FAO-BASED RESPONSIBLE FISHERIES MANAGEMENT CERTIFICATION
FULL ASSESSMENT AND CERTIFICATION REPORT

For The

US Alaska Sablefish Commercial Fishery

(200 mile EEZ)

Applicant Group

Alaska Seafood Marketing Institute (ASMI)

October 2011

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I. Summary and Recommendations

Summary

The Alaska Seafood Marketing Institute (ASMI), on behalf of the Alaska sablefish commercial fishery, has requested assessment of the US Alaska sablefish commercial fishery to the requirements of the United Nations Food and Agriculture Organisation (FAO) Code of Conduct for Responsible Fisheries (CCRF, 1995) based Responsible Fisheries Management (RFM) Certification Program. The FAO CCRF was initiated in 1991 by the FAO Committee on Fisheries and unanimously adopted on 31 October 1995 by the over 170 member Governments of the FAO Conference.

The ASMI application was made in April 2010. After Validation Assessment was completed in October 2010, a full Assessment Team was formed to undertake the assessment and final certification determination was given on the 11th October 2011.

Alaska sablefish *(Anoplopoma fimbria)* is the species of focus in this Assessment and Certification Report. The Alaska sablefish commercial fishery employs demersal longline, pot and trawl gear within Alaska jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

The FAO Code presented to an ISO 65/EN45011 accredited Certification Body, Global Trust Certification, to be used as the Standard for the assessment of Alaska Fisheries. The conformance reference points from the published FAO CCRF (now referred to as Standard) were converted into the audit checklist criteria [FAO-Based RFM Criteria (Version 1, July 2010)] by the ISO 65/EN45011 Certification Body to ensure audit ability and feasibility for accreditation.

The audit checklist criteria were cross-referenced back to the FAO CCRF Clauses. A further FAO document, the Guidelines on Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries (FAO 2005) was used to help contextualize and add clarity to the audit criteria. The derived FAO-Based RFM Conformance Criteria were submitted to a National Accreditation Board of the International Accreditation Forum for further cross reference and ISO 65/EN45011 accreditation validity.

The assessment was conducted according to the Global Trust procedures for FAO-Based RFM Certification using the FAO-Based RFM Criteria (Version 1, July 2010). This Full Assessment Report should be read in conjunction with the Certification Summary attached in Appendix 3 of this document. Whilst the FAO CCRF contains Articles with differing focuses, only the Articles and/or sub-Articles specifically relevant to the biological sustainability of the stock under consideration, with due regards to conservation, biodiversity and ecosystem integrity are detailed in this report.

During the assessment process the key outcomes evaluated and documented by the Assessment Team included:

A. The Fisheries Management System

The Magnuson Stevens Act (MSA) is the primary domestic legislation governing management of the United States marine fisheries. In 1996, the United States Congress reauthorized the MSA to include, among other things, a new emphasis on the precautionary approach in U.S. fishery management policy. In federal waters (3-200 nm), Alaska sablefish fisheries are managed by the NPFMC and the NMFS Alaska Regional Office, subject to their Groundfish Fishery Management Plans (FMPs). NPFMC recommends regulations to govern the directed sablefish fisheries in waters off Alaska; and makes allocation decisions among sablefish users and user groups fishing off Alaska. NPFMC sablefish management measures include a TAC which is divided among gear types and an Individual Fishing Quota (IFQ) program for the majority of fixed gear. Fixed gear (longlines and pots) harvest around 85% of the sablefish quota and trawl gear about 15%.

In 1995, the NPFMC and NMFS implemented an IFQ system for the Alaska sablefish (and halibut) industry, which has significantly decreased the number of vessels in the fishery, increased season length and gross income, as well as decreasing bycatch and reducing gear losses and the related ghost fishing effects. The NMFS conducts stock surveys, stock assessment reports and a multitude of biological and environmental studies, and in connection with the United States Coast Guard (USCG) enforces regulations. These agencies, and all of their activities and decisions, are subject to the MSA. The Groundfish FMPs are written and amended subject to MSA and govern the management of the fisheries.

In state waters (0-3 nm), sablefish fisheries catch around less than 10% of the total Alaska landings and are managed and regulated by the ADFG and the BOF outside the IFQ program. State and federal management is interlinked and full cooperation between federal and state agencies allows effective and responsible management. State fisheries include two minor state fisheries in Cook Inlet and the Aleutian Islands and three major state fisheries in Prince William Sound, Chatham and Clarence Strait. These fisheries, similarly to the federal ones, are governed under state specific fishery management plans and/or regulations. These include the Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC 28.640). 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272, and Southeast Alaska State managed sablefish (Chatham and Clarence strait) regulations are specified under 5AAC28 Groundfish Commercial Fisheries Regulations. The Alaska Wildlife Troopers enforce fisheries regulations in state waters.

The NPFMC's management arrangements and decision making processes for the fishery are organized in a very transparent manner, and actively encourages stakeholder participation, and all Council deliberations are conducted in open, public session. Similarly, the BOF process is transparent, and open to all stakeholders. Both federal and state agencies provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The GOA and BSAI sablefish stocks are both considered to be parts of the same stock, but separate from sablefish further south along the west coast of North America. They are not considered to be trans-boundary and hence there are no formal co- management arrangements with other countries.

The NMFS and the NPFMC participates in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. Additionally, under the Coastal and Marine Spatial Planning (CMSP) framework objective of the National Ocean Policy, the U.S. will be subdivided into nine regional planning areas of which Alaska/Arctic region will be one entity. Each region will have a corresponding regional planning body consisting of Federal, State, and tribal representatives to develop regional goals, objectives, and ultimately regional CMS plans. CMSP has been initiated in some states. Other states, like Alaska, are in the development phase to implement CMSP.

The NPFMC assesses economic, social and cultural value of the fishery resources in order to assist decision-making, allocation and use. Also, the coastal zone is monitored as part of the coastal management process using physical, chemical, biological, economic and social parameters. Involvement includes a multitude of federal and state agencies and programs.

B. Science and Stock Assessment Activities

The NMFS and ADFG collect fishery data and conduct fishery independent surveys to assess the sablefish fishery and ecosystems in GOA and BSAI areas. GOA and BSAI Stock Assessment and Fishery Evaluation (SAFE) reports provide complete descriptions of data types and years collected. Fishery data is collected from fixed gear (longline and pot) vessels which target sablefish in the IFQ fishery and trawl fisheries that catch sablefish as retained bycatch in other fisheries such as rockfish and sole. Records of catch and effort for these vessels are firstly recorded through the e-landing (electronic fish tickets) catch recording system, secondly collected by observers and thirdly, recorded by vessel captains in voluntary and required logbooks. The Restricted Access Management Division of NMFS tracks in-season catches and IFQ balances. Real-time accounting of individual harvests contributes significantly to accurate and timely management of each IFQ holder's IFQ accounts and supports in-season transfers.

Fishery data from the Observer Program are available since 1990. Observers report age, length, and CPUE data for selected vessels. Vessels between 60 and 125 feet carry an observer 30% of the time and vessels >125 feet carry an observer 100% of the time. Since 1999, logbooks have been required for vessels >60 feet. Vessels <60 feet are not required to carry observers or submit logbooks but many do participate in a voluntary logbook program formed in 1997. The NMFS implemented observer program is at present in restructuring phase. The new observer program aims at increasing observer coverage in the <60 feet vessel portion of the fleet and employ the coverage more systematically to allow a scientifically sound catch recording coverage system.

The mission of the NMFS Alaska Fisheries Science Center (AFSC) is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. The AFSC operates several laboratories (including Auke Bay Biological Lab and the National Marine Mammal Lab), and extensive fisheries monitoring and analysis sections and divisions.

The NMFS's AFSC conducts longline sablefish surveys to collect catch, effort, age, length, weight and maturity data. These domestic longline surveys provide an accurate index of sablefish abundance. AFSC describes survey protocol on their website. From 1979-1994, the AFSC conducted cooperative annual longline surveys initially with Japan, and then independently from 1987 to present. The fixed

station positions are divided among six NPFMC management areas: Bering Sea, Aleutian Islands, Western GOA, Central GOA, West Yakutat, and East Yakutat/Southeast. Stations are placed 30-50 km apart, and gear is set from 150-1000 m at each slope station. Catches are pooled by management area and an abundance index is computed for use in stock assessment and fishery evaluation reports.

Trawl surveys of the upper continental slope that adult sablefish inhabit have been conducted biennially or triennially since 1980 in the Aleutian Islands, and 1984 in the GOA. Trawl surveys of the Eastern Bering Sea slope were conducted biennially from 1979-1991 and standardized for 2002, 2004, and 2008. Trawl surveys of the Eastern Bering Sea shelf are conducted annually.

The sablefish population is represented with an age-structured model. The assessment uses a statistical, forward-projecting age structured model which estimates population numbers and mortality rates separately for male and female sablefish. The model is fitted using data on catches, length/age compositions and CPUE from the fisheries, and several series of abundance indices and associated age or length compositions from longline and trawl surveys. The 2008 model represents an incremental improvement over the one developed in the 2007 assessment, by making better use of survey age data and reducing the number of parameters describing fishery selectivity. The current model configuration follows a more complex version of the GOA Pacific ocean perch model with split sexes to attempt to more realistically represent the underlying population dynamics of sablefish.

For state-managed fisheries, ADFG also has a well-developed research capacity. The state's Policy and Planning Committee establish research priorities. For example, in 1988, the department began annual longline research surveys in both NSEI and SSEI to assess the relative abundance of sablefish over time and differing environmental conditions. This data is used to describe the age and size structure of the populations and detect recruitment events. ADFG standardized survey methods with NMFS survey. Mark-recapture studies for sablefish are also carried out in Southeast Alaska. The two minor Cook Inlet and the Aleutian Islands open-access fisheries are managed using a Guideline Harvest Level (GHL), which is determined based on harvest history, fishery performance, and the federal survey for the area. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model.

The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST).

The Economic and Social Sciences Research Program within NMFS's Resource Ecology and Fisheries Management (REFM) Division provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs. The AFSC's Economic and Social Sciences Research (ESSR) Program has been preparing the implementation of the Alaska Community Survey, an annual voluntary data collection program initially focused on Alaska communities for feasibility reasons, in order to improve the socio-economic data available for consideration in North Pacific fisheries management.

C. The Precautionary Approach

The MSA is the primary domestic legislation governing management of the nation's marine fisheries. In 1996, the United States Congress reauthorized the MSA to include, among other things, a new emphasis on the precautionary approach in U.S. fishery management policy.

For the past 25 years, the Council management approach has incorporated forward-looking conservation measures that address differing levels of uncertainty. Recognizing that potential changes in productivity may be caused by fluctuations in natural oceanographic conditions, fisheries, and other, non-fishing activities, the Council states that it intends to continue to take appropriate measures to insure the continued sustainability of the managed species. It will carry out this objective by considering reasonable, adaptive management measures, as described in the MSA and in conformance with the National Standards, the Endangered Species Act, the National Environmental Policy Act, and other applicable law.

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The first element of the precautionary approach is the Optimum Yield (OY) for the groundfish complexes in the Bering Sea / Aleutian Islands (BSAI) and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The range for BSAI is 1.4 to 2.0 million mt while the range for GOA is 116 to 800 thousand mt. These total groundfish harvest limits the total groundfish harvest that can be taken from the BSAI and GOA marine ecosystems, effectively adopting a conservative ecosystem approach to fisheries.

The second element of precautionary approach is the *Tier* system, based on knowledge and uncertainties of the stock in question. NPFMC inaugurated the Tier system in fisheries management: the harvest control rule depends on the amount of information available. The less the information about a given stock, the more conservative is the catch allowed. Currently, sablefish in Alaska is managed under tier 3, where sufficient information is available to determine a target biomass level, which would be obtained at equilibrium when fishing according to the control rule with recruitment at the average historical level.

The third element of the precautionary approach is the OFL, ABC and TAC system. Allowable Biological Catch (ABC) is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. Overfishing Level (OFL) is a limiting catch level, corresponding to fishing at MSY level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. In application, the NPFMC sets TAC ≤ ABC < OFL. Since 1981, actual groundfish harvests have averaged approximately 90% of the cumulative TAC and 65% of the cumulative ABC because of the complex array of accountability measures governing these fisheries. By-catch from a given stock is limited by a Maximum Retainable By-catch amount (MRB), which is determined as a percentage of retained catch (not including arrowtooth flounder).

The harvest control rule is a biomass-based rule, for which fishing mortality is constant when biomass is above the target and declines linearly down to a limit value when biomass drops below the target. Model projections indicate that the sablefish stock is neither overfished nor approaching an overfished condition. Projected 2011 spawning biomass is 37% of unfished spawning biomass. Spawning biomass has increased from a low of 30% of unfished biomass in 2002 to 37% projected for 2011. NPFMC estimated the posterior probability that projected abundance will fall below thresholds of 17.5% [minimum stock size threshold (MSST) or limit reference point] of the unfished spawning biomass based on the posterior probability estimates over the next 14 years. The

probability was 0. In NPFMC settings, thresholds are defined in the Council harvest rules. These are when the spawning biomass falls below MSY or *B35%* and when the spawning biomass falls below ½ MSY or *B17.5%* which calls for a rebuilding plan under the MSA. The harvest rate decreases to zero if spawning biomass reaches the MSST.

D. Management Measures

The management system for the NPFMC groundfish fisheries is a complex suite of measures comprised of harvest controls—e.g., OY, ABC, TAC, OFL—effort controls (ITQs, licenses, cooperatives), time and/or area closures (also known as habitat protection, marine reserves), by-catch controls (PSC limits, retention and utilization requirements), monitoring and enforcement (observer program, social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions and to avoid seabirds).

