycatch, and other biological information. The major change, in 1993, was to have observers provide genus or species identifications of incidentally caught seabirds. During species composition sampling, the observer makes a reliable identification (to species or species group) and records the numbers and weights of birds in the sample. NMFS uses these incidental mortality data by seabird species to calculate incidental catch rates of the observed hauls and to extrapolate numbers of seabirds incidentally caught from the observed portion of the fleet to the unobserved portion, resulting in an estimate of total seabird incidental catch. Other observer-collected information, which NMFS forwards to USFWS, is sightings of sensitive species (six species of special concern whose populations are very small or declining), any bird and vessel interactions, documented collisions of birds with the vessel superstructure, and detailed information found on the leg bands of banded seabirds. NMFS coordinated with the USFWS to update the seabird section of the NMFS observer manual. This included the incorporation of a standardized USFWS form for reporting sightings of sensitive species. This same USFWS form is available to fishermen to report sightings of short-tailed albatrosses.

Observers began providing information on seabird avoidance measures being used by hook-and-line vessels in 1997. The information collection was expanded in early 1999 to incorporate more detailed information about the frequency of measures used during a fishing trip and specific characteristics of different avoidance measures. For example, use of line-weighting regimes (number and size of weights and weight spacing on the groundline), construction and deployment characteristics of towed streamer lines and buoy bags, and the purpose of offal discharge to distract seabirds from baited hooks. Special projects are also being considered that would collect this seabird and gear interaction data on a haul-by-haul, rather than trip basis. Collecting more detailed and specific data will allow for an better analysis of how well avoidance measures reduce seabird incidental catch rates. Beginning in 2000, observers will record the type of seabird avoidance measure being used on vessels fishing with hook-and-line gear on a haul-by-haul basis. This will allow for a more detailed analysis of seabird incidental catch estimates based on the type of avoidance measure being used. This is expected to give some indication of the effectiveness of the avoidance measure.

Incidental Catch Estimation Procedures

A report using 1993-1997 data from the hook-and-line fishery describes seabird incidental catch estimation
methods and procedures developed by USFWS, in consultation with NMFS (Stehn et al. 2001). Similar methods and procedures were developed by NMFS and used to calculate preliminary estimates using 1993-1999 data for all groundfish fisheries (NMFS 2001a). Standard statistical procedures ("separate ratio estimators" of stratified random sampling; Cochran 1977) for estimating a population total from a sample were used. NMFS calculated rates and estimates for all seabird species or species groups in each stratum of all gears, statistical fishing areas, regions (BSAI or GOA), vessel types (processors, motherships, and catcher-only vessels), time periods (annual or each of 13 four-week periods in a year) for each year from 1993 to 1999. As requested by USFWS, the following eleven groups of seabirds were chosen for analysis: short-tailed albatross, black-footed albatross, Laysan albatross, unidentified albatross, fulmars, gulls, shearwaters, unidentified tubenoses (procellarids), alcids, other bird species, and unidentified seabirds (those not identified to one of the other ten groups).

Incidental catch estimates were based on the number of seabirds by species in samples from observed hauls and the total commercial fish catch as estimated by the NMFS blend program. The NMFS method utilized two measures of fishing effort: total tons of groundfish catch per haul or set for the trawl fishery (NMFS blend program), and the number of hooks or pots per set for both the hook-and-line and pot fisheries (estimated for the unobserved fishery in the NMFS blend program using the average number of hooks or pots, respectively, in the observed fishery). The NMFS Observer Program NORPAC database records the weight of the catch by species in the species composition samples and the estimated weight of the entire catch (all species combined) in the whole haul or set. NORPAC also records the number of hooks or pots in the sample and the estimated number of total hooks or pots in the whole set. The number of observed birds in a species composition sample per effort (tons or hooks or pots) of that sample was used to extrapolate the number of seabirds to the whole haul or set, and similarly upwards to the whole fishery, including the unobserved effort.

The unobserved weight of fish was calculated by subtracting the known weight of sampled fish on observed hauls from the estimated total weight of fish (all hauls). The estimated total number of birds caught was the sum of observed birds in the catch and the estimated unobserved birds. For each species or species group in a stratum, the number of unobserved birds was estimated by multiplying the ratio of the number of observed birds of that species or species group caught per unit of effort of sampled groundfish from observed hauls times the total estimated effort of groundfish caught in unobserved hauls. Bycatch estimates from each stratum were summed to yield total estimates for statistical fishing areas and regions. No estimates were made for those few strata in the NMFS blend program which consisted only of data from unobserved vessels; in this regard the estimates are conservative.

Both the catch rate of birds (number of birds per weight of fish, or birds per 1,000 hooks) and the catch rate of fish (total weight of all fish species per hook/pot/net) were assumed to be equal for observed and unobserved hauls of the same gear, area, and time period. These assumptions may not hold, not necessarily because the presence of the observer may change the fishing practices of the skipper or crew, but rather because, for some other operational reason, the smaller (unobserved) vessels may have different catch rates than the large or mid-sized vessels. The constant catch rates for birds and/or fish among vessel size categories are untested and critical assumptions. If different catch rates do exist for different vessel size categories, then the average area catch rates and the estimates of the total seabird incidental catch number may be overestimated or underestimated.

In the NMFS analysis of 1993 to 1999 observer data, only three of the albatross taken were identified as a short-tailed albatross (and all from the BSAI region). Of the albatross taken, not all were identified. This analysis of 1993 to 1999 data resulted in an average estimate of two short-tailed albatross being taken annually in the BSAI groundfish hook-and-line fishery and zero short-tailed albatross being estimated taken annually in the GOA groundfish hook-and-line fishery. The incidental take limit established in the USFWS biological opinions on the effects of the hook-and-line fisheries on the short-tailed albatross is based on the actual reported takes and not on extrapolated estimated takes.

At the February 1999 North Pacific Fishery Management Council's meeting, the Council's Science and Statistical Committee stated in its minutes that ". . . Because incidental catch is so small, estimation of the total take of short-tailed albatross is problematic. Uncertainty exists on how the known take of albatross should be expanded to the unobserved portion of the fishery." NMFS and USFWS recognize that this uncertainty exists. Until 1995, a reported take of a short-tailed albatross had not occurred within the observer sample and subsequently, the estimation of short-tailed albatross take in the hook-and-line fisheries was even more uncertain. As previously noted, the number of unobserved birds is calculated by multiplying the ratio of the number of birds caught per weight of fish (or 1,000 hooks) sampled from observed hauls by the total estimated weight of fish (or 1,000) hooks) in unobserved hauls. This same procedure was used for all seabird species, including the short-tailed albatross, that were observed in the longline sets sampled by observers. If the sets sampled by observers are not representative of all sets in the hook-and-line fishery, a substantial bias could exist in the ratio of the number of birds caught per weight of groundfish caught or 1,000 hooks of line set. In the NMFS preliminary analysis of 1993–1999 observer data, only three of the albatross taken were identified as a short-tailed albatross (and all from the BSAI region). Of the albatross taken, not all were identified. This analysis of 1993–1999 data resulted in an average estimate of two short-tailed albatrosses being taken annually in the BSAI groundfish hook-and-line fishery and zero short-tailed albatross being estimated taken annually in the GOA groundfish hook-and-line fishery. The incidental take limit established in the USFWS biological opinions on the effects of the hook-and-line fisheries on the short-tailed albatross is based on the actual reported takes and not on extrapolated estimated takes.

Prescription of Mitigation Measures

NMFS required hook-and-line vessels fishing for groundfish in the BSAI and GOA and federally permitted hook-and-line vessels fishing for groundfish in Alaskan waters adjacent to the BSAI and GOA, to employ specified seabird avoidance measures to reduce seabird incidental catch and incidental seabird mortality in 1997 (62 FR 23176, April 29, 1997). Measures were necessary to mitigate hook-and-line fishery interactions with the short-tailed albatross and other seabird species. Prior to 1997, measures were not required, but anecdotal information suggests that some vessel operators may have used mitigation measures voluntarily. NMFS required seabird avoidance measures to be used by vessels fishing for Pacific halibut in U.S. Exclusive Economic Zone (EEZ) waters off Alaska the following year (63 FR 11161, March 6, 1998). See the proposed rules as well as environmental assessment, regulatory impact review, and final regulatory flexibility analysis prepared for these rulemakings for further discussion of the measures and the development of the regulations (62 FR 10016, March 5, 1997; 62 FR 65635, December 15, 1997; NMFS 1997a, 1998c).

The current regulatory requirements are specified in Alternative 1, the status quo alternative (section 2.1).

Enforcement of Seabird Avoidance Regulations

The U.S. Coast Guard assumed an aggressive and proactive policy of educating commercial hook-and-line fishermen in the months prior to regulations being effective. At-sea enforcement has continued this policy in checking for compliance with regulations during at-sea boardings. Reports of these compliance checks are made in the Coast Guard's report to the Council at each meeting. From 1999 to 2001, NMFS Enforcement investigated 41 cases involving alleged violations of seabird avoidance regulations and other seabird-related issues. These investigations resulted in: 2 paid penalties, 8 written warnings, 6 verbal warnings, 12 cases closed for lack of resources, 12 cases transferred to USFWS, and 1 case closed for lack of evidence (J. Passer, pers. comm.)

Research and Development of Mitigation Measures and Methods

The USFWS Biological Opinion on the effects of the BSAI and GOA groundfish fisheries on the short-tailed albatross required NMFS to develop a plan to evaluate the effectiveness of the seabird avoidance measures that were required in 1997. During the public comment period of the proposed rule (62 FR 10016, March 5, 1997), critics of the proposed regulations argued that the more stringent measures required by Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in southern oceans should be adopted in Alaska's fisheries. Although similar to NMFS regulations in many ways, CCAMLR regulations are more restrictive in that they require vessels to set longlines only at night, and to deploy streamer lines at all times during fishing operations. At that time, no scientific data existed on the effectiveness of any deterrent measures in Alaska's fisheries. The appropriateness of the CCAMLR measures for the conditions of the BSAI and GOA was therefore unknown. NMFS and USFWS agreed to endorse more flexible requirements initially for Alaska to allow fishermen, managers and scientists to experiment with devices and determine their effectiveness. Testing the effectiveness of seabird bycatch avoidance measures will allow NMFS to better ascertain if they are effective in the Alaskan fisheries. Once measures have been tested, NMFS will be better able to revise regulations to maximize their effectiveness. This may include specific performance standards for the seabird avoidance measures, if appropriate (NMFS 1997).

NMFS completed and submitted to USFWS a *Test Plan to Evaluate Effectiveness of Seabird Avoidance Measures Required in Alaska's Hook-and-Line Groundfish and Halibut Fisheries* (test plan; NMFS 1998d). The test plan focuses on three key components to evaluate the effectiveness of seabird avoidance measures:

1. experimental testing of avoidance measures,
2. collection of information on avoidance measures by observers on commercial vessels, and
3. solicitation and gathering of information from fishermen on the effectiveness of seabird avoidance measures.

The WSGP conducted a two-year experimental research study in 1999 and 2000 to test the effectiveness of selected seabird avoidance measures in the individual fishing quota (IFQ) halibut and sablefish fishery and in the BSAI Pacific cod freezer-longliner fishery. Paired streamer lines, weighted gear, paired streamer lines in combination with weighted gear, and single streamer lines were the deterrent measures tested in controlled experiments in the IFQ fishery. Line shooters, lining tubes, weighted gear, paired streamer lines, paired streamer lines in combination with weighted gear, and single streamer lines were the deterrent measures tested in controlled experiments in the BSAI Pacific cod fishery. The WSGP scientific research program on the effectiveness of seabird avoidance measures currently used in the hook-and-line fisheries off Alaska forms the basis of measures proposed in Alternative 3 (section 2.3).

See Appendix 1 and the final report (Melvin et al 2001) for complete details, results, and recommendations from the study. WSGP staff presented final research results to the Council at its October 2001 meeting and made recommendations to the Council and NMFS for revisions to the existing regulatory requirements to improve their effectiveness at reducing seabird bycatch.

3.2.2 Overview of Estimates of Incidental Catch of Seabirds in Hook-and-Line Fisheries off Alaska

The risk to seabirds of getting caught in fishing gear varies with bird species and gear type. Other factors that influence risk include season and location of fishing. Occurrence and density of seabird species at sea vary greatly at different places and times, according to habits of the birds, breeding activities, migration, and habitats, abundance, and movements of forage species. Based on the average annual estimates of seabirds observed taken in groundfish hook-and-line fisheries from 1993 to 1999, 93 percent of the hook-and-line seabird bycatch was caught in the BSAI, and 7 percent in the GOA (Table 3). Also of note, the bycatch rates in the BSAI are approximately 3 times higher than in the GOA (Table 3). Estimates of the annual seabird bycatch for the Alaska groundfish fisheries, based on 1993 to 1999 data, indicate that approximately 16,000 seabirds are taken annually in the combined BSAI and GOA groundfish fisheries (14,500 in the BSAI; 1,200 in the GOA) at the average annual rates of 0.10 and 0.03 birds per 1,000 hooks in the BSAI and in the GOA, respectively (Table 3).

Of the estimated 14,500 seabirds that are incidentally caught in the BSAI, the species composition is: 61 percent fulmars, 17 percent gull species, 12 percent unidentified seabirds, 5 percent albatross species, 3 percent shearwater species, and 2 percent 'all other' species (Figure 5).

Of the estimated 1,200 seabirds that are incidentally caught in the GOA, the species composition is: 47 percent fulmars, 35 percent albatrosses, 9 percent gull species, 6 percent unidentified seabirds, 3 percent shearwater species, and less than 1 percent 'all other' species (Figure 6). Five endangered short-tailed albatrosses were reported caught in the hook-and-line fishery since reliable observer reports began in 1990: two in 1995, one in 1996, and two in 1998, and all in the BSAI. Both of the birds caught in 1995 were in the vicinity of Unimak Pass and were taken outside the observers' statistical samples; the bird caught in 1996 was near the Pribilof Islands in an observer's sample; the two short-tails taken in 1998 were in observers' samples.

It is difficult at this time to make valid comparisons of bird incidental catch rates between regions (Table 3). It is not possible to discern whether the differences between the BSAI and GOA estimated incidental catch rates are due to vastly different levels of fishing effort in each region, different vessel types used in each region (small catcher vessel in GOA and large catcher/processors in the BSAI), different distribution and abundance of birds, and so on. An analysis of covariance would allow for a valid statistical comparison of regional incidental catch rates.

3.3 Status of Endangered Species Act Consultations on Groundfish and Halibut Fisheries

The Endangered Species Act of 1973 as amended (16 U.S.C. 1531 *et seq*; ESA), provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The designation of an ESA listed species is based on the biological health of that species. The status determination is either threatened or endangered. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout

all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine fish, plants, and mammals (except for walrus and sea otter) and anadromous fish species. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

In addition to listing species under the ESA, the critical habitat of a newly listed species is designated concurrent with its listing to the "maximum extent prudent and determinable" [16 U.S.C. § 1533(b)(1)(A)]. The ESA defines critical habitat as those specific areas in which are found physical or biological features that are essential to the conservation of a listed species and that may be in need of special consideration. Federal agencies are prohibited from authorizing or undertaking actions that jeopardize the continued existence of a listed species, or that destroy or adversely modify designated critical habitat. Some species, primarily the cetaceans, which were listed in 1969 under the Endangered Species Conservation Act and carried forward as endangered under the ESA, have not received critical habitat designations.

Federal agencies have an affirmative mandate to conserve listed species. One assurance of this is Federal actions, activities or authorizations (hereafter referred to as Federal action) must be in compliance with the provisions of the ESA. Section 7 of the ESA provides a mechanism for consultation by the Federal action agency with the appropriate expert agency (NMFS or USFWS). Informal consultations, resulting in letters of concurrence, are conducted for Federal actions that have no adverse affects on the listed species. Formal consultations, resulting in biological opinions, are conducted for Federal actions that may have an adverse affect on the listed species. Through the biological opinion, a determination is made as to whether the proposed action poses "jeopardy" or "no jeopardy" of extinction to the listed species. If the determination is that the action proposed (or ongoing) will cause jeopardy, reasonable and prudent alternatives may be suggested which, if implemented, would modify the action to no longer pose the jeopardy of extinction to the listed species. These reasonable and prudent alternatives (RPA) must be incorporated into the Federal action if it is to proceed. A biological opinion with the conclusion of no jeopardy may contain a series of management measures intended to further reduce the negative impacts to the listed species. These management alternatives are advisory to the action agency [50 CFR. 402.24(j)]. If a likelihood exists of any taking[2] occurring during promulgation of the action, an incidental take statement may be appended to a biological opinion to provide for the amount of take that is expected to occur from normal promulgation of the action. An incidental take statement is not the equivalent of a permit to take. Incidental take statements include reasonable and prudent measures, non-discretionary requirements of the action agency that are intended to minimize the effects of the incidental take. Terms and conditions for implementing the reasonable and prudent measures will also be included in the incidental take statement.

Twenty-three species occurring in the GOA and/or BSAI groundfish management areas are currently listed as endangered or threatened under the ESA (Table 6). The group includes great whales, pinnipeds, Pacific salmon and steelhead, and seabirds. As mentioned in section 3.3.3, northern sea otter has been given a candidate rating. Candidate species are not subject to Section 7 consultation though the agency would consider minimizing direct and indirect takes if any were known to occur.

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[2] The term "take" under the ESA means "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct" [16 U.S.C. § 1538(a)(1)(B)].

Table 6. ESA Listed Species. The following species are currently listed as endangered or threatened under the ESA and occur in the GOA and/or BSAI groundfish management areas.

Common Name	Scientific Name	ESA Status
Northern Right Whale	*Balaena glacialis*	Endangered
Bowhead Whale [1]	*Balaena mysticetus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Snake River Sockeye Salmon	*Onchorynchus nerka*	Endangered
Short-tailed Albatross	*Phoebaotria albatrus*	Endangered
Steller Sea Lion	*Eumetopias jubatus*	Endangered and Threatened [2]
Snake River Fall Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Snake River Spring/Summer Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Puget Sound Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Lower Columbia River Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Upper Willamette River Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Upper Columbia River Spring Chinook Salmon	*Onchorynchus tshawytscha*	Endangered
Upper Columbia River Steelhead	*Onchorynchus mykiss*	Endangered
Snake River Basin Steelhead	*Onchorynchus mykiss*	Threatened
Lower Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Upper Willamette River Steelhead	*Onchorynchus mykiss*	Threatened
Middle Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Spectacled Eider	*Somateria fishcheri*	Threatened
Steller Eider	*Polysticta stelleri*	Threatened

[1] The bowhead whale is present in the Bering Sea area only.

[2] Steller sea lion are listed as endangered west of Cape Suckling and threatened east of Cape Suckling.

Of the species listed under the ESA and present in the action area, some may be negatively affected by groundfish fishing. NMFS is the expert agency for ESA listed marine mammals and anadromous fish species. The USFWS is the expert agency for ESA listed seabirds. The fisheries as a whole must be in compliance with the ESA.

Section 7 consultations with respect to actions of the federal groundfish fisheries have been done for all the species listed here, either individually or in groups. See section 3.8 of the SEIS (NMFS 1998a), for summaries of section 7 consultations done prior to December 1998. Consultations have been completed since December 1998 and those that are underway at this time are summarized in sections 3.5.1 and 3.5.2 of the draft SSL Protection Measures SEIS for ESA listed marine mammals and for ESA listed Pacific salmon, respectively (NMFS, 2001b). This proposed action would not effect any of the above listed species or their critical habitats in ways that were not already considered in existing and current biological opinions.

ESA Listed Birds

See section 2.9.5 of the DPSEIS (NMFS, 2001a) for a complete section 7 consultation history of all listed seabird species that may be affected by the BSAI and GOA groundfish fisheries.

The USFWS listed the short-tailed albatross as an endangered species under the ESA throughout its United States range (65 FR 46643, July 31, 2000). The short-tailed albatross was originally designated as endangered under the Endangered Species Conservation Act of 1969 on the list of foreign-listed species. When the ESA replaced the 1969 Act in 1973, short-tailed albatross were included as a foreign species but not as a native species, thus the listing noted the short-tailed albatross as endangered except in the United States. The USFWS proposed to correct this administrative error by extending the endangered status for the short-tailed albatross to include the species' range within the United States (63 FR 58692, November 2, 1998). This proposal was finalized and the endangered status of the short-tailed albatross extended in a final rule published by the USFWS on July 31, 2000 (65 FR 46643). Despite the listing oversight, the short-tailed albatross has always been considered a protected species in the EEZ since its 1970 listing. The EEZ is beyond the 3-mile territorial limit of the United States and is an economic zone rather than an area where the United States has territorial jurisdiction. Therefore, section 7 consultations between NMFS and USFWS are appropriate and required and have occurred since 1989. Although USFWS has determined that this species is adversely affected by hook-and-line Pacific halibut and groundfish fisheries off Alaska, the determinations to date are the fisheries do not jeopardize the continued existence of the short-tailed albatross. The current world population of short-tailed albatross is approximately 1500 individuals.

A Biological Opinion on the BSAI hook-and-line groundfish fishery and the BSAI trawl groundfish fishery for the ESA listed short-tailed albatross was issued March 19, 1999, by the USFWS for the years 1999 through 2000 (USFWS 1999). The conclusion continued a no jeopardy determination and the incidental take statement expressing the requirement to immediately reinitiate consultations if incidental takes exceed four short-tailed albatross over two years' time. Reporting incidental take of short-tailed albatross is a condition of the biological opinion. Accordingly, NMFS reported the incidental take of 2 endangered short-tailed albatrosses in the hook-and-line groundfish fishery of the BSAI in 1998. The first bird was taken on 21 September 1998, at 57°30'N, 173°57'W. In a separate incident, one short-tailed albatross was observed taken on 28 September 1998, at 58°27'N, 175°16'W (Table 5).

NMFS initiated two section 7 consultations with USFWS in 2000. The first FMP-level consultation is on the effects of the BSAI and GOA FMPs in their entirety on the listed species (and any designated critical habitat) under the jurisdiction of the USFWS (NMFS, 2000a). The second consultation is action-specific and is on the effects of the 2001 to 2004 TAC specifications for the BSAI and GOA groundfish fisheries on the listed species (and any critical habitat) under the jurisdiction of the USFWS (NMFS, 2000b). This action-specific consultation will incorporate the alternatives proposed in the draft SEIS on Steller Sea Lion Protection Measures for the 2002 groundfish fisheries (NMFS 2001b). The most recent Biological Opinion on the effects of the groundfish fisheries on listed seabird species expired December 31, 2000. NMFS requested and was granted an extension of that Biological Opinion and its accompanying Incidental Take Statement (USFWS, 2001). USFWS intends to issue a Biological Opinion in late 2001. This will allow for the consideration of new information: recommendations by Washington Sea Grant Program on suggested regulatory changes to seabird avoidance measures based on a two-year research program as well as Council and NMFS action on the proposed alternatives in the Steller sea lion Protection Measures SEIS.

In 1997, NMFS initiated a section 7 consultation with USFWS on the effects of the Pacific halibut fishery off Alaska on the short-tailed albatross. USFWS issued a Biological Opinion in 1998 that concluded that the Pacific halibut fishery off Alaska was not likely to jeopardize the continued existence of the short-tailed albatross (USFWS 1998b). USFWS issued an Incidental Take Statement of two short-tailed albatross in a two year period (1998/1999, 2000/2001, 2002/2003, etc), reflecting what the agency

anticipated the incidental take could be from the fishery action. Under the authority of ESA, USFWS identified non-discretionary reasonable and prudent measures that NMFS must implement to minimize the impacts of any incidental take. The combined reasonable and prudent measures from the 1998 Biological Opinion on the effects of the Pacific halibut fishery on the short-tailed albatross and the 1997 Biological Opinion on the effects of the BSAI and GOA groundfish hook-and-line fisheries on the short-tailed albatross are listed in Table 7 and discussed further in a section below. USFWS' conservation recommendations resulting from the aforementioned formal consultations are also listed in Table 8. If the 2-year incidental take limit is exceeded in either the groundfish or the halibut fisheries, NMFS must immediately reinitiate section 7 consultation and review with USFWS the need for possible modification of the reasonable and prudent measures established to minimize take of the short-tailed albatross. (USFWS 1998d).

Because this proposed action represents a change to the action, a new consultation will be initiated for the Pacific halibut fishery off Alaska. This proposed action is being considered as part of the action that is currently being consulted on for the groundfish fisheries. Thus, the biological opinion that USFWS intends to issue in late 2001 will reflect this proposed action.

3.4 The Human Environment

The operation of the groundfish fishery in the BSAI and the GOA is described by gear type in the SEIS (NMFS, 1998a) and in the draft SEIS (NMFS 2001a). General background on the fisheries with regard to each species is given in the BSAI and GOA groundfish FMPs (NPFMC 1999a and 1999b) and an overview of both the groundfish and halibut fisheries using hook-and-line gear is in section 3.4.1 of this EA/RIR/IRFA . The following describes the participants in the fisheries, economic aspects and safety considerations with the current groundfish and halibut fisheries.

3.4.1 Fishery Participants

An important part of the human environment potentially impacted by the proposed alternatives for revisions to seabird avoidance measures is the fishery participants. This group includes fishermen, fish processing workers, and all the support personnel that help the fish product go from being harvested to consumed. Participants may be either directly affected such as fishermen or indirectly affected such as businesses that supply materials to the fishing industry. Depending on the location the fishery participants may make up the majority of the residents in a community so that the community may have an important socioeconomic link to groundfish fisheries activities. Detailed information on the fishery participants, including vessels and processors, most directly effected by this proposed action may be found in sections 6 of this EA/RIR/IRFA. Section 6 outlines the economic impacts of each alternative on fishery participants. Additional information regarding fishery participants can also be found in the 1999 Economic SAFE report (Hiatt and Terry, 2000), section 3.10 of the draft SEIS (NMFS 2001a), Appendix C (RIR) of the draft SSL Protection Measures SEIS (NMFS 2001b), and Tables 9 through 22 of this EA/RIR/IRFA.

The federal fisheries being modified by this proposed action for purposes of seabird bycatch reduction are the groundfish fisheries of the BSAI and GOA that use hook-and-line gear. The Pacific halibut fishery off Alaska using hook-and-line gear would also be modified by this action. These same groundfish fisheries have also been subject to modifications for purposes of complying with the ESA and necessary and required protections to the endangered Steller sea lion. For additional details of changes to the hook-and-line groundfish fisheries in 2001 for purposes of Steller sea lion protection, see the

emergency interim rules published on January 22, 2001 (66 FR 7276) and July 17, 2001 (66 FR 37167). For details of the proposed changes to the hook-and-line groundfish fisheries in 2002 for purposes of Steller sea lion protection, see the draft SEIS on Steller Sea Lion Protection Measures (NMFS 2001b). The target fishery that uses hook-and-line gear that has been most impacted by fishery changes in 2001 and proposed changes in 2002 is the Pacific cod target. The changes are needed to mitigate potential adverse effects as a result of competition for fish between Steller sea lions and the BSAI and GOA pollock, Pacific cod, and Atka mackerel fisheries (NMFS 2001b).