IFQ management of the sablefish fishery has increased fishery catch rates and decreased the harvest of immature fish. Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging U.S. $3.1 million annually. The shift from an open-access to an IFQ fishery has nearly doubled catching efficiency, while it has reduced the number of hooks deployed. The IFQ fishery likely has also reduced discards of other species because of the slower pace of the fishery and the incentive to maximize value from the catch. Under the major State managed sablefish fisheries, the use of an equal quota share system is very much like individual fishery quotas, and produces similar efficiencies. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery. Additional goals of the IFQ Program were to keep the historic fleet structure of the fishery, limit and discourage corporate ownership, limit windfall profits to participants granted quota, discourage speculative entry, and reward participants who invested in the fishery (long-time participants and active participants).

MSFCMA's National Standard 9 governs federal regulators. It states that 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. Regulations in place address waste, discard, bycatch, and endangered species interactions in the sablefish fisheries. The NMFS promulgates these regulations through the NPFMC. In this respect, specific regulations were put in place intended to reduce the incidental mortality of the short-tailed albatross and other seabird species with revision in 1998 and 2008. The short-tailed albatross is a listed species under the Endangered Species Act (ESA). The BOF enacted changes to state law, mirroring regulations within state waters for groundfish fisheries. These measures now include the use of streamer (tory) lines, night setting, line shooter and lining tubes, have been shown to reduce seabird interactions when setting or retrieving gear.

The NMFS and the ADFG have well-established regulations on fishing seasons and legal gear use. Discards of sablefish in the longline fishery are small, typically less than 5% of total catch. The catch of sablefish in the longline fishery typically consists of a high proportion of sablefish, 90% or more. However at times grenadiers may be a significant catch and they are almost always discarded. The trawl fishery operates under strict maximum retainable allowances for sablefish. The discards from trawl fisheries decreased from a 1994-2003 average of 825 t to an average of 262 mt for 2004-2009, while hook and line fisheries decreased slightly from 525 t down to 462 t.

Three gear types may be used to harvest sablefish in the GOA and BSAI – demersal longline (a passive gear type), pots (= traps, another passive gear type), and trawl (an active gear type). All of these gear types must be marked and operated in accordance with federal fisheries regulations – 50 CFR Part 679: Fisheries of the Exclusive Economic Zone off Alaska. Similar requirements apply to sablefish fisheries in state waters. Longline gear is the gear that lands the vast majority of sablefish. Longline and the manner of fishing have been developed over a long period of time to be selective of target species. Pot gear use mandates the inclusion of escape devices, should the pot be lost. The Alaska Administrative Code 5 AAC 39.145, as well as federal regulations under 50 CFR 679.2 state that pot gear in Alaska crab and bottom fish fisheries is required to have an escape mechanism consisting of an opening closed by 100% cotton twine.

The IFQ fishery in Alaska is carried out by experienced and competent fisherman. Obtaining sablefish IFQ share most often will require the purchaser (aspirant fisherman) to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. This competence and professionalism is a learned experience with the culmination of entrants into the fishery starting at deck hand level working their way up through proof of competence.

Fishing specific training is available from places including the Alaska Maritime Training Center (AMTC). AMTC's goal is to promote safe marine operations by effectively preparing captains and crew members for employment in the Alaskan maritime industry. The AMTC is a United States Coast Guard (USCG) approved training facility located in Seward, Alaska, and offers USCG/STCW-compliant maritime training.

E. Implementation, Monitoring and Control

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) monitor and enforce Alaska fisheries laws and regulation. Sablefish landings must be reported to NMFS via its mandatory "e-landings" reporting system. Commercial harvests of pollock, sablefish and halibut are the primary enforcement responsibilities of OLE. The IFQ, Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities.

In any given year, OLE Agents and Officers spend an average 10,000-11,000 hours conducting patrols and investigations, and an additional 10,000-11,000 hours on outreach activities. The OLE maintains 19 patrol boats around the country to conduct a variety of patrols including Protected Resources Enforcement Team (PRET) boardings, protection of National Marine Sanctuaries and various undercover operations.
Information collection and monitoring of logbook information and fish tickets at landing is carried out by NMFS's OLE. In addition, they inspect and cross check at landings and processors records for reconciliation.

The MSA provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy). NOAA's OLE Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL). GCEL can then assess a civil penalty in the form of a Notice of Permit Sanctions (NOPs) or Notice of Violation and Assessment (NOVAs), or they can refer the case to the U.S. Attorney's Office for criminal proceedings. For perpetual violators or those whose actions have severe impacts upon the resource criminal charges may range from severe monetary fines to boat seizures and/or imprisonment may be levied by the United States Attorney's Office.

Sanctions include the possibility of temporary or permanent revocation of fishing privileges. Withdrawal or suspension of authorizations to serve as masters or officers of a fishing vessel are also among the enforcement options. Within the USA EEZ, penalties can range up through forfeiture of the catch to forfeiture of the vessel, including financial penalties and prison sentences.

For the state fisheries, the Alaska Wildlife Troopers (AWT) have increased undercover fisheries operations for sport and commercial fisheries over last 3 years. A fully staffed investigations unit dedicates time to commercial investigations. This includes cooperation, as jurisdictionally appropriate, with USCG and NMFS OLE.

F. Serious Impacts of the Fishery on the Ecosystem

NPFMC and NOAA/NMFS conduct assessments and research on environmental factors on sablefish and associated species and their habitats. Findings and conclusions are published yearly in Stock Assessment and Fishery Evaluation Report, the annual Ecosystem SAFE documents, and research reports. The SAFE reports include sections for 1) Ecosystem effects on the stock; and 2) Effects of the sablefish fishery on the ecosystem. SAFE reports also describe results of first-order trophic interactions for sablefish from the ECOPATH model, an ecosystem modeling software package. The Resource Ecology and Ecosystem Management group at the AFSC provides up-to-date ecosystem information and assessments in annual *Ecosystem Considerations* documents. These annual reports include an ecosystem assessment, contributions with updated status and trend indices, and ecosystem-based management indices and information for the Bering Sea, Aleutian Islands, and the Gulf of Alaska ecosystems. These documents accompany the groundfish stock assessment reports presented to the North Pacific Fishery Management Council each fall.

NOAA also supports the Fisheries And The Environment (FATE) program with focus on the development, evaluation, and distribution of leading ecological and performance indicators. In 2010, FATE projects included a study to integrate environmental variables into sablefish recruitment and stock assessment models. Furthermore, the *Final Programmatic Supplemental Environmental Impact Statement for the Alaska Groundfish Fisheries* (PSEIS) (NMFS 2004) provides information about the effects of the fishery on the ecosystem and effects of the ecosystem on the groundfish fishery. It evaluates the historical effects of the spatial concentration of the state fishery and regime changes on sablefish stocks.

The PSEIS document provides evidence that physical oceanographic factors, particularly climate, have a controlling influence on biological community composition in the BSAI and GOA. An important conclusion drawn from these studies is that any effects of human activities on the marine environment should be considered in the context of the powerful physical forces that appear to be driving the BSAI and GOA ecosystems. Total biomass of commercially-fished species in shelf and slope areas had increased since 1984, despite a considerable, concurrent increase in harvest effort. At the same time, the abundances of unexploited (or underexploited) species including skate, some shark species, forage species, arrowtooth flounder, and other flatfish had increased. The controlling factor for these increases appeared to be environmental, with changes in community species composition in nearshore areas linked to an increase in advection in the Alaska Coastal Current. Scientists concluded that cyclical weather patterns increased flow around the GOA and enhanced the supply of nutrients and plankton on the shelf and upper slope areas, resulting in higher productivity.

Young-of-the-year sablefish prey mostly on euphausiids and copepods while juvenile and adult sablefish are opportunistic feeders. Larval sablefish abundance has been linked to copepod abundance and young-of-the-year abundance may be similarly affected by euphausiid abundance because of their apparent dependence on a single species. The dependence of larval and young-of-the-year sablefish on a single prey species may be the cause of the observed wide variation in annual sablefish recruitment.

In considering the impacts of the fishery on the ecosystem, researchers have defined possible concern for benthic species in habitat areas of particular concern (HAPC), seabirds, and by-catch of grenadiers, spiny dogfish, and other shark species. The sablefish fishery catches the majority of grenadier total catch (average 66%) and the trend is stable. The trend in seabird catch is variable but appears to be decreasing, presumably due to widespread use of measures to reduce seabird catch. Sablefish fishery catches of other species is minor. In order to protect endangered short-tailed albatross in other North Pacific fisheries, NMFS required seabird avoidance measures to be used by vessels fishing for Pacific halibut and sablefish in U.S. EEZ waters off Alaska in 1998 (63 FR 11161). As of 2004, longline vessels over 26 ft LOA are required to use either single or paired streamer lines (or in some cases for smaller vessels, a buoy bag line) to reduce incidental take of seabirds.

In 1992, fisheries observers reported eight sea otters taken incidentally by the Aleutian Island sablefish pot fishery. No other sea otter takes were reported from observed fisheries in the range of the southwest stock from 1993 through 2000. Killer and sperm whales frequently take fish directly from commercial fishing gear as it is retrieved. Interactions with commercial longline fisheries are well-documented throughout the BSAI. The placing of metallic beads throughout longline gear has been experimented to repel whales from plucking sablefish off longlines.

While it is possible that longlines could move small boulders it is unlikely fishing would persist where this would often occur. Relative to the effect on living structures and relative to the effect by bottom tending mobile gear, a significant effect of longlines on bedrock, cobbles, or sand is not easily envisioned.

Outcome summaries for Section A-F of the Full Assessment and Certification Report can be found in Section 6. **Click here to jump to section 6**.

Please note that the website references provided in this report were correct at the time of the assessment**.**

Recommendations

Recommendation of the Assessment Team

The Assessment Team recommend that the management system of the applicant fishery, the US Alaska sablefish commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ) is awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

Peer Reviewer A's main summary and recommendation states:

I agree with the Evidence of Adequacy Rating for all clauses described. From my state, national and international experience, the IFQ sablefish fishery is one of the best managed fisheries in the world. Starting from stock assessment, moving to harvest determination and conservation protections, providing a safe and rational fishery and being overseen by a comprehensive management and enforcement system, this fishery is exceptionally well managed. This document provides the necessary information to evaluate the FAO-based RFM Conformance Criteria. While the existing Evidence text was generally quite adequate, I have provided additions and edits where clarification was needed or where specific points could bolster the line of evidence presented. In some cases I provided additional web sites where evidence was located. I have noted two items that I question about (Clause 13.1.1 and Clause 13.1.2) – though they are cited elsewhere. They just do not seem correct and may be speculation or mistakes being repeated from background documents. It would be a shame to repeat someone else's error.

Peer Reviewer B's main summary and recommendation states:

The Alaska Sablefish fishery is managed in a way consistent with the FAO standard of sustainable fisheries. The MSA provides a strong legislative basis for sustainable fisheries management in the US. There is a high level of cooperation and coordination among management agencies and the Council in Alaska and this has operationalized the fisheries management objectives. Biological reference points have been defined for the species and these are continually used to determine annual total allowable catches. The data collection systems in place provide a strong scientific basis for stock assessment, research, and management. The analytical techniques used are "state of the art". Fisheries are well monitored, wastage through discarding is minimized, deleterious effects of fishing on the marine ecosystem are mitigated, and fishermen are actively engaged in management activities. Overall, this is a fine example of well managed fisheries.

Note. All Peer Review comments were addressed by the Assessment Team. The Peer Review reports can be found in **Section 8** along with the Assessment Team responses to comments made.

Determination: The appointed members of the Global Trust Certification Committee met on the 11th October 2011. After detailed discussion, the Committee determined that the applicant fishery, the US Alaska sablefish commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ) be awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

II. Schedule of Key Assessment Activities

Assessment Activities	Date (s)
Application Date	April 2010
Initial Site Visit Consultation Meetings	June –July 2010
Initial Validation Assessment Report	September 2010
Appointment of Full Assessment Team	September- October 2010
On-site Witnessed Assessment and Consultation Meetings	November and December 2010
Draft Assessment Report	August 2011
External Peer Review	September 2011
Final Assessment Report	October 2011
Certification Review/Decision	11th October 2011

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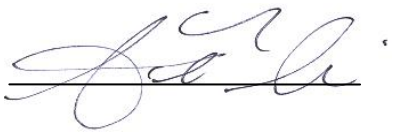
Signature: 

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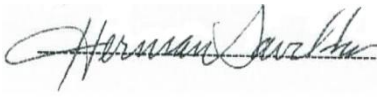
Signature: 

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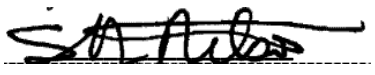
Virginia
USA

Signature: 

***Validation Report Prepared by*:** Deirdre Hoare, Dave Garforth, Stephen Grabacki

IV. Acronyms

ABC	Allowable Biological Catch
ADFG	Alaska Department of Fish and Game
AFSC	Alaska Fisheries Science Center
ASMI	Alaska Seafood Marketing Institute
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CCRF	Code of Conduct for Responsible Fisheries
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
CPUE	Catch per Unit Effort
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FMP	Federal Management Plan
GOA	Gulf of Alaska
IFQ	Individual Fishing Quota
MSFCMA	Magnuson-Stevens Fisheries Management and Conservation Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPAFC	North Pacific Anadromous Fish Commission
NPFMC	North Pacific Fishery Management Council
OFL	Overfishing Level
OLE	Office for Law Enforcement
PWS	Prince William Sound
RACE	Resource Assessment and Conservation Engineering
REFM	Resource Ecology and Fisheries Management
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch

1. Introduction

The US Alaska sablefish commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ) was assessed against the requirements of the FAO-Based RFM Certification Program. The application was made by the Alaska Seafood Marketing Institute (ASMI) on behalf of the Alaska sablefish commercial fishery and participants, and was validated by Global Trust Certification Ltd.

This Assessment and Certification Report documents the assessment procedure for the certification of commercially exploited Alaska sablefish to the FAO-Based RFM Certification Program. This is a voluntary program for Alaska fisheries that has been supported by ASMI who wishes to provide an independent, third-party certification program that can be used to verify that Alaska sablefish fisheries are responsibly managed according to the FAO Code of Conduct for Responsible Fisheries.

The assessment was conducted according to the Global Trust procedures for FAO-Based RFM Certification in accordance with EN45011/ISO/IEC Guide 65 accredited certification procedures. The assessment is based on the criteria specified in the FAO CCRF and the minimum criteria set out for marine fisheries in the FAO Guidelines for the Eco-Labeling of Fish and Fishery Products from Marine Capture Fisheries (2005/2009), hereafter referred to as the FAO Criteria.

The assessment is based on 6 major components of responsible management derived from the FAO CCRF and Guidelines for the Eco-labeling of products from marine capture fisheries.

A The Fisheries Management System
B Science and Stock Assessment Activities
C The Precautionary Approach
D Management Measures
E Implementation, Monitoring and Control
F Serious Impacts of the Fishery on the Ecosystem

These six major components are supported by 14 fundamental clauses which in turn are sustained by 96 sub-clauses. Collectively, these form the FAO Conformance Criteria against which a fishery applying for RFM assessment and certification is assessed.

The assessment comprised of application review, validation reporting, assessment planning, assessment and verification reporting, peer review and Certification Committee review. Two site visits were made to the fishery during the assessment. At various stages in the assessment process, information pertaining to the step in the assessment process has been posted on the Alaska Seafood Marketing Institute (ASMI) website (http://sustainability.alaskaseafood.org/black-cod-certification). A summary of the consultation meetings is presented in **Section 5**. Assessors comprised of both externally contracted fishery experts and Global Trust internal staff (**Appendix 1**). Peer Reviewers comprised of externally contracted fisheries experts (**Appendix 2**).

This report documents each step in the assessment process and the recommendation to the Certification Committee of Global Trust who presided over the certification decision, the 11th October 2011, according to the requirements of ISO/IEC Guide 65 accredited certification.

1.1 Recommendations of the Assessment Team

Recommendation of the Assessment Team

The Assessment Team recommend that the management system of the applicant fishery, the US Alaska sablefish commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ) is awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

2. Fishery Applicant Details

Applicant Contact Information			
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State:	Alaska AK 99801-1147		
Country:	***USA***		
Phone:	**(907) 465-5560**	**E-mail Address:**	*info@alaskaseafood.org*
Key Management Contact Information			
Full Name:	***(Last)*** Rice	***(First)*** Randy	
Position:	***Seafood Technical Program Director***		
Correspondence Address:	*U.S. Marketing Office Suite 310*		
Street :	**150 Nickerson Street**		
City :	***Seattle***		
State:	***Washington 98109-1634***		
Country:	***USA***		
Phone:	**(206) 352-8920**	**E-mail Address:**	***marketing@alaskaseafood.org***
Nominated Deputy:	***As Above***		
Deputy Phone:	As Above	**Deputy E-mail Address:**	**rrice@alaskaseafood.org**

3. Background to the Fishery

3.1. Species Biology

General Description

Sablefish (*Anoplopoma fimbria*), also known as black cod, are a groundfish species in the family Anoplopomatidae, which has only one other species, the skilfish (*Erilepis zonifer*). Sablefish are elongate in shape and are dark gray to black on their upper body with a lighter gray under side. They have two dorsal fins that are well separated which easily distinguish them from skilfish which have two dorsal fins close together (Figure 1). Sablefish have been recorded to reach sizes of 114 cm in length from nose to tip of the tail and a weight of up to 25 kg. An average sized sablefish from the 2010 Southeast Alaska state fisheries is 691 cm from nose to fork length and 3.7 kg.

Figure 1. A sablefish biting on longline bait.

Early life history

Spawning is pelagic at depths of 300-500 m near the edges of the continental slope (Mason et al. 1983, McFarlane and Nagata 1988), with eggs developing at depth and larvae developing near the surface as far offshore as 180 miles (Wing 1997). Average spawning date in Alaska based on otolith analysis is March 30 (Sigler et al. 2001). Along the Canadian coast (Mason et al. 1983) and off Southeast Alaska sablefish spawn from January-April with a peak in February. Farther down the coast off of central California sablefish spawn earlier, from October-February (Hunter et al. 1989). Sablefish in spawning condition were also noted as far west as Kamchatka in November and December (Orlov and Biryukov 2005).

The size of sablefish at 50% maturity off California and Canada is 58-60 cm for females, corresponding to an age of approximately 5 years (Mason et al. 1983, Hunter et al. 1989). In Alaska, most young-of-the-year sablefish are caught in the central and eastern Gulf of Alaska (GOA) (Sigler et al. 2001). Near the end of the first summer, pelagic juveniles less than 20 cm drift inshore and spend the winter and following summer in inshore waters, reaching 30-40 cm by the end of their second summer (Rutecki and Varosi 1997). After their second summer, they begin moving offshore to deeper water, typically reaching their adult habitat, the upper continental slope at 4 to 5 years. This corresponds to the age range when sablefish start becoming reproductively viable (Mason et al. 1983). Younger fish (age 3-4) inhabit shallower waters on the shelf, while older fish migrate down to the slope. Fish also tend to move counter clockwise through the GOA with age (e.g., Maloney and Sigler 2008, Heifetz and Fujioka 1991).

Feeding Ecology

Larval sablefish feed on a variety of small zooplankton ranging from larval copepods (crustaceans) to small amphipods (small, shrimp-like crustaceans). Juveniles feed primarily on macrozooplankton and micronekton. Older juveniles and adults appear to be feed on whatever prey is available, ranging from bottom invertebrates to fishes, squid, and jellyfish. During their second year, sablefish live near shore and feed on salmon fry and smolts during the summer months. Likewise, salmon in southeast Alaska are known to feed on young sablefish during the late summer. A major predator for adult sablefish is most likely sperm whales.

Migration

Federally managed sablefish found in the Bering Sea and in the GOA are considered one population with migration occurring between these regions. In the GOA, small sablefish move westward and large sablefish move eastward. Consequently, large year classes are first noticed in the westward areas. In Southeast Alaska, the Chatham and Clarence Strait fisheries are considered separate populations; however, tagging studies indicate some movement between Chatham Strait and outside waters and between Clarence Strait and British Colombian waters. The degree of migration between inside and outside waters has not been quantified.

Evidence

http://www.adfg.alaska.gov/index.cfm?adfg=sablefish.main
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
http://www.nmfs.noaa.gov/fishwatch/species/sablefish.htm

3.2. Fishery Location and Method

Distribution

Sablefish (Anoplopoma fimbria) inhabit the North Eastern Pacific Ocean from northern Mexico to the GOA, westward to the Aleutian Islands, and into the Bering Sea (Wolotira et al. 1993). Adult sablefish occur along the continental slope, shelf gullies, and in deep fjords, generally at depths greater than 200 m. Sablefish observed from a manned submersible were found on or within 1 m of the bottom (Krieger 1997). In contrast to the adult distribution, juvenile sablefish (less than 40 cm) spend their first two to three years on the continental shelf of the GOA, and occasionally on the shelf of the southeast Bering Sea. The Bering Sea shelf is utilized significantly in some years and little used during other years (Shotwell 2007).

Stock structure and management units

Sablefish form two populations based on differences in growth rate, size at maturity, and tagging studies (McDevitt 1990, Saunders et al. 1996, Kimura et al. 1998). A northern population inhabits Alaska and northern British Columbia (BC) waters and a southern population inhabits southern BC, Washington, Oregon, and California waters, with mixing of the two populations occurring off southwest Vancouver Island and northwest Washington. Sablefish are assessed as a single population in Federal waters off Alaska because northern sablefish are highly migratory for at least part of their life (Heifetz and Fujioka 1991, Maloney and Heifetz 1997, Kimura et al. 1998). Sablefish are managed by discrete regions to distribute exploitation throughout their wide geographical range. There are 4 management areas in the GOA: Western, Central, West Yakutat, and East Yakutat/Southeast Outside (SEO) (Fig. 2); and 2 management areas in the Bering Sea and Aleutian Islands (BSAI): the eastern Bering Sea (EBS) and the Aleutian Islands (AI) region (Fig. 3).

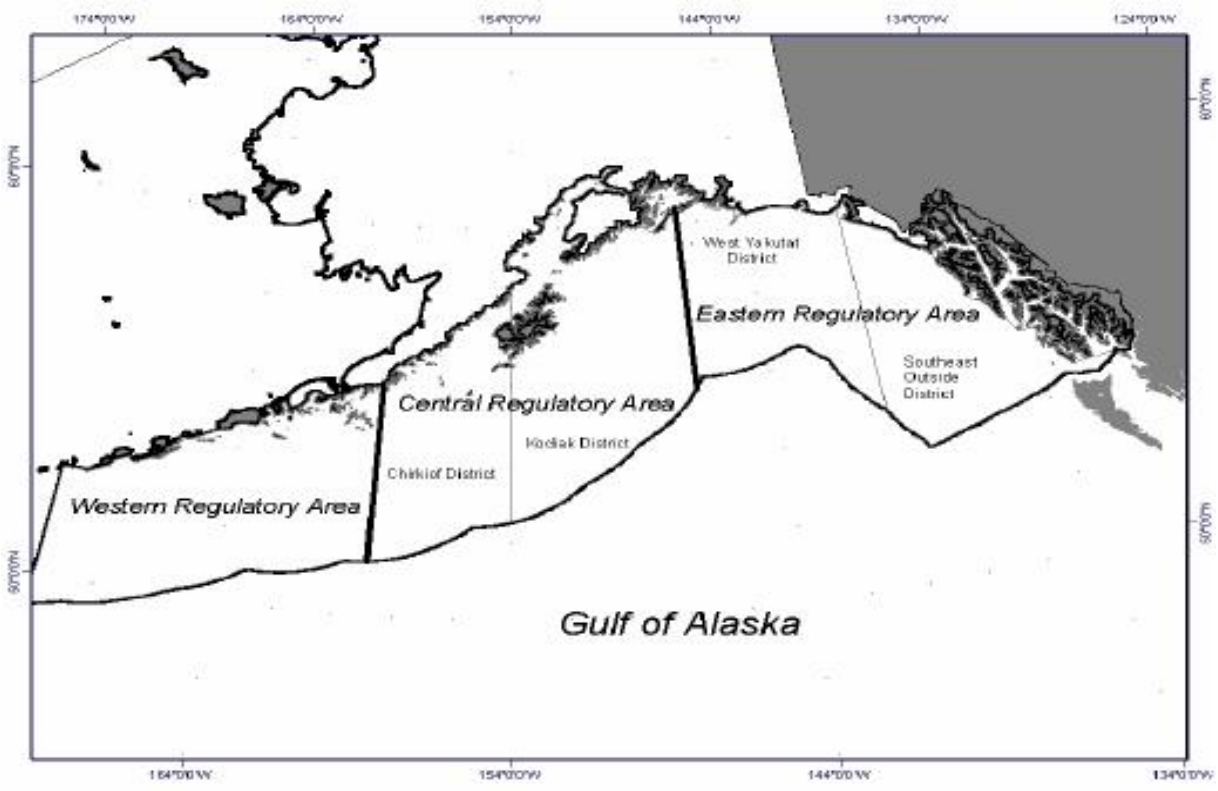


Figure 2. Regulatory Areas of the GOA (from FISHERY MANAGEMENT PLAN for Groundfish of the GOA. NPFMC. December 2009).

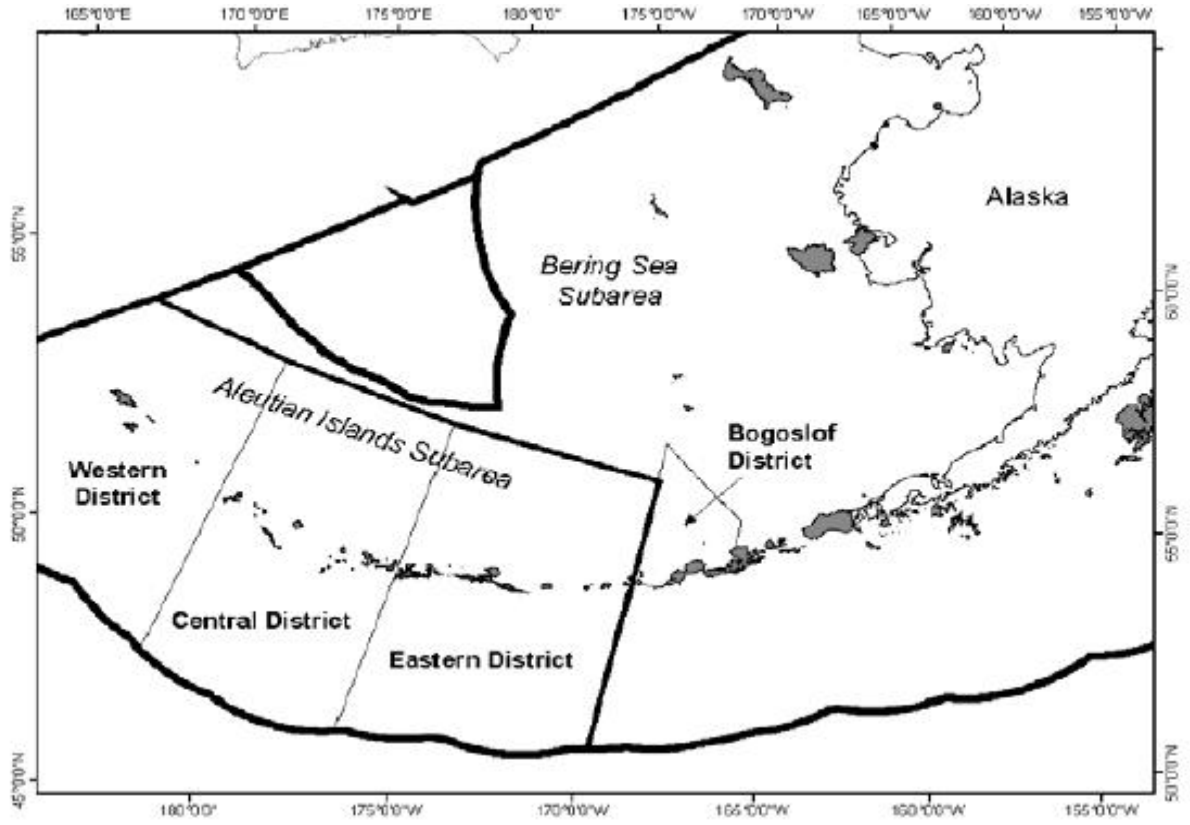


Figure 3. Subareas and districts of the BSAI management area. (From FISHERY MANAGEMENT PLAN for Groundfish of the BSAI Management Area, NPFMC December 2009).