For purposes of seabird bycatch reduction, the current hook-and-line fisheries can best be characterized according to the area fished and/or the vessel type (Table 9). Relatively large catcher-processor vessels are more common in the BSAI whereas smaller catcher vessels, of diverse size classes, account for most of the harvest activity in the GOA. Obvious similarities occur between these different groups, but differences in gear type, bait used, hooks set per day, setting speed, and other vessel and gear characteristics do occur. See section 3.2 of this EA/RIR/IRFA for descriptions of the gear used in hook-and-line fisheries. Although vessel length is not the sole characteristic to determine the likelihood of potential for gear interactions with seabirds, it can be related to other vessel characteristics that may contribute to this risk. Because data are not collected on many of these other vessel characteristics, vessel length is often referred to in ascertaining necessity and suitability of certain seabird avoidance measures on vessels. Tables 12, 13b, 15b, 16a, and 16b provide information about the numbers of vessels participating in hook-and-line fisheries. For vessels in the 26 to 60 ft LOA category, the numbers of participating vessels are reported in 5 ft increments.

BSAI For additional details of the BSAI hook-and-line fisheries, see section 2.7.7.4 of the DPS EIS (NMFS 2001a). See section 2.5.1.2 of the Steller Sea Lion Protection Measures SEIS for additional details on the directed fishery for Pacific cod (NMFS 2001b).

Pacific cod fishery in 2001: See section 2.5.1.2 of the Steller Sea Lion Protection Measures SEIS for additional details on the directed fishery for Pacific cod and a summary of the 2001 management measures (NMFS 2001b). The measures effecting the BSAI Pacific cod fishery for 2001 include:

- Seasonal apportionment of TAC (less the CDQ reserve) of 60 percent of the annual TAC (104,340 mt) from January 1 to June 10 and 40 percent of the annual TAC (69,560 mt) from June 10 to December 31, 2001;
- Specified closed areas;
- Exempt vessels less than 60 ft (18.3 m) LOA that are fishing the fixed gear Pacific cod allocation around Akutan and Unalaska from the Steller sea lion protection measures;
- The second season delayed from June 10 until August 15 (for BSAI vessels greater than or equal to 60 ft LOA).

In 2000, the total BSAI hook-and-line groundfish catch was 111,000 mt, representing 7.5 percent of the total groundfish catch (Table 10). In 2000, 99 hook-and-line catcher vessels and 43 hook-and-line catcher/processors operated in the BSAI (Table 11). The BSAI hook-and-line groundfish fleet is characterized predominantly by the larger catcher/processor vessels (freezer-longliners) and most of these vessels use autoline gear. Hook-and-line catcher-processor vessels accounted for 98.2 percent of the 1999 groundfish harvest by vessels using hook-and-line gear (Table 13a). Of these 41 catcher/processor vessels operating in 1999, 88 percent (36) were longer than or equal to 100 ft LOA (Table 11). In 2001, 14 catcher/processors and 19 catcher vessels using hook-and-line gear in the BSAI are eligible for the multi-species Community Development Quota program (MS-CDQ) (Table 16a).

Based on observer data collected from 1993 to 1999, the average annual estimate of total number of hooks deployed in the BSAI is approximately 150 million (Table 3).

GOA For additional details of the GOA hook-and-line fisheries, see section 2.7.7.7 of the DPS EIS (NMFS 2001a).

Pacific cod fishery in 2001: See section 2.5.1.2 of the Steller Sea Lion Protection Measures SEIS for additional details on the directed fishery for Pacific cod and a summary of the 2001 management measures (NMFS 2001b). The measures effecting the GOA Pacific cod fishery for 2001 include:

- Seasonal apportionment of TAC (less the CDQ reserve) of 60% of the annual TAC from January 1 to June 10 and 40% of the annual TAC from June 10 to December 31, 2001;
- Except for the Eastern GOA, the second season delayed from June 10 until September 1.

In 2000, the total GOA hook-and-line groundfish catch was about 30 mt, representing 14.6 percent of the total groundfish catch (Table 10). A total of 971 hook-and-line catcher vessels and hook-and-line 21 catcher/processors operated in the GOA (Table 11). The GOA hook-and-line groundfish fleet is characterized predominantly by the smaller catcher vessels (Table 9). In 1999, catcher vessels accounted for 70.4 percent of the groundfish harvest (Table 13a). Of these 886 catcher vessels operating in 1999, 99 percent (877) were less than 100 ft LOA and 86 percent (766) were less than 60 ft LOA (Table 11). Based on observer data collected from 1993 to 1999, the average annual estimate of total number of hooks deployed is approximately 39 million (Table 3).

Included in the GOA are "internal waters" of Prince William Sound (Area 649), Southeast Inside District (Area 659), and state waters of Cook Inlet. Most of the vessels harvesting groundfish from these areas in 2000 were less than 60 ft LOA and many in the range of 26 (7.9 m) to 50 ft (15.2 m) LOA (Table 13b). In Cook Inlet, 39 vessels harvested 15.7 mt of Pacific cod in state waters of Cook Inlet in 2000 (D. Ackley, pers. comm.).

The total number of hook-and-line catcher vessels that caught groundfish off Alaska in 2000 was 1004 and the total number of hook-and-line catcher-processor vessels that caught and processed groundfish off Alaska in 2000 was 44 (Table 11).

Pacific halibut fishery

The Pacific halibut fishery occurs primarily on the continental shelf (50 to 200 m depth) and more rarely on the upper slope (to 400 m depth). During the spring through fall fishing period, Pacific halibut move into shallow water to feed, from the greater winter spawning depths (greater than 400 m depth). In most areas, the continental shelf extends 5 to 100 km offshore, although the shelf extends nearly 800 km in the eastern Bering Sea.

Hook-and-line is the only gear-type authorized for the commercial harvest of Pacific halibut in the U.S. EEZ. Indeed, halibut is designated as a "prohibited species", requiring the immediate release of any bycatch, in trawl and pot fisheries for groundfish and other species.

The IFQ program for Pacific halibut was implemented in 1995 to address problems associated with these over-capitalized fisheries. Under the program, a specified amount of catch is available to eligible persons holding Quota Shares. The IFQ season is from March 15 to November 15. In 2000, 53.1 million pounds of halibut were harvested by 1,694 vessels (Tables 15a and 16a). Based on IPHC catch and effort data, the total number of hooks deployed in 1998 was estimated to be in the range of 27 to 37 million

(Williams pers. comm.). The Western Alaska Community Development Quota (CDQ) program is associated with the IFQ program in that it also administers an allocation for the harvest of Pacific halibut. The CDQ Program allocates a percentage of all BSAI quotas for groundfish, prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to provide the means for starting or supporting commercial fisheries business activities that will result in an ongoing, regionally based, fisheries-related economy in Western Alaska.

See Table 15a for the annual Pacific halibut allocation quotas and amounts landed for both the IFQ and CDQ programs. Landings by number of vessels in 5 ft increments is provided. Table 15b provides similar information for just the CDQ halibut fishery. Eighty percent of the halibut harvested in the GOA is from IPHC Areas 2C, 3A, and 3B (Table 15a). Of the 1284 unique vessels that landed IFQ or CDQ halibut in 2000, 89% of the vessels were less than 50 ft (15.2 m) LOA (Table 16a). Of the 219 vessels landing halibut in IPHC Area 4E, 98% were vessels less than 32 ft (9.8 m) LOA, representing half of the halibut harvested (Table 16a). Of the gear types reported in IPHC logbooks in 2000, snap gear was reported by 39 to 47 % of the vessels in IPHC Areas 2C, 3A, 3B (Table 16b).

3.4.2 Economic Aspects of the Fishery

The Regulatory Impact Review of this EA/RIR/IRFA provides a description of the fisheries and regional profiles (sections 6.1.4 and 6.3.3.3) and the impacts of the alternatives analyzed in this document. A summary of historical groundfish fishery catch and value follows below.

The most recent description of the economic aspects of the groundfish fishery is contained in the 1999 Economic Status Report (Hiatt and Terry 2000). This report, incorporated herein by reference, presents the economic status of groundfish fisheries off Alaska in terms of economic activity and outputs using estimates of catch, bycatch, ex-vessel prices and value, the size and level of activity of the groundfish fleet, the weight and value of processed products, wholesale prices, exports, and cold storage holdings. The catch, fleet size and activity data are for the fishing industry activities that are reflected in Weekly Production Reports, Observer Reports, fish tickets from processors who file Weekly Production Reports, and the annual survey of groundfish processors. External factors that, in part, determine the economic status of the fisheries are foreign exchange rates, the prices and price indices of products that compete with products from these fisheries, and fishery imports.

All catch data for 1991 through 1998 are based on the blend estimates of total catch which are used by NMFS to monitor groundfish and PSC quotas during each fishing year. External factors included, which in part, determine the economic status of the fisheries are foreign exchange rates, the prices and price indexes of products that compete with products from these fisheries, and fishery imports.

The commercial groundfish catch off Alaska totaled 1.66 million mt in 1999, 11.5 percent below 1998. The decrease in catch was accompanied by a 31 percent increase in the average ex-vessel price of groundfish and the estimated ex-vessel value of the catch, excluding the value added by at-sea processing, rose from $415.9 million in 1998 to $483.4 million in 1999. (Tables 1 and 19 for the 1999 Economic Status Report).

During the ten years from 1990 to 1999 the total catch in the commercial groundfish fisheries off Alaska varied between 1.66 and 2.43 million mt. The peak catch occurred in 1991, in part because blend estimates of catch and bycatch were not yet used to monitor most quotas. If they had been, several

fisheries would have been closed earlier in the year (Greig et al. 1999; Table 1 for the 1999 Economic Status Report).

The ex-vessel value of domestic landings, excluding the value added by at-sea processing, increased from $415.9 million in 1998 to $483.4 million in 1999. In 1999, catcher vessels accounted for 52.2 percent of the ex-vessel value of the groundfish landings compared to 48.3 percent of the total catch, because catcher vessels take a higher percentage of valuable species such as sablefish which was $2.786 per pound in 1999. Similarly, trawl gear accounted for only 63.8 percent of the total ex-vessel value compared to 89.5 percent of the catch because much of the trawl catch is of low priced species such as pollock which was about $0.088 per pound in 1999 (Tables 4 and 19 for the 1999 Economic Status Report).

Price changes for groundfish species between 1998 and 1999 are summarized below. These are ex-vessel prices and do not include the value added by at-sea processing.

- The average price of pollock increased from $0.065 per pound in 1998 to $0.088 in 1999.
- Average prices of sablefish rose from $2.359 in 1998 to $2.786 in 1999.
- Pacific cod prices went from $0.209 in 1998 to $0.287 in 1999.
- Flatfish prices rose from $0.129 in 1998 to $0.137 in 1999.
- Rockfish prices declined from $0.148 in 1998 to $0.133 in 1999.
- Atka mackerel prices rose from $0.069 in 1998 to $0.081 in 1999.

(All prices from Table 18 for the 1999 Economic Status Report).

Walleye pollock has been the dominant species in the commercial groundfish catch off Alaska. The pollock catch in 1999 totaled 1.09 million mt and accounted for 66 percent of the total groundfish catch of 1.66 million mt. The pollock catch was down 13.1 percent from 1998. The next major species, Pacific cod, accounted for 242,500 mt or 14.6 percent of the total 1999 groundfish catch. The Pacific cod catch was down 6 percent from a year earlier. The 1999 catch of flatfish, which includes yellowfin sole, rock sole, and arrowtooth flounder was 186,400 mt in 1999, down 16.5 percent from 1998. Pollock, Pacific cod, and flatfish comprised 91.5 percent of the total 1999 catch. Other important species are sablefish, rockfish, and Atka mackerel (Table 1 from the 1999 Economic Status Report).

The actual value realized from the groundfish harvest in 2001 will be dependent on factors unquantifiable at present, including market demand, costs of harvesting and processing, proportion of catch processed at sea (value added), and the degree to which the harvests are constrained by PSC limits.

The sectors most directly affected by this action are the catcher vessels and catcher/processors using hook-and-line (longline) gear. See section 6 of this EA/RIR/IRFA for a more complete description of these hook-and-line fisheries that target primarily Pacific cod, sablefish, and Greenland turbot in the BSAI and sablefish and Pacific cod in the GOA. See Table 3 for the hook-and-line portion of the groundfish harvest in the BSAI and GOA for 1997 through 2000. See Tables 11 and 12 for number of participating vessels and catcher-processors in the hook-and-line groundfish fisheries, by vessel size categories, for 1994 through 2000. See Table 14 for ex-vessel values associated with the primary hook-and-line groundfish targets. See Tables 15 and 16 for harvest and vessel statistics of the IFQ/CDQ fisheries.

3.4.3 Safety

Commercial fishing is dangerous. Lincoln and Conway of the National Institute of Occupational Safety and Health (NIOSH) estimate that, from 1991 to 1998, groundfish fatality rates were about 46/100,000, or about ten times the national average.(Lincoln and Conway, page 692-693).[3] The danger inherent in commercial groundfish fishing was underscored by two accidents in March and April of 2001. In March, two men were lost when the 110 foot cod trawler Amber Dawn sank in a storm near Atka Island. In April, 15 men were lost when the 103 foot trawler-processor Arctic Rose sank about 200 miles to the northwest of St. Paul Island in the Bering Sea, while fishing for flathead sole.

However, during most of the 1990s commercial fishing appeared to become safer. While annual vessel accident rates remained relatively stable, annual fatality per incident rates (case fatality rates) dropped. The result was an apparent decline in the annual occupational fatality rate.[4] From 1991 to 1994, the case fatality rate averaged 17.5% a year; from 1995 to 1998 the rate averaged 7.25% a year. Lincoln and Conway report that "The reduction of deaths related to fishing since 1991 has been associated primarily with events that involve a vessel operating in any type of fishery other than crab." (Lincoln and Conway, page 693.) Lincoln and Conway described their view of the source of the improvement in the following quotation.

> The impressive progress made during the 1990s in reducing mortality from incidents related to fishing in Alaska has occurred largely by reducing deaths after an event has occurred, primarily by keeping fishermen who have evacuated capsized (sic.)or sinking vessels afloat and warm (using immersion suits and life rafts), and by being able to locate them readily, through electronic position indicating radio beacons. (Lincoln and Conway, page 694).

There could be many causes for this improvement. Lincoln and Conway point to improvements in gear and training, flowing from provisions of the Commercial Fishing Industry Vessel Safety Act of 1988, that were implemented in the early 1990s. Other causes may be improvements in technology and in fisheries management. Technological improvements may include advances in EPIRB technology. Fishery management improvements may include the introduction of individual quotas in the halibut and sablefish fisheries. The introduction of coops in the pollock fisheries in 1999 and 2000 would not be reflected in these statistics, but by rationalizing fishing, they may lead to safety improvements.

3.4.4 Fisheries Management and Enforcement

Seabird avoidance measures are established in regulations. Measures are proposed through the Council process as regulatory amendments to implement the groundfish FMPs and necessary measures for the halibut fishery. Consistent with this process is the implementation of the *National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries* (NPOA) which calls for prescription of

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[3]The NIOSH study does not cover 1999-2001. Results updated through 1999 should be published in the summer of 2001; however, these results are not available at this writing. (Lincoln, pers. comm.). The rates are based on an estimate of 17,400 full time employees active in the fisheries. This estimate of the employment base was assumed constant over the time period. However, various factors may have affected this base, including reductions in the size of the halibut and sablefish fleets due to the introduction of individual quotas. These estimates must therefore be treated as rough guides. The updated results due in the summer of 2001 should include an updated estimate of the number of full time equivalent employees as well.

[4]This result is based on an examination of the years from 1991-1998. It does not reflect the losses in the winter of 2001.

mitigation measures in those longline fisheries where a seabird bycatch problem is known to exist (Appendix 2).

Enforcement of seabird regulations is through the efforts of NMFS Enforcement and the United States Coast Guard. From 1999 to 2001, NMFS Enforcement investigated 41 alleged seabird regulation violations. The violations noted were: failure to employ seabird avoidance measures, interference with observer sampling procedures, and intentional harassment of seabirds. The conclusion of the 41 cases is as follows: 2 penalties paid, 8 written warnings issued, 6 verbal warnings issued, 12 cases transferred to USFWS, 12 cases closed for lack of enforcement resources, and 1 case closed for lack of evidence. Additionally, observers record on a haul-by-haul basis what seabird avoidance measures are used, as reported by the vessel skipper and verified by the observer. Investigation of alleged violations of seabird regulations may include review of observer affidavits. Affidavits could be filed in instances where onboard observers witness non-compliance with federal regulations. Seabird avoidance regulations are among the milieu of federal laws and regulations that the Coast Guard enforces through the actions of its vessel boarding parties. When a Coast Guard unit boards or observes a hook-and-line vessel, queries are made as to what types of seabird avoidance measures are used.

See section 4.1.4 (effects of Alternative 4) for a discussion of monitoring and enforcement issues, with particular reference to the role of observers, performance standards for streamer lines and buoy bag lines, and the use of observer-collected seabird bycatch data to promote bycatch reduction initiatives.

4.0 ENVIRONMENTAL CONSEQUENCES

Section 4.0 of the SEIS (NMFS 1998a) analyzes the impacts associated with a range of TAC specifications on future catches, marine mammals, seabirds, forage species, and prohibited species, as well as other components of the physical and chemical environment. An initial analysis of the effects of the IFQ management system for the halibut fisheries off Alaska on the biological environment and associated effects on marine mammals, seabirds, and other threatened or endangered species was done in the environmental impact statement for the action (NMFS 1992). New information that is available since that analysis is summarized in this EA and tiers off the analysis presented in the SEIS.

The environmental impacts generally associated with fishery management actions are effects resulting from: 1) harvest of fish stocks that may result in changes in food availability to predators, changes in population structure of target fish stocks, and changes in community structure; 2) changes in the physical and biological structure of the benthic environment as a result of fishing practices (e.g., gear effects and fish processing discards); 3) entanglement/entrapment of non-target organisms in active or inactive fishing gear; and 4) major shifts in the abundance and composition of the marine community as a result of disproportionate fishing pressure on a small set of species (also known as "cascading effects," National Research Council, 1996). Only issues that were not contained in the 1998 SEIS or which are new issues associated with implementing the seabird avoidance measures are analyzed in this EA. The Draft Programmatic SEIS (NMFS 2001a) is also used to support the analysis of impacts in this EA because it provide more recent analysis of alternatives consistent with protection measures for seabirds analyzed in this EA.

Section 4.3.3 of the Draft Programmatic SEIS (NMFS, 2001a) provided rationale for the consideration of potential direct and indirect fishery effects on different seabird taxonomic groups. This analysis displays only those effects that are additional and/or attributable to promulgation of revised regulations for seabird avoidance measures in the hook-and-line fisheries off Alaska to reduce bycatch of the short-tailed albatross (*Phoebastria albatrus*) and other seabird species. The environmental issues include: direct effects of gear use and entanglement/entrapment of non-target organisms in active fishing gear. The intended effect of the proposed regulatory amendment is to reduce the direct effect of hook-and-line gear on seabirds and to reduce the incidental catch of seabirds in this gear. The proposed seabird avoidance measures in hook-and-line gear are not likely to indirectly effect the biological, physical, and chemical environment, thus an analysis of indirect effects is not warranted.

The seabird taxonomic groups represented in observed hook-and-line hauls are listed in Table 4. Those most likely to be directly impacted by incidental take in hook-and-line gear were identified in section 4.3.3 of the draft Programmatic SEIS (NMFS, 2001a). These species or species groups are: northern fulmar, gulls (glaucous-winged, glaucous, herring), shearwaters (sooty and short-tailed), and albatrosses (Laysan's, black-footed, and short-tailed). Other seabird species present in the project area, including the threatened spectacled eider and Steller's eider, are not likely to be incidentally taken in hook-and-line gear.

4.1 Effects of Alternatives on Seabirds

4.1.1 Effects of Alternative 1 on Seabirds: (Status Quo–No Action)

The effects of incidental take of seabirds (from fishing gear and vessel strikes) are described in section 4.3.3 of the Draft Programmatic SEIS (NMFS, 2001a). The criteria used for determining significance for

the impact from incidental take in the draft SSL Protection Measures SEIS (NMFS, 2001b) were also used in this analysis.

Effects	Rating				
	Significant (negative)	Conditionally Significant (positive)	Insignificant	Conditionally Significant (negative)	Unknown
Incidental take	Take number and/or rate increases substantially and impacts at the population or colony level.	Take number and/or rate may decrease minimally, not at a population or colony level.	Take number and/or rate is the same or slightly reduced.	Take number and/or rate may increase minimally, not at a population or colony level.	Take number and/or rate is not known.

As noted in Section 4.3.3.1 of the Draft Programmatic SEIS (NMFS, 2001a), several factors are likely to affect the risk of seabird incidental catch, including: fishing effort (number of hooks per year), the distribution of effort by sub-area and season, the abundance and distribution of seabirds in the vicinity of fishing vessels, and the use of seabird deterrents in hook-and-line fisheries. The relative importance of these factors has not been fully studied. It is reasonable to assume that risk goes up or down, however, partly as a consequence of fishing effort (measured as total number of hooks) each year. But, if seabird avoidance measures used to prevent birds from accessing baited hooks are effective, then effort levels would probably be less of a critical factor in the probability of a bird getting hooked in that an adequately protected hook would not catch a bird. The Draft Programmatic SEIS (NMFS, 2001a) concluded that northern fulmars were the only species showing a positive linear relationship between fishing effort and numbers of birds hooked. This relationship did not exist for other bird groups (albatrosses, gulls, shearwaters).

The hook-and-line fisheries in the BSAI primarily target Pacific cod, sablefish, and Greenland turbot. In most years, Pacific cod is the most fully utilized of these targets, it is less likely to be constrained by halibut bycatch levels, and it accounts for most of the hook-and-line harvest. The harvest usually approaches the annual TAC allocation to hook-and-line gear. Beginning in the latter half of 2000, the annual Pacific cod TAC is allocated to sectors based on gear type (hook-and-line, pot, trawl), vessel type (catcher processor, catcher vessel), and vessel length (greater than or equal to 60 ft LOA and less than 60 ft LOA). At the Council's request, NMFS presented summary bycatch information for seabird and halibut bycatch by the freezer longliner (catcher processor) fleet for 1998 through 2000 (NMFS, 2001c). This fleet primarily targets Pacific cod in the BSAI. The vessel-specific bird bycatch rates (number of birds/1000 hooks) varied by two orders of magnitude. There was also considerable difference in the percentage sets with bird bycatch. Comparing the overall bycatch rates with the percentage of sets with bird bycatch indicated that some vessels catch birds often, they have many sets with bird bycatch, but do not catch many birds in each set. Other vessels have a lower percentage of sets with birds, but higher bycatch rates, indicating that when birds are caught, many are caught at one time. These different scenarios highlight several different contributing factors to bird bycatch. As noted previously, bird distribution and abundance and their proximity to vessels and the diligent use of effective seabird avoidance measures by vessel operators all contribute to the likelihood of birds being taken.

In the GOA, hook-and-line fisheries primarily target sablefish and Pacific cod. In most years, sablefish is the most fully utilized of the GOA fishery targets. Thus, the harvest more often approaches the annual TAC. The annual sablefish IFQ quota is allocated to hook-and-line (longline) gear.

Given that the primary hook-and-line target fisheries in the BSAI and GOA are typically fully utilized and that their annual TACs do not fluctuate drastically, changes in groundfish TAC that would result in significant changes in bird bycatch are not expected.

Quantitative models could further elucidate the potential population-level impact of fisheries-related seabird mortality, particularly for those seabirds species that are killed in high numbers (e.g. northern fulmar), for abundant species (e.g. sooty shearwater and short-tailed shearwater, Laysan's albatross), and for less abundant species of concern (black-footed albatross). Although northern fulmars breed throughout the Aleutian Islands and many other coastal areas of Alaska, over 90% of the Alaska breeding population can be found on four main colonies: Semidi Islands (GOA), Chagulak Islands (eastern AI), Pribilof Islands (primarily St. George), and St. Matthew/Hall Islands. These four colony locations also account for the vast majority of other breeding seabird populations as well. The population of fulmars on the Pribilof Islands (St. George and St. Paul) was estimated at about 70,000 in the 1970's.[5] The population on St. George peaked in 1992, followed by nearly an 80% decline over the succeeding two censuses in 1996 and 1999 (Dragoo et al, 2000). It's too early to say whether that apparent drop in numbers is real, it's possible that the highly variable numbers at the colony in recent years are related to variable environmental conditions during the summer months. But, if a majority of the fulmars taken annually in the hook-and-line fishery originate from one colony (such as St. George), and if a substantial proportion of the catch is adult birds, then it's possible that fishery bycatch could be contributing to recent declines monitored at St. George. Conversely, if the count on St. George in 1992 was anomalously high, the apparent subsequent 'decline' is relatively meaningless in terms of actual population impacts. Fulmars would not be expected to double their numbers over 4 years (i.e., between 1988 and 1992, as suggested by Dragoo et al, 2000), which lends support to that interpretation.

A planned pilot study by U.S. Geological Survey (USGS) will collect data on the at-sea foraging distribution of northern fulmars as well as identifying the colony of provenance of a sample of bycaught northern fulmars. Results will be used in the development of population models that may elucidate the potential for incidental take in hook-and-line fisheries to have colony-level population impacts.

Although not an ESA-listed species, the black-footed albatross is of some concern because some of the major colony population counts may be decreasing or of unknown status. The current world population is estimated at 300,000 (NMFS, 2001d). This species is classified as 'vulnerable' under the international classification criteria of the World Conservation Union (IUCN). The combined annual estimated take of black-footed albatrosses in the BSAI and GOA groundfish hook-and-line fisheries is 239 birds (Tables 2a and 2b). This level alone is an insignificant impact to the black-footed albatross population. But mortality also occurs in the Hawaiian pelagic longline fisheries and may be assumed to occur in other North Pacific longline fisheries conducted by Japan, Taiwan, Korea, Russia, and China. Based on 1994 through 1999 data, the estimated average annual total catch of black-footed albatrosses in the Hawaiian pelagic longline fishery is 1,743 (NMFS, 2001d). Thus, approximately 2,000 birds are estimated to be taken annually in the Hawaii and Alaska longline fisheries. Preliminary annual estimates of numbers of

[5]S. Hatch, "Personal Communication," USGS, Alaska Biological Science Center, 1011 E. Tudor, Anchorage, AK 99501.

both black-footed and Laysan's albatrosses taken in non-U.S. fisheries in the North and Central Pacific pelagic longline fisheries (swordfish and tuna) are about 30,000 birds (Cousins et al, 2001). It is not known what portion of these are black-footed albatrosses. Preliminary conclusions from population modeling indicate that a loss of 10,000 birds per year (natural and anthropogenic mortality sources) is about the maximum a population of 300,000 black-footed albatrosses could sustain and still remain stable (Cousins and Cooper, 2000). Further, the modeling exercises indicated that if the total number of birds killed in the longline fishery each year is 1% of the total population, then the population growth rate will be reduced by more than 1% (Cousins, 2001). Thus, taken together, it is possible that even though the bycatch from the BSAI and GOA groundfish hook-and-line fisheries accounts for a very small portion of the total that is estimated to potentially occur in the North and Central Pacific fisheries, it could contribute to a significant cumulative effect on the black-footed albatross.