Fishery Method

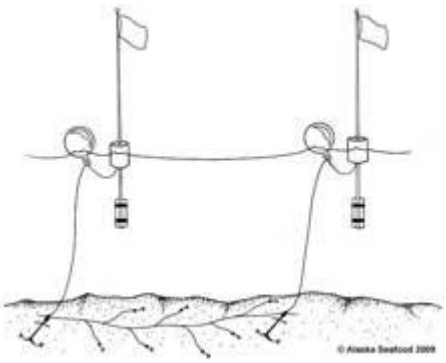
The Alaskan sablefish fishery is managed through the NPFMC's GOA and BSAI Groundfish Fishery Management Plans. It is primarily a small boat fishery with nearly 400 vessels.

The majority of the sablefish catch in Alaska comes from the eastern and central GOA, but the fishery also operates in the western GOA, Bering Sea, and Aleutian Islands. Fixed gear (longlines and pots) harvests approximately 85% of the sablefish quota and trawl gear approximately 15%. Pot fishing, which is banned in the GOA, is allowed in the BSAI and accounts for nearly half of the Individual Fishing Quota (IFQ) catch in those areas. (http://www.afsc.noaa.gov/ABL/MESA/mesa_sa_sable_fi.htm).

State managed sablefish caught in the Clarence Strait area has both a season for pot and longline gear. Furthermore, the Aleutian Islands state fishery allows longline, pot, jig, and hand troll gear (latter two allowed but no fishing), and one trawl vessel qualifies for the limited entry program in Prince William Sound (http://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management).

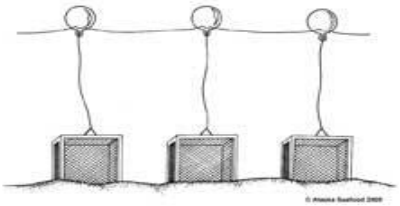
Longline gear

The directed sablefish fishery is primarily a hook-and-line fishery. Longliners catch bottomfish, primarily halibut, sablefish (black-cod), lingcod, and rockfish, via a long line ("groundline") that is laid on the bottom. Attached to the groundline are leaders or *gangions* with baited hooks. Each longline can be up to a mile in length and have thousands of baited hooks. The lines are anchored at each end of each set. Circle hooks usually are used, except for modified J-hooks on some boats with machine baiters. The gear usually is deployed from the vessel stern with the vessel travelling at 5-7 knots. Lines at both ends of the set run to the surface and are marked with a buoy and flag. A longline vessel typically sets several lines for a 24-hours soak. The lines are retrieved over a side or stern roller with a power winch and the fish caught are bled and or dressed and then packed in ice in the vessel's holds. Longliners are typically large vessels, 50 to 100 feet long, with a weather cover on the stern to protect the crew. Most vessels in this fishery can pack 20 to 40 tons or more of iced product before returning to port. Longliners are readily identified by their weather cover and, when not fishing, by the numerous orange buoys and flags that are tied along their rails. This fishery delivers its catch whole bled (rockfish), whole and gutted (halibut), or headed and gutted (sablefish and lingcod) for subsequent sale to fresh and frozen markets (http://afs2011.org/program/daily-program-tables).



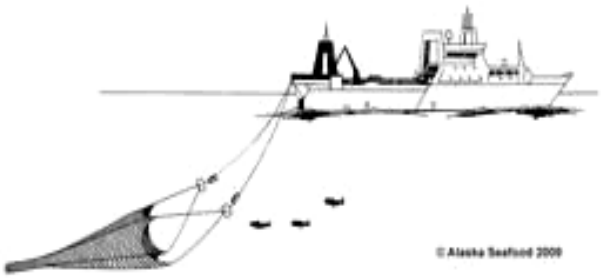
Pot gear

For the catch of Alaska whitefish, pots are used for black cod and cod, but never for pollock, halibut, or sole. In the case of sablefish, pots are being increasingly used by fisherman because of the increased loss of halibut to killer and sperm whales depredation on longline gear. Pots are large steel-framed cages covered in net mesh. The baited pots are placed on the seafloor where they trap the fish. Fish enter the traps through tunnels but cannot escape. Later the pots are retrieved and the fish are sorted on deck. Non-target catch is returned to the sea.



Trawl gear

Sablefish are caught and legally landed as bycatch during directed trawl fisheries for other species groups such as rockfish and deepwater flatfish under Maximum Retainable Allowances specifications (explained in page 21).



A trawl is a large, bag-shaped net that is towed by a fishing vessel. Trawlers are generally large boats ranging from 70 feet to over 200 feet in length. The doors, because of the way they are built and rigged to the trawl, keep the mouth of the trawl open as it moves through the water. The headrope is equipped with floats forming the upper opening. The footrope is rigged with weights forming the lower opening. Trawlers use sophisticated ultrasonic devices both for location of fish underwater and for species identification.

Upon locating a school of the desired species, the vessel trawls through the school and captures the fish. The fish accumulate in the end of the trawl, the "cod end", regardless of the species of fish being harvested. Electronic sensors tell the harvester exactly where the trawl is in relation to the fish and the ocean floor, while other sensors report how full the trawl becomes. When capture is complete, the trawl is brought to the surface.

Once the trawl full of fish reaches the surface of the water, one of two things happens. If the vessel has the ability to process the fish onboard, it is called a factory-trawler or a freezer-trawler or catcher-processor. These vessels simply pull the net aboard, empty the net, sort the species, and process the catch. If the vessel is only capable of catching fish, then it must deliver the catch to a processing plant. These processing plants might be in other vessels, called floating processors, or they might be on shore (http://www.ciaprochef.com/alaskaseafood/harvesting-whitefish.html).

3.3. Fishery Management History and Organization

Management entities

The North Pacific Fishery Management Council. The NPFMC is one of eight regional councils established by the Magnuson Fishery Conservation and Management Act in 1976 [renamed the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), in short Magnuson-Stevens Act (MSA)] to oversee management of the nation's fisheries. The NPFMC recommends regulations to govern the directed sablefish fisheries in waters off Alaska and makes allocation decisions (Figure 4) among sablefish users and user groups fishing off Alaska. NPFMC sablefish management measures include a Total Allowable Catch (TAC) which is divided among gear types (trawl and fixed gear) and an IFQ program for the majority of fixed gear. Fixed gear (longlines and pots) harvests around 85% of the sablefish quota and trawl gear about 15%. In 1995, the NPFMC and the National Oceanic and Atmospheric Administration (NOAA)'s NMFS Alaska Regional Office implemented an IFQ system for the Alaska sablefish and halibut industry, similar to Canada's program implemented in 1991. As a result, the commercial fishing season was extended from only days to around 8 months, usually from mid March to mid November. This ended the derby fishery with its great loss in gear, resource (through wastage and spoilage), economic returns and human life. Sablefish seasons are set simultaneous with those for halibut to reduce waste and discards, since many longline fishermen who target sablefish also hold IFQ for halibut.

The National Marine Fisheries Service. The NOAA's NMFS is responsible for the management, conservation, and protection of living marine resources within the US EEZ. The NMFS Alaska Regional Office oversees fisheries that produce about half the fish caught in US waters, with responsibilities covering 842,000 square nautical miles off Alaska. NOAA's Alaska Fisheries Science Center (AFSC) annually assesses the abundance of sablefish through longline surveys and scientists also conduct trawl surveys to assess their abundance every two or three years. Fishery data is collected by fishery observers and through required and voluntary logbook programs. The NMFS has been tagging and releasing sablefish in Alaska waters since 1972 to study its movements.

Alaska Department of Fish and Game. The state of Alaska manages five Sablefish state fisheries through the ADFG and the BOF outside the IFQ program. Two minor state fisheries are the ones in Cook Inlet and the Aleutian Islands; these are open-access fisheries originally started for fishermen not allowed to participate in the newly formed IFQ program. These fisheries are managed using a Guideline Harvest Level (GHL), which is determined based on harvest history, fishery performance, and the federal survey for the area. Additionally, three major state fisheries exist which are limited entry and are located in Prince William Sound, Chatham and Clarence Strait. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For the Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population. In addition, in Chatham Strait an annual stock assessment is performed which includes a mark-recapture estimate of the population abundance.

Evidence
http://www.nmfs.noaa.gov/fishwatch/species/sablefish.htm
http://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management
http://alaskafisheries.noaa.gov/ram/reports/ifq_cdq_seasons.pdf
http://www.nmfs.noaa.gov/sfa/domes_fish/catchshare/docs/ak_halibut_sablefish.pdf
http://www.fakr.noaa.gov/ram/ifqreports.htm

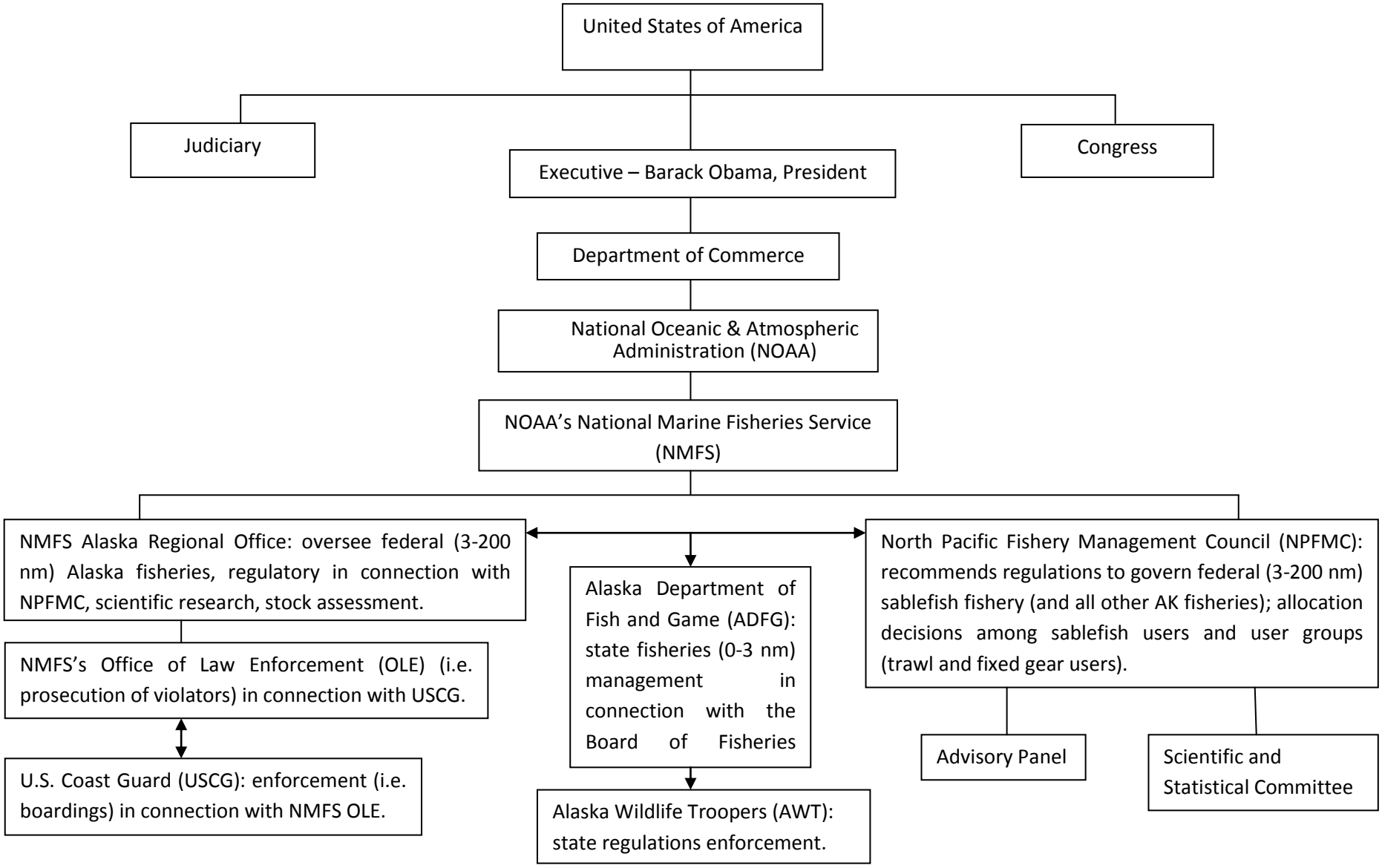


Figure 4: Alaska Sablefish Fisheries Management Chart

Important dates relevant to sablefish management

***Quota allocation**:*
Amendment 14 to the GOA Fishery Management Plan allocated the sablefish quota by gear type: 80% to fixed gear (including pots) and 20% to trawl in the Western and Central GOA, and 95% to fixed gear and 5% to trawl in the Eastern GOA, effective 1985. Amendment 13 to the BSAI Fishery Management Plan, allocated the sablefish quota by gear type, 50% to fixed gear and 50% to trawl in the eastern Bering Sea, and 75% to fixed gear and 25% to trawl gear in the Aleutians, effective 1990.

IFQ management:
Amendment 20 to the GOA Fishery Management Plan and 15 to the BSAI Fishery Management Plan established IFQ management for sablefish beginning in 1995. These amendments also allocated 20% of the fixed gear allocation of sablefish to a Community Development Quotas (CDQ) reserve for the BSAI.

***Maximum retainable allowances (MRA)**:*
MRAs for sablefish were revised in the GOA by a regulatory amendment, effective 10 April 1997. The percentage depends on the basis species: 1% for pollock, Pacific cod, Atka mackerel, "other species", and aggregated amount of non groundfish species. Fisheries targeting deep flatfish, rex sole, flathead sole, shallow flatfish, Pacific ocean perch, shortraker and rougheye rockfish, other rockfish, northern rockfish, pelagic rockfish, demersal shelf rockfish in the Southeast Outside district, and thornyheads are allowed 7%. Arrowtooth flounder fisheries are not allowed to retain any sablefish.

***Allowable gear**:*
Amendment 14 to the GOA Fishery Management Plan banned the use of pots for fishing for sablefish in the GOA, effective 18 November 1985, starting in the Eastern area in 1986, in the Central area in 1987, and in the Western area in 1989. An earlier regulatory amendment was approved in 1985 for 3 months (27 March - 25 June 1985) until Amendment 14 was effective. A later regulatory amendment in 1992 prohibited longline pot gear in the Bering Sea (57 FR 37906). The prohibition on sablefish longline pot gear use was removed for the Bering Sea, except from 1 to 30 June to prevent gear conflicts with trawlers during that month, effective 12 September 1996. Sablefish longline pot gear is allowed in the Aleutian Islands.

***Management areas**:*
Amendment 8 to the GOA Fishery Management Plan established the West and East Yakutat management areas for sablefish, effective 1980 (http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf).

History of the fishery

Early U.S. fishery, 1957 and earlier
Sablefish have been exploited since the end of the 19 th century by U.S. and Canadian fishermen. The North American fishery on sablefish developed as a secondary activity of the halibut fishery of the United States and Canada. Initial fishing grounds were off Washington and British Columbia and then spread to Oregon, California, and Alaska during the 1920's. Until 1957, the sablefish fishery was exclusively a U.S. and Canadian fishery, ranging from off northern California northward to Kodiak Island in the GOA; catches were relatively small, averaging 1,666 t from 1930 to 1957, and generally limited to areas near fishing ports (Low et al. 1976).

Foreign fisheries, 1958 to 1987

Japanese longliners began operations in the eastern Bering Sea in 1958. The fishery expanded rapidly in this area and catches peaked at 25,989 t in 1962. As the fishing grounds in the eastern Bering Sea were pre-empted by expanding Japanese trawl fisheries, the Japanese longline fleet expanded to the Aleutian Islands region and the GOA. In the GOA, sablefish catches increased rapidly as the Japanese longline fishery expanded, peaking at 36,776 t overall in 1972. Catches in the Aleutian Islands region remained at low levels with Japan harvesting the largest portion of the sablefish catch.

Most foreign harvests of sablefish were taken from the eastern Bering Sea until 1968, and then from the GOA until 1977. Heavy fishing by foreign vessels during the 1970's led to a substantial population decline and fishery regulations in Alaska, which sharply reduced catches. Catch in the late 1970's was restricted to about one-fifth of the peak catch in 1972, after the passage of the MSA, Sasaki (1985) described the gear used in the directed Japanese longline fishery. He found only minor differences in the structure of fishing gear and the fishing technique used by Japanese commercial longline vessels.

There were small differences in the length of hachis (Japanese term for a longline skate) and in the number of hooks among vessels, but hook spacing remained about 1.6 m. The use of squid as bait also remained unchanged, except some vessels used Pacific saury as bait when squid was expensive. The standard number of hachis fished per day was 376 (Sasaki 1978) and the number of hooks per hachi was 43 until 1979, when the number was reduced to 40 (T. Sasaki, Japan Fisheries Agency, 4 January 1999).

Japanese trawlers caught sablefish mostly as bycatch in fisheries targeting other species. Two trawl fisheries caught sablefish in the Bering Sea through 1972: the North Pacific trawl fishery which caught sablefish as bycatch in the directed pollock fishery, and the land-based dragnet fishery that sometimes targeted sablefish (Sasaki 1973). The latter fishery mainly targeted rockfishes, Greenland turbot, and Pacific cod, and only a few vessels targeted sablefish (Sasaki 1985).

The land-based fishery caught more sablefish, averaging 7,300 t from 1964 to 1972, compared to the North Pacific trawl fishery, which averaged 4,600 t. In the GOA sablefish were caught as bycatch in the directed Pacific Ocean Perch fishery until 1972, but some vessels started targeting sablefish in 1972 (Sasaki 1973). Most net caught sablefish were caught by stern trawls, but significant amounts also were caught by side trawls and Danish seines the first few years of the Japanese trawl fishery.

Other foreign nations besides Japan also caught sablefish. Substantial U.S.S.R. catches were reported from 1967-73 in the Bering Sea (McDevitt 1986). Substantial R.O.K. catches were reported from 1974-1983 scattered throughout Alaska. Other countries reporting minor sablefish catches were Republic of Poland, Taiwan, Mexico, Bulgaria, Federal Republic of Germany, and Portugal. The U.S.S.R. gear was factory-type stern trawl and the R.O.K. gear was longlines and pots (Low t al. 1976).

Recent U.S. fishery, 1977 to present

The U.S. longline fishery began expanding in 1982 in the GOA and in 1988, harvested all sablefish taken in Alaska except minor joint venture catches. Following domestication of the fishery, the previously year-round season in the GOA began to shorten in 1984. By the late 1980's, the average season length decreased to 1-2 months. In some areas, this open-access fishery was as short as 10 days, warranting the label “derby” fishery.

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Season length (months)	12	7.6	3.0	1.5	1.2	1.8	1.5	1.3	0.9	0.7	0.5	0.3

Season length continued to decrease until Individual Fishery Quotas (IFQ) were implemented for hook and line vessels in 1995 along with an 8-month season. From 1995 to 2002 the season ran from approximately March 15th to November 15th. Starting in 2003 the season was extended by moving the start date to approximately March 1st. The sablefish IFQ fishery is concurrent with the halibut IFQ fishery.

The expansion of the U.S. fishery was helped by exceptional recruitment during the late 1970's. This exceptional recruitment fuelled an increase in abundance for the population during the 1980's. Increased abundance led to increased quotas and catches peaked again in 1988 at about 70% of the 1972 peak. Abundance has since fallen as the exceptional late 1970's year classes have dissipated. With the rationalization of the fishery and improved management, sablefish stock abundance is largely following successful recruitment events, rather than mismanaged harvest. Nevertheless, catches fell again by 2000 to approximately 42% of the 1988 peak. Catches since 2000 have increased modestly, largely due to a strong 1997 year class.

IFQ management has increased fishery catch rates and decreased the harvest of immature fish (Sigler and Lunsford 2001). Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging US$3.1 million annually. Decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery.

For Federal and State sablefish fisheries combined, the number of logline vessels targeting sablefish has decreased dramatically since the IFQ program was initiated (Hiatt 2009).This has improved the economic returns to the fishery and reduced the impacts on both the ecosystem and the stocks.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Vessels	700	646	504	544	528	511	503	491	438	438	399	409	395	388	389

Reference

http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf

3.4. Stock Assessment Activities

The Alaska Fisheries Science Centre (AFSC) conducts annual sablefish logline surveys to estimate their relative abundance on the continental slope of the eastern Bering Sea, Aleutian Islands, and the GOA. While the survey is primarily designed to assess sablefish, and indices of abundance have been computed since 1979, catch data from other species are also available. From 1979-1994, the AFSC conducted cooperative annual logline surveys with Japan, and then independently from 1987-present.

The fixed station positions are divided among six NPFMC management areas: Bering Sea, Aleutian Islands, Western GOA, Central GOA, West Yakut at, and East Yakut at/Southeast. Stations are placed 30-50 km apart, and gear is set from 150-1000 m at each slope station. Catches are pooled by management area and an abundance index is computed for use in stock assessment and fishery evaluation reports.

Model Structure
The sablefish population is represented with an age-structured model. The analysis presented in the 2010 SAFE sablefish report for BSAI and GOA extends earlier age structured models developed by Kimura (1990) and Sigler (1999), which all stem from the work by Fournier and Archibald (1982). The current model configuration follows a more complex version of the GOA Pacific Ocean Perch model (Hansel man et al. 2005a) with split sexes to attempt to more realistically represent the underlying population dynamics of sablefish. The current configuration was accepted by the Ground fish Plan Team and NPFMC in 2008 (Hansel man et al. 2008). The population dynamics and likelihood equations are described in Box 1 of the 2010 sablefish SAFE report. The analysis was completed using AD Model Builder software, a C++ based software for development and fitting of general nonlinear statistical models (Otter Research 2000). The following table lists the parameters estimated independently.

Parameter name	Value	Value	Source
Time period	1981-1993	1996-2004	
Natural mortality	0.1	0.1	Johnson and Quinn (1988)
Female maturity-at-age	$m_a = 1/(1+e^{-0.84(a-6.60)})$		Sasaki (1985)
Length-at-age - females	$\bar{L}_a = 75.6(1-e^{-0.208(a+3.63)})$	$\bar{L}_a = 80.2(1-e^{-0.222(a+1.95)})$	Hanselman et al. (2007)
Length-at-age - males	$\bar{L}_a = 65.3(1-e^{-0.227(a+4.09)})$	$\bar{L}_a = 67.8(1-e^{-0.290(a+2.27)})$	Hanselman et al. (2007)
Weight-at-age - females	$\ln \hat{W}_a = \ln(5.47) + 3.02\ln(1-e^{-0.238(a+1.39)})$		Hanselman et al. (2007)
Weight-at-age - males	$\ln \hat{W}_a = \ln(3.16) + 2.96\ln(1-e^{-0.356(a+1.13)})$		Hanselman et al. (2007)
Age-age conversion	Known	Known	Heifetz et al. (1999)
Recruitment variability (σ_r)	1.2	1.2	Sigler et al. (2002)

Age and Size of Recruitment: Juvenile sablefish rear in near shore and continental shelf waters, moving to the upper continental slope as adults. Fish first appear on the upper continental slope, where the longline survey and longline fishery primarily occur, at age 2 and a length of about 45 cm fork length. Fish are susceptible to trawl gear at an earlier age than to longline gear because trawl fisheries usually occur on the continental shelf and shelf break inhabited by younger fish, and catching small sablefish is hindered by the large bait and hooks on longline gear.

Growth and maturity: Sablefish grow rapidly in early life, growing 1.2 mm d^{-1} during their first spring and summer (Sigler et al. 2001). Within 100 days after first increment formation, they average 120 mm. Sablefish are currently estimated to reach average maximum lengths and weights of 68 cm and 3.4 kg for males and 80 cm and 6.2 kg for females. New growth relationships were recently estimated as more age data has become available (Hanselman et al. 2007); this analysis was accepted by the Plan Team in November 2007. The AFSC divided the data into two time periods based on the change in sampling design that occurred in 1995. It appears that sablefish maximum length and weight has increased slightly over time. New age-length conversion matrices were constructed using these curves with normal error fit to the standard deviations of the collected lengths at age. These new matrices provided for a superior fit to the data. Therefore, AFSC uses a bias-corrected and updated growth curve for the older data (1981-1993) and a new growth curve describing recent randomly collected data (1996-2004). Sablefish are difficult to age, especially those older than eight years (Kimura and Lyons 1991). To compensate, AFSC uses an ageing error matrix based on known-age otoliths (Heifetz et al. 1999). Fifty percent of females are mature at 65 cm, while 50 percent of males are mature at 57 cm (Sasaki 1985), corresponding to ages 6.5 for females and 5 for males (Table 3.8, 2010 Sablefish SAFE Report reproduced here below). Maturity parameters were estimated independently of the assessment model and then incorporated into the assessment model as fixed values.

Table 3.8. Sablefish fork length (cm), weight (kg), and proportion mature by age and sex (weights from 1996-2004 age-length data).

	Fork length (cm)		Weight (kg)		Fraction mature	
Age	Male	Female	Male	Female	Male	Female
2	48.1	46.8	1.0	0.9	0.059	0.006
3	53.1	53.4	1.5	1.5	0.165	0.024
4	56.8	58.8	1.9	2.1	0.343	0.077
5	59.5	63.0	2.2	2.6	0.543	0.198
6	61.6	66.4	2.5	3.1	0.704	0.394
7	63.2	69.2	2.7	3.5	0.811	0.604
8	64.3	71.4	2.8	3.9	0.876	0.765
9	65.2	73.1	2.9	4.2	0.915	0.865
10	65.8	74.5	3.0	4.4	0.939	0.921
11	66.3	75.7	3.0	4.6	0.954	0.952
12	66.7	76.6	3.1	4.8	0.964	0.969
13	67.0	77.3	3.1	4.9	0.971	0.979
14	67.2	77.9	3.1	5.1	0.976	0.986
15	67.3	78.3	3.1	5.1	0.979	0.99
16	67.4	78.7	3.1	5.2	0.982	0.992
17	67.5	79.0	3.1	5.3	0.984	0.994
18	67.6	79.3	3.2	5.3	0.985	0.995
19	67.6	79.4	3.2	5.3	0.986	0.996
20	67.7	79.6	3.2	5.4	0.987	0.997
21	67.7	79.7	3.2	5.4	0.988	0.997
22	67.7	79.8	3.2	5.4	0.988	0.998
23	67.7	79.9	3.2	5.4	0.989	0.998
24	67.7	80.0	3.2	5.4	0.989	0.998
25	67.7	80.0	3.2	5.4	0.989	0.998
26	67.8	80.1	3.2	5.4	0.99	0.998
27	67.8	80.1	3.2	5.4	0.99	0.999
28	67.8	80.1	3.2	5.4	0.99	0.999
29	67.8	80.1	3.2	5.5	0.99	0.999
30	67.8	80.2	3.2	5.5	0.99	0.999
31	67.8	80.2	3.2	5.5	1	1

The maturity - length function is ml = 1 / (1 + e -0.40 (L - 57)) for males and ml = 1 / (1 + e -0.40 (L - 65)) for females. Maturity at age was computed using logistic equations fit to the length-maturity relationships shown in Sasaki (1985, Figure 23, GOA). Prior to the 2006 assessment, average male and female maturity was used to compute spawning biomass. Beginning with the 2006 assessment, female-only maturity has been used to compute spawning biomass. Female maturity-at-age from Sasaki (1985) is described by the logistic fit of ma = 1/(1+e-0.84(a-6.60)).