Alternative 1 is not expected to alter prosecution of the hook-and-line fisheries in ways that would significantly impact the potential for the incidental take of seabirds. Given the above discussion, the effect of incidental take on northern fulmars at the GOA colonies is probably insignificant (see section 4.2). Until further information is available, the impact of the incidental take on BSAI fulmar colonies is unknown. The incidental take of fulmars in the BSAI could be significant at a population and/or colony level if the bycatch is predominantly coming from St. George and if a substantial proportion of the bycaught birds are adults. The impact of the incidental take in the BSAI and GOA groundfish fisheries on all other seabird species besides fulmars is insignificant at the population level (see section 4.2).

Short-tailed albatross. Based on 1993 to 1999 data, it has been recently estimated that two short-tailed albatross are probably taken in the BSAI hook-and-line fisheries every year and none in the GOA hook-and-line fisheries (Tables 2a and 2b). At the current population level and the continuing 7-8% annual growth rate, the level of mortality resulting from hook-and-line fisheries is not thought to represent a threat to the species' continued survival, although it likely is slowing the recovery (NMFS, 2001a). Because of its critically small population size, the hook-and-line mortality of short-tailed albatrosses is a conservation concern. The expected result of hook-and-line fishing activity in 1999 and 2000 was the continuation of a lower population growth rate than that which would have occurred in the absence of fishery related mortality. Two individual albatrosses per year at a population level of approximately 1,100 birds represented a 0.2% decrease in population growth rate (USFWS, 1999). In consideration of this fishery-related mortality, USFWS recently noted that in the event of a major population decline resulting from a natural environmental catastrophe (such as a volcanic eruption on Torishima) or an oil spill, the effects of hook-and-line fisheries on short-tailed albatrosses could be significant under ESA (USFWS, 2000). If such a catastrophic event were to occur, it would constitute new information requiring the reinitiation of a Section 7 consultation under the ESA. As noted previously, Alternative 1 (No Action) represents the currently required seabird avoidance measures intended to reduce the incidental catch of short-tailed albatross. Some of these measures (single streamer line, night setting, lining tube) were found to be not as effective as other measures tested in the WSGP research study (see Appendix I; Melvin et al 2001). Estimates are not available of how effective all of the current measures are, other than to consider the bird catch rates or numbers taken, and it is not evident at this time if the annual and area variation is related to use of the measures (first required in 1997) or to other factors. Current measures, as they continue to be developed and improved, are expected to further reduce the likelihood of adverse effects on short-tailed albatross. Given all of these factors, Alternative 1 is determined to have conditionally significant adverse effects on the short-tailed albatross with respect to incidental take.

Eiders. Section 4.3.3 of the Draft Programmatic SEIS (NMFS, 2001a) indicates that spectacled and Steller's eiders are not likely to be directly affected by the BSAI and GOA fisheries therefore any effects of incidental take are insignificant.

4.1.2 Effects of Alternative 2 on Seabirds (1999 Council Final Action)

Alternative 2 is based on the Council's recommendations for revisions to seabird avoidance measures in 1999. Those recommendations were to revise the existing regulations as follows (see section 2.2 for specific language):

- Use groundlines which are sufficient weighted to cause the baited hooks to sink reach of seabirds immediately after the groundline is set;
- In addition to the existing offal discharge requirement, embedded hooks must be removed from any offal that is discharged;
- Tow a bird scaring line in a specified manner during deployment of the gear to prevent birds from taking baited hooks. Towed buoy bags, float devices, or bird streamer lines would qualify as bird scaring lines, if properly constructed. Towing a board or stick during deployment of gear no longer would qualify as an acceptable seabird avoidance measure;
- Deploy hooks underwater through a lining tube at a depth sufficient to prevent birds from settling on hooks during deployment of gear, in conjunction with the use of a bird scaring line;
- Deploy gear only during the hours specified in regulation, using only the minimum vessel's lights necessary for safety (i.e. night-setting).
- Regulations would apply to operators of Federally-permitted vessels greater than 35 ft (10.7 m) LOA using hook-and-line gear. This would have the effect of extending the current exemption to use seabird avoidance measures from vessels less than 26 ft (7.9 m) LOA to vessels less than or equal to 35 ft (10.7 m) LOA.

Weighted Groundlines

The current regulation specifies the performance that must be achieved, not the method that must be used to achieve it. The two most common methods of sinking hook-and-line gear are applying additional weights to the groundline and thawing baits. The latter method is appropriate for pelagic longline fisheries, not demersal (Brothers *et al* 1999a). Given that all Alaska hook-and-line fisheries are demersal, it has been assumed that fishermen are applying weights to the groundline to comply with this requirement. Because demersal gear actually sets on the ocean floor, theoretically the only limitations on attaching weights is the hydraulic line-hauling capacity and the method of weight attachment and detachment (Brothers *et al* 1999a).

The purpose of applying additional weights to the groundline is to cause the gear to sink more quickly such that seabirds cannot reach the baited hooks. Precisely how fast a bait needs to sink so that seabirds cannot take it is generally dependent upon 3 factors: 1) Whether additional bait protection such as a bird scaring line is being used, 2) the vessel's line-setting speed, and 3) the foraging capabilities of the seabirds present. To account for these variables and to achieve consistent, reliable benefit from appropriate line weighting necessitates a generalized approach--applying as much weight as frequently as possible within the limits of feasibility. The line weighting regimes may differ in each of the longline fisheries according to the method and gear used (Brothers *et al* 1999a).

Although albatross and most other seabirds in Alaska are surface feeders, they can still reach baited hooks 1 to 2 and possibly 3 m below the water's surface (Gould pers. comm.). By sinking fishing gear quickly AND protecting the vulnerable zone behind the vessel with a surface deterrent(s), seabird

bycatch should be significantly reduced. Line sink rates will vary as a function of the line weighting regime used, line setting speed, propeller turbulence, 'line hook-ups' (when hooks snag on line setting gear as the longline is being deployed), and 'weight pull-backs' (occurs when line weights are pulled from the vessel by the drag of the line already deployed). Preliminary investigations in the demersal Patagonian toothfish fishery found that a line weighting regime of 4kg/40m was effective at sinking gear to a sufficient depth, as tested on a 150 ft autoliner vessel (Robertson 1998). A similar regime is being promoted in New Zealand, 5kg/40m (J. Molloy pers. comm.). Several fishermen in Alaska hook-and-line fisheries are finding that smaller weights applied more frequently (0.5kg/20m) are effectively sinking the gear to a sufficient depth on smaller vessels (M. Lundsten pers. comm.). The small weights are spliced directly into the groundline. Many seabird experts around the world believe that for demersal fisheries, sufficiently weighting the groundline may be one of the most effective and practicable methods available to significantly reduce the bycatch of seabirds (N. Brothers pers.comm.). A study of the 1997 Japanese tuna pelagic longline fishery off Eastern Tasmania found that observed seabird bycatch rates were 65 percent lower when a weighted branchline was in use than when one was not in use (Brothers *et.al.* 1998b). Additionally, results from this same fishery in 1996 suggest that the use of weighted branch lines is beneficial in not only reducing seabird bycatch but in increasing the tuna catch (Brothers *et.al.* 1998a). Line weighting is one of the mitigation measures identified in the FAO's IPOA (see Appendix II).

The WSGP study evaluated the effects of adding weights to the groundline in both the sablefish and cod fishery (see Appendix I and Melvin et al 2001) and found the effect on seabird bycatch was variable. In 1999, adding weight to the gear in both fisheries significantly reduced seabird bycatch relative to a control of no deterrent, although the effect was not as pronounced as for paired streamer lines. In 2000, the addition of weight to the groundline in both fisheries provided no improvement in the already high bycatch reduction of paired streamer lines. Although adding weight to groundlines caused gear to sink faster, differences in vessel speed and vessel characteristics proved much more important (Melvin et al 2001). In the cod fishery, the attachment of additional weight to the groundline posed a safety hazard during both deployment and retrieval. For weighting to be a practical seabird bycatch deterrent, the researchers concluded the weight should be integrated into the line. Until further investigations are undertaken to determine the optimum weighting regimes for reducing seabird bycatch and the methods to improve the practicality of line weighting, the WSGP researchers concluded that vessel operators should not be required to add weight to groundlines for seabird avoidance (Melvin et al 2001).

Offal Discharge

The purpose of addressing offal discharge is to minimize the attractiveness of the vessel or the gear deployment area to seabirds. If seabirds are not attracted to the vessel in the first place, then the likelihood of snagging one on a baited hook is decreased greatly. Many vessel operators have indicated that it is not practicable to not discharge offal, particularly during haul operations. Some evidence suggests that discharging of homogenized offal during line settings greatly reduced the incidental take of seabirds, mainly because the birds were more attracted by offal than by baited hooks (Cherel *et.al.* 1996).

Alternative 2 proposes to revise the current regulation by adding a requirement that hooks be removed from any offal (i.e. fish heads) that are discharged. Scavenging birds can become hooked in this manner and although not immediately life-threatening, hooked birds may realize negative effects to their survival. Removing embedded hooks prior to fish heads being discharged is one of the mitigation measures identified in the FAO's IPOA (FAO 1998).

The use of offal discharge to distract seabirds away from the area of gear deployment has been reported by several commercial fishermen in Alaska. These reports come from smaller vessels where sablefish heads are hand-tossed away from the setting gear. Fishermen have indicated no foreseeable obstacles to removing hooks from fish heads prior to discharging offal. Removal of hooks from fish heads on larger processor vessels may provide an operational benefit in that damage to offal-processing equipment, caused by the grinding of hooks, could be reduced (T. Smith pers. comm.).

Bird Scaring Line

A towed buoy bag, float device, and streamer line would all qualify as a bird scaring line under Alternative 2. Multiple bird scaring lines can be used but are not required.

Buoy Bag: Preliminary results from an experiment conducted on a Norwegian longline vessel indicate that towed floats (i.e. buoy bag) reduced significantly the number of seabirds caught on baited hooks compared to when no seabird avoidance device was used (Løkkeborg 1998). Three different avoidance measures were tested--towed floats, streamer line, and an underwater setting funnel (i.e. lining tube). During 11 sets for each of these methods, 2, 0, and 6 seabirds, respectively, were caught compared to 74 seabirds when no avoidance device was used. A streamer line performed better than a towed float (buoy bag) which performed better than a lining tube.

IPHC conducted preliminary experiments in summer 1998 to evaluate the effectiveness of buoy bags in reducing the potential for seabird bycatch (Trumble 1999, Appendix 5). The number of bait attacks by seabirds (i.e. attempts by seabird to take baited hooks) was observed for sets when a buoy bag was towed compared to sets when no deterrent device was used (control). These observations were made for both sets using sablefish gear and sets using halibut gear. Bait attacks with the buoy bag deployed averaged 3.2 per skate for sablefish gear and 1.9 for halibut gear. Bait attacks with no deterrent device in use averaged 6.5 and 3.6 per skate for sablefish and halibut gear, respectively. The number of bait attacks with the buoy bag was about half the number as when no device was used. Sablefish gear experienced about twice the number of attacks per skate as did the halibut gear, both with and without the bird bag, even though the sablefish gear had 4 times as many hooks (Trumble 1999). Thus, fewer bait attacks by seabirds occurred when a buoy bag was used compared to when no deterrent device was used. No comparisons were made with streamer lines.

Seabird bycatch expert, Nigel Brothers, has offered that if during the deployment of demersal hook-and-line gear (particularly with an appropriately weighted groundline that achieves a very precise and local point of vulnerability) the period of vulnerability to seabirds is very brief, both in time and distance astern of the vessel, then a towed buoy bag could be ideal for preventing seabirds from accessing baited hooks (Brothers pers. comm.). The towed buoy bag, adjusted to be just aft of this vulnerable zone, can create a virtual barrier that birds cannot get around in the time and/or distance available. Towed buoy bags may not be appropriate though if the vulnerable period is lengthy in time and/or distance astern from the vessel.

Since seabird avoidance measures were required in 1997 for the groundfish hook-and-line fisheries and in 1998 for the halibut fishery, two short-tailed albatross have been reported taken in observed hook-and-line hauls. In both instances, buoy bags were being used, indicating they were not effective in those particular instances at thwarting the take of an endangered species.

Streamer Lines: The purpose of towing a streamer line is to prevent seabirds from accessing the vulnerable zone behind a vessel, where baited hooks are still accessible until they have sunk deep enough

that the birds cannot reach them. Streamer lines would have buoys and/or weights attached at the end of the line (to keep the line taut so it doesn't tangle with the deploying gear) and would have 6 to 10 paired streamers suspended from the line, over the area where the fishing gear is being deployed. Like all of the avoidance measure construction materials, a durable and sturdy material should be used. A wide variety of streamer constructions have been devised, the key being an unpredictable movement that the birds do not become accustomed to. Paired streamer lines have been distributed free-of-charge to Alaska fishermen under a program funded by the USFWS and administered by the Pacific States Marine Fisheries Commission. The effectiveness of streamer lines at reducing seabird bycatch has been directly tested in only a few experiments (review in Melvin et al 2001). More frequently, its effectiveness has been noted through the analyses of observer data, other scientific observations, and anecdotal information. Worldwide, it is probably the most common seabird avoidance measure in use today. It is required in specified fisheries by country or convention in Australia, Japan, New Zealand, South Africa, United Kingdom (Falkland Islands/Malvinas), United States (as an option), CCAMLR, and CCSBT. It is estimated that the use of effective and correctly positioned bird scaring lines may reduce seabird bycatch by 80 percent (Brothers *et al* 1999a).

Several experimental studies have found bird streamer lines to be effective in reducing the number of seabirds taken (Løkkeborg 1992, 1996, 1998; Melvin et al 2001) and reducing the rate at which seabirds attack baited hooks (Melvin et al 2001). One of the recommendations from the WSGP research program is for the required use of paired streamer lines, having found that single streamer lines were less effective in reducing the abundance of seabirds around the vessel, bait attacks, and seabird bycatch (Melvin et al 2001). See the analysis of Alternative 3 for additional details on the effectiveness of paired vs. single streamer lines.

Other Devices: Examples of 'other devices' used are fire hose, paddlewheel, plastic streamers tied near stern, gun, and air horn. Water cannons may be effective at reducing seabird bycatch but the distance astern to which the water reached was considered to be inadequate. Noise deterrents may have some effect, albeit very limited, if used sparingly so birds do not become habituated to the sounds (Brothers *et al* 1999a). Little is known about the effectiveness of the other devices.

Alternative 2 would not prohibit the use of other devices but rather require that they be used in combination with a bird scaring line. Because no currently used mitigation measure in any longline fishery is thought to be absolutely effective, the use of measures in combination has been promoted (CCAMLR 1996, FAO 1999, Brothers *et al* 1999a).

Lining Tube

One purpose of setting demersal hook-and-line gear underwater through a lining tube is to deploy the gear at a depth that is not accessible by seabirds. Several studies have noted a reduction in bait loss and seabird bycatch when a lining tube is used (Løkkeborg 1996, 1998, 2001). Fewer birds were caught with a lining tube than compared to when no avoidance was used (28:99, 6:74) but more birds were caught with a lining tube than when a streamer line was used (28:2, 6:0).

Several methods have been or are being developed to set gear underwater; the baited hooks being delivered from the vessel so that they first emerge in the water, out of sight of nearby birds. The lining tube can be of sufficient diameter to permit the line, hooks, buoys, etc. to pass down it and exit underwater astern or have a grooved side for external deployment of buoys, weights, etc. Theoretically, underwater setting could virtually eliminate seabird bycatch (Brothers *et al* 1999a). But, current information indicates that the device has some design deficiencies compromising the essential

capabilities of any underwater setting device to: 1) deliver hooks deep enough, 2) withstand the substantial forces acting upon it, 3) not create additional problems, such as increased bait loss or line wear (Brothers *et al* 1999a). Problems have been noted with the line escaping from the tube, through a groove along its length (P. Ryan, J. Silden, J. Youngblood pers. comm.). This effectively brings the line back to the surface where seabirds are able to access the baited hooks. Design improvements to a springed locking mechanism may have resolved this problem. Another concern is whether or not propeller turbulence causes the line, after it leaves the tube, to come back to the surface (Robertson pers. comm.). This could be remedied by extending the tube beyond the propeller turbulence (if possible) or applying weights to the groundline to cause it to sink more rapidly after exiting the lining tube. Tests carried out on Norwegian vessels indicated that the pitch angle of the vessel affects the lining tube's efficiency. In the beginning of a trip, when the vessel has not taken on fish, the tube goes deeper into the water and works well. Once the catch is loaded (middle and forward part of vessel), the tube sets the line closer to the water's surface with loss in efficiency (S. Løkkeborg pers.comm.). Sea condition is also a factor that can affect the performance of the lining tube.

Currently, only one vessel in the Alaska hook-and-line fisheries has installed a lining tube. The custom installation occurred in the summer of 1997 and required the vessel to be dry-docked. The vessel company and Mustad (gear manufacturer) indicated that problems occurred with the groundline escaping from the lining tube. The vessel skipper noticed a greater number of birds caught during these times. Improvements were made to the lining tube in the summer of 1998; the high bycatch in 1998 may be attributable to the problems with the lining tube in the early part of the year. After the lining tube was fine-tuned and used in conjunction with a buoy bag, the skipper reported greatly reduced seabird bycatch. Vessel-specific bird bycatch rates for freezer-longliners in 1998 through 2001 are presented in Table 17. The rates in boldface represent vessels that either deployed their gear from amidships (i.e. not the stern) or used a lining tube for underwater deployment. Rates for these vessels are both above and below the annual fleet average in 2001 (Table 17 and Figure 12).

Currently, only one manufacturer (O. Mustad) produces the lining tube. Mustad is currently exploring the possibilities for licensing with a North American manufacturer. Installations are custom to the vessel and must occur in a shipyard. Thus far, all installations worldwide (60 vessels) have occurred on vessels over 100 ft LOA but the manufacturer indicated lining tubes could be installed on vessels no smaller than 60 ft LOA.

Underwater setting devices are one of the mitigation measures identified in the FAO's IPOA. The IPOA notes that the devices are still under development but could have high effectiveness (FAO 1999). Underwater setting chutes designed for pelagic longline fisheries have been tested in Australia (Brothers et al 2000) and are currently being trialed at sea. Similar tests are planned for the Hawaii pelagic longline fishery (Gilman, pers. comm.)

At the February 1999 Council meeting, NPLA provided written and oral testimony that, based on NMFS and USFWS comment, the lining tube should be studied and observed scientifically before it is required to be used by any vessels. Results from the WSGP's research program indicate that the lining tube in the 1999 cod fishery significantly reduced bycatch to levels comparable to adding weight to the groundline (Melvin et al 2001). See section 4.1.2 of this EA/RIR/IRFA for a discussion of the effects of weighted groundlines on seabird bycatch reduction. But because of design limitations (propeller turbulence bringing line to surface, line exiting prematurely from lining tube), highly variable seabird bycatch rates in other studies, and the prohibitive cost, the WSGP study concluded that the lining tube should not be viewed as a comprehensive solution to seabird bycatch in the Alaska groundfish fishery (Melvin et al

2001). WSGP investigators encouraged further development of cost-effective subsurface deployment strategies.

Night Setting

This practice has been identified worldwide as the most effective measure available and capable of virtually eliminating seabird mortality in some fishing areas (Brothers *et al* 1999a). Two recent studies that analyzed observer data from Japanese pelagic longline vessels in the Australian Fishing Zone both found that seabird bycatch rates during the day were consistently higher than the bycatch rates from sets deployed at night (Brothers et.al. 1999b, Klaer and Polacheck 1998). In contrast, a study of the tuna longline fisheries off southern Africa estimated extremely high bird bycatch rates (1.6 birds per 1,000 hooks) despite most of the sets being made at night (Ryan et al 2001). The authors note the need to investigate the level of deck-lighting during the night sets in that it is unusual for albatrosses to be caught during night sets, suggesting that light levels may have been excessive. Despite its potential efficacy, night-setting has remained relatively unpopular among fishermen. In high latitude areas, such as Alaska, night-setting is not a feasible option in the summer and current regulations do not allow it in June and July. It can pose other restrictions to smaller-sized vessels where fishing efficiency may be compromised (vessel size-related seaworthiness and catch and fuel-carrying capacity) (Brothers *et al* 1999a). Sand flea predation on target catch that occurs in certain areas when sets are left to soak for extended periods (as may be necessitated by night-setting) may also pose practical and economic problems. Day sets are typically preferred over night-setting and also allow for avoidance of gear conflicts. Night-setting is required by CCAMLR and is currently an option in Alaska and will be an option under the Australian TAP. Night-setting was a license condition in 1992 for foreign longline vessels fishing in New Zealand waters but, for unknown reasons, was removed as a requirement the following year (Duckworth 1995). Vessels in the New Zealand domestic and foreign pelagic longline tuna fishery all set voluntarily at night. Most of the vessels in the demersal longline fishery operate continuously and therefore set during the daytime also (Molloy pers. comm.).

Also important to consider when analyzing the use of night-setting is the feeding behavior of seabirds. Although most seabirds are diurnal feeders, the Laysan's albatross and the Northern fulmar are known to feed at night (NMFS 1998a) and the endangered short-tailed albatross may also forage at night (Sherburne 1993).

Night-setting is one of the mitigation measures identified in the FAO's IPOA. The IPOA notes that this method is generally recognized as being highly effective (up to 90 percent reduction in seabird bycatch), but effectiveness can vary between fishing grounds and also seasonally according to the seabirds species. Effectiveness of this measure may be reduced around the full moon (Brothers *et al* 1999a).

The WSGP study showed a profound 'time-of-day' effect on seabird bycatch both in overall magnitude and by species (Melvin et al 2001). The rate at which seabirds were caught varied significantly across time-of-day categories and was driven by fulmar bycatch. Although fulmars were the predominant species caught at night, one Laysan albatross was caught at night in each year (Melvin 2001).

One of the short-tailed albatross reported taken in the hook-and-line fishery in 1998 was observed on the haul at night (NMFS Observer Program, pers. comm.). The actual time the short-tailed albatross was hooked is not known.

The WSGP study concluded that in the North Pacific where some seabird species, including albatross, are active at night, using night-setting alone as a deterrent should be abolished (Melvin et al 2001).

Exemption for Small Vessels

At its February 1999 meeting, the Council requested that several revisions be made to the analysis document for the proposed regulatory amendment. One of the requested revisions was to provide geographic information on the interactions of hook-and-line vessels with seabirds. The Council was also interested in information about bird/vessel interactions by different vessel sizes. Industry queries have been made as to the necessity for the use of seabird avoidance measures on smaller vessels and those fishing in nearshore waters. Low abundance of seabirds, particularly albatross, has been reported by many fishermen for these nearshore areas. It is also reported that as a result of the type of fishing operations that occur on smaller-sized vessels, these vessels are much less likely to encounter and hook seabirds. Two separate figures were provided in the March 1999 draft of the EA/RIR/IRFA–a map of the generalized distribution, sightings, and incidental take of short-tailed albatross and a map showing the locations on hook-and-line hauls in the BSAI and GOA (Figures 1 and 2 in NMFS 1999a). Additional and more detailed information is provided in Figures 1 through 4 in this EA/RIR/IRFA where short-tailed albatross sightings and known takes (from a USFWS database) are indicated on a BSAI/GOA map illustrating summed pounds of sablefish and halibut harvested by different vessel length categories (NMFS-RAM IFQ database). The USFWS short-tailed albatross database is a historical database that includes all reported sightings and takes, records dating back to 1940. The fish harvest information in Figures 1 through 4 is from 1995 to April 1999 IFQ vessel landing reports from the NMFS-RAM database. The NMFS-RAM database was used because it provides vessel landing report information that can be readily accessed for different vessel length categories. Harvest records from the RAM database are also representative of harvest from smaller-sized vessels, an important distinction to consider in light of the Council's 1999 recommendation to exempt vessels less than or equal to 35 ft (10.7 m) LOA from using seabird avoidance measures.

Vessel Size Considerations: Operators of smaller vessels typically set many fewer hooks, set gear at slower speeds (which typically sinks gear at a faster rate), and land many fewer fish (therefore, less and more sporadic offal discharge) (Table 9). These characteristics have been reported to contribute to attracting fewer birds to their vessels. These reports are from operators of vessels less than 60 ft (18.3 m) LOA and therefore observers are not required on their vessels. The length of a vessel can be a factor in the distance fished from shore but smaller vessels (less than 35-40 ft LOA) are not precluded from fishing offshore, the distance often being determined by the desired target fishery.

The two short-tailed albatross takes in 1998 occurred on freezer-longliner (catcher/processor) vessels; thus an industry proposal at the Council's December 1998 meeting to require lining tubes on freezer-longliners only. Although the five most recent reported takes of short-tailed albatross have all occurred on freezer-longliners of at least 124 ft (38m) LOA (two in 1995, 1 in 1996, and 2 in 1998) (Table 5), these vessels were required to carry observers and observers reported the short-tailed albatross takes. Although no takes of short-tailed albatross have been reported from unobserved vessels less than 60 ft (18.3 m) LOA, it is not known if takes on these small vessels have actually occurred. Fishermen may be reluctant to self-report the incidental take of an endangered species given the potential implications under ESA which calls for any action causing an incidental take limit to be exceeded to cease, pending reinitiation of a section 7 consultation. Self-reporting, by itself is probably not an adequate method for monitoring protected species encounters in a fishery (USFWS, 1998).

Some evidence suggests that large vessels which provide a continuous supply of food may attract more seabirds than smaller vessels and experience a higher seabird bycatch rate (Barnes *et. al.* 1997).

Variations between vessels in the numbers of observed seabird catches appeared to be related, at least in part, to the extent to which birds accumulate around vessels. This, in turn, is a function of the length of time that offal is discarded. Smaller vessels are not as attractive to scavenging seabirds as are larger vessels, which provide a continuous supply of food. Smaller vessels fishing off the southwest cape in South Africa do not accumulate large numbers of scavenging birds, because hauling and setting periods are much shorter and erratic and the offal is only available to birds for short periods and in small quantities (Christian Boix, pers. comm.). A very preliminary analysis of seabird bycatch observer data from 1993 to 1997 suggests that the bycatch rate on freezer-longliners is twice that of catcher vessels (Appendix 6).

Taken together, this may indicate that very small vessels that typically fish closer to shore may be less likely to encounter short-tailed albatross and other pelagic seabirds that more commonly occur in offshore waters. This same type of information also provided the justification for exempting vessels less than 26 ft (7.9m) LOA from using seabird avoidance measures when regulations were originally implemented in 1997. Whereas the vast majority of fishing activity by vessels less than 25 ft (7.9 m) LOA occurs in areas that do not overlap with reported sightings of short-tailed albatrosses (Figure 1), the same cannot be said for vessels from 26 ft (7.9 m) LOA to 35 ft (10.7m) LOA (Figure 2). Vessels of this size range cannot be categorized in the same way as the less than 26 ft vessels in that a relatively greater degree of overlap occurs between fishing activity and reported sightings of short-tailed albatross. Vessels in the next 2 size categories analyzed (36 to 59 ft LOA and over 60 ft LOA; Figures 3 and 4 respectively) are more similar in that extensive overlap occurs and at greater fishing levels (i.e. summed pounds of sablefish and halibut).

In 1998, USFWS concurred with a NMFS determination that vessels less than 26 ft (7.9 m) LOA fishing with hook-and-line gear were not likely to adversely effect the endangered short-tailed albatross (USFWS 1998). The justification for exempting these vessels from some of the seabird avoidance measures was based on observations by industry that smaller vessels typically deploy less gear, use gear that sinks faster, deploy gear at slower speeds (resulting in faster sink rates), discard less offal (which attracts fewer birds), and *fish closer to shore where pelagic seabirds, including the short-tailed albatross, are less likely to be encountered* (NMFS, 1997c). In its response to NMFS, the USFWS stated that "the Service understands that hook-and-line vessels under 26 ft (7.9 m) in length that are fishing for halibut and groundfish off Alaska do not often venture far enough from shore to encounter the endangered short-tailed albatross" (USFWS 1998d).

Fishing Area Considerations: At this time, the necessary information is not available that would warrant consideration of revisions to the current regulations with regard to areas fished that could be exempt from certain seabird avoidance requirements (see Appendix 6). Current regulations do not require vessels less than 26ft (7.9m) LOA to employ all of the seabird avoidance measures. The current geographic distribution of reported takes and sightings of the short-tailed albatross includes both the BSAI and GOA (Table 12 and Figures 1 through 4). Industry queries have been made as to the necessity for the use seabird avoidance measures on smaller vessels and those fishing waters in the Southeast Inside District (NMFS Area 659), Prince William Sound (NMFS Area 649) or certain portions of IPHC Area 2C. Low abundance of seabirds, particularly albatross, has been reported by many fishermen for these areas. Operators of smaller vessels in these waters are typically setting many fewer hooks, setting gear at slower speeds (which typically sinks gear at a faster rate), landing many fewer fish (less and more sporadic offal discharge), and overall attracting fewer, if any, birds to their vessels. These reports are from operators of vessels less than 60 ft (18.3 m) LOA and therefore observers are not required on their vessels. Researchers with the WSGP also observed during their 1999 field season that halibut fishery operations

that typically occur closer to shore i.e. not on the Continental shelf break where many seabirds occur, do not appear to interact very often with seabirds (Melvin, pers. comm.).

The USFWS conducted a study in 1994 to obtain baseline data on the abundance and distribution of marine bird populations in Southeast Alaska during the summer (USFWS 1995). Surveys were conducted from small boats in the waters of Southeast Alaska in June and July 1994 and the study area extended from Haines and Glacier Bay south to Dixon Entrance. The western and southern boundaries were defined as all waters within 3nm (5.6km) of shore and the survey area included all water within these boundaries and land within 0.07 nm (100m) of shore. All survey waters were divided into two strata: shoreline and offshore. The shoreline stratum was defined as all waters within 0.1 nm (200m) of land. The offshore stratum included all water greater than 0.1 nm (greater than 200m) from shore and included about 87 percent of the study area. Of 24 marine bird species groups observed during this study, 10 were groups that have been observed as bycatch in observed hauls in the BSAI and the GOA. Fulmars, gulls, albatrosses, and shearwaters are the types of birds most commonly taken as bycatch in hook-and-line fisheries. These species groups accounted for about 24 percent of the almost 2 million marine birds estimated in the study area. None of the 3 albatross species were observed during the USFWS 1994 study. Special studies on research vessels or on commercial vessels with an observer onboard would be required to obtain pertinent seabird information for months other than those covered in the USFWS survey.

The USFWS also conducted marine bird surveys in Prince William Sound (PWS) as part of a study to determine whether species affected by the *Exxon Valdez* oil spill in 1989 were recovering (USFWS 1997). This study was unique in that it's one of the few monitoring projects that followed the population trends of marine and coastal birds for longer than a short-term basis. Long-term studies traditionally have been on a single species, usually at a colony, but this survey covered a large area and collected data on several species. USFWS conducted the surveys from boats and divided PWS into 3 strata: shoreline, coastal-pelagic, and pelagic. The shoreline stratum consisted of all waters within 200 m of land. Coastal-pelagic (nearshore) and pelagic (offshore) waters of the study area were divided into 5-minute latitude-longitude blocks; blocks with greater than 1.8 km of shoreline were classified as coastal-pelagic and those with less than 1.8 km or less of shoreline were considered pelagic. During the 1996 PWS survey, 83 total bird species were observed–41 species were sighted in March (winter populations) and 76 species were sighted in July (breeding populations). Eighteen different bird species or species groups have been observed taken in the BSAI and GOA hook-and-line fisheries from 1993 to 1997 (Table 4). Of the 18 species or species groups, 13 were sighted during the 1996 PWS marine bird survey. The 18 species or species groups can be categorized into 5 larger groups based on taxonomy and frequency of takes—fulmars, gulls, albatrosses, shearwaters, and 'other' (Table 4). Relatively similar bird species groups are taken in the BSAI and GOA hook-and-line fisheries (Figures 5 and 6)–the relative take composition is highest for the northern fulmar in both the BSAI and GOA (60% and 47% respectively) with gulls and albatrosses being the second and third largest take groups in the BSAI (17% and 5%); this order is reversed in the GOA (6% and 37%), where more albatrosses are taken. The composition is different for the bird species observed in PWS (Figure 7). No albatross species were sighted during any of the years that PWS was surveyed and relatively few northern fulmars or shearwater species were sighted in 1996 (1%, less than 1%) (Figure 4). The 'other' species category comprised the vast majority of bird species and numbers observed in the PWS. Besides the OTHR species noted in Table 4, OTHR in PWS represents a greater diversity and number of species than those that are taken in the hook-and-line fisheries of the BSAI and GOA.

At the February 1999 Council meeting, the SSC suggested that observer data from hook-and-line hauls be analyzed to determine what portion of observed hauls had seabird bycatch. For instance, the number of hauls with zero bird bycatch, the number of hauls with 1, 2, 3 birds, etc. Such an analysis of dolphin mortalities in the Pacific tuna purse seine fishery indicated that only a small number of the set/hauls accounted for the vast majority of the dolphin bycatch and most of the purse seine set/hauls accounted for very little of the dolphin bycatch. Likewise, a study of the New Zealand subantarctic squid trawl fishery found that the number of incidentally captured seabirds varied greatly among tows. The birds were not caught regularly and, in most tows, none were caught (Bartle 1991). A reanalysis of the data indicated that an average bycatch rate, as calculated in the original study, is of little value; either no birds are caught or quite a few are (Hilborn and Mangel 1997). Adverse weather was suggested as a reason why many birds may be caught in certain tows, the birds colliding with net sounder cables that they could not see. An analysis of the Alaska hook-and-line fishery bycatch data could likewise address if the seabird bycatch occurs in relatively similar patterns throughout the BSAI and the GOA or if it is "patchy". If "patchy", is the "patchiness" related to location, season, time of day, vessel type or vessel characteristics or any other obvious factors? Preliminary investigation of the 1993 to 1997 observed hook-and-line hauls indicates that 11.7 percent (6042 of 51,643 hauls) included one or more bird species and 682 hauls (1.3 percent) included an albatross species (R. Stehn pers. comm.). Additional analysis is necessary to discern other patterns in the data.

See the following section 4.1.3 for a discussion of the appropriateness of using area- and season-based management as a seabird bycatch reduction strategy. Given what is currently not known about seabird distribution, a precautionary approach is warranted and the use of measures of known effectiveness is warranted given the objective of reducing seabird bycatch of the endangered short-tailed albatross and other seabird species.

4.1.3 Effects of Alternative 3 on Seabirds

Alternative 3 is comprised of proposed regulatory changes as recommended by WSGP researchers, based on a 2-year scientific research study evaluating the effectiveness of seabird avoidance measures currently in use in the demersal hook-and-line fisheries off Alaska. The WSGP final report makes four basic types of recommendations: 1) proposed changes to existing regulations, 2) optional actions that could be included in a comprehensive seabird bycatch reduction program and that are non-regulatory in nature, 3) suggestions for future research, and 4) gear, methods, and operations which should not be allowed as seabird avoidance measures. The regulatory recommendations include some suggested guidelines to assist fishers in achieving some of the standards that would be required in regulation. Although this EA/RIR/IRFA only analyzes those alternatives that could be included in a proposed federal action, the non-regulatory components of the WSGP recommendations are presented in section 2.3 as they provide a context and setting for the regulatory components. All components are more fully described in the WSGP final report (Melvin et al 2001).

Regulatory Recommendations

A. Gear:

Based on the results of the WSGP research program, the existing requirements for seabird avoidance measures at § 679.24(e)(3) would be replaced with the following requirements. All operators of applicable vessels using hook-and-line gear must:

1. Paired Streamer Lines: Deploy a minimum of two streamer lines while setting hook-and-line gear. If both streamer lines cannot be deployed prior to the first hook, at least one streamer line

must be deployed before the first hook and both streamers must be fully deployed within 90 seconds. Exceptions: In conditions of wind speeds exceeding 30 knots (near gale or Beaufort 7 conditions), it is acceptable to fly a single streamer from the windward side of the vessel. In winds exceeding 45 knots (storm or Beaufort 9 conditions), the safety of crew supersedes deployment of streamer lines.

2. Performance Standard: Streamer lines must be deployed in such a way that streamers are in the air for a minimum of 131.2 ft (40 m) aft of the stern for vessels under 100 ft (30.5 m) and 196.9 ft (60 m) aft of the stern for vessels 100 ft (30.5 m) or over. The performance standard can be achieved in several ways: by increasing the height off the water at the stern [recommended minimum is 20 ft (6.1 m)], minimizing the weight of streamer line components, and/or increasing drag at the far end of the streamer line with combinations of drogues, weights and buoys.

3. Materials Standard: The minimum streamer line specifications are as follows:
Length: 300 feet (91.4 m)
Spacing of streamers: Every 5 meters until performance standard is achieved.
Streamer material: Brightly colored, UV-protected plastic tubing or 3/8 inch polyester line or material of an equivalent density. An individual streamer must hang from the mainline to 0.25 meters of the water in the absence of wind.
Line material: discretionary
Terminal end: discretionary
Breakaways: discretionary, but highly recommended.

B. Operations: Based on the results of the WSGP research program, the existing requirements for seabird avoidance methods at § 679.24(e)(2)(ii) would be amended to include the following for All operators of applicable vessels using hook-and-line gear:

1. Directed Discharge During the Set: Directed discharge (through chutes, pipes, or other similar devices suited for purpose of offal discharge) of residual bait or offal from the stern of the vessel while setting gear is prohibited. This does not include baits falling off the hook or offal discharges from other locations that parallel the gear and subsequently drift into the wake zone well aft of the vessel. For vessels not deploying gear from the stern (i.e. gear is deployed from the side of the vessel or amidship), directed discharge of residual bait or offal over sinking longlines while gear is being deployed is prohibited.

Recommendations of Methods Not to Use for Seabird Bycatch Reduction

A. Setting gear at night as a sole deterrent method.
B. Area- and season-based management as a seabird bycatch reduction strategy.
C. Use of single streamer lines, except as conditions prevent the use of paired streamer lines.
D. Until further investigations are undertaken to determine the optimum weighting regimes for reducing seabird bycatch and the methods to improve the practicality of line weighting, requiring that vessel operators add weight to groundlines for seabird avoidance is not recommended
E. Use of a line shooter as a seabird bycatch reduction device.
F. Use of a lining tube as a sole deterrent method.

See Appendix 1 and the WSGP Final Report "*Solutions to Seabird Bycatch in Alaska's Demersal Longline Fisheries"* (Melvin et al 2001) for a complete description of research rationale, experimental methodology, results, and recommendations.

Paired Streamer Lines

In summary, among all deterrents tested, paired streamer lines proved the most comprehensive bycatch solution. Paired streamer lines successfully reduced seabird bycatch in all years, regions, and fleets (88% to 100% relative to controls with no deterrent). In addition to reducing seabird bycatch, paired streamer lines also reduced bird abundance in the vicinity of the groundline and reduced the number of bird attacks on the groundline. Paired streamer lines were robust in a wide range of wind conditions and required little adjustment as physical conditions changed. In 2000, paired streamers virtually eliminated both Laysan albatross and northern fulmar attacks on baited hooks and completely eliminated albatross and northern fulmar bycatch.

Performance and materials standards for paired streamer lines are recommended under Alternative 3. Standards were derived from experimentation on the active commercial fishing vessels in both the IFQ sablefish and halibut fishery in the GOA and Aleutian Islands and the Pacific cod freezer-longliner fleet in the BSAI. Applying standards is intended to enhance possibly ensure the effectiveness of the paired streamer lines and improve the enforceability of regulations requiring such measures.

Single Streamer Lines

This deterrent was tested in both the sablefish and cod fisheries in 2000. WSGP results indicate that single streamer lines were slightly less effective than paired streamer lines, reducing seabird bycatch by 96% and 71% in the sablefish and cod fisheries, respectively. It is possible that differences in effectiveness would have been noticeably greater if comparisons had been made in a year of high bird interaction. In 1999, bird interaction and take rates were extremely high, relative to 2000. Single streamer lines allowed significantly more bait attacks than paired streamer lines. For instance, bait attacks by Laysan's albatross were 5 times greater for single streamer line sets than for sets with paired streamer lines. This suggests the risk of albatross bycatch remains when single streamer lines are used. Based on qualitative observations, single streamer lines appear to be ineffective under certain conditions—if flown with no wind, deployed from the center of the vessel, or from the leeward side especially in strong wind conditions (Melvin et al 2001).

Vessels that Deploy Gear from the Side or through a Lining Tube

Although the WSGP did not test the effectiveness of paired or single streamer lines directly on 'side-setting' vessels or vessels using a lining tube, tests were conducted on freezer-longliners with other similar characteristics and the results appear to be applicable to these vessels. Based on information gathered by WSGP researchers since the experiments were conducted, the use of paired streamer lines on these types of vessels appears to be warranted, practicable, and possible (E. Melvin, pers. comm.).

Five hook-and-line vessels fishing in the BSAI and/or GOA are known to deploy gear from midships ("side-set"), rather than the more common stern deployment location. Upon deployment from "side-setters", fishermen have described that the groundline travels alongside the hull of the vessel, where it appears that birds cannot easily access the baited hooks so close to the side of the vessel. Fishermen have observed that by the time the line reaches back to the stern, it is thought to have sunk to a depth not accessible by North Pacific seabirds. It has been suggested that deploying paired streamer lines from the stern of the vessel, one from either side of the stern, is not necessary when the groundline is set midships, that only a single streamer line on the same side as the setting equipment is necessary. All of

these side-setting vessels have experienced bird bycatch, some at much higher rates than the average rate of the freezer-longliner fleet in the BSAI (Table 17, Figure 12). The annual bycatch rates among these vessels is variable, with some of the highest rates in the BSAI freezer-longliner fleet. As discussed elsewhere in this EA/RIR/IRFA, many factors contribute to bird bycatch and the use of deterrent devices is not the only factor that affects the bycatch rate. Additionally, target level reductions have not been identified. Even so, given that: 1) some of these vessels experience relatively high levels of bycatch and 2) individual vessel accounting is not a current component of the seabird bycatch reduction program in Alaska, the precautionary approach would suggest that the most effective devices of known practicability are appropriate for use and could be required of the side-setting vessels. Thus, the use of paired streamer lines on side-setting vessels is reasonable and warranted.

Offal Discharge During the Set

WSGP researchers observed on some cod vessels the continual discharge of residual bait and in some cases the discharge of offal through dedicated chutes or pipes at the stern during the set, directly over baited hooks. This effectively, attracted birds into the area where baits were sinking, aggravating seabird interactions with the gear (Melvin et al 2001). Eliminating such directed discharge of residual bait or offal over sinking longlines would reduce the attractiveness of this area to birds and thus reduce the likelihood of birds attacking the bait and becoming hooked and drowning.

Strategies and Methods Not to Pursue for Seabird Bycatch Reduction

Night Setting: Night setting is also addressed in section 4.1.2, the analysis of alternative 2. The WSGP study showed a profound 'time-of-day' effect on seabird bycatch both in overall magnitude and by species (Melvin et al 2001). The rate at which seabirds were caught varied significantly across time-of-day categories and was driven by fulmar bycatch. Although fulmars were the predominant species caught at night, one Laysan albatross was caught at night in each year (Melvin 2001). The WSGP study concluded that in the North Pacific where some seabird species, including albatross, are active at night, using night-setting alone as a deterrent should be abolished (Melvin et al 2001). Night setting is permissible but must be accompanied by the required seabird avoidance measures.

Area- and season-based management as a seabird bycatch reduction strategy.

Given the apparent confounding of temporal and spatial effects on bycatch reduction noted by WSGP researchers and that the study was not designed to examine these seasonal and regional interactions, researchers were not able to discern effects on seabird bycatch associated with the area fished or time of year fished (Melvin et al 2001). As regional and seasonal closures would have significant economic effects on the fleet, a more comprehensive technical solution of known effectiveness (i.e. paired streamer lines) is preferred.

*Use of single streamer lines, except as conditions prevent the use of paired streamer lines.*See discussion of paired and single streamer lines for basis of this recommendation that single streamer lines not be used, except under certain weather conditions where deployment of two streamer lines may raise safety concerns, given the hazardous deck conditions that can arise during severe weather.

An integrated weight groundline system is not currently available from gear manufacturers. An integrated system that accounts for safety and operational concerns is preferred over a system of adding weights on to the groundline

WSGP researchers found that adding weights to the groundline had a variable effect on seabird bycatch. Researchers hypothesized that adding weights would cause the groundline to sink faster, shrinking the total distance astern that baited hooks are available to seabirds, likely resulting in fewer birds being

hooked. But operational aspects such as vessel speed at deployment and propeller turbulence bringing the line back to or near the surface could reduce or eliminate the benefits of using a weighted groundline. Additionally, in the cod fishery on freezer-longliners, the attachment of additional weight to the groundline posed a safety hazard during both deployment and retrieval (Melvin et al 2001). Researchers concluded that for weighting to be practical and effective at reducing seabird bycatch, weight must be integrated into the groundline itself rather than added at each deployment.

Use of a line shooter as a seabird bycatch reduction device.
A line shooter is designed to set lines at a speed slightly faster than the vessel's speed during setting. It is placed behind the baiting machine and ensures that the line is set slack (no tension) into the water. It is thought that if the line is set slack, it will sink faster, thus reducing the potential opportunities birds may have to access baited hooks. The line shooter tested in the 1999 cod fishery on freezer-longliners was the only deterrent which significantly increased the rate of seabird bycatch (Melvin et al 2001). Experiments conducted on longline vessels in Norway found that seabird bycatch was reduced by 59% for lines set with a line shooter (Lokkeborg 2001) but was not as efficient as bird streamer lines or an underwater setting funnel in that birds were still able to take baits. The simultaneous use of weighted lines is one possible way of improving the efficiency of the line shooter, and it is likely that less weight would be needed when the lines are set slack with no tension (Lokkeborg 2001). Given that even in this Norwegian study birds could access baits when a line shooter was used, this device is not recommended as a seabird bycatch reduction device in the Alaska demersal hook-and-line fisheries.

Use of a lining tube as a sole deterrent method.
Although the lining tube tested in the 1999 cod fishery on a freezer-longliner did significantly reduce bycatch by 79%, other studies have indicated that levels of bycatch reduction are highly variable (Melvin et al 2001). Performance of the lining tube can vary with sea conditions and the action of propeller turbulence to bring the line to or near the surface, accessible to seabirds. Improvements to underwater setting devices are currently under development. During the interim, a more comprehensive solution could be achieved by using the lining tube in conjunction with streamer lines. See section 4.1.2 and the discussion of paired and single streamer lines in this section 4.1.3 for additional information. Given that certain conditions can warrant single streamer lines ineffective, the use of paired streamer lines is warranted. See Table 17 for vessel-specific annual bird bycatch rates for the BSAI freezer-longliner fleet, including a vessel with a lining tube.

4.1.4 Effects of Alternative 4 on Seabirds

Alternative 4 depicts several modifications of the WSGP recommendations (proposed in Alternative 3) some of which were recommended by the SSC, AP, and Council at the October 2001 Council meeting. Alternative 4 addresses the use of seabird avoidance measures on smaller vessels that were not specifically addressed in the experimental regime of the WSGP research. Modifications also include components of either the existing regulatory requirements (Alternative 1) or the Council's recommendation in 1999 for seabird avoidance measures (Alternative 2).

1. Seabird avoidance measures would be required of operators of all applicable vessels (see section 2.0). Operators of vessels that are less than 26 ft (7.9 m) LOA, would still be required to comply with §679.24(e)(2) but not with §679.24(e)(3).

2. Offal Discharge Requirement: In addition to offal discharge requirements under Alternative 3, operators of applicable vessels would also be required to remove embedded hooks in offal that is to be discharged.

3. Bird Line Requirements (see Table 1a):

"Inside" Waters (Area 649, 659, state waters of Cook Inlet):

a. A minimum of 1 buoy bag line of a specified performance standard is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of 1 streamer line of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

EEZ:

a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of paired streamer lines of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

Vessels using Snap Gear:

a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels greater than 45 (13.7 m) ft LOA.

4. Performance Standards for Bird Line Requirements are as follows (Table 1a):

a. Buoy Bag Line Standard: A single streamer line (10 to 40 m length) with no streamers attached; buoy bag line to be deployed within 2m of either side of main groundline.
b. Single Streamer Standard: A single streamer line deployed in such a way that streamers are in the air for a minimum of 40 m aft of the stern and within 2m of either side of main groundline.
c. Paired Streamer Standard: Paired streamer lines deployed in such a way that streamers are in the air for a minimum of 40 m aft of the stern and within 5m of either side of main groundline.
d. Snap Gear Streamer Standard: A single streamer line (45 m length) deployed in such a way that streamers are in the air for 20 m aft of the stern and within 2m of either side of main groundline.

The performance standards can be achieved in several ways: by increasing the height off the water at the stern [recommended minimum is 20 ft (6.1 m)], minimizing the weight of streamer line components,

and/or increasing drag at the far end of the streamer line with combinations of drogues, weights and buoys.

5. Other Devices include the following:
   a. Add specified weights to groundline.
   b. Use a buoy bag line or streamer line, of specified performance standards.
   c. Strategic offal discharge to distract birds away from the setting of baited hooks: Discharge fish, fish parts (i.e. offal) or spent bait while setting gear on the opposite side of the vessel from where the gear is being set.

6. Requirements for All Operators of Applicable Vessels:
   a. Seabird avoidance devices as described above must:
      i. Be onboard in the possession of the vessel operator.
      ii. Be made available for inspection upon request by an authorized officer (USCG, NMFS Enforcement Officer or other designated official)
      iii. Meet certain specified standards.
      iv. Be used while hook-and-line gear is being deployed.
      v. A functioning and effective spare bird line must also be onboard.
   b. Seabird Avoidance Plan must be:
      i. Completed.
      ii. Onboard the vessel.
      iii. Made available for inspection upon request by an authorized officer (USCG, NMFS Enforcement Officer or other designated official).

7. Alternative 4 Option for Small Vessel Exemption in Specified Areas: Vessels 32 ft (9.8 m) LOA or less fishing halibut in IPHC Area 4E would be exempted from seabird avoidance regulations. Vessels fishing in the "internal waters" of Southeast Alaska (NMFS Area 659; Southeast Inside District), Prince William Sound (NMFS Area 649), and State waters of Cook Inlet would also be exempted.

Applicability of Regulations
See section 4.1.2 and the analysis of vessel size considerations. In 1998, USFWS concurred with a NMFS determination that vessels less than 26 ft (7.9 m) LOA fishing with hook-and-line gear were not likely to adversely affect the endangered short-tailed albatross (USFWS 1998). The justification for exempting these vessels from some of the seabird avoidance measures was based on observations by industry that smaller vessels typically deploy less gear, use gear that sinks faster, deploy gear at slower speeds (resulting in faster sink rates), discard less offal (which attracts fewer birds), and *fish closer to shore where pelagic seabirds, including the short-tailed albatross, are less likely to be encountered* (NMFS, 1997c). In its response to NMFS, the USFWS stated that "the Service understands that hook-and-line vessels under 26 ft (7.9 m) in length that are fishing for halibut and groundfish off Alaska do not often venture far enough from shore to encounter the endangered short-tailed albatross" (USFWS 1998c). Given these determinations by NMFS and USFWS and given that the WSGP study did not conduct experiments on vessels in this skiff-size range, it is not necessary that the WSGP recommendation of paired streamer lines apply to vessels less than 26 ft (7.9 m) LOA.

Offal Discharge Requirement
See section 4.1.2 and the analysis of offal discharge requirements. Alternative 3 also proposes to revise the current regulation by adding a requirement that hooks be removed from any offal (i.e. fish heads) that

are discharged. Scavenging birds can become hooked in this manner and although not immediately life-threatening, hooked birds may realize negative effects to their survival. Removing embedded hooks prior to fish heads being discharged is one of the mitigation measures identified in the FAO's IPOA (FAO 1998).

The use of offal discharge to distract seabirds away from the area of gear deployment has been reported by several commercial fishermen in Alaska. These reports come from smaller vessels where sablefish heads are hand-tossed away from the setting gear. Fishermen have indicated no foreseeable obstacles to removing hooks from fish heads prior to discharging offal. Removal of hooks from fish heads on larger processor vessels may provide an operational benefit in that damage to offal-processing equipment, caused by the grinding of hooks, could be reduced (T. Smith pers. comm.).

The WSGP study did not evaluate the effectiveness of this measure and therefore does not address it in its recommendations. When the Council identified its preferred alternative for changes to seabird avoidance measures in April 1999, they included this industry recommendation as a means to further reduce potential harm to seabirds.

Bird Line Requirements and Standards for Smaller Vessels
Because vessels greater than or equal to 26 ft (7.9 m) LOA are known to fish in areas where short-tailed albatross occur (Figures 2 and 3; see discussion in section 4.1.2), it is appropriate for vessels of this size to deploy seabird avoidance measures to prevent the incidental take of seabirds that may be encountered. Anecdotal information from operators of vessels even in the 30 to 40 ft range indicate that they have encountered seabirds while fishing and on occasion have taken them incidentally.

Some operators of smaller vessels have indicated it may be difficult and impracticable to deploy paired streamer lines. Further, some believe it may not be necessary given the nearshore or inside waters where they fish because these areas may be less frequented by short-tailed albatross and the other seabird species that are most frequently reported as incidentally taken in hook-and-line gear (Table 4). Because of small crew sizes on some of these vessels (1 to 4), lack of superstructure on skiffs to suspend streamer line poles, and operations on vessels using snap gear that require routine backing down during gear deployment, the use of paired streamer lines and in some instances even single streamer lines may prove difficult and sometimes hazardous (Table 9). It has been suggested that measures other than paired streamer lines could be deployed instead for small vessels greater than or equal to 26 ft (7.9 m) LOA.