Maximum age and natural mortality: Sablefish are long-lived; ages over 40 years are regularly recorded (Kimura et al. 1993). Reported maximum age for Alaska is 94 years (Kimura et al. 1998); the previous reported maximum was 62 (Sigler et al. 1997). Canadian researchers report age determinations up to 55 years (McFarlane and Beamish 1983). A natural mortality rate of M=0.10 has been assumed for previous sablefish assessments, compared to M=0.112 assumed by Funk and Bracken (1984). Johnson and Quinn (1988) used values of 0.10 and 0.20 in a catch-at-age analysis and found that estimated abundance trends agreed better with survey results when M=0.10 was used. Natural mortality has been modelled in a variety of ways in previous assessments. For sablefish assessments before 1999, natural mortality was assumed to equal 0.10. For assessments from 1999 to 2003, natural mortality was estimated rather than assumed to equal 0.10; the estimated value was about 0.10. For the 2004 assessment, a more detailed analysis of the posterior probability showed that natural mortality was not well-estimated by the available data. The posterior distribution of natural mortality was very wide, ranging to near zero. The acceptance rate during Markov Chain Monte Carlo (MCMC) runs was low, 0.10-1.15. Parameter estimates even for MCMC chains thinned to every 1000th value showed some serial correlation. For the 2005 assessment AFSC assumed that the approximate value of natural mortality was known very precisely (c.v. = 0.001 for prior probability distribution) and that the approximate value was 0.10. At this level of prior precision, it was essentially a fixed parameter. Using such a precise prior on a relatively unknown parameter to fix it is of no use except to acknowledge that AFSC does not know the parameter value exactly. However, it creates confusion and is an improper use of Bayesian priors, so in 2006 AFSC returned to fixing the parameter at 0.10.

Variance and effective sample sizes: Several quantities were computed in order to compare the variance of the residuals to the assumed input variances. The standardized deviation of normalized residuals (SDNR) is closely related to the root mean squared error (RMSE) or effective sample size; values of SDNR of approximately 1 indicate that the model is fitting a data component as well as would be expected for a given specified input variance. The normalized residuals for a given year *i* of the abundance index was computed as:

$$\delta_i = \frac{\ln(I_i) - \ln(\hat{I}_i)}{\sigma_i}$$

where σ_i is the input sampling standard deviation of the estimated abundance index. For age or length composition data assumed to follow a multinomial distribution, the normalized residuals for age/length group *a* in year *i* were computed as:

$$\delta_{i,a} = \frac{(y_{i,a} - \hat{y}_{i,a})}{\sqrt{\hat{y}_{i,a}(1-\hat{y}_{i,a})/n_i}}$$

where *y* and $\hat{y}$ are the observed and estimated proportion, respectively, and n is the input assumed sample size for the multinomial distribution. The effective sample size was also computed for the

age and length compositions modelled with a multinomial distribution, and for a given year *i* was computed as:

$$E_i = \frac{\sum_a \hat{y}_a * (1 - \hat{y}_a)}{\sum_a (\hat{y}_a - y_a)^2}.$$

An effective sample size that is nearly equal to the input sample size can be interpreted as having a model fit that is consistent with the input sample size. For the 2010 recommended assessment model, AFSC used average SDNR as a criterion to help reweight the age and length compositions. SDNR is a common metric used for goodness of fit in other fisheries, particularly in New Zealand (e.g. Langley and Maunder 2009) and has been recommended for use in fisheries models in Alaska during multiple CIE reviews such as Atka mackerel (R.I.C.C. Francis) and rockfish (P. Cordue). AFSC iteratively reweighted the model by setting an objective function penalty to reduce the deviations of average SDNR of a data component from one. Initially, AFSC tried to fit all multinomial components this way, but due to tradeoffs in fit, it was found that the input sample sizes became too large and masked the influence of important data such as abundance indices. Given that AFSC has age and length samples from nearly all years of the longline surveys, AFSC chose to eliminate the attempt to fit the length data well enough to achieve an average SDNR of one, and reweighted all age components and only length components where no age data exists (e.g. domestic trawl fishery). The abundance index SDNRs were calculated, but no attempt was made to adjust their input variance because AFSC has a priori knowledge about their sampling variances. This process was completed before the 2010 data were added into the assessment. The table below shows the input CVs/sample sizes for the data sources and their associated output SDNR for the recommended model. This reweighting is intended to be done once and then fixed for at least several years.

	Input N/CV	SDNR	Effective N
Multinomial Compositions			
Domestic LL Fishery Ages	200	0.99	176
Domestic LL Fishery Lengths	120	0.86	321
Trawl Fishery Sizes	50	0.94	101
LL Survey Ages	160	0.96	175
NMFS Trawl Survey Lengths	140	0.96	188
Domestic LL Survey Lengths	20	0.30	196
Japanese/Coop LL Survey Lengths	20	0.32	199
Lognormal abundance indices			
Domestic RPN	5%	1.93	
Japanese/Coop RPN	5%	1.47	
Domestic Fishery RPW	10%	0.81	
Foreign Fishery RPW	10%	1.17	
NMFS Trawl Survey	8-14%	2.41	

Parameters Estimated Conditionally

Below is a summary of the parameter totals estimated conditionally in the recommended model:

Parameter name	Symbol	Number
Catchability	q	6
Log-mean-recruitment	μ_r	1
Spawners-per-recruit levels	F_{35}, F_{40}, F_{50}	3
Recruitment deviations	τ_y	78
Average fishing mortality	μ_f	2
Fishing mortality deviations	ϕ_y	102
Fishery selectivity	fs_a	8
Survey selectivity	ss_a	7
Total		207

Catchability is separately estimated for the Japanese longline fishery, the cooperative longline survey, the domestic longline survey, U.S. longline derby fishery, U.S. longline IFQ fishery, and the NMFS GOA trawl survey. Information is available to link these estimates of catchability. Kimura and Zenger (1997) analyzed the relationship between the cooperative and domestic longline surveys. For assessments through 2006, AFSC used their results to create a prior distribution which linked catchability estimates for the two surveys. For 2007, AFSC estimated new catchability prior distributions based on the ratio of the various abundance indices to a combined Alaskan trawl index. This resulted in similar mean estimates of catchability to those previously used, but allowed us to estimate a prior variance to be used in the model. This also facilitates linking the relative catchabilities between indices. These priors were used in the recommended model for 2008. This analysis was presented at the September 2007 Plan Team and is presented in its entirety in Hanselman et al. (2007). Lognormal prior distributions were used with the parameters shown below:

Index	U.S. LL Survey	Jap. LL Survey	Fisheries	GOA Trawl
Mean	7.857	4.693	4.967	0.692
CV	33%	24%	33%	30%

Recruitment is not estimated with a stock-recruit relationship, but is estimated with a level of average recruitment with deviations from average recruitment for the years 1933-2010. Fishing mortality is estimated with two average fishing mortality parameters for the two fisheries (fixed gear and trawl) and deviations from the average for years 1960-2010 for each fishery. Selectivity is represented using a function and is separately estimated by sex for the longline survey, fixed-gear fishery, and the trawl survey. Selectivity for the longline surveys and fixed-gear fishery is restricted to be asymptotic by using the logistic function. Selectivity for the trawl fishery and trawl survey are dome-shaped (right descending limb) and estimated with a two-parameter gamma-function and a power function respectively. This right-descending limb is allowed because AFSC does not expect that the trawl survey and fishery will catch older aged fish as frequently because they fish shallower than the fixed-gear fishery. Selectivity for the fixed-gear fishery is estimated separately for the "derby" fishery prior to 1995 and the IFQ fishery from 1995 thereafter. Fishers may choose where they fish in the IFQ fishery, compared to the crowded fishing grounds during the 1985-1994 "derby" fishery, when fishers reportedly often fished in less productive depths due to crowding (Sigler and Lunsford 2001). In choosing their ground, they presumably target bigger, older fish, and depths that produce the most abundant catches.

Bayesian analysis

Since the 1999 assessment, AFSC developed a limited Bayesian analysis that considered uncertainty in the value of natural mortality as well as survey catchability. The Bayesian analysis has been modified in various ways since the 1999 assessment. In this latest 2010 assessment, the Bayesian analysis considers additional uncertainty in the remaining model parameters, but not natural mortality.

The multidimensional posterior distribution is mapped by Bayesian integration methods. The posterior distribution was computed based on 10 million MCMC simulations drawn from the posterior distribution and thinned to 5,000 parameter draws to remove serial correlation between successive draws and a burn-in of 1 million draws was removed from the beginning of the chain. This was determined to be sufficient through simple chain plots, and comparing the means and standard deviations of the first half of the chain with the second half.

AFSC estimated the posterior probability that projected abundance will fall below thresholds of 17.5% (minimum stock size threshold or MSST) and 35% (maximum sustainable yield or MSY) of the unfished spawning biomass based on the posterior probability estimates. Abundance was projected for 14 years. In the projections, future recruitments varied as random draws from a lognormal distribution with the mean and standard deviation of the 1979-2008 recruitment, in addition to the uncertainty propagated during the MCMC simulations.

In previous assessments, the decision analysis thresholds were based on Mace and Sissenwine (1993). However, in the NPFMC setting there are thresholds that are defined in the Council harvest rules. These are when the spawning biomass falls below MSY or *B35%* and when the spawning biomass falls below ½ MSY or *B17.5%* which calls for a rebuilding plan under the MSA. For the previous analysis based on Mace and Sissenwine (1993), see Hanselman et al. 2005b.

Model Results

Definitions

Spawning biomass is the biomass estimate of mature females. Total biomass is the estimate of all sablefish age two and greater. Recruitment is measured as the number of age two sablefish. Fishing mortality is fully-selected F, meaning the mortality at the age the fishery has fully selected the fish.

Abundance trends

Sablefish abundance increased during the mid-1960’s due to strong year classes in the early 1960's. Abundance subsequently dropped during the 1970's due to heavy fishing; catches peaked at 53,080 t in 1972. The population recovered due to a series of strong year classes from the late 1970's; spawning abundance peaked again in 1987. The population then decreased because these strong year classes expired. The model suggested an increasing trend in spawning biomass since the all-time low in 2002, but is exhibiting a steady decrease in total biomass since 2003.

Projected 2011 spawning biomass is 37% of unfished spawning biomass. Spawning biomass has increased from a low of 30% of unfished biomass in 2002 to 37% projected for 2011 as shown below in Figure 3.2.7 from the 2010 Sablefish SAFE Report.

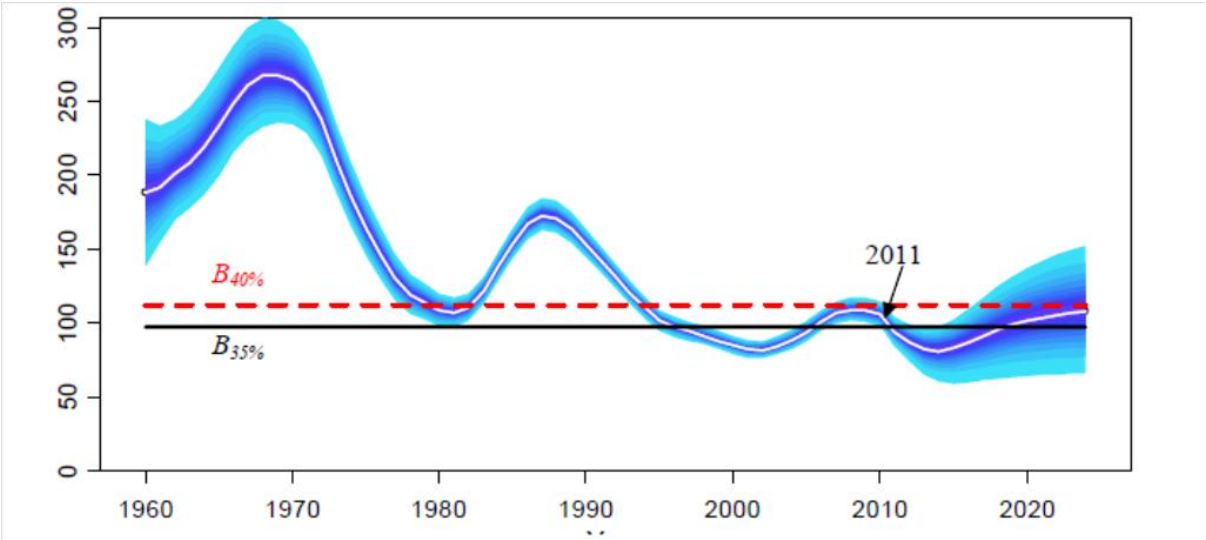


Figure 3.27. Estimates of female spawning biomass (thousands t) and their uncertainty. White line is the median and shaded fills are 5% increments of the posterior probability distribution of spawning biomass based on 10,000,000 MCMC simulations. Width of shaded area is the 95% credibility interval. Harvest policy is least conservative with catch at maximum permissible ABC.

Evidence:

http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
http://www.afsc.noaa.gov/abl/mesa/mesa_sfs_lsd.htm

Center for Independent Experts (CIE) review of the 2008 Alaska Sablefish Stock Assessment and Fishery Evaluation (SAFE) Report.