This view was supported by the SSC comments at the October 2001 Council meeting. The SSC noted that the proposed changes to existing regulations (paired streamer lines), while appropriate and useful for reduction of seabird bycatch by the large vessels in the longline fishery, may not be appropriate for application on smaller vessels, particularly small vessels fishing in the inside waters of southeast Alaska. The SSC suggested that the inside waters of southeast Alaska are not frequented by short-tailed albatrosses at present, and therefore less stringent regulations to avoid seabird bycatch may be appropriate. The SSC identified a need for additional study of the necessity for bycatch reduction on small vessels and on the best ways to achieve this, if bycatch reduction is required. They recognized that small vessels may not be able to deploy streamer lines as specified for the larger vessels of the longline fleet. The SSC suggested that members of the small-vessel segment of the industry cooperate in developing new information, equivalent to that now available from the larger vessels on the frequency of bycatch and the most appropriate methods for bycatch reduction.

See section 4.1.2 (effects of Alternative 2) for an analysis of streamer lines, buoy bag lines, vessel size considerations, and fishing area considerations. It is not solely the vessel length that is a factor in whether or not a vessel interacts with seabirds. Vessel length is a readily measured parameter that may indicate other characteristics and parameters which also factor into the probability of a bird getting hooked. The probability of a bird being caught is a function of many interrelated factors including: type of fishing operation and gear used; length of time fishing gear is at or near the surface of the water; behavior of the bird (feeding and foraging techniques); water and weather conditions (e.g., sea state); size of the bird; availability of food (including bait and offal); and physical condition of the bird (molt, migration, health). The fishing operation and gear characteristics include: target fishery, hand vs. auto-bait, conventional vs. snap gear, crew size, bait used, setting speed, fishing day cycle, distance behind stern that gear enters waters, and height above water that gear is set (Table 9).

Vessels without superstructures have a less readily available platform for deployment of streamer lines. Effective streamer lines must be deployed from a height sufficient to suspend them over the area at the stern of the vessel where baited hooks are being deployed and sinking to fishing depth. Vessels without superstructures are often referred to as "skiffs". Skiffs could be defined as vessels without the following: a covered wheelhouse, bait shed, rigging for gear deployment, deck, berthing, and galley. Anecdotal information suggests that skiffs as described here are typically of shorter vessel lengths and fish closer to shore and/or in "inside" or "internal" waters. Given all these various factors, it is appropriate to require skiffs to use less stringent seabird avoidance measures than those proposed for larger vessels (i.e. paired streamer lines).

See section 4.1.3 (effects of Alternative 3) for an analysis of paired vs. single streamer lines. Although WSGP researchers concluded that paired streamer lines are more effective than single streamer lines, they found that under some conditions single streamer lines were effective. When flown from the windward side of the vessel in moderate wind, a single streamer line could be quite effective at deterring seabirds from sinking baits, as the streamers were located over the groundline (Melvin et al 2001). Over half (42%) of the paired streamer lines requested from a USFWS streamer line distribution program have been made by operators of vessels from 20 to 50 ft LOA (Table 22). These fishermen have not been systematically surveyed as to their efforts in deploying paired (or single) streamer lines. Some fishermen from smaller vessels have indicated their successful experiences with deploying streamer lines. Until additional information is available about deployment of streamer lines from small vessels, Alternative 4 proposes the use of a single streamer line rather than paired lines on vessels of specified lengths, fishing in specified areas, and using specified gear (Table 1a).

Bird Line Requirements and Standards in Inside Waters: Under Alternative 4, "skiff" vessels without superstructures that are greater than 26 ft to (7.9 m) 45 ft (13.7 m) LOA and fishing in "inside" waters [Prince William Sound (Area 649), Southeast Inside District (Area 659), and state waters of Cook Inlet] would be required to deploy a buoy bag line (single streamer line of 10 to 40 m length with no streamers attached) within 2 m of either side of the main groundline (Table 1a). Given the evaluation of buoy bag effectiveness (section 4.1.2) and that encountering a short-tailed albatross in these "inside" waters is not likely, these less stringent requirements are suitable for these vessels fishing in these areas. Vessels with superstructures that are greater than 26 ft (7.9 m) to 45ft (13.7 m) LOA would be required to deploy a single streamer line in such a way that the streamers are in the air for a minimum of 40 m aft of the stern and deployed with 2 m of either side of the main groundline. This is the same requirement for any vessels greater than 45 ft (13.7 m) LOA fishing in these designated inside waters.

Bird Line Requirements and Standards in EEZ Waters: Because of apparent increased likelihood of encountering short-tailed albatross and other seabirds while fishing offshore, all vessels greater than 26 ft (7.9 m) LOA using hook-and-line gear would be required to use measures in addition to those required in inside waters (Table 1a). Vessels greater than 26 ft (7.9 m) to 45 ft (13.7 m) LOA would also be required to use at least one of the following measures: added weights to groundlines, a second buoy bag line, strategic offal discharge, or a second streamer line. Adding sufficient weights to the groundline would serve to sink the gear more quickly, making the baited hooks less accessible to seabirds. Strategic offal discharge would serve to distract birds away from the setting of baited hooks. Strategic offal discharge consists of discharged fish, fish parts (i.e. offal) or spent bait while setting gear on the opposite side of the vessel from where the gear is being set. Vessels greater than 45 ft (13.7 m) to 100 ft (30.5) LOA fishing in the EEZ would be required to deploy paired streamer lines in such a way that the streamers are in the air for a minimum of 131.2 ft (40 m) aft of the stern and deployed with 5 m of either side of the main groundline.

Bird Line Requirements and Standards in EEZ Waters for Vessels using Snap Gear: See section 3.2 for a complete description of snap gear deployment. In summary, vessels deploying snap gear usually set gear at very slow speeds (1.5 to 3 knots), have small crew sizes (1 to 4), and routinely back the vessel down during gear deployment operations. The very slow setting speeds may: 1) sink bait hooks more quickly, making them inaccessible to seabirds, and 2) make it impracticable to tow a streamer line and keep the streamers aloft. Small crew sizes (particularly 1 or 2) may make it impracticable to deploy and manage single or paired streamer lines at the performance standards called for under Alternative 3. Routinely backing the vessel down to set snap gear creates potential hazardous conditions if the towed streamer line were to become entangled in the vessel's propeller. These various factors provide justification for modified requirements. "Skiff"-like vessels without superstructures that are greater than 26 ft to (7.9 m) 45 ft (13.7 m) LOA would be required to deploy a buoy bag line (single streamer line of 10 to 40 m length with no streamers attached) within 2 m of either side of the main groundline in addition to at least one other specified device (Table 1a). These devices include: added weights to groundlines, a second buoy bag line, strategic offal discharge, or a second streamer line. Vessels with superstructures that are greater than 26 ft (7.9 m) to 45ft (13.7 m) LOA would be required to deploy a single streamer line (of 45 m length) in such a way that the streamers are in the air for a minimum of 20 m aft of the stern and deployed with 2 m of either side of the main groundline. This would be the same requirement for any vessels greater than 45 ft (13.7 m) LOA that are deploying snap gear.

The SSC identified a need for additional study of the necessity for bycatch reduction on small vessels and on the best ways to achieve this, if bycatch reduction is required. They recognized that small vessels may not be able to deploy streamer lines as specified for the larger vessels of the longline fleet. The SSC suggested that members of the small-vessel segment of the industry cooperate in developing new information, equivalent to that now available from the larger vessels on the frequency of bycatch and the most appropriate methods for bycatch reduction. It would be appropriate for this information to be developed within some specified time period and then the measures for small vessels, as proposed here, be re-evaluated. During this period, the small-vessel sector of the hook-and-line industry could work with USFWS, ADF&G, and NMFS as these agencies evaluate the effectiveness of measures in the small boat fleet, occurrence of bird interactions with small boats, and potentially bird research observations on ADF&G and IPHC survey cruises.

Bird Line Requirements and Standards for Larger Vessels

As noted above in the description of proposed requirements for vessels in EEZ waters, vessels greater than 45 ft (13.7 m) to 100 ft (30.5 m) LOA fishing in the EEZ would be required to deploy paired

streamer lines in such a way that the streamers are in the air for a minimum of 131.2 (40 m) aft of the stern and deployed within 5 m of either side of the main groundline. Vessels greater than or equal to 100 ft (30.5 m) would be required to deploy paired streamer lines in such a way that the streamers are in the air for a minimum of 196.9 ft (60 m) aft of the stern and deployed within 5 m of either side of the main groundline. The requirements and standards would be the same as those proposed under Alternative 3.

Enforcement of Performance Standards
At its October 2001 meeting, the Council requested that the EA/RIR/IRFA be revised to include a discussion of monitoring and enforcement issues, with particular reference to the role of observers, performance standards for streamer lines and buoy bag lines, and the use of observer-collected seabird bycatch data to promote bycatch reduction initiatives.

Enforcement of seabird regulations is through the efforts of NMFS Enforcement and the United States Coast Guard. Additionally, observers record on a haul-by-haul basis what seabird avoidance measures are used, as reported by the vessel skipper and verified by the observer. Investigation of alleged violations of seabird regulations may include review of observer affidavits. Affidavits could be filed in instances where onboard observers witness non-compliance with federal regulations. Seabird avoidance regulations are among the milieu of federal laws and regulations that the Coast Guard enforces through the actions of its vessel boarding parties. When a Coast Guard unit boards or observes a hook-and-line vessel, queries are made as to what types of seabird avoidance measures are used.

In 2000, observers began monitoring the seabird avoidance measures that vessels deploy during the set. Observers are instructed to check the set as other duties, priorities, and schedules allow. Although, observers are not required to monitor a specified number of sets (e.g., once per set, once per 3 sets, etc.), approximately 55% of observed hauls were monitored at the time the gear was being deployed in 2000. With new seabird regulations being promulgated, there would be new requirements specifying the type of seabird avoidance gear to deploy and how it must be deployed. NMFS does not anticipate a change in the basic instructions to observers regarding data collected on seabird gear for 2002. At this time, observers would not be instructed to monitor the specific performance-based requirements set out by regulation. As time permits, observers would continue to observe the set and record whether avoidance measures are being deployed. It is expected that if an observer checks a set and the required measures are not deployed or in use, the observer would record that information in their logbook with the potential of completing an affidavit for enforcement purposes.

Effective outreach and education also serves to achieve compliance with required measures that are intended to reduce seabird bycatch. The North Pacific Groundfish Observer Program (Observer Program) will begin working directly with operators, owners, skippers, and crews of hook-and-line vessels to reduce seabird bycatch. Through an outreach program engaging the recently formed Observer Cadre and the expertise of the WSGP, WSGP will provide training for Cadre members on the proper deployment of streamer lines and on vessel-specific factors that may affect seabird bycatch. These staff will then be available, on a limited basis, to participate in cruises with selected longline vessels. The outreach program will cooperate with owners of vessels with higher than average bird bycatch to deploy staff for at-sea training of vessel crew. NMFS also hopes to deploy staff to some vessels with little or no bycatch, to explore how they are successful in avoiding seabird bycatch. Through this work, NMFS in a contractual partnership with WSGP intends to assist industry in improving the use of seabird avoidance measures and reducing seabird bycatch.

NMFS Enforcement investigations of alleged fishery regulation violations utilize a variety of information sources that include but are not limited to: vessel inspections at the dock, observer affidavits, and agent interviews. Investigative material is gathered and considered in an appropriate context. Performance standards can assist in these efforts if they provide objective and measurable criteria. Such standards can remove the element of subjectivity that may arise in the absence of clear, direct, and objective criteria. Effective enforcement relies on good enforcement policy and is aided by well-written regulations that are understood by fishery managers, observers, fishers, Enforcement officers, and US Coast Guard officers. Given the appropriate context and setting, it is likely that minor variations from the objective performance standards (e.g., 100 sec vs 90 sec to deploy both streamer lines) may not warrant an enforcement action. More blatant, intentional, and egregious modifications or omissions (e.g., a second streamer line is never deployed, or deployed 10 min after the longline is set) could justify an enforcement action. Of course, such determinations would be made on a case-by-case basis. To prosecute violations of performance standards, evidence will be required in the form of observer affidavits, witness violations from other vessels or aircraft overflights, or confessions of violators.

Requirement for a Seabird Avoidance Plan
Alternative 4 would require all vessels required to use seabird avoidance measures to also complete a Seabird Avoidance Plan. The Plan would primarily serve to highlight the importance of the seabird bycatch issue and heighten awareness of all crew members onboard vessels using hook-and-line gear and required to use measures to avoid seabirds. The Plan would consist of form that includes but is not limited to the following fields: Name of vessel, skipper, crew members; types of seabird avoidance measures used on board the vessel; where gear and spare gear is stored; name(s) of crew responsible for deploying, adjusting, and monitoring seabird gear; instructions/description detailing how the seabird gear is deployed. For instance, the description could provide the sequence of events of the deployment of the seabird and hook-and-line gear. The vessel skipper would be responsible for the completion of the Plan and his/her signature would indicate that all crew members had read the Plan and were familiar with it. The Plan must be made available for inspection upon request by an authorized officer (USCG, NMFS Enforcement Officer or other designated official).

Option for Small Vessel Exemption
At its October 2001 meeting, the Council requested that Alternative 4 be revised to include the following option: Vessels 32 ft (9.8 m) LOA or less fishing halibut in IPHC Area 4E would be exempted from seabird avoidance regulations. Vessels fishing in the "internal waters" of Southeast Alaska (NMFS Area 659; Southeast Inside District), Prince William Sound (NMFS Area 649), and State waters of Cook Inlet would also be exempted.

See section 4.1.4 and the subheading *"Bird Line Requirements and Standards for Smaller Vessels*" for a complete analysis of the effects of smaller vessels, including those less than 32 ft (9.8 m) LOA and fishing area considerations for smaller vessels. As noted previously, because vessels greater than or equal to 26 ft (7.9 m) LOA are known to fish in areas where short-tailed albatross occur (Figures 2 and 3; see discussion in section 4.1.2), it is not appropriate for vessels less than 32 ft (9.8 m) LOA to be exempt from requirements for seabird avoidance measures. Information is not currently available to suggest why vessels fishing in areas designated under this option (IPHC Area 4E, NMFS Areas 649 and 659, and State waters of Cook Inlet) should be exempt from seabird avoidance measures altogether. Given the various characteristics of vessels this size, it is appropriate to consider the use of less stringent measures that are more suited to the specific conditions and operations of vessels in this size range.

4.2 Summary of the Effects of the Alternatives on Seabirds

The proposed alternatives address revisions to seabird avoidance measures, all above-water or near-surface modifications to hook-and-line fishing operations. The parts of the biological environment that may be potentially affected by each alternative are: endangered species (short-tailed albatross) and other non-target species (numerous seabird species). The effect on a part of the environment could be either direct or indirect and beneficial or adverse. All of the alternatives could have a direct effect on seabird species. The objective of a regulatory change is to improve the effectiveness of the seabird avoidance measures required of the vessels using hook-and-line gear off Alaska. Although this analysis does not quantitatively compare the potential beneficial effects of each of the alternatives, a qualitative assessment can be made.

The effects of incidental take of seabirds under the status quo alternative (Alternative 1) were described in the draft Programmatic SEIS (NMFS, 2001a) and the SSL Protection Measures SEIS (NMFS, 2001b). It's possible that the highly variable numbers of northern fulmars at one of the BSAI colonies in recent years are related to variable environmental conditions during the summer months. But, if a majority of the fulmars taken annually in the hook-and-line fishery originate from one colony (such as St. George), and if a substantial proportion of the catch is adult birds, then it's possible that fishery bycatch could be contributing to recent declines monitored at St. George. Conversely, if the count on St. George in 1992 was anomalously high, the apparent subsequent 'decline' is relatively meaningless in terms of actual population impacts. The effect of incidental take on northern fulmars at the GOA colonies is probably insignificant. Until further information is available, the impact of the incidental take on BSAI fulmar colonies is unknown. The incidental take of fulmars in the BSAI could be significant at a population and/or colony level if the bycatch is predominantly coming from St. George and if a substantial proportion of the bycaught birds are adults. The impact of the incidental take in the BSAI and GOA groundfish fisheries on all other seabird species besides fulmars is probably insignificant at the population level.

Based on 1993 to 1999 data, it has been recently estimated that two short-tailed albatross are probably taken in the BSAI hook-and-line fisheries every year and none in the GOA hook-and-line fisheries (Tables 2a and 2b). At the current population level and the continuing 7-8% annual growth rate, the level of mortality resulting from hook-and-line fisheries is not thought to represent a threat to the species' continued survival, although it likely is slowing the recovery (NMFS, 2001a). Because of its critically small population size, the hook-and-line mortality of short-tailed albatrosses is a conservation concern. The expected result of hook-and-line fishing activity in 1999 and 2000 was the continuation of a lower population growth rate than that which would have occurred in the absence of fishery related mortality. Some of these measures (single streamer line, night setting, lining tube) were found to be not as effective as other measures tested in the WSGP research study (see Appendix I; Melvin et al 2001). Estimates are not available of how effective all of the current measures are, other than to consider the bird catch rates or numbers taken, and it is not evident at this time if the annual and area variation is related to use of the measures (first required in 1997) or to other factors. Current measures, as they continue to be developed and improved, are expected to further reduce the likelihood of adverse effects on short-tailed albatross. Given all of these factors, Alternative 1 is determined to have conditionally significant adverse effects on the short-tailed albatross with respect to incidental take.

Because Alternative 2 includes seabird avoidance measures that are either known to have been in use when a short-tailed albatross take occurred, or measures that are known to be less effective than others, the effect of Alternative 2 on the incidental take of seabirds is not believed to be different than the effect of Alternative 1.

Although not an ESA-listed species, the black-footed albatross is of some concern because some of the major colony population counts may be decreasing or of unknown status. The current world population is estimated at 300,000 (NMFS, 2001e). This species is classified as 'vulnerable' under the international classification criteria of the IUCN. The combined annual estimated take of black-footed albatrosses in the BSAI and GOA groundfish hook-and-line fisheries is an insignificant impact to the black-footed albatross population. But mortality also occurs in other domestic longline fisheries and may be assumed to occur in other Pacific Rim nations. Thus, it is possible that even though the bycatch from the BSAI and GOA groundfish hook-and-line fisheries accounts for a very small portion of the total that is estimated to potentially occur in the North and Central Pacific fisheries, it could contribute to a significant cumulative effect on the black-footed albatross. Given all of these factors, Alternatives 1 and 2 are determined to have conditionally significant adverse effects on the black-footed albatross with respect to incidental take.

Alternative 3 includes seabird avoidance measures known to be effective at reducing seabird bycatch. Given the greater effectiveness of these measures, Alternative 3 provides greater benefit to seabirds than does Alternatives 1 and 2. Alternative 4 proposes modified seabird avoidance measures based on vessel characteristics and fishery locations that are believed to be appropriate in these situations where the likelihood of interacting with short-tailed albatross and other seabird species is reduced. Therefore, the effects of Alternative 4 would not differ measurably from those of Alternative 3.

Effects of the Alternatives on Incidental Take of Seabird Species

Species/Species Groups	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Northern Fulmar				
Incidental take–BSAI	U	U	I	I
Incidental take–GOA	I	I	I	I
Short-tailed Albatross				
Incidental take	CS-	CS-	I	I
Other Albatrosses & Shearwaters				
Incidental take	CS-	CS-	I	I
Gulls				
Incidental take	I	I	I	I

S = Significant, CS = Conditionally Significant, I = Insignificant, U = Unknown, + = positive, - = negative

5.0 CUMULATIVE IMPACTS

Cumulative effects are defined in federal regulations as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant action taking place over a period of time" (40 CFR 1508.7). In this case changes in management of the Alaskan groundfish fisheries represent sequential actions that may, or may not, overlap in time. Each policy change contributes an increment to the total cumulative effect, while working in combination with the effects of other fisheries, other human activities, and natural phenomena (NMFS 2001a).

A detailed discussion of cumulative effects of the status quo fisheries on seabirds is in section 4.13 of the draft SEIS (NMFS 2001a) and section 4.13.8 of the SSL Protection Measures SEIS (NMFS, 2001b). The draft SEIS cumulative effects analyses described the potential direct and indirect effects of each alternative, identified external factors that may have additive or synergistic effects, and evaluated the significance of the effects.

5.1 Biological Cumulative Effects

The following summary table is based upon information in the cumulative effects section of the draft SEIS (NMFS 2001a) and the draft SSL Protection Measures SEIS (NMFS, 2001b). The rationale for deciding if an effect is significant or not is presented for each environmental category in the draft SEIS and is not repeated here. Each category was divided into areas of effect. If any area was determined to have an effect, the category in Table 5.1 is shown to be either conditionally significant (CS) or not significant (NS). A minus sign indicated an adverse effect.

Section 4.3.3 of the Draft Programmatic SEIS (NMFS, 2001a) provided rationale for the consideration of potential direct and indirect fishery effects on different seabird taxonomic groups. This analysis displays only those effects that are additional and/or attributable to promulgation of revised regulations for seabird avoidance measures in the hook-and-line fisheries off Alaska to reduce bycatch of the short-tailed albatross (*Phoebastria albatrus*) and other seabird species. The environmental issues include: direct effects of gear use and entanglement/entrapment of non-target organisms in active fishing gear. The intended effect of the proposed regulatory amendment is to reduce the direct effect of hook-and-line gear on seabirds and to reduce the incidental catch of seabirds in this gear. The proposed seabird avoidance measures in hook-and-line gear are not likely to indirectly affect the biological, physical, and chemical environment, thus an analysis of indirect effects is not warranted.

The seabird taxonomic groups represented in observed hook-and-line hauls are listed in Table 4. Those most likely to be directly impacted by incidental take in hook-and-line gear were identified in section 4.3.3 of the draft Programmatic SEIS (NMFS, 2001a). These species or species groups are: northern fulmar, gulls (glaucous-winged, glaucous, herring), shearwaters (sooty and short-tailed), and albatrosses (Laysan's, black-footed, and short-tailed). Other seabird species present in the project area, including the threatened spectacled eider and Steller's eider, are not likely to be incidentally taken in hook-and-line gear.

Analysis of Cumulative Effects for Alternatives 1 - 4

Past Internal and External Effects

The following discussion on past effects is excerpted from the Draft Programmatic SEIS (NMFS, 2001a). Past management decisions (FMP amendments) have focused on reducing the amount of seabird bycatch by instituting an observer program in the foreign and domestic fisheries. The program collects quantitative data for decision makers on actual species affected and catch rates (BSAI amendments 13, 27, 37 and GOA amendments 18 and 30). Directed fisheries on forage fish, important food sources for many species of fish-eating seabirds such as fulmars, albatross, shearwater, murres and kittiwakes were prohibited in order to prevent adverse effects on these seabirds (BSAI amendment 36 and GOA amendment 39).

Foreign fisheries have operated in the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) from the 1940s to the 1980s. Throughout this period, seabird bycatch or entanglement in fishing gear was an undesired aspect of these fisheries.

Seabird bycatch became a major concern for these seabirds, especially in the high seas Japanese drift gillnet fisheries operating in the western North Pacific south of the Aleutian Islands and in the western Bering Sea (NRC 1996). Seabird bycatch levels in the 1970s ranged from 700,000 in the early 1970s to 400,000 birds annually in the mid 1970s (King et al. 1979). The bycatch was believed to be reduced in the late 1980s with the exclusion of these fisheries from the U.S. Exclusive Economic Zone (EEZ) (DeGange and Day 1991). Ghost nets from this fishery also likely impacted many seabird species. Fulmars were undoubtedly lost to these fisheries but precise numbers killed or overall effects on the population are not known.

Past International Pacific Halibut Commission (IPHC) halibut fisheries and state-managed hook-and-line and pot fisheries also had some level of negative effect on fulmars due to entanglement with gear and vessel collisions, but overall effects were likely much less than those due to the groundfish fisheries.

Long-term and short term climate change and regimes shifts have very likely affected fish-eating seabirds fulmar populations in the past. The extent of these effects on seabirds is discussed in the Draft Programmatic SEIS (NMFS, 2001a --Appendix J, Section 1.2) but actual effects on individual species is largely unknown.

Present and Predicted External Effects

External effects associated with Alternative 1 are depicted on Table 4.13-32 of the SSL Protection Measures SEIS (NMFS, 2001b). Most of these effects are the same as those described above with the exception of foreign fisheries (Japanese high seas drift nets fisheries) that are no longer of major concern. The external effects do not change by alternative because these effects are external to the groundfish fishery. They are repeated on Table 4.13-32 for each alternative in order to a allow an individual analysis of that alternative.

Cumulative Effects

The cumulative effects analysis in the following paragraphs is summarized in Table 4.13-32 of the SSL Protection Measures SEIS (NMFS, 2001b):

- **Incidental Take/Entanglement:** Past adverse external effects on fulmars include incidental take in foreign and joint venture fisheries, state-managed fisheries and IPHC managed halibut fisheries.

Present external factors also contribute to the overall mortality of seabirds including foreign fisheries, other state-managed hook-and-line fisheries (cod, sablefish, rockfish), and halibut fisheries (57 individual in 1998, IPHC 1999). Based on the Draft Programmatic SEIS (NMFS 2001a) analysis and given the estimates of seabird incidental catch in the groundfish fisheries using hook-and-line gear and of seabird populations in Alaska (NMFS, 2001a, Table 3.3-6), the effects of incidental take were considered insignificant to seabird populations as a whole. The Draft Programmatic SEIS (NMFS, 2001a) concluded that northern fulmars were the only species showing a positive linear relationship between fishing effort and numbers of birds hooked. This relationship did not exist for other bird groups (albatrosses, gulls, shearwaters). Approximately 10,000 fulmar are taken as bycatch each year but this is rated as insignificant at the population level.

Incidental take of northern fulmars is found to be cumulative based on the effects of the groundfish fisheries and the external factors of other fisheries. The cumulative effect of incidental take/entanglement under Alternative 1 is considered to be insignificant based on the very large numbers of fulmar in the north Pacific (over one million pair in Alaska). Effect are considered insignificant in the GOA and unknown in the BSAI. The impact of the incidental take in the BSAI and GOA groundfish fisheries on all other seabird species besides fulmars is considered insignificant at the population level.

Present and predicted external effects are identified for incidental take of albatross by foreign fisheries, State-managed fisheries, and the IPHC halibut fisheries. The combined annual estimated take of black-footed albatrosses in the BSAI and GOA groundfish hook-and-line fisheries is 239 birds. External effect from take in other fisheries in other parts of its range in Pacific have indicated that this take could be contributing to conditionally significant negative effect on the population (Section 4.1 of this analysis).

Take of the endangered short-tailed albatross is considered to be a cumulative effect. While very few albatross are taken incidentally in the groundfish fishery, due to the critically small population size of this endangered species, any hook-and-line mortality is of concern. Alternatives 1 and 2 would have conditionally significant adverse effects on the short-tailed albatross with respect to incidental take. Based on new information about the effectiveness of seabird avoidance measures as studied in a WSGP research program, the measures proposed in Alternative 3 and possibly Alternative 4 are very likely to greatly reduce the incidental catch of short-tailed albatross, thus the effects of these alternatives on short-tailed albatross is insignificant.