Multiple changes have been implemented in the Alaskan sablefish (*Anoplopoma fimbria*) assessment in the period since the last independent review. Recently, there have been stakeholder concerns over a real apportionment of harvest and depredation of survey catches by whales. Therefore, NOAA Fisheries' AFSC requested a thorough review of the Alaskan 2008 sablefish assessment. Accordingly the CIE appointed a panel of independent Experts to undertake a review of the 2008 assessment of Alaskan sablefish. The Panel comprised three CIE reviewers, Dr. Michael Armstrong (CEFAS, UK), Dr. John Casey (CEFAS, UK) and Dr. Neil Klaer (CSIRO, Australia); and the review was Chaired by Jim Ianelli (AFSC, Seattle). The review was held at the AFSC laboratory at Lena Point from Tuesday, 17 March 2009, through Thursday, 19 March 2009. These below are the summaries reviews as provided by the three CIE reviewers and can be found at: http://www.alfafish.org/fish-species.shtml

Dr. Armstrong Peer Review Summary

The sablefish assessment uses a statistical, forward-projecting age structured model which estimates population numbers and mortality rates separately for male and female sablefish. The model is fitted using data on catches, length/age compositions and CPUE from the fisheries, and several series of abundance indices and associated age or length compositions from longline and trawl surveys. The 2008 model represents an incremental improvement over the one developed in the 2007 assessment, by making better use of survey age data and reducing the number of parameters describing fishery selectivity. The new model does not alter the perception of recent biomass trends given by the 2007 assessment.

The chosen form of assessment is appropriate for the types of data available. The input data having most influence on the assessment (mainly from the longline fishery and survey) appear to be derived from well-designed surveys and from fishery sampling schemes that have improved over time. Some other data sets, for example the trawl fishery length compositions, are based on more limited sampling. The domestic longline survey is particularly influential in the assessment model. Although its ability to provide indices directly proportional to fish abundance has been studied in relation to gear saturation or competition with other species, the assumption of constant catchability should be reviewed at intervals in the light of any substantive change in conditions that could affect catch rates independent of sablefish density.

The new assessment appears to adequately characterize the long-term trends in sablefish biomass. The model suffers from retrospective bias in estimates of recent biomass, although the bias is much reduced in the last two years. Although the retrospective bias could be eliminated by fixing catchability at the estimates from the most recent assessment, or allowing natural mortality to drift, the causes of the bias remain poorly understood. The raw longline survey and fishery CPUE trends do not suggest the trough in 4+ biomass estimates from the mid 1990s to the early 2000s given by the full assessment model. There are also some unusual trends in the relative abundance of males and females estimated by the split-sex model, suggesting that future assessments may benefit from including sex ratio in the estimation procedure. Fitting combined-sex length based selectivity curves for the different fleets may also help.

Despite the bias issues, the current assessment model provides the most appropriate basis for determining stock trends, short-term projections and catch options for 2009 based on the existing biological reference points. The uncertainties around the projections are correctly characterised by the MCMC simulations that also capture the uncertainties in the historical assessment.

The assessment and forecasts would benefit from better information on abundance of more recent year classes recruiting to the fishery. The GOA trawl fishery data should provide useful data although it is not annual and the length compositions are not well fitted in the assessment. Other sources of index data on young sablefish should be evaluated for possible inclusion in the assessment, and further work on climate and ecosystem related drivers of sablefish population dynamics should be pursued.

The effect of whale depredation on the longline survey indices and on catch apportionment calculations was of concern to stakeholders. Depredation is very regional, and although previous estimates of numbers of sablefish removed from the lines are relatively small, the incidence of sperm whale depredation has been increasing in the eastern GOA. Further work is needed to evaluate ways of quantifying and reducing whale depredation.

The AFSC has a substantial data base of conventional tagging results from releases carried out over many years, as well as a growing data set from archival tagging. The data appear to be under-utilised and there is considerable potential for incorporating the tagging data into spatial models of sablefish dynamics that could be used both for developing operating models to test assessment and management procedures, and for implementing a spatially resolved assessment model. If a spatially resolved model can be successfully fitted, with robust estimates of regional selectivity and catchability parameters, it would also provide a sounder basis for evaluating catch apportionment schemes.

Dr. Casey peer review summary

In general, the input data and methods used to process them for inclusion in the assessment were adequate and appropriate. The fishery and survey data were extensive and well documented. The current treatment of abundance index data affected by whale depredation is unlikely to have affected the overall management advice for the Alaskan sablefish stock, but the Panel notes that alternative approaches should be investigated for dealing with any further increases in whale depredation.

Knowledge of stock structure, natural mortality and sex-related maturity and growth parameters are adequately represented in the assessment although there are some issues regarding the handling of sex ratio in the model that need to be resolved for future assessments. Although the assessment showed some retrospective bias up to 2006, the analytical approach provides an acceptable basis for assessing stock condition and status and for providing management advice.

The current apportionment scheme is difficult to evaluate given the information presented, particularly since there are unstated socio-economic objectives that play a role. It is recommended that a set of objectives be clearly identified. While recognizing that there are uncertainties in regional abundance and productivity, the approach of distributing Allowable Biological Catch (ABC) values taking into account regional biomass levels appears an appropriate way of attaining equivalent fishing mortality in the different regions.

Overall, the input data used for the 2008 Alaskan sablefish assessment have been processed and used appropriately and the results of the assessment represent the best estimate of current stock status and form an appropriate basis on which to take management decisions. Accordingly and noting that Alaskan sablefish are managed under Tier 3 of NPFMC harvest rules, Dr. Casey concurred with the findings of the 2008 assessment and with the ABC set for 2009.

Dr. Klaer Peer Review Summary

In general, the input data and methods used to process them for inclusion in the assessment were adequate and appropriate. The fishery and survey data were extensive and well documented.
A single document should be developed that describes reference data for catches, abundance indices and age/size composition and how they were created. Those reference sets should also be electronically archived at a single location.
Generalized Linear Models should be used to standardize fishery CPUE data, and possibly other abundance indices used in the assessment.

Knowledge of stock structure, natural mortality and sex-related maturity and growth parameters are adequately represented in the assessment. Efforts to quantify ecosystem and environmental effects on sablefish dynamics should continue to be encouraged.

The analytical approach was appropriate and provides an acceptable basis for management advice.
For future assessments, spatial structure could be implemented simply within the current assessment using area-specific selectivity by fishing method. A fully spatially structured assessment model that includes movement among areas could be implemented in parallel with the current assessment to test whether the additional complexity is justified. Stock Synthesis 3 should be considered as a candidate model to use for the implementation of spatial structure.
Improved documentation of projection methods is required. Bias correction should be examined. Uncertainty in assessment results should be more fully explored using alternative model structures, and this uncertainty should be communicated to management. Simulation testing should be used to verify the assessment models, compare among alternative assessment model structures, and to test the robustness of harvest strategies and apportionment schemes to uncertainty. Implementation of a MSE framework for Alaskan sablefish would achieve all of these goals.

The current apportionment scheme is difficult to evaluate given the information presented, particularly since there are unstated socio-economic objectives that play a role. A set of objectives should be clearly identified. The approach of distributing ABC values, taking into account regional biomass levels, appears an appropriate way of attaining equivalent fishing mortality in the different regions.

CIE Reviews available at: http://www.alfafish.org/fish-species.shtml

Responses of AFSC to the review panel are provided in section 3C of the 2009 Sablefish SAFE report accessible at http://www.afsc.noaa.gov/refm/docs/2009/BSAIsablefish.pdf.

Additional review and comments from the NPFMC Scientific and Statistical Committee (SSC)

Every year the Stock Assessment and Fishery Evaluation Report (SAFE) and findings originated at the AFSC is passed on to the NPFMC's SSC for comment and review. Review and comments details are available in each SAFE report and should be consulted if further information is required.

Changes of the Stock Assessment Model in response to the CIA panel review and SSC comments.

2009 SAFE Report (Advice for 2010) Summary of major changes:

- Relative to 2008's assessment, AFSC made the following substantive changes in the current assessment.
- *Input data:* Addition of relative abundance and length data from the 2009 longline survey, relative abundance and length data from the 2008 longline and trawl fisheries, and age data from the 2008 longline survey and longline fishery were added to the assessment model. A NMFS GOA trawl survey was conducted in 2009 and its biomass estimate and associated lengths were also added.
- *Model changes:* No model changes were recommended for 2010. A modelling workshop to begin implementing CIE recommendations and evaluate industry concerns was planned for winter 2010. AFSC initial responses to the CIE review are in Appendix 3C. http://www.afsc.noaa.gov/refm/docs/2009/BSAIsablefish.pdf

2010 SAFE Report (Advice for 2011) Summary of major changes

- Relative to the 2009's assessment, AFSC made the following substantive changes in the current assessment.
- *Input data*: AFSC added relative abundance and length data from the 2010 longline survey, relative abundance and length data from the 2009 longline and trawl fisheries, age data from the 2009 longline survey and 2009 longline fishery, updated 2009 catch and estimated 2010 catch to the assessment model. As recommended in the 2009 CIE review and 2010 sablefish modelling workshop, AFSC eliminated the longline surveys' relative population weight (RPW) indices from the model to avoid double use of the information from those surveys. Now AFSC only fits relative population numbers (RPN) from the longline surveys.
- *Model changes*: AFSC recommended minor adjustments to the variance assumptions in the model. By eliminating an index, it was appropriate to rebalance data weightings. AFSC used the standard deviation of the normalized residuals (SDNR) as a criterion to reweight the compositional likelihoods. This resulted in a model with better balance between likelihood components and less weight on length information when ages were available. http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf

3.5. Historic Biomass and Removals in the Alaska Sablefish Fishery

Historic Biomass

The historic biomass of sablefish in Alaska is presented here below in Figure 3.10 of the 2010 Sablefish SAFE Report Biomass has stabilized since the mid 1990s after previous biomass peaks in the mid 1980s and the late 1960s. These peaks were due to strong recruitment.

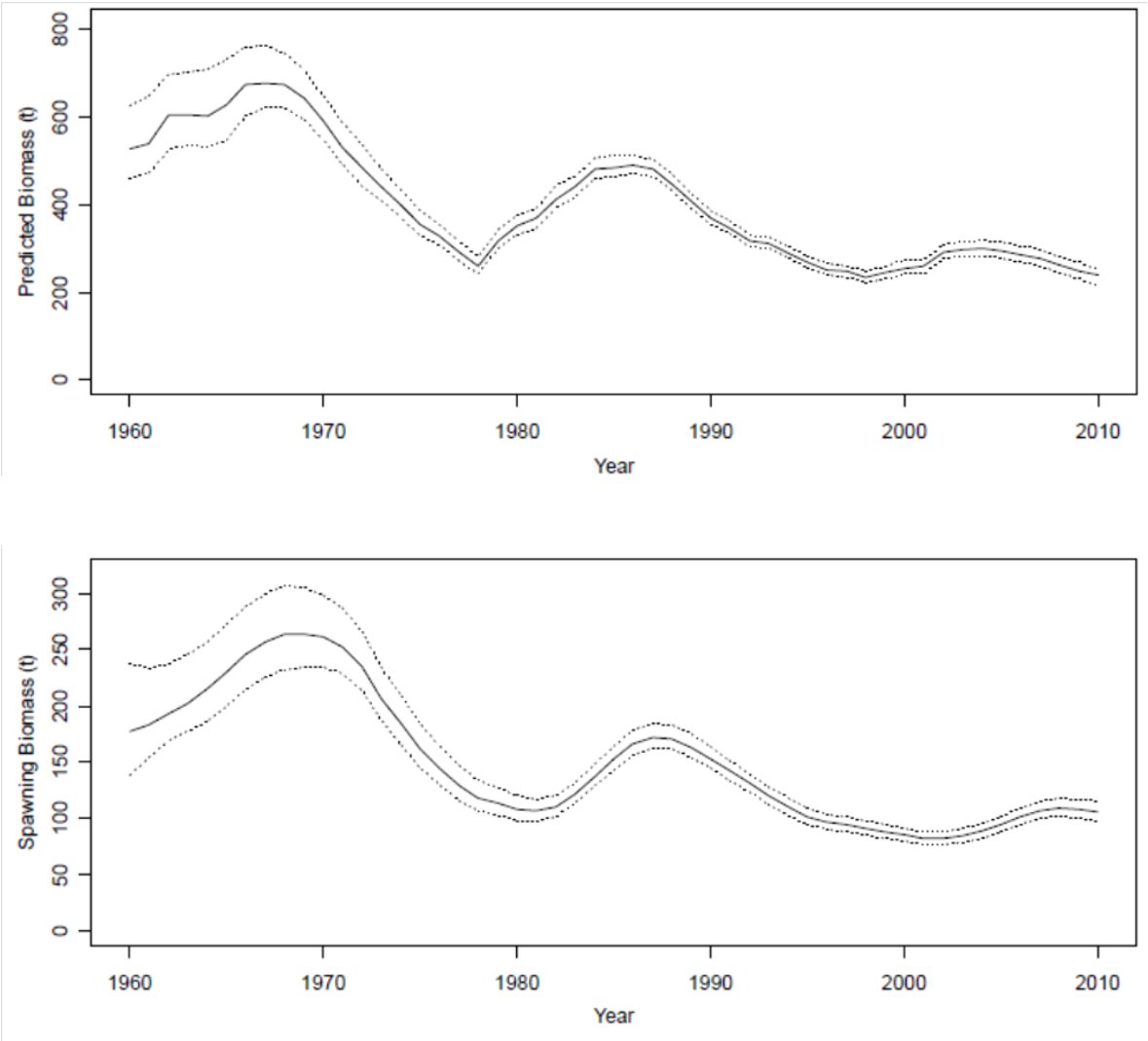


Figure 3.10.--Estimated sablefish total biomass (thousands t) and spawning biomass (bottom) with 95% MCMC credible intervals.

Also, Figure 5 below presents Alaska sablefish spawning stock biomass against landings from 1960 to 2010.