Because of the potential take occurring outside of Alaska fisheries, the incidental take is considered to be a conditionally significant negative cumulative effect across all alternatives. To the extent that measures under Alternative 3 are adopted in foreign fisheries, the potential effects on short-tailed albatross would be greatly reduced and insignificant.

Spectacled and Steller's eiders are not likely to be directly affected by the BSAI and GOA groundfish fisheries therefore any effects of incidental take are insignificant (NMFS, 2001a). Incidental take of eiders was found to not be cumulative based on a lack of internal effects from the groundfish fisheries.

Cumulative Effect of Incidental Take on Species/Species Groups	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Northern Fulmar–BSAI	U	U	I	I
Northern Fulmar–GOA	I	I	I	I
Short-tailed Albatross	CS-	CS-	CS-	CS-
Other Albatrosses & Shearwaters	CS-	CS-	CS-	CS-
Gulls	I	I	I	I

S = Significant, CS = Conditionally Significant, I = Insignificant, U = Unknown, + = positive, - = negative

6.0 REGULATORY IMPACT REVIEW

6.1 Introduction

This Regulatory Impact Review (RIR) evaluates the proposed the revisions to regulations for seabird avoidance measures in the hook-and-line fisheries off Alaska to reduce the incidental catch (i.e. bycatch) of the short-tailed albatross (*Phoebastria albatrus*) and other seabird species. This action will revise existing regulations that apply to the groundfish fisheries and the Pacific halibut fishery off Alaska.

6.1.1 Statutory authority

Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ), which extends between 3 and 200 nautical miles from the baseline used to measure the territorial sea. The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the Regional Fishery Management Councils. In the Alaska region, the North Pacific Fishery Management Council (Council) has the responsibility to prepare fishery management plans (FMPs) for the marine fisheries it finds that require conservation and management. The National Marine Fisheries Service (NMFS) is charged with carrying out the federal mandates of the Department of Commerce with regard to marine fish.

The groundfish fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 miles offshore) off Alaska are managed under the Fishery Management Plan for the Groundfish Fisheries of the Gulf of Alaska and the Fishery Management Plan for the Groundfish Fisheries of the Bering Sea and Aleutian Islands Area. Both fishery management plans (FMPs) were developed by the North Pacific Fishery Management Council (Council). The Gulf of Alaska (GOA) FMP was approved by the Secretary of Commerce and became effective in 1978 and the Bering Sea and Aleutian Islands Area (BSAI) FMP became effective in 1982.

Management of the Pacific halibut (hereafter halibut) fishery in and off of Alaska is based on an international agreement between Canada and the United States–the "Convention between United States of America and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea," signed at Ottawa, Canada on March 2, 1953, and amended by the "Protocol Amending the Convention," signed at Washington, D.C., March 29, 1979. This Convention, administered by the International Pacific Halibut Commission (IPHC), is given effect in the United States by the Northern Pacific Halibut Act of 1982 (Halibut Act), P.L. 97-176, 16 U.S.C. 773c(c) the Halibut Act. Generally, fishery management regulations governing the halibut fisheries are developed by the IPHC and recommended to the U.S. Secretary of State. When approved, these regulations are published by NMFS in the Federal Register as annual management measures. For 2001, the annual management measures were published March 21, 2001 at 66 FR 15801.

The Halibut Act authorizes the regional fishery management councils having authority for the geographic area concerned to develop regulations governing the halibut fishery in U.S. portions of Convention waters that would apply to nationals or vessels of the U.S. Such an action by the Council is limited only to those regulations that (a) are in addition to and not in conflict with IPHC regulations, (b) must be approved and implemented by the Secretary and (c) any allocation of fishing privileges must be fair and equitable and consistent with other applicable Federal law.

Actions taken to amend fishery management plans or implement other regulations governing the groundfish fisheries and halibut fishery must meet the requirements of Federal laws and regulations. In addition to the Magnuson-Stevens Act and the Halibut Act, the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Executive Order (E.O. 12866), the Regulatory Flexibility Act (RFA), and the American Fisheries Act (AFA).

6.1.2 Regulatory Impact Review (RIR)

This Regulatory Impact Review (RIR) provides the analysis required under Executive Order (E.O.) 12866. The following statement from the E.O. summarizes the requirements of an RIR:

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

Executive Order 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant". A "significant regulatory action" is one that is likely to:

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

3 Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

6.1.3 Purpose of and Need for the Action

The purpose of this federal action is to revise the existing seabird avoidance regulations based on results from a two-year scientific research program on the effectiveness of seabird avoidance measures currently used in the hook-and-line fisheries off Alaska (see Appendix 1). Concerns exist relating to the incidental catch of the endangered short-tailed albatross and other seabird species in the hook-and-line fisheries off Alaska. A Biological Opinion issued by the USFWS (USFWS, 1999) requires that NMFS investigate the effectiveness of seabird avoidance measures currently used in Alaska's hook-and-line groundfish fishery. If so warranted by the research results, NMFS is required to modify the existing seabird avoidance

regulations to improve the effectiveness of measures or devices which are required, and minimize the likelihood of short-tailed albatross mortalities.

The objective of the action is to revise the current seabird avoidance requirements to improve their effectiveness at reducing the bycatch of short-tailed albatrosses and other seabird species. This could be achieved by: 1) providing improved requirements for the construction and/or deployment of measures, 2) adding new measures, and/or 3) deleting current measures.

NMFS issued final regulations for seabird avoidance measures in the GOA and BSAI groundfish hook-and-line fisheries on April 29, 1997 (62 FR 23176) and in the Pacific halibut fishery off Alaska on March 6, 1998 (63 FR 11161). The current seabird avoidance regulations apply to operators of Federally-permitted vessels fishing for groundfish with hook-and-line gear in the GOA and the BSAI, and Federally-permitted vessels fishing for groundfish with hook-and-line gear in waters of the State of Alaska that are shoreward of the GOA and the BSAI, and to operators of vessels fishing for Pacific halibut in U.S. Convention waters off Alaska. Currently, all applicable hook-and-line fishing operations must be conducted in the following manner:

1. Use hooks that when baited, sink as soon as they are put in the water.

2. If offal is discharged while gear is being set or hauled, it must be discharged in a manner that distracts seabirds from baited hooks, to the extent practicable. The discharge site on board a vessel must either be aft of the hauling station or on the opposite side of the vessel from the hauling station.

3. Make every reasonable effort to ensure that birds brought aboard alive are released alive and that wherever possible, hooks are removed without jeopardizing the life of the bird.

4. For a vessel longer than or equal to 26 ft (7.9m) length overall (LOA), the operator of the vessel must employ one or more of the following seabird avoidance measures:

    a. Tow a streamer line or lines during deployment of gear to prevent birds from taking hooks;

    b. Tow a buoy, board, stick or other device during deployment of gear at a distance appropriate to prevent birds from taking hooks. Multiple devices may be employed;

    c. Deploy hooks underwater through a lining tube at a depth sufficient to prevent birds from settling on hooks during deployment of gear; or

    d. Deploy gear only during the hours specified in regulation ["hours of darkness" §679.24(e)(3)(iv)], using only the minimum vessel's lights necessary for safety.

6.1.4 Description of the Alternatives

The process undertaken by NMFS (and the Council) to develop alternatives and a preferred action is treated in Section 2.0 of the EA (above). The objective of this action is to revise the current seabird avoidance requirements to improve their effectiveness at reducing the bycatch of short-tailed albatrosses and other seabird species. This could be achieved by: 1) providing improved requirements for the

construction and/or deployment of measures, 2) adding new measures, and/or 3) deleting current measures.

Applicability of All Alternatives

Management of the Federal groundfish fishery located off Alaska in the 3-200 nm U.S. EEZ is conducted under the BSAI and GOA FMPs. The State of Alaska manages groundfish fisheries off Alaska from 0 to 3 nm. State groundfish management occurs either through its fishery management plans or as "parallel" fisheries. Parallel groundfish fisheries refer to groundfish harvests in State waters that are managed concurrently with federal season openings and closures. Harvests from these parallel fisheries are accounted for under the federal TACs. See section 3.10 of the Draft SSL Protection Measures SEIS for additional detail about the state-managed fisheries (NMFS, 2001b). Management of the IFQ and CDQ halibut fishery occurs in U.S. Convention waters off Alaska, which is from 0-200 nm offshore.

As noted previously, the current seabird avoidance regulations apply to operators of Federally-permitted vessels fishing for groundfish with hook-and-line gear in the GOA and the BSAI, and Federally-permitted vessels fishing for groundfish with hook-and-line gear in waters of the State of Alaska that are shoreward of the GOA and the BSAI, and to operators of vessels fishing for Pacific halibut in U.S. Convention waters off Alaska. Since the inception of requirements for seabird avoidance measures off Alaska, NMFS has intended for all hook-and-line vessel operators at risk of incidentally taking short-tailed albatross and/or other seabird species to use these measures, regardless of geographic area fished (i.e. EEZ, state waters, inside waters) or target fishery (i.e. groundfish, halibut, IFQ, CDQ). As new information becomes available the applicability of the requirements could be revised as appropriate. To more closely reflect the respective fishery management authorities and policies of federal and state governments, regulations implementing any of the alternatives would apply to operators of vessels fishing for:

1. Pacific halibut in the IFQ and CDQ management programs (0 to 200 nm),
2. IFQ sablefish in EEZ waters (3 to 200 nm) and waters of the State of Alaska (0 to 3 nm), except waters of Prince William Sound and areas in which sablefish fishing is managed under a State of Alaska limited entry program (Clarence Strait, Chatham Strait), and
3. Groundfish (except IFQ sablefish) with hook-and-line gear in the U.S. EEZ waters off Alaska (3-200 nm).

The IFQ and CDQ federal management programs have a consistent and comprehensive history of application of federal regulations in state waters. The federal management of the groundfish resource off Alaska has a long history of cooperation with the State of Alaska. The Council, USFWS, and NMFS could pursue adoption of seabird avoidance regulations by the State of Alaska for hook-and-line fisheries for groundfish in State waters. At its March 2002 meeting, the Alaska Board of Fisheries (Board) will consider a Board-generated proposal that would change state groundfish regulations to parallel federal regulations governing seabird avoidance measure requirements for operators in hook-and-line fisheries.

Under any of the alternatives, existing regulations would be revised to clarify that seabird avoidance regulations apply as originally intended to all operators of vessels of a specified length that are fishing in U.S. Convention waters off Alaska for Pacific halibut, whether under the auspices of the IFQ program or the more recently developed CDQ program. At the time the seabird avoidance measures were required in the Pacific halibut fishery (63 FR 11161 March 6, 1998), the fixed gear halibut CDQ allocations were managed as part of the IFQ program and implementing regulations were found at Part 679 Subpart D (§

679.40). In 1999, regulations governing halibut CDQ fishing were revised to clarify which elements of the halibut IFQ regulations applied to the halibut CDQ fishery (64 FR 20210 April 26, 1999). These regulations are found at Part 679 Subpart C (§ 679.30) and inadvertently did not include reference to the seabird avoidance gear and methods requirements.

This EA/RIR/IRFA considers the following alternatives:

Alternative 1: No Action: No change in the current Federal requirements for seabird avoidance measures.

Alternative 2: Revisions to existing regulations, based on the Council's final action in April 1999.

All operators of applicable vessels greater than 35 ft (10.7m) LOA using hook-and-line gear would conduct fishing operations in the following manner:

1. Use groundlines which are weighted to cause the baited hooks to sink out of reach of seabirds immediately after the groundline is set;

2. If offal is discharged while gear is being set or hauled, it must be discharged in a manner that distracts seabirds from baited hooks, to the extent practicable. The discharge site on board a vessel must either be aft of the hauling station or on the opposite side of the vessel from the hauling station. Hooks must be removed from any offal (i.e. fish heads) that is discharged; and

3. Make every reasonable effort to ensure that birds brought aboard alive are released alive and that wherever possible, hooks are removed without jeopardizing the life of the bird.

4. Employ one of the following seabird avoidance measures:

    a. Tow a bird scaring line during deployment of the gear to prevent birds from taking baited hooks. The bird scaring line would be towed directly over the baited hooks and would be of a sufficient length and attached to the vessel at a sufficient height to protect the entire area behind the stern of the vessel where baited hooks are accessible to seabirds. If multiple bird scaring lines are used, they would be immediately adjacent, on each side, of the groundline bearing the baited hooks. Towed buoy bags, float devices, or bird streamer lines would qualify as bird scaring lines if they are properly constructed to effectively deter and prevent seabirds from accessing baited hooks. Towing a board or stick during deployment of gear no longer would qualify as an acceptable seabird avoidance measure.

    b. In addition to 4a above, deploy hooks underwater through a lining tube at a depth sufficient to prevent birds from settling on hooks during deployment of gear.

    c. Deploy gear only during the hours specified in regulation ["hours of darkness" §679.24(e)(3)(iv)], using only the minimum vessel's lights necessary for safety.

In summary, Alternative 2 would explicitly specify that weights must be added to the groundline. Currently, the requirement is that baited hooks must sink as soon as they enter the water. It is assumed that fishermen are weighting the groundlines to achieve this performance standard. The offal discharge regulation would be amended by requiring that prior to any offal discharge, embedded hooks must be removed. Streamer lines and towed buoy bags and float devices may all qualify as bird scaring lines. Specific instructions are provided for proper placement and deployment of bird scaring lines. Towed boards and sticks would no longer qualify as seabird avoidance measures. The use of bird scaring lines would be required in conjunction to using a lining tube. Night-setting would continue to be an option and would not require the concurrent use of a bird scaring line.

Alternative 3: Revisions to existing regulations, based on recommendations from a two-year scientific research study conducted by the WSGP on the effectiveness of seabird avoidance measures used in hook-and-line fisheries off Alaska.

The WSGP final report makes four basic types of recommendations: 1) proposed changes to existing regulations, 2) optional actions that could be included in a comprehensive seabird bycatch reduction program and that are non-regulatory in nature, 3) suggestions for future research, and 4) gear, methods, and operations which should not be allowed as seabird avoidance measures . The regulatory recommendations include some suggested guidelines to assist fishers in achieving some of the standards that would be required in regulation. Although this EA/RIR/IRFA only analyzes those alternatives that could be included in a proposed federal action, the non-regulatory components of the WSGP recommendations are presented here as they provide a context and setting for the regulatory components. These other components are more fully described in the WSGP final report (Melvin et al 2001).

I. Regulatory Recommendations

A. Gear:

Based on the results of the WSGP research program, the existing requirements for seabird avoidance measures at § 679.24(e)(3) would be replaced with the following requirements. All operators of applicable vessels using hook-and-line gear must:

1. Paired Streamer Lines: Deploy a minimum of two streamer lines while setting hook-and-line gear. If both streamer lines cannot be deployed prior to the first hook, at least one streamer line must be deployed before the first hook and both streamers must be fully deployed within 90 seconds. Exceptions: In conditions of wind speeds exceeding 30 knots (near gale or Beaufort 7 conditions), it is acceptable to fly a single streamer from the windward side of the vessel. In winds exceeding 45 knots (storm or Beaufort 9 conditions), the safety of crew supersedes deployment of streamer lines.

2. Performance Standard: Streamer lines must be deployed in such a way that streamers are in the air for a minimum of 131.2 ft (40 m) aft of the stern for vessels under 100 ft (30.5 m) and 196.9 ft (60 m) aft of the stern for vessels 100 ft (30.5 m) or over. The performance standard can be achieved in several ways: by increasing the height off the water at the stern [recommended minimum is 20 ft (6.1 m)], minimizing the weight of streamer line components, and/or increasing drag at the far end of the streamer line with combinations of drogues, weights and buoys.

3. Materials Standard**:** The minimum streamer line specifications are as follows:

_____*Length*: 300 feet (91.4 m)

_____*Spacing of streamers*: Every 5 meters until performance standard is achieved.

Streamer material: Brightly colored, UV-protected plastic tubing or 3/8 inch polyester line or material of an equivalent density. An individual streamer must hang from the mainline to 0.25 meters of the water in the absence of wind.
Line material: discretionary
Terminal end: discretionary
Breakaways: discretionary, but highly recommended.

B. Operations: Based on the results of the WSGP research program, the existing requirements for seabird avoidance methods at § 679.24(e)(2)(ii) would be amended to include the following for All operators of applicable vessels using hook-and-line gear:

1. Directed Discharge During the Set: Directed discharge (through chutes, pipes, or other similar devices suited for purpose of offal discharge) of residual bait or offal from the stern of the vessel while setting gear is prohibited. This does not include baits falling off the hook or offal discharges from other locations that parallel the gear and subsequently drift into the wake zone well aft of the vessel. For vessels not deploying gear from the stern (i.e. gear is deployed from the side of the vessel or amidship), directed discharge of residual bait or offal over sinking longlines while gear is being deployed is prohibited.

II. Non-regulatory Recommendations
Based on qualitative observations from the WSGP research program, the following actions are recommended for the purposes of: minimizing seabird interactions with hook-and-line gear, promoting stewardship within the fishing fleet, and addressing seabird bycatch at national and international levels;

A. Gear
1. Hand-Bait Chutes: Develop methods to deploy weights in a way that prevents longlines from going taut while setting gear. Actions might include a modification to the chute by adding a setting shelf that would prevent the need to lift weights from the deck up the full height of the chute thereby minimizing tension to deployed gear.
2. Auto-Bait Systems: Encourage companies that manufacture and sell auto-bait systems to refine designs to minimize hook foulings.

B. Education and Outreach
1. Report Card: Institute a system to inform the owners and operators of hook-and-line fishing vessels annually of their seabird bycatch numbers and rates (per 1,000 hooks) relative to their fleet using NORPAC data sources. Fleets include IFQ sablefish, Pacific cod, and Greenland turbot. The Pacific halibut should be included if observer data become available.

2. Peer System: Develop an industry-based peer system to reward vessels that successfully avoid seabird bycatch. Encourages dialog among fishers to share information and methods to minimize the incidental capture of seabirds.

3. Fleet Education: Develop and deliver an education program targeting vessel owners, operators, and crew, illustrating the proper deployment and use of streamer lines, as well as the need for seabird conservation and related regulations.

4. National Action: Encourage other U.S. fishery management councils including the Pacific Fishery Management Council and the NMFS Northwest Region to extend recommended regulatory measures to demersal hook-and-line fleets in their jurisdiction.

5. International Action: Encourage other longlining nations in the Pacific Rim to require seabird bycatch deterrents in their longline fisheries (demersal and pelagic). Specifically, all demersal fisheries should fly paired streamer lines and eliminate directed discharge of residual bait and/or offal over sinking longlines.

III. Future Research

Research programs testing seabird deterrent strategies are limited by existing technologies. Continued innovation and technology development are required in Alaska fisheries and worldwide to minimize seabird bycatch in hook-and-line fisheries. Accordingly, the WSGP research program recommends the following:

A. *Fleet Innovation:* Encourage continued development of seabird bycatch avoidance measures by the Alaska fleet.

B. *Novel Technologies*: Encourage the development of designs and technologies that eliminate the need to fly streamer lines. These include:

   1. Underwater Setting: Technologies that deploy longlines below the surface beyond the reach of seabirds (tubes and chutes or novel hull designs).

   2. Line Weighting: Fishing line that sinks quickly below the surface but also maintains the handling qualities valued by fishers.

IV. Recommendations of Methods Not to Use for Seabird Bycatch Reduction

A. Setting gear at night as a sole deterrent method.
B. Area- and season-based management as a seabird bycatch reduction strategy.
C. Use of single streamer lines, except as conditions prevent the use of paired streamer lines.
D. Until further investigations are undertaken to determine the optimum weighting regimes for reducing seabird bycatch and the methods to improve the practicality of line weighting, requiring that vessel operators add weight to groundlines for seabird avoidance is not recommended.
E. Use of a line shooter as a seabird bycatch reduction device.
F. Use of a lining tube as a sole deterrent method.

Alternative 4: Minor modifications to WSGP recommendations for regulatory changes.

1. Seabird avoidance measures would be required of operators of all applicable vessels (see section 2.0). Operators of vessels that are less than 26 ft (7.9 m) LOA, would still be required to comply with §679.24(e)(2) but not with §679.24(e)(3).

2. Offal Discharge Requirement: In addition to offal discharge requirements under Alternative 3, operators of applicable vessels would also be required to remove embedded hooks in offal that is to be discharged.

3. Bird Line Requirements (see Table 1a):

"Inside" Waters (Area 649, 659, State waters of Cook Inlet):

a. A minimum of 1 buoy bag line of a specified performance standard is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of 1 streamer line of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

EEZ:

a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of paired streamer lines of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

Vessels using Snap Gear:

a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels greater than 45 (13.7 m) ft LOA.

4. Performance Standards for Bird Line Requirements are as follows (Table 1a):

a. Buoy Bag Line Standard: A single streamer line (40 m length) with no streamers attached; buoy bag line to be deployed within 2m of either side of main groundline.
b. Single Streamer Standard: A single streamer line deployed in such a way that streamers are in the air for a minimum of 40 m aft of the stern and within 2m of either side of main groundline.
c. Paired Streamer Standard: Paired streamer lines deployed in such a way that streamers are in the air for a minimum of 40 m aft of the stern and within 5m of either side of main groundline.
d. Snap Gear Streamer Standard: A single streamer line (45 m length) deployed in such a way that streamers are in the air for 20 m aft of the stern and within 2m of either side of main groundline.

The performance standards can be achieved in several ways: by increasing the height off the water at the stern [recommended minimum is 20 ft (6.1 m)], minimizing the weight of streamer line components, and/or increasing drag at the far end of the streamer line with combinations of drogues, weights and buoys. See the EA for discussion and relevance of vessels without superstructures ("skiffs"), use of snap gear, and fishing area considerations. The EA also includes a discussion of the Alternative 4 option for exemption from seabird avoidance measures for specified vessels fishing in specified areas.

5. Other Devices include the following:
   a. Add specified weights to groundline.
   b. Use a buoy bag line or streamer line, of specified performance standards.
   c. Strategic offal discharge to distract birds away from the setting of baited hooks: Discharge fish, fish parts (i.e. offal) or spent bait while setting gear on the opposite side of the vessel from where the gear is being set.

6. Requirements for All operators of applicable vessels:
   a. Seabird avoidance devices as described above must:
      i. Be onboard in the possession of the vessel operator.
      ii. Be made available for inspection upon request by an authorized officer (USCG, NMFS Enforcement Officer or other designated official)
      iii. Meet certain specified standards.
      iv. Be used while hook-and-line gear is being deployed.
      v. A functioning and effective spare bird line must also be onboard.
   b. Seabird Avoidance Plan must be:
      i. Completed.
      ii. Onboard the vessel.
      iii. Made available for inspection upon request by an authorized officer (USCG, NMFS Enforcement Officer or other designated official).

7. Alternative 4 Option for Small Vessel Exemption in Specified Areas: Vessels 32 ft (9.8 m) LOA or less fishing halibut in IPHC Area 4E would be exempted from seabird avoidance regulations. Vessels fishing in the "internal waters" of Southeast Alaska (NMFS Area 659; Southeast Inside District), Prince William Sound (NMFS Area 649), and State waters of Cook Inlet would also be exempted.

See Table 1 for a comparison of the four alternatives that are analyzed in this EA/RIR/IRFA.

6.2 Description of the Fisheries

The groundfish and halibut fisheries off Alaska are an economically important segment of the U.S. domestic fishing industry. Commercial groundfish catches off Alaska totaled approximately 1.7 million tons (t) in 1999, compared to 1.9 million t in 1998. The value of the catch at ex-vessel, *excluding* the value added by processing, was estimated at $483 million in 1999, an increase from $416 million in 1998.

Groundfish accounted for the largest share of the ex-vessel value of all commercial fisheries off Alaska in 1999 (39%), while the Pacific salmon fisheries were second, at $346 million (28% of the total value). The ex-vessel value of the shellfish catch amounted to $271 million (22% of the total).

The value of the 1999 catch, after primary processing, was approximately $1.2 billion. This estimate *includes* the "value added" by at-sea and shoreside processors, typically characterized as representing the "first wholesale" gross product value.

The exvessel value of the 2000 halibut harvest from Alaska was approximately $123 million.

6.2.1 The Harvesting Sector

After Alaska pollock, the next dominant species in the commercial groundfish catch off Alaska is Pacific cod, the primary hook-and-line target in the BSAI. Pacific cod, accounted for 101,000 mt (or almost 75% of the total 1999 groundfish catch by hook-and-line gear in the EEZ off Alaska). The 1999 Pacific cod catch with hook-and-line gear was down about 8%, from a year earlier. Sablefish represents a much smaller portion of the total groundfish catch by hook-and-line gear but is the primary hook-and-line target in the GOA. In 1999, the total sablefish harvest by hook-and-line gear was 12,000 mt, down about 1.0% from 1998 (see Table 11, Hiatt and Terry 2000).

Trawling accounts for, on average, approximately 90% of the total groundfish catch, and hook and line gear accounts for another 7.9%. Pacific cod is harvested by trawls (in 1999, 44% or 105,000 t); by hook and line gear (in 1999, 41% or 101,000 t); and by pots (in 1999, 15% or 35,000 t). Tables 11 and 12 of this EA/RIR/IRFA provide estimates of the numbers of vessels participating in the hook-and-line gear fisheries.

Catcher Vessels

The following accounts of the hook-and-line harvesting sectors are from section 3.10.2.1 of the draft SEIS (NMFS, 2001a). These are the harvest sectors most likely to be directly effected by the proposed action. See Tables 11 and 12 of this EA/RIR/IRFA for numbers of groundfish hook-and-line vessels by vessel length category operating from 1994 to 2000 in the BSAI and GOA. See Table 16a for numbers of vessels operating in the IFQ and CDQ halibut and sablefish fisheries.

Far more fixed-gear, 33–59 ft LOA, catcher vessels are active in groundfish fisheries than any other class. These vessels have the third-highest harvest value of groundfish among the catcher vessel classes. These vessels obtain most of their groundfish revenues from harvests of Pacific cod and high-valued species such as sablefish and rockfish. Although their retained harvests are much smaller than those of the larger trawl catchers, they have obtained groundfish harvest revenues in excess of all other vessel classes except the AFA-qualified trawlers. Fixed-gear catcher vessels less than or equal to 32 ft LOA have limited activity in groundfish fisheries as most of them were constructed specifically for salmon. They often harvest higher value groundfish, such as Pacific cod and rockfish and sablefish, when not engaged in the salmon fishery. Size restricts the effectiveness of the 32 ft LOA or less fixed-gear in groundfish fisheries (NMFS, 2001a).

Hook-and-line Catcher Vessels Greater than or Equal to 60 Feet in Length

Description

A large majority of the vessels in this class operate solely with hook-and-line fixed gear, focusing on halibut and relatively high-value groundfish such as sablefish and rockfish. Operating parameters are primarily influenced by regulations for fixed gear in these fisheries. Both fisheries generate high value per ton, and these vessels often enter other high-value fisheries such as the high-seas albacore fisheries. These vessels' reliance on groundfish fisheries sets them apart from smaller fixed-gear catcher vessels permitted to operate in Alaska salmon fisheries with multiple gear types. Overall, this fleet is quite diverse. Most vessels are between 60 ft and 80 ft long the average length is about 70 ft; have an average rating of about 85 gross tons, with a range of 40 to 220 gross maximum tons, and have an average horsepower rating around 400, with a range of 135 to about 1,000 hp. The larger vessels in this class can operate in the Bering Sea during most weather conditions. Smaller vessels can have trouble operating during adverse weather.

Participation in Fisheries

The number of vessels in this class increased from 89 in 1988 to 126 in 1992 (Table 20). Since 1992, the number of these vessels making more than minimal groundfish landings has stabilized at about 100. Sablefish and halibut fisheries management changed dramatically after an IFQ system was implemented in 1995. Previously, the two fisheries were common property fisheries characterized by a race for fish, with increasingly shorter seasons and more vessels. With IFQs, vessel owners are allocated a percentage of the total allowable catch (TAC). The system has significantly increased the value of fish harvested by hook-and-line vessels because fishermen are better able to cater to fresh-fish markets—particularly halibut—and sell their catch to the highest bidder. Vessels with halibut or sablefish IFQs may fish their share at any time during the open season—March 15 through November 15. Few vessels operate continually over the entire season.

Groundfish Landings by Species

Because of high-valued sablefish, the ARSO species complex, which in this analysis includes sablefish and rockfish, is the most important groundfish species for this sector in terms of harvest volume and total exvessel value (Table 20). Pacific cod has been the second most important species, in terms of volume for this sector since 1988, but is a much smaller component in terms of exvessel value. In 1998, the ARSO aggregation accounted for 5,000 tons, or 58.5 percent of harvest volume, and $17.3 million, or 91.4 percent of total exvessel value. The eastern and central GOA FMP subareas are the most important fishing areas for this sector, accounting for 75 to 83 percent of the total value of groundfish retained by this class from 1995 to 1998. Approximately 70 percent of exvessel value was paid by southeast and southcentral Alaska inshore processors between 1994 and 1998.

Employment and Payments to Labor

The hook-and-line catcher vessel sector is one of the most labor-intensive sectors. These vessels typically carry between three and six deckhands and a skipper who also works the deck—although the number of crewmembers has decreased since 1995 with IFQs. Between 1993 and 1998 employment has remained relatively stable on these vessels, ranging from a low of 534 to a high of 649 (Table 20). Payments to labor, however, jumped at the outset of the IFQ program, from below $4 million in 1993 to more than $12 million in 1995. Payments to labor fell to $7.6 million in 1998. Employment has been split, with about 50 percent, dominated by southeast and southcentral Alaska, and 50 percent elsewhere.

Fixed-Gear Catcher Vessels 33 to 59 Feet in Length

Description

Vessels in this class vary greatly in size and power and have an average length of about 45 ft, an average rating of about 30 gross tons, and average about 300 horsepower. The larger size of these vessels in comparison to the smaller fixed-gear class results in greater capacity and fishing efficiency. Consequently, the class accounts for a larger portion of the total harvest for this gear category than is harvested by vessels 32 ft or less LOA. This category also employs a mix of gear types, with smaller vessels typically using hook-and-line and jig gear, and larger vessels typically employing hook-and-line and pot gear. A number of vessels in this class have holds with refrigerated seawater to ensure quality. This class was established because these vessels typically were designed for and participate in a greater number of fisheries than do smaller fixed-gear vessels.

Participation in Fisheries

The number of vessels in this class ranged between 608 and 1,054 between 1988 and 1998 (Table 19). Most of these vessels participated in the ARSO species complex every year between 1988 and 1998,

whereas pollock and flatfish consistently had the least number of landings. The activities of this class have focused on salmon, halibut, and groundfish. Over the last 10 years, between 30 and 40 percent of exvessel value has come from groundfish. The importance of groundfish varies significantly during the annual fishing cycle because most of these vessels shift their efforts to salmon, crab, halibut, and other species during June, July, and August. On average, slightly more than one-third of the exvessel value has come from groundfish, slightly less than one-third from salmon, and slightly more than one-quarter from halibut. About 70 percent of these vessels participating in the groundfish fisheries also participate in the salmon and halibut fisheries.

Groundfish Landings by Species

The ARSO species complex, which in this analysis includes sablefish and rockfish, is the most important groundfish species for this sector in terms of total exvessel value (Table 19). Because of high-valued sablefish, ARSO has been the most important species group over time. Pacific cod has been the second most important species in terms of volume for this catcher vessel sector since 1988, but is a much smaller component in terms of exvessel value. For example, in 1998 ARSO accounted for about 35 percent of harvest volume and about 80 percent of exvessel value, while Pacific cod accounted for 63 percent of harvest volume and 20 percent of harvest value. The eastern and central GOA have been the most important groundfish FMP subareas for this sector. From 1988 to 1998, these two areas accounted for almost all of the total value of groundfish retained by this fixed-gear catcher vessel class. Since 1992, southeast Alaska inshore plants have paid about half of total exvessel value to this sector.

Employment and Payments to Labor

This analysis uses an average crew size of 3.5 persons—including the skipper and crew—for this type of vessel. Another 0.5 persons has been added to the average as vessel support staff. The actual number of crew varies, depending on a number of factors such gear type, presence of automatic baiting machines, vessel size, and sablefish IFQ shares owned by the skipper and crew. Employment on these vessels ranged from 2,440 to 3,836 between 1988 and 1998 (Table 19). During the same period, payments to labor ranged from $12.8 million to $21.6 million. Approximately 80 percent of these payments are made to Alaskans—about 40 percent of the total is harvested by southeast Alaska residents.

Fixed-Gear Catcher Vessels Less Than or Equal to 32 feet in Length

Description

A large number of fixed-gear vessels 32 ft or less LOA were built to the 32-ft maximum vessel length for the Bristol Bay salmon drift gillnet fishery. These vessels may use a mix of hook-and-line, jig, and sometimes pot gear to harvest halibut and groundfish before or after the salmon season. Implementation of halibut and sablefish IFQs enhanced the ability of these vessels to participate in the sablefish fisheries by reducing risk without diminishing catch. Vessels in this class are too small to operate in unprotected waters in adverse weather conditions, so they typically fish within several miles of shore. This class was established because these smaller vessels have constrained harvest capacity and limits on the gear types that they can effectively use. Vessels in this class average of about 30 ft in length, 15 gross tons, and 250 horsepower rating.

Participation in Fisheries

The primary target species of vessels in this category that use hook-and-line gear are halibut and groundfish, including Pacific cod and, to a lesser extent, sablefish and rockfish (Table 18). Many pursue halibut and sablefish under the current IFQ system and harvest other groundfish as incidental catch. About half the exvessel value received by this category came from halibut. A significant percentage of

the fleet may pursue rockfish and other relatively high-value groundfish as a target species after reaching their IFQ cap. Vessels using jig gear typically pursue Pacific cod and rockfish. Pots are also used for Pacific cod. Vessels in this class can begin to fish in January, when the season opens for Pacific cod, and other groundfish species, but few vessels do so. Most wait until at least March 15, when the halibut season opens, but many wait until late April or May when the weather has further improved. IFQ owners will fish until their quotas are reached, or until they need to begin preparations for salmon season. Following salmon season, vessel owners with IFQs remaining will change gear to harvest the remaining quota. The number of vessels in this class decreased significantly from 209 in 1988 to 102 in 1998, a decline at least partly attributable to implementation of the IFQ systems.

Groundfish Landings by Species

Although total exvessel value of harvest from these vessels has dropped, the groundfish percentage of exvessel value has increased from about 10 percent in 1988 to about 20 percent in 1998 (Table 18). The ARSO species complex—which in this analysis includes sablefish and rockfish—and Pacific cod are the most important groundfish species for this vessel class in terms of harvest volume. The implementation of a Pacific cod quota within state waters and increasing prices have increased harvest activity in the Pacific cod fishery. In 1998, Pacific cod accounted for 78.8 percent of harvest volume and 64.9 percent of total exvessel value. The Central GOA FMP subarea is the most important fishing area for this sector accounting for at least half of the total value of groundfish by this class. Processors in Kodiak Island and AKSE take approximately 60 percent of the deliveries from this class by value.

Employment and Payments to Labor

This analysis uses an average crew size of three persons for this type of vessel—which includes the skipper and the crew. Another 0.5 FTE was added to the average as vessel support staff. The actual number of crew varies, depending on such factors as vessel size and gear type. Employment was cut in half since 1988, to a low of 357 in 1998. Payments to labor fell to 1989 levels following a sharp rise in 1993 and 1994. More than 50 percent of the employment and payments to labor from this class are to southeast and southcentral Alaska.

6.2.2 The Processing Sector

Between 1991 and 1998, catcher/processors harvested an average of 62 percent of all groundfish in the North Pacific, but in 1999 catcher/processors accounted for only 52 percent of the total. The decline in 1999 is primarily a result of the shift of BSAI pollock quotas to inshore operators under the AFA. Almost 60 percent of all groundfish reported by catcher/processors since 1991 has been pollock, while flatfish accounted for more than 17 percent, and Pacific cod was 13 percent. Approximately 95 percent of all catcher/processor harvests have come from the BSAI.

Between 1992 and 1999, catcher/processors generated an average of 355,000 mt of product, with an average annual wholesale value of $712 million. The average mt of catcher/processor product has generated $570. Over the eight years from 1992 to 1999, catcher/processors improved their average utilization rate (the proportion of product weight to round weight) from less than 24 percent to 32 percent.

Hook-and-line catcher/processor These vessels, also known as freezer longliners, do not trawl or use pot gear but use hook-and-line gear with a focus on Pacific cod. Most hook-and-line catcher processors are limited to headed and gutted products, and in general are smaller than HT-CPs. The following account of the hook-and-line catcher/processors is from section 3.10.2.2 of the draft SEIS (NMFS, 2001a). This is

the processing sector most likely to be directly effected by the proposed action.

Description of the Class

Vessels in the hook-and-line catcher/processors sector use predominantly hook-and-line gear to harvest Bering Sea and GOA groundfish resources. Vessels in this class are about the same size as head-and-gut vessels and produce headed and gutted products. The hook-and-line catcher/processors evolved because regulations applying to this gear type provide more fishing days than are available to other gear types. These vessels can produce relatively high-value products that compensate for the relatively low catch volumes. These vessels average just over 130 ft LOA and most are equipped with gear that enables them to bait and haul about 30,000 to 40,000 hooks per day. Generally, they are not built to standards that would permit them to be loadline certified, a requirement to produce fillets.

Participation in Groundfish Fisheries

In 1992, 57 vessels were in the hook-and-line catcher/processors group; in 1999, there were 40 vessels (Table 21). They tend to target Pacific cod, with sablefish and certain flatfish species (especially Greenland turbot) as important secondary target species. Many vessels reported harvesting all four groundfish species groups each year from 1991 through 1999. Most harvesting activity has occurred in the Bering Sea, but these vessels operate in all FMP subareas. In 1999, 39 of the 40 active vessels reported harvests in the Bering Sea, 23 in the Aleutian Islands, 24 in western GOA, 19 in central GOA, and 10 in the eastern GOA.

Groundfish Landings by Species

In 1999, the volume of total groundfish retained and discarded, 122,400 mt, was near the average of 125,000 mt per year for the period 1992–1999 (Table 21). Total production in 1999 was also near the long-term average of 48,700 mt (for final product from groundfish resources). Of the total reported tons in 1999, approximately 97,500 (78 percent of the total) were Pacific cod and 17,000 mt (14 percent of the total) were ARSO. Total wholesale production value in 1999 was $103 million, $100 million of which came from head-and-gut products. Total wholesale production value in 1999 was higher than in any other year during the period 1992–1999.

Employment and Payments to Labor

The main crew positions on a hook-and-line catcher/processor are processing crew, fishing crew, and officers or other specialized personnel. Estimated FTE employment generated by the groundfish fishery was 419 people in 1999 and 456 in 1998 (Table 21). The number of vessels in these years suggests an average crew size of 19 persons. Total payments to labor were $37 million in 1999, with 73 percent of those payments going to Washington State residents.

6.3 Analysis of the Alternatives

NMFS guidance for preparation of RIRs provides that, *"At a minimum, the RIR ... should include a good qualitative discussion of the economic effects of the selected alternatives. Quantification of the effects is desirable, but the analyst needs to weigh such quantification against the significance of the issue and available studies and resources."* (NMFS, 2000(d), page 2).

Under the required ESA section 7 consultation on the 1999 GOA and BSAI groundfish fisheries, the ensuing USFWS Biological Opinion established an incidental take limit of four short-tailed albatrosses

for the 2-year period of 1999 and 2000. That Biological Opinion and its Incidental Take Statement has been extended until superseded by a following opinion (USFWS, 2001). The incidental take limit established by the USFWS in its Biological Opinion for the Pacific halibut fishery off Alaska is two short-tailed albatrosses for every 2-year period, beginning in 1998 and 1999. If the 2-year take is exceeded in either fishery, NMFS must immediately reinitiate section 7 consultation and review with USFWS the need for possible modification of the reasonable and prudent measures established to minimize take of the short-tailed albatross. It is possible that fishing operations would be altered and closures imposed during the reinitiated section 7 consultation.

If the 2-year take of short-tailed albatross exceeded the incidental take limit, the actual economic impacts resulting from the modification of the reasonable and prudent measures established to minimize take of the short-tailed albatross would depend upon ensuing revisions to the reasonable and prudent measures. The impacts could range from those of the measures proposed under Alternative 2 (see below for economic impacts) to fishery closures. The economic impact of fishery closures would depend upon the length of time of the closed period and the extent of the closure. The exvessel value of groundfish caught in 1999 by hook-and-line gear by area, catcher type, and species group is noted in Table 14. The most valuable target species for the various fleets by area was: sablefish at $55.9 million for the GOA catcher vessel fleet, sablefish at $9.3 million for the GOA catcher-processor fleet, sablefish at $2.2 million for the BSAI catcher vessel fleet, and Pacific cod at $62.7 million for the BSAI catcher-processor fleet.

The incidental take limit for short-tailed albatrosses could be exceeded under any of the alternatives. If the regulatory revisions under the proposed alternatives improve and strengthen the current seabird avoidance measures, then the likelihood of encountering and taking a short-tailed albatross would be reduced (to an unquantifiable degree). Therefore, the likelihood of a fishery closure and its ensuing adverse economic impacts would be reduced (i.e., net National welfare would be enhanced).

The reasonable and prudent measures associated with both the incidental take statements in the groundfish section 7 consultation and the Pacific halibut section 7 consultation require that if warranted, NMFS will revise existing seabird avoidance regulations to improve the effectiveness of the seabird avoidance measures and methods. The intent of these regulations is to improve the effectiveness of the measures, thereby reducing seabird bycatch of the short-tailed albatross and of other seabird species. Although these other seabird species are not the principal subject of the proposed action, they would receive collateral protection, i.e. benefits, as a result of the action.

As addressed in sections 6.4.1 and 6.4.2, (to the extent that the proposed actions are successful) it can be reasonably expected that both subsistence users and non-consumptive users of the marine resource would be positively impacted and realize a net benefit as a result of the proposed regulatory changes and the intended continued reduction of the bycatch of short-tailed albatrosses and other seabird species in the hook-and-line fisheries off Alaska.

The implementation of the proposed changes for revisions to the current seabird avoidance measures is entirely consistent with the FAO's IPOA and the current development of the United State's NPOA.

6.3.1 Identification of the Individuals or Groups that may be Potentially Impacted by the Proposed Action

6.3.1.1 Consumptive Users of the Marine Resource

Fishery Marine Resource: See section 6.2 of this EA/RIR/IRFA and the SAFE Report: Economic Status of the Groundfish Fisheries Off Alaska, 1999 (Hiatt and Terry, 2000) for the most recent economic description of the BSAI and GOA groundfish hook-and-line fisheries. The SAFE report includes information on the catch and value of the fisheries, the numbers and sizes of fishing vessels and processing plants, and other economic variables that describe or affect the performance of the fisheries. Data for 2000 indicate that in the BSAI, 99 catcher vessels and 43 catcher/processors fished with hook-and-line gear, and 971 catcher vessels and 21 catcher/processors fished with hook-and-line gear in the GOA (Table 11). The total number of hook-and-line catcher vessels that caught groundfish off Alaska in 2000 was 1004 and the total number of hook-and-line catcher-processor vessels that caught and processed groundfish off Alaska in 2000 was 44 (Table 11). These numbers account for the total number of vessels that operated in Federal waters off Alaska (note some vessels operate in both the BSAI and GOA, thus the overlap).

A recent description of the Pacific halibut fishery is contained in IPHC's annual report (IPHC 1998). In 2000, 1,284 vessels landed halibut only from U.S. Convention waters off Alaska, 96 percent of which were vessels less than 60 ft (18.3 m) LOA (Table 16a). Many vessels using hook-and-line gear will harvest both halibut and groundfish, therefore overlap exists in the number of vessels in each of these categories. In 2000, 410 vessels landed both halibut and groundfish (449 less 39; Table 16a). Based on the IFQ/CDQ database, a total of 1,733 vessels (catcher vessels and freezer-longliners) harvested halibut and/or sablefish in 2000 (Table 16a). In all of Alaska, 1048 vessels using hook-and-line gear caught or caught and processed groundfish in 2000 (Table 11).

Under the no action alternative (Alternative 1) and Alternative 4, vessels less than 26 ft (7.9 m) LOA would continue to be exempt from some of the seabird avoidance measures. In 2000, approximately 4.2 percent of groundfish vessels were less than 26 ft (7.9 m) LOA (42 vessels) and 18.8 percent of vessels making halibut landings were less than 26 ft (7.9 m) LOA (242 vessels) (Tables 12 and 16a). Under Alternative 2, proposed revised management measures would apply to vessels longer than 35 ft (10.7m) LOA. Therefore, 845 vessels harvesting groundfish and 657 vessels harvesting halibut only would be subject to the revised regulations for seabird avoidance measures (Tables 12 and 16a). In 2000, 203 groundfish vessels (20.2 percent of total number of vessels) and 627 vessels (49 percent of total number of vessels) landing halibut only were shorter than or equal to 35 ft (10.7m) LOA (Tables 12 and 16a) and thus would not be subject to the revised seabird avoidance measures. Under Alternative 3, the proposed revised management measures would apply to all hook-and-line vessels. Operators of 1048 hook-and-line vessels harvested groundfish in 2000 and 1,284 vessels harvested halibut (Table 16a).

To the extent that the potentially impacted vessels noted above are partners with CDQ groups, the alternatives addressed in this analysis could indirectly impact the six CDQ groups representing the 65 western Alaska communities that are eligible for the CDQ Program. Types of indirect impacts might include: increased operating costs, reductions to operational range and/or impacts to the timing of the fishery, reductions in CPUE, or possibly employment impacts. Compliance could impact the number of crew-days required to catch a given amount of fish.

Seabird Marine Resource–Subsistence Use: The objective of the proposed action is to revise the current seabird avoidance requirements to improve their effectiveness at reducing the bycatch of short-tailed albatrosses and other seabird species. The endangered short-tailed albatross is afforded certain protections under the ESA in the United States and under protective laws and status in Japan and does

not possess a present-day consumptive value (see section 3.3). This species does, however, engender non-consumptive (including non-use) economic values. The economic value of other seabird species in Alaska may include both "use" (consumptive) value and "non-use" (non-consumptive) values.

In the case of other seabird species, Alaska Native populations have a traditional "subsistence" harvest right to the seabird resource. To the extent that the incidental catch of seabirds in hook-and-line fisheries reduces the subsistence harvest of these seabirds, the Alaska Native community will suffer a welfare loss. Or expressed alternatively, reducing the fishery impacts on seabird populations would be expected to yield direct benefits to the Alaska Native subsistence community, by enhancing their opportunity to engage in the traditional "use" of these seabird resources.

The USFWS is the agency primarily responsible for the management of seabirds. The USFWS Office of Migratory Bird Management coordinates and contracts with the Alaska Department of Fish and Game's (ADF&G) Division of Subsistence to obtain information on subsistence harvest of migratory birds in rural Alaska communities and coordinates with these communities and others interested in migratory bird management to develop policies and programs to better understand harvest and to maintain populations of birds hunted for subsistence.

Studies by ADF&G's Division of Subsistence indicate that in the 1980s and 1990s, subsistence hunting, fishing, and gathering in rural Alaska communities were part of a "mixed, subsistence-market economy", meaning that subsistence activities are undertaken by extended family groups using small-scale technologies and each family's subsistence production was supported and supplemented by cash employment (Fall 1990, Wolfe and Bosworth 1994). Of Bristol Bay communities surveyed in the 1980s, approximately 4 percent of the subsistence harvest was composed of birds and their eggs (Fall 1990). Seabird species included sea ducks, gulls, and murres. The two most common seabird species harvested in Alaska during the late 1990s were common murres and crested auklets, with 90 percent of the harvest occurring in the communities of Saint Lawrence and Diomede islands. Other seabirds taken in Alaska include: cormorants, gulls, loons, kittiwakes, puffins, terns, and grebes (Wolfe, pers. comm.) Of these seabird species, only gulls are typically taken incidentally in hook-and-line fisheries. Recent ADF&G reports indicate that in the 1990s, birds made up 2 percent of the composition of the wild food harvest by rural residents and 1 percent of the harvest by urban residents (Wolfe and Bosworth 1994). Attaching a dollar value to subsistence uses is difficult, as subsistence products generally do not circulate in markets. However, if families did not have subsistence foods, substitutes would have to be imported and purchased, which would require larger cash incomes. If one assumes a replacement expense of $3 to $5 per pound, the simple "replacement cost" of the 2 percent of the composition of the wild food harvest by rural residents would be estimated at $2.6 to $4.4 million annually (Wolfe and Bosworth 1994). This estimate likely understates the true value of these resources to subsistence users. This is so for at least two reasons. First, there are no "perfect substitutes" in the market for these subsistence species (e.g., chicken eggs are not an identical protein source to, say, gull eggs). Second, there are cultural, familial, and community values associated with participation in the harvesting and sharing of subsistence foods, which are foregone if these resources are simply "replaced" by food stuffs obtained in a market. While not easily estimated, these values are, nonetheless, real. Therefore, any action which results in increased availability of these subsistence resources (within the range under consideration here), to Alaska Native users, yields an economic (as well as, socio-cultural) benefit.

6.3.1.2 Non-Consumptive Users of the Marine Resource

While no market currently exists within which short-tailed albatrosses are "traded" (in the traditional

economic sense), they nonetheless have economic value. In general, it can be demonstrated that society places economic value on (relatively) unique environmental assets, even if those assets are never directly exploited. That is, for example, society places real (and measurable) economic value on simply "knowing" that, in this case, short-tailed albatross populations are flourishing in their natural environment.

A substantial literature has developed which describes the nature of these non-use values to society. In fact, it has been demonstrated that these non-use economic values may include several dimensions, among which are "existence" value, "option" value, and "bequest" value. As the respective terms suggest, society places an economic "value" on, in this case, the continued *existence* of the short-tailed albatross resource; society further "values" the *option* it retains through the continued existence of the resource for future access to short-tailed albatross populations; and society places "value" on providing future generations the opportunity to enjoy and benefit from this resource. These estimates are additive and mutually exclusive measures of the value society places on these natural assets, and are typically calculated as "willingness-to-pay" or "willingness-to-accept" compensation (depending upon with whom the implicit ownership right resides) for non-marginal changes in the status or condition of the asset being valued.

Quantitatively measuring society's non-use value for an environmental asset, e.g., the short-tailed albatross, is a complex but technically feasible task. However, in the current situation, an empirical estimation of these values is unnecessary, because the ESA implicitly assumes that society automatically enjoys a *"net benefit"* from any action which protects threatened or endangered species (including the habitat they rely upon), and/or facilitates the recovery of populations of such species (or their habitat). Therefore, it is neither necessary nor appropriate to undertake the estimation of these benefits. It is sufficient to point out that these very real ("use" and) "non-use" values to society from enhancement of the short-tailed albatross resource do exist. Examples of non-consumptive uses/users who may place economic value upon the "seabird" marine resource are: Recreational users, birders, ecotourism commercial operations, birdwatching and nature tour operations, and national and international conservation organizations, in addition to citizens of the U.S., unaffiliated with any particular group, who may attach one or more of these non-use values to the short-tailed albatross and other seabird populations.

To the extent that the proposed revisions to seabird avoidance measures are effective in improving the state of the short-tailed albatross population that forages seasonally in waters off Alaska and the populations of other seabird species, all of society collectively benefits. However, the potential attributable costs of the application of the proposed measures are distributed much more narrowly. Indeed, they accrue most obviously to those who directly exploit and depend upon the environmental resource base in the affected areas. In the present context, this is primarily the fishing industry using hook-and-line gear and operating in the BSAI and GOA and, by extension, the communities which support and depend upon those fisheries. The following discussion summarizes the economic and social impacts which might be expected to accompany adoption of the proposed regulatory amendment to the BSAI and GOA groundfish management plans and to the regulatory regime for the Pacific halibut fishery off Alaska to implement revised seabird avoidance measures.

6.3.2 Impacts of Alternative 1 - No Action

The no action alternative would not revise the current requirements for seabird avoidance measures. The potential economic impacts to the fishing industry of the no action alternative are noted above in section 4.5. Adoption of this alternative could result in the complete closure of all hook-and-line fisheries in the BSAI and GOA and the Pacific halibut fishery off Alaska, with devastating economic and social consequences for those fisheries and the communities that depend upon them. The number of vessels less than 26 ft LOA and exempt from using some of the seabird avoidance measures is 42 in the groundfish fishery and 242 in the halibut fishery (Tables 12 and 16a). In the halibut fishery, these vessels accounted for 600,000 pounds of halibut harvested in 2000 (Table 16a). Although this information is not specifically known for hook-and-line vessels less than 26 ft LOA, it is available for fixed-gear catcher vessels less than or equal to 32 ft LOA. In 1998, these vessels accounted for 1.2 metric tons of groundfish harvested (Table 18). Groundfish accounted for almost 20 percent of the total exvessel value attributable to these vessels, the remaining exvessel value to non-groundfish species such as salmon, crab, and halibut (Table 18).

6.3.3 Impacts of Alternative 2 - Revisions to Current Seabird Bycatch Avoidances Measures (Council's 1999 Final Action)

Based on the number of vessels in the various vessel size categories in 2000, the proposed regulatory revisions under Alternative 2 would result in 203 groundfish vessels (19.3 percent of total number of vessels) and 627 halibut vessels (49 percent of total number of vessels) being exempt from using certain of the seabird avoidance measures (Tables 12 and 16a). The harvest from these halibut vessels represents about 7 percent of halibut landed (Table 16a).

The proposed measures required of All operators of applicable vessels under this alternative would be expected to be of minimal cost. Procedural or operational changes may be required in fishing operations and the potential costs for such changes have not been quantified. It has been assumed that fishermen are already applying weights to the groundline to comply with the current requirement to sink baited hooks quickly. If this is so, then no or minimal costs would be associated with this revised measure. If weights are not currently being used, the cost would depend on the number and types of weights used. For instance, a 5-lb. 'cannonball' weight costs $5.65. Total cost would vary, depending on how many weights were used. Current data are not available as to the amount of weight needed to fully comply with this requirement in fisheries off Alaska. A researcher conducting a line weighting study on vessels fishing for Patagonia toothfish (*Dissosticus eleginoides*) south of the Falkland Islands used a 4kg/40m line weighting regime for Mustad autoline systems (Robertson 1998). Operators of smaller catcher vessels have experimented with using sash or seine weights, spaced integrally along the skate and at skate junctions.

Similarly, it is quite possible that many fishermen are already using bird scaring lines that would comply with the proposed standards. If so, then no or minimal costs would be associated with this proposed regulatory change. Estimated costs for bird scaring lines are $50 to $250, each. A USFWS program has been providing streamer lines to applicants at no cost.

Removing embedded hooks may impose costs in the form of operational changes to crew procedures, although they cannot be quantitatively estimated at this time. In the unlikely event of hooks remaining embedded in fish during processing by freezer-longliner operations, removal of hooks could potentially provide benefits in that costly damage to offal-processing equipment could be reduced (T. Smith pers. comm.). These requirements (and thus, cost and benefit estimates) would apply only to groundfish and halibut hook-and-line vessels 35' LOA and larger, under this alternative.

Using a lining tube and night-setting are "voluntary" measures under this proposed action and thus would presumably only be employed by an operator if the cost was fully compensated by the expected benefits of undertaking these setting procedures. The estimated cost for a lining tube, including installation is approximately $40,000 per vessel. It is unknown if changes in operating costs would occur with the use of a lining tube.

The economic impact attributable to requiring night-setting is not known but could be more burdensome for small vessels if this measure presents compromises to fishing efficiency and/or safety (vessel size-related seaworthiness and catch and fuel-carrying capacity) (Brothers *et al* 1999a). Additional costs, for example, to install adequate vessel lighting for night-setting operations may also be imposed. Unknown economic impacts could occur if CPUE is reduced due to sand flea predation on catch that occurs in certain areas and reportedly may occur at night due to longer soak periods.

If night-setting potentially increases the likelihood of a vessel encountering and taking a short-tailed albatross (because of the bird's possible nocturnal feeding behavior), then direct economic impacts could be severe if the incidental take limit were exceeded and closure of the fishery was an option under consideration.

6.3.4 Impacts of Alternative 3 - Revisions to Current Seabird Bycatch Avoidances Measures (WSGP Recommendations)

Alternative 3 would require seabird bycatch avoidance measures for all lengths of vessels. In 2000, 1004 catcher vessels and 44 catcher/processors harvested groundfish in all of Alaska (Table 12). 1284 vessels landed only IFQ/CDQ halibut (Table 16a). The proposed measures required of All operators of applicable vessels under this alternative would be expected to be of minimal cost. Procedural or operational changes may be required in fishing operations and the potential costs for such changes have not been quantified.

Paired streamer lines are estimated to cost $100 to $500, depending on materials used. A USFWS program has been providing paired streamer lines to applicants at no cost. It's projected that an adequate supply remains to outfit the rest of the hook-and-line fleet off Alaska (Table 22). Some vessels may need to rig their vessels with poles, davits, or some type of structure to deploy the streamer lines from such that the required performance standard will be achieved. It is not known what this exact cost may be and would vary based on the existing configuration of the individual vessel. Costs could range from material costs for galvanized fence posting to costs for welding more elaborate davits and rigging structures ($100 to $3000). Costs are not anticipated to be prohibitive.

Under Alternative 3, vessels would be prohibited from the direct discharge of residual bait or offal from the stern of the vessel while setting gear. For vessels not deploying gear from the stern, directed discharge of residual bait or offal over sinking longlines while gear is being deployed would be prohibited. Discharge of bait or offal may occur through chutes, pipes, or other similar devices suited for the purpose of offal discharge. This proposed requirement may require some vessels to redirect offal discharge from its current location. It is not known how many vessels may require a reconfiguration of offal discharge chutes. The cost for such modifications would depend on the particular layout of the vessel.

6.3.5 Impacts of Alternative 4 - Revisions to Current Seabird Bycatch Avoidances Measures (Modifications to WSGP Recommendations)

Like Alternative 2, Alternative 4 would not require vessels less than 26 ft LOA to use streamer lines. Alternative 4 would require (see Table 1a):

Inside Waters (Area 649, 659, state waters of Cook Inlet:

a. A minimum of 1 buoy bag line of a specified performance standard is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of 1 streamer line of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

Because current vessel data sources do not differentiate vessels without superstructures from those with superstructures, it is not known how many vessels would only be required to use the buoy bag line in inside waters. A buoy bag line is estimated to cost less than the $50-$250 for a single streamer line. In 2000, 528 vessels greater than 26 ft (7.9 m) LOA harvested groundfish in inside waters (Table 13b).

EEZ:

a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of paired streamer lines of a specified performance standard is required of vessels greater than 45 (13.7 m) ft LOA.

Because current vessel data sources do not differentiate vessels without superstructures from those with superstructures, it is not known how many vessels would be required to use the buoy bag line and how many would be required to use the single streamer line. A buoy bag line is estimated to cost less than the $50-$250 for a single streamer line. In 2000, 466 vessels greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA harvested groundfish as part of the Federal TAC (Table 12). The specified other devices (weighting, additional buoy bag line or streamer line, strategic offal discharge) would be of a similar cost. In 2000, 540 catcher vessels and catcher/processors greater than 45 (13.7 m) ft LOA harvested groundfish as part of the Federal TAC (Table 12).

Paired streamer lines are estimated to cost $100 to $500, depending on materials used. A USFWS program has been providing paired streamer lines to applicants at no cost. It's projected that an adequate supply remains to outfit the rest of the hook-and-line fleet off Alaska (Table 22). Some vessels may need to rig their vessels with poles, davits, or some type of structure to deploy the streamer lines from such that the required performance standard will be achieved. It is not known what this exact cost may be and would vary based on the existing configuration of the individual vessel. Costs could range from material costs for galvanized fence posting to costs for welding more elaborate davits and rigging structures ($100 to $3000). Costs are not anticipated to be prohibitive.

Vessels using Snap Gear:

a. A minimum of 1 buoy bag line of a specified performance standard and one other specified device is required of vessels without superstructures (ie skiff) greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
b. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels with superstructures greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA.
c. A minimum of 1 streamer line of a specified performance standard and one other specified device is required of vessels greater than 45 (13.7 m) ft LOA.

Because current vessel data sources do not differentiate vessels without superstructures from those with superstructures, it is not known how many vessels using snap gear would only be required to use the buoy bag line and how many would be required to use the single streamer line. A buoy bag line is estimated to cost less than the $50-$250 for a single streamer line. Data on gear type is only available from IPHC for the halibut fishery. In 2000, 467 vessels greater than or equal to 26 ft (7.9 m) LOA and less than or equal to 45 (13.7 m) ft LOA and 166 vessels greater than 45 (13.7 m) ft LOA harvested halibut. The specified other devices (weighting, additional buoy bag line or streamer line, strategic offal discharge) would be of a similar cost.

Under Alternative 4, all vessels required to use and possess seabird avoidance devices would also be required to have a spare replacement bird line (buoy bag line, single streamer line, paired line). The cost of the replacement line would be the same as the cost of the line it would replace.

6.4 Administrative, Enforcement and Information Costs

No significant additional costs for administration, enforcement, or information requirements are expected under any of the alternatives.

6.5 Significance Under E.O. 12866

On the basis of the foregoing analysis, NMFS determines that the proposed alternatives do not have the potential to be judged "*significant,"* as that term is defined under E.O. 12866, for the following reasons (identified in the Executive Order as criteria for making this assessment):

- None of the alternative will have an annual effect on the economy of $100 million or more;
- NMFS cannot identify any reason why the alternatives would create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- None of the alternatives address entitlements, grants, user fees, or loan programs. Therefore, NMFS determines that this proposed action will not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof;
- NMFS has not identified any novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order that would arise as a result of adoption of any of the alternatives.

6.6 Consistency with National Standards

The following section addresses issues raised by the National Standards, as contained in the Magnuson-Stevens Act (Act), including a brief discussion of the consistency of the proposed alternatives with each, where applicable. If a National Standard is not explicitly referenced below, the proposed measures if implemented would be consistent with those standards.

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

Information in this analysis represents the most current, comprehensive set of information available to the agency (and the Council), recognizing that some information (such as operational costs) is unavailable. Each of the alternatives was analyzed based on information that appears to be consistent with this standard.

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

The alternatives make no explicit or implicit differentiation among residents of different states, nor does it have as its purpose or intent to allocate or assign fishing privileges.

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

The wording of this standard was changed in the recent Magnuson-Stevens Act authorization, to 'consider' rather than 'promote' efficiency. Efficiency in the context of this change refers to economic efficiency, and the reason for the change has been interpreted as an effort to de-emphasize, to some degree, the importance of economics relative to other considerations (Senate Report of the Committee on Commerce, Science, and Transportation on S. 39, the Sustainable Fisheries Act, 1996). The analysis presents information relative to these perspectives, but does not point to a preferred alternative in terms of this standard. National Standard 5 recognizes the importance of various other issues, in addition to economic efficiency, not the least of which, in the current case, is the objective of, "*the protection of marine ecosystems*" (e.g., the short-tailed albatross and other seabird species).

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

The alternatives appear to be consistent with this standard, as they build and improve upon the existing seabird bycatch reduction program that is currently in place. Certain measures, such as an underwater lining tube, that are known to be relatively expensive have not been required at this time.

National Standard 8 - Conservation and management measures shall, consistent with the conservation

requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Many of the coastal communities in Alaska and the Pacific Northwest participate in these GOA and BSAI groundfish fisheries and halibut fishery, in one way or another, whether it be as host to processing facilities, support businesses, or as the harbor/home/operating port to fishermen and processing workers. Major groundfish ports in Alaska that process catch from the Bering Sea include Dutch Harbor, St. Paul, Akutan, Sand Point, King Cove, and Kodiak. Additionally, the Seattle, Washington area is home port to many catcher and catcher/processor vessels operating in these fisheries. Summary information on 126 of these coastal communities is provided in "*Faces of the Fisheries*" (NPFMC 1994). Improvements to existing seabird avoidance measures may greatly reduce the likelihood of the incidental take limit for the short-tailed albatross being exceeded. The direct economic impacts could be severe if the incidental take limit were exceeded and closure of the fishery was an option under consideration.

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

Although incidental catch of seabirds in hook-and-line fisheries is often termed "bycatch", the Magnuson-Stevens Act excludes seabirds from the definition of "fish" and, therefore, bycatch. Unless certain requirements under the ESA are involved, the Magnuson-Stevens Act does not *require* the implementation of measures to reduce incidental catch of seabirds. However, the Magnuson-Stevens Act authorizes implementation of fishery management measures designed to protect the marine environment from the effects of fishing activities. In order to strengthen NMFS' ability to effectively implement seabird conservation measures in all U.S. fisheries, NMFs and USFWS are supporting an amendment to the Magnuson-Stevens Act that would change the definition of bycatch to include seabirds and would require fishery management plans to specifically address seabird bycatch.

For purposes of NMFS' implementation of the *National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries*, the term "bycatch" is broadened to refer to incidental, or unintentional, seabird catch or mortality.

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

Alternative 3 would require the use of two streamer lines while setting hook-and-line gear, with certain exceptions for safety considerations. In conditions of wind speeds exceeding 30 knots (near gale or Beaufort 7 conditions), it would be acceptable to deploy a single streamer line from the windward side of the vessel. In winds exceeding 45 knots (storm or Beaufort 9 conditions), the safety of crew supersedes the deployment of streamer lines and the use of such lines would be at the discretion of the vessel operator.

7.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS

Under provisions of the Regulatory Flexibility Act (RFA), if it cannot be certified that a proposed rule *"will not have a significant economic impact on a substantial number of small entities"*, an initial regulatory flexibility analysis (IRFA) must be prepared. To ensure a broad consideration of impacts and alternatives, NMFS has prepared an IRFA pursuant to 5 USC 603, without first making the threshold determination of whether or not this proposed action would have a significant economic impact on small entities.

The central focus of the IRFA should be on the economic impacts of a regulation on small entities and on the alternatives that might minimize the impacts and still accomplish the statutory objectives.

7.1 Requirement to Prepare an IRFA

The level of detail and sophistication of the analysis should reflect the significance of the impact on small entities. Under 5 U.S.C., Section 603(b) of the RFA, each IRFA is required to address:

- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and the legal basis for, the proposed rule;
- A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate);
- A description of the projected reporting, record keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;
- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that would minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:

    1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
    2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
    3. The use of performance rather than design standards;
    4. An exemption from coverage of the rule, or any part thereof, for such small entities.

7.2 What is a "small entity"?

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) and small government jurisdictions.

7.2.1 Small Businesses

Section 601(3) of the RFA defines a "small business" as having the same meaning as "small business concern" which is defined under Section 3 of the Small Business Act. "Small business" or "small business concern" includes any firm that is independently owned and operated and not dominate in its field of operation. The SBA has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor...A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture there can be no more than 49% participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the US including fish harvesting and fish processing businesses. A business involved in fish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of $3 million for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer-persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business involved in both the harvesting and processing of seafood products is a small business if it meets the $3 million criterion for fish harvesting operations. Finally a wholesale business servicing the fishing industry is a small businesses if it employs 100 or fewer-persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established "principles of affiliation" to determine whether a business concern is "independently owned and operated." In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern's size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when (1) A person is an affiliate of a concern if the person owns or controls, or has the power to control 50% or more of its voting stock, or a block of stock which

affords control because it is large compared to other outstanding blocks of stock, or (2) If two or more persons each owns, controls or has the power to control less than 50% of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors or general partners controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint venturers if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

7.2.2 Small Organizations

The RFA defines "small organizations" as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

7.2.3 Small Governmental Jurisdictions

The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

7.3 Reason for Considering the Proposed Action

The purpose and intent of the proposed seabird bycatch reduction action, under consideration herein, were addressed in section 6.1.3 of the Regulatory Impact Review. A detailed description of the problem that underlies the proposed action, and the action's objectives, are contained in Section 1.0 of this combined EA/RIR/IRFA document.

7.4 Number and Description of Affected Small Entities

The following information, to the extent practicable, enumerates the number and nature of the "small entities" which comprise the commercial sectors, not-for-profit organizations, and governmental jurisdictions and communities which depend directly or indirectly upon the hook-and-line groundfish fisheries of the BSAI and GOA and the IFQ and CDQ Pacific halibut fisheries off Alaska and which therefore would include those which would be directly regulated by the proposed action. Taken as a whole, these "entities" define the potentially impacted universe for purposes of the IRFA.

To identify the number and type of business concerns participating in the BSAI and GOA groundfish hook-and-line fisheries that meet the definition of "small entities," each must be measured against the size and affiliation standards outlined in section 5.2.1. While available data on ownership and affiliation patterns in the 1999 BSAI and GOA groundfish hook-and-line fisheries are not sufficiently detailed to discern whether each individual business concern meets the definition of "small entity," data available from the NMFS Economic SAFE document (Hiatt and Terry, 2000) do allow some general conclusions to be drawn concerning the number of small entities present in recent years in each component of the industry. While these data reflect the 1994 through 2000 fishing years, they are believed to be a

reasonable description of the several operational sectors, with respect to RFA size criteria (Tables 11,12,16,17).

In 2000, 801 catcher vessels under Alternative 2 and 962 catcher vessels under Alternative 4 harvesting groundfish which would be considered to be small entities and that would be subject to the revised seabird avoidance measures (Table 11). 1042 vessels greater than 26 ft LOA landed only halibut in 2001 and would be considered to be small entities and would be subject to the proposed measures under Alternative 4. 657 vessels greater than 35 ft LOA landed only halibut in 2001 and would be considered to be small entities and would be subject to the proposed measures under Alternative 2 (Table 16a).

To the extent that any of these vessels are partners with CDQ groups, the alternatives addressed in this analysis could indirectly impact the six CDQ groups representing the 65 western Alaska communities that are eligible for the CDQ Program. The CDQ groups and the communities they represent all are small entities under the RFA. To the degree that CDQ vessels can pass along costs to CDQ groups, this would reduce the direct impact on the vessels themselves, but only by redistributing these impacts among the broader universe of "small entities".

7.5 Adverse Economic Impacts on Small Entities

After reviewing the alternatives and suboptions analyzed in "environmental assessment" and "regulatory impact review" sections of this document, several conclusions may be drawn concerning the potential differential impacts of the proposed management measures on "small entities"fishing groundfish with hook-and-line gear in the BSAI and GOA management areas and the IFQ and CDQ Pacific halibut fisheries off Alaska. These are summarized in the following sections.

Most catcher vessels and some catcher/processors harvesting groundfish and halibut off Alaska meet the definition of a small entity under the RFA. In 2000, 801 catcher vessels under Alternative 2 and 962 catcher vessels under Alternative 4 harvesting groundfish which would be considered to be small entities and that would be subject to the revised seabird avoidance measures (Table 11). 1042 vessels greater than 26 ft LOA landed only halibut in 2000 and would be considered to be small entities and would be subject to the proposed measures under Alternative 4. 657 vessels greater than 35 ft LOA landed only halibut in 2001 and would be considered to be small entities and would be subject to the proposed measures under Alternative 2 (Table 16a). No changes to regulatory measures are called for under Alternative 1. Although small entities would not experience additional costs for seabird avoidance gear under Alternative 1, the economic impacts could be very significant if the short-tailed albatross incidental take limit were exceeded (the likelihood of this happening may be greater under Alternative 1) and closures were imposed as a result. (See the discussion of this alternative contained in the RIR).

Under Alternative 2, the economic impact on small entities would depend upon the particular measures chosen. Alternative 2 would require the use of a bird scaring line, estimated at $50 to $250 and the use of line weights (cost would be dependent upon amount of weights needed). Procedural or operational changes may be required in fishing operations. In 2000, 801 groundfish vessels were over 35 ft (10.7m) LOA and 657 vessels landing halibut were over 35 ft (10.7m) LOA (all are assumed to be "small" under RFA criteria). Some small entities would be relieved of a regulatory restriction (the current seabird avoidance measures) under Alternative 2.

The incidental take limit for short-tailed albatrosses could be exceeded under any of the alternatives. If the regulatory revisions under Alternatives 2, 3, or 4 improve and strengthen the current seabird avoidance measures (Alternative 1), then the likelihood of encountering and taking a short-tailed albatross would be reduced. Therefore, the likelihood of a fishery closure and its ensuing economic impacts would be reduced.

If the anticipated take of short-tailed albatross were exceeded in either the groundfish fishery or the halibut fishery under any alternative, the actual economic impacts resulting from a modification of the reasonable and prudent measures established to minimize take of the short-tailed albatross would depend upon the revised measures, which could range from measures proposed in Alternatives 2, 3, or 4 to closures. The economic impact of fishery closures would depend upon the length of time of the closed period and the extent of the closure. The 1999 exvessel value of the Pacific cod fishery, for hook-and-line gear, was estimated at approximately $72 million, approximately $71 million for the sablefish fishery, and totaled approximately $150 million for all groundfish species caught with hook-and-line gear (Table 14). Such economic impacts on small entities could result in a substantial reduction in annual gross revenues and could, therefore, potentially have a significant adverse economic impact on a substantial number of small entities. Data are currently not available upon which to draw net revenue conclusions about these potential effects.

Alternatives that addressed modifying reporting requirements for small entities were not considered in this analysis. Such alternatives are not relevant to this action and would not mitigate the impacts on small entities. The proposed seabird avoidance measures are based on performance standards rather than design standards, therefore alleviating a potential economic burden to small entities. Alternative 2 would apply to vessels greater than 35 ft (10.7m) LOA. This provides for an exemption from coverage of the proposed action to approximately 203 catcher vessels that harvest groundfish and approximately 627 vessels that landed halibut (Tables 12 and 16a).

7.6 Reporting and Record Keeping Requirements

The proposed seabird bycatch reduction action contains one new or revised record keeping or reporting requires. All vessels using hook-and-line gear greater than 26 ft (7.3 m) LOA would be required to complete a *Seabird Avoidance Plan* form. The attributable costs or burdens are expected to be minimal.

7.7 Other Relevant Federal Regulations

There are no pending Federal regulations, which can be identified, which would have any undesirable interactions with the proposed action.

7.8 Alternatives Which Minimize Impacts on Small Entities

Adoption of proposed Alternatives 2, 3, or 4, would reduce the potential adverse economic impacts which may accompany retention of the Status Quo Alternative (e.g., fishery closures). It appears that the likelihood of exceeding the incidental take limit of short-tailed albatrosses may be greater under Alternative 2 than Alternatives 3 or 4, given that buoy bags would still be permissible by large vessels under Alternative 2 and buoy bags were in use when the 2 short-tailed albatross were taken by large vessels in 1998. Under an option of Alternative 4, vessels 32 ft (9.8 m) LOA or less fishing halibut in IPHC Area 4E would be exempted from seabird avoidance regulations. Vessels fishing in the "internal waters" of Southeast Alaska (NMFS Area 659; Southeast Inside District), Prince William Sound (NMFS

Area 649), and State waters of Cook Inlet would also be exempted. This exemption would relieve a regulatory restriction from small vessels and would minimize the impacts on small entities.

8.0 CONCLUSIONS

To determine the significance of impacts of the actions analyzed in this EA, NMFS is required by NEPA and 50 CFR § 1508.27 to consider the following:

Context: The setting of the proposed action is the groundfish fisheries of the BSAI and GOA and the Pacific halibut fishery off Alaska. Any effects of the action are limited to these areas. The effects on society within these areas is on individuals directly and indirectly participating in the groundfish and halibut fisheries and those who use the ocean resources. The proposed action includes changes to current fishing practices and uses of seabird avoidance measures. Because this action continues groundfish fisheries in BSAI and GOA and Pacific halibut fisheries off Alaska, this action may have impacts on society as a whole or regionally.

Intensity: A listing of considerations to determine intensity of the impacts are in 50 CFR § 1508.27 (b) and in the NOAA Administrative Order 216-6, Section 6. Each consideration is addressed below in order as it appears in the regulations.

1. Beneficial and adverse impacts are required to be considered in this action. Impacts on the marine environment and socioeconomic conditions were analyzed in this EA/RIR/IRFA. Effects on the environment from the use of improved seabird avoidance measures is not expected to have any effects beyond those described in recent NEPA analyses (NMFS 1998, 2001a, 2001b) from which much of this analysis references.

A) Revisions to seabird avoidance measures would be based on results and recommendations from scientific experiments designed for the demersal hook-and-line fisheries off Alaska. One of the objectives of the research was to evaluate the effectiveness of seabird avoidance measures used in hook-and-line fisheries off Alaska. Improvements to measures would have a beneficial impact on an endangered species and many other non-endangered seabird species.

B) Another objective of the experimental research program was to identify seabird avoidance measures that would not decrease the catch of target species or increase the bycatch of other organisms.

C) Potential adverse effects on the human environment were minimized by identifying cost-effective and practicable measures.

D) Potential adverse effects on the human environment were further minimized by greatly reducing the likelihood of encountering and taking a short-tailed albatross. Therefore, the likelihood of a fishery closure and its ensuing economic impacts would be reduced. The proposed action would reduce the likelihood of encountering and taking other seabird species as well.

2. **Public Health and Safety** is not likely to be impacted under any of the proposed alternatives.

3. This action takes place in the geographic areas of the Bering Sea, Aleutian Islands, and Gulf of Alaska, generally from 3 nm to 200 nm offshore. The land adjacent to these areas contain **cultural resources and ecologically critical areas**. The marine waters where the fisheries occur contain ecologically critical area. Effects on the unique characteristics of these areas are not anticipated to occur with this proposed action.

4. **This action may be considered controversial**. This action deals with the protection of the endangered short-tailed albatross while implementing the groundfish and halibut fisheries. There are some differences of opinion between various industry and environmental groups on the interactions between the fisheries and short-tailed albatross and the appropriate course of action to protect the short-tailed albatross. The controversy suggested here is not of a scientific nature nor is it universal. Many individuals and groups from the industry and environmental sectors do agree that bycatch of the endangered short-tailed albatross, as well as that of other seabird species, should be reduced.

5. The **risks to the human environment** by implementing the BSAI and GOA groundfish fisheries are described in detail in the draft SEIS (NMFS 2001). Because of the seabird avoidance measures proposed with this action, it is anticipated that there will be minimal or no risk to the human environment beyond that disclosed in the draft SEIS.

6. **Future actions** related to this proposed action may result in impacts. To the extent that future research indicates additional improvements to seabird avoidance measures and methods, future action could be warranted.

7. **Cumulatively significant impacts** beyond those described in the TAC setting SEIS (NMFS 1998a) are possible with this action with respect to short-tailed albatross. Fisheries are regulated by federal and state agencies in marine waters. NMFS and the State of Alaska work closely in setting harvest levels and managing the near shore and offshore fisheries of the state. The state and federal fisheries are unlikely to cause cumulative effects beyond those described in the SEIS for the biological component of the BSAI and GOA. The extent to which foreign fisheries are impacting short-tailed albatross and other seabird species is unknown.

8. This **action will have no effect on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places, nor cause loss or destruction of significant scientific, cultural, or historical resources.** This consideration is not applicable to this action.

9. **This proposed action will have no impact on ESA listed species in the BSAI and GOA, except for short-tailed albatross**. Although the USFWS has determined that the short-tailed albatross is adversely affected by hook-and-line Pacific halibut and groundfish fisheries off Alaska, they have determined that these fisheries do not jeopardize the continued existence of the species. Because incidental take is anticipated, NMFS must carry out certain measures to minimize the impact of the incidental take. The proposed action is expected to beneficially affect the short-tailed albatross.

10. **This action poses no known violation of Federal, State, or local laws or requirements for the protection of the environment.** This action will be conducted in a manner consistent to the maximum extend practicable with the Alaska Coastal Zone Management Act of 1972 and its implementing regulations.

11. **Introduction or spread of a non-indigenous species** has occurred in the past (possibly from ballast water releases) in the GOA and BSAI areas and may continue to occur through the State managed fisheries, International Pacific Halibut Commission fisheries and from commercial tankers and cargo ships transporting fisheries products to foreign ports. The introduction of rats on islands from vessels in port or from wrecks is also a great concern for seabird populations, but no data are available to quantify

the effect of rats on seabird populations. Because the number of vessels participating in the fisheries has decreased and the US Fish and Wildlife Service in Alaska has an extensive program to reduce the threat of new rat invasions, NMFS considers the effects of fishery related rat introduction to be insignificant. Overall, there is no direct evidence of adverse effect from the introduction of non-indigenous species but there is the potential for the non-indigenous species to increase in abundance and disrupt the food web (draft SEIS, NMFS 2001).

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