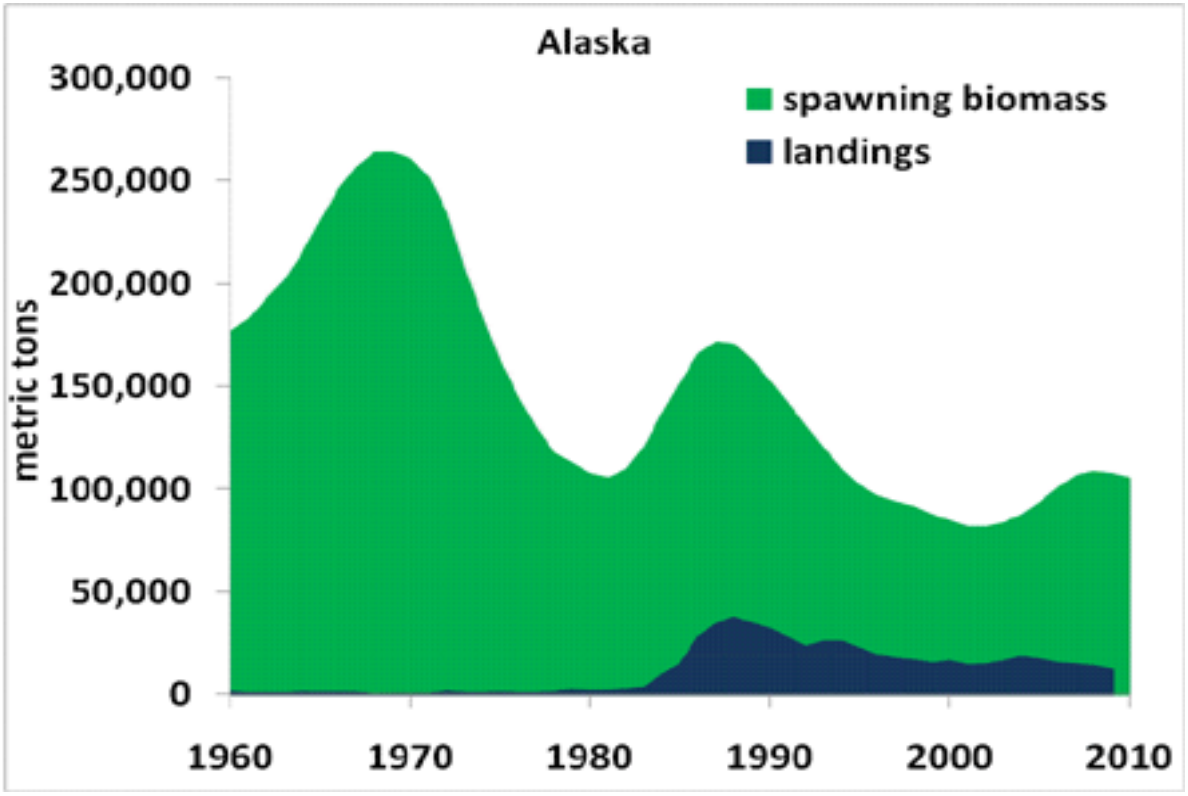


Figure 5. Alaska sablefish spawning stock biomass and landings from 1960 to 2010.

Sablefish catch in Alaska

Annual catches in Alaska averaged about 1,700 t from 1930 to 1957 and exploitation rates remained low until Japanese vessels began fishing for sablefish in the Bering Sea in 1958 and the GOA in 1963. Catches rapidly escalated during the mid 1960's. Annual catches in Alaska reached peaks in 1962, 1972, and 1988 (Figure 3.1 of the 2010 Sablefish SAFE Report).

The 1972 catch was the all-time high, at 53,080 t, and the 1962 and 1988 catches were 50% and 72% of the 1972 catch. Evidence of declining stock abundance and passage of the MSFCMA led to significant fishery restrictions from 1978 to 1985, and total catches were reduced substantially.

Catches averaged about 12,200 t during this time. Exceptional recruitment fuelled increased abundance and increased catches during the late 1980's. The domestic fishery also expanded during the 1980's, harvesting 100% of the catch in the GOA by 1985 and in the Bering Sea and Aleutians by 1988. Catches declined during the 1990's. Catches peaked at 38,406 t in 1988, fell to about 13,000 t in the late 1990's, and have been near 13,000 t recently.

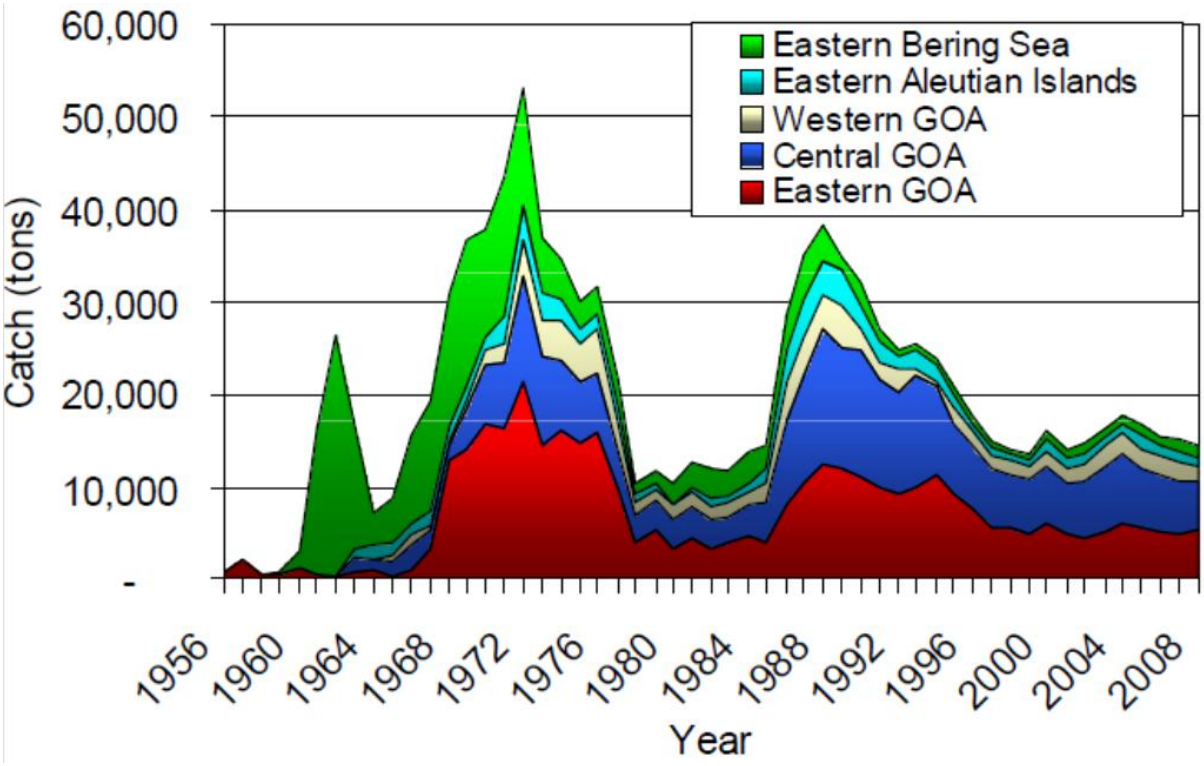


Figure 3.1. Sablefish Fishery Total Reported Catch (t) by NPFMC area and year.

Evidence
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
http://www.alfafish.org/misc-pdfs/sablefish/Sable_PlanTeam_Nov2010.pdf
http://www.nmfs.noaa.gov/fishwatch/species/sablefish.htm

Bycatch and discards

Sablefish discards have decreased in recent years. From 1994 to 2003 discards averaged 1,357 t for the GOA and BSAI combined (Table 3.2 Hanselman et al. 2008). The highest amount was 800 t in 2004, of which 667 t occurred in the GOA and 133 t occurred in the BSAI. Discards decreased after 2003, down to an average in 2004-09 of 697 mt, 89% of which occurred in the GOA. The discards from trawl fisheries decreased from a 1994-2003 average of 825 t to an average of 262 mt for 2004-2009, while hook and line fisheries decreased slightly from 525 t down to 462 t (Table 3.2 below from the 2010 Sablefish SAFE Report).

Table 3.2. Discarded catches of sablefish (amount [t], percent of total catch, total catch [t]) by (H&L=hook & line, Pot, Trwl=trawl), FMP area for 1994-2009. Average values are shown fo 2003. Annual values for 1994-2003 are shown in previous sablefish SAFE chapters.

		BSAI			GOA			Combined		
YEAR	Gear	Discard	% Discard	Catch	Discard	% Discard	Catch	Discard	% Discard	Catch
1994 -	H&L	122	10%	1,281	403	3%	13,358	525	4%	14,639
2003	Pot	7	2%	508				7	2%	508
Average	Trwl	52	17%	314	773	35%	2,232	825	32%	2,546
	Total	181	9%	2,103	1,177	8%	15,590	1,357	8%	17,693
2004	H&L	29	3.4%	852	461	3.2%	14,346	489	3.2%	15,197
	Pot	18	2.2%	817	-	0.0%	-	18	2.2%	817
	Trwl	86	26.5%	325	206	15.5%	1,332	292	17.7%	1,656
	Total	133	6.7%	1,993	667	4.3%	15,677	800	4.5%	17,670
2005	H&L	28	3.2%	880	255	2.0%	12,860	283	2.1%	13,741
	Pot	33	2.6%	1,277	-	0.0%	-	33	2.6%	1,277
	Trwl	32	8.2%	388	181	15.5%	1,169	213	13.7%	1,556
	Total	93	3.7%	2,545	436	3.1%	14,029	529	3.2%	16,574
2006	H&L	46	4.7%	982	286	2.4%	12,073	332	2.5%	13,055
	Pot	6	0.6%	1,042	-	0.0%	-	6	0.6%	1,042
	Trwl	10	7.2%	144	269	24.5%	1,098	280	22.5%	1,242
	Total	62	2.9%	2,168	556	4.2%	13,171	618	4.0%	15,339
2007	H&L	16	2.3%	679	242	2.1%	11,586	258	2.1%	12,265
	Pot	46	3.0%	1,511	-	0.0%	-	46	3.0%	1,511
	Trwl	9	6.5%	132	175	15.9%	1,103	184	14.9%	1,235
	Total	70	3.0%	2,322	417	3.3%	12,689	488	3.2%	15,011
2008	H&L	90	10.9%	832	737	6.3%	11,727	827	6.6%	12,558
	Pot	5	0.6%	928	-	0.0%	-	5	0.6%	928
	Trwl	1	0.4%	259	72	8.4%	864	73	6.5%	1,122
	Total	97	4.8%	2,018	809	6.4%	12,590	906	6.2%	14,609
2009	H&L	18	1.5%	1,183	739	7.2%	10,331	756	6.6%	11,515
	Pot	2	0.2%	635	-	0.0%	-	2	0.2%	635
	Trwl	6	3.7%	168	81	9.1%	889	87	8.3%	1,057
	Total	26	1.3%	1,986	820	7.3%	11,220	845	6.4%	13,206
2004 -	H&L	38	4.2%	901	453	3.7%	12,154	491	3.8%	13,055
2009	Pot	18	1.8%	1,035	-	0.0%	-	18	1.8%	1,035
Average	Trwl	24	10.2%	236	164	15.3%	1,076	188	14.4%	1,312
	Total	80	3.7%	2,172	617	4.7%	13,229	697	4.5%	15,402

A table of the average catch (t) of the most abundant species caught in the 2005-2009 sablefish fishery are shown below. Grenadiers are by far the most abundant bycatch in the sablefish fishery. Commercially valuable species taken in the sablefish fishery include thornyhead rockfish, shortraker rockfish, rougheye rockfish, and Pacific cod.

	Hook and Line			Other Gear			All Gear		
Species	Discard	Retained	Total	Discard	Retained	Total	Discard	Retained	Total[1]
Grenadiers[2]	-	-	8,834	-	-	104	-	-	8,938
Thornyhead rockfish	46	377	423	2	14	16	49	391	440
Arrowtooth flounder	321	87	408	110	18	128	431	105	536
Other skates	202	8	209	1	1	2	203	8	211
Shortraker rockfish	79	119	199	4	3	6	83	122	205
Longnose skate	167	6	173	1	1	2	168	7	175
Spiny dogfish	170	0	170	0	0	0	170	0	170
Rougheye rockfish	40	89	128	3	1	4	42	89	132
Pacific cod	32	74	106	1	6	8	33	81	114
Greenland turbot	40	53	93	20	5	25	60	58	118
Other	92	32	124	24	22	46	117	53	170
Total All Species	1,189	845	10,867	166	71	341	1,356	914	11,209

[1] Data from Terry Hiatt (AKFIN database), only includes catch where sablefish were defined as the target. [2]Grenadiers are only listed as Total because they are not defined in the discard tables.

Whale depredation

Depredation by killer whales and sperm whales is not uncommon in the Alaska sablefish IFQ fishery (Sigler et al. 2007). Killer whale depredation occurs in the Bering Sea, Aleutian Islands, and Western GOA. Sperm whale depredation occurs in the Central and Eastern GOA. Pot fishing for sablefish has increased in the BSAI as a response to depredation of longline catches by killer whales. In 2000 the pot fishery accounted for less than ten percent of the fixed gear sablefish catch in the BSAI. Since 2004, pot gear has accounted for over half of the Bering Sea fixed gear IFQ catch and up to 34% of the catch in the Aleutians. In 2009, pot fishing remained a high portion of the fixed gear catch in the BS (70%). In the Aleutian Islands pot fishery, pot fishing appeared to decrease from 22% to 7.6% of the fixed gear catch in 2009. However, this was not due to vessels changing back to longline gear, but solely due to the fact that two of the pot vessels did not fish the Aleutian Islands in that year.

Evidence

http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf

3.6. Economic Value of the Alaska Sablefish Fishery

Most of the total world catch of sablefish comes from Alaska. Sablefish in Alaska has the highest value per pound than any other groundfish. This can be clearly seen in the two figures below depicting the total groundfish share of sablefish in terms of catch (mt) (Figure 5) and value (US$) (Figure 6). Washington, Oregon and California (WOC) have generally accounted for less than one-third of the U.S. harvest, although the WOC share was about 37% in 2009. Outside the U.S., sablefish are caught along the British Columbia coast, from Vancouver north to the Alaskan border.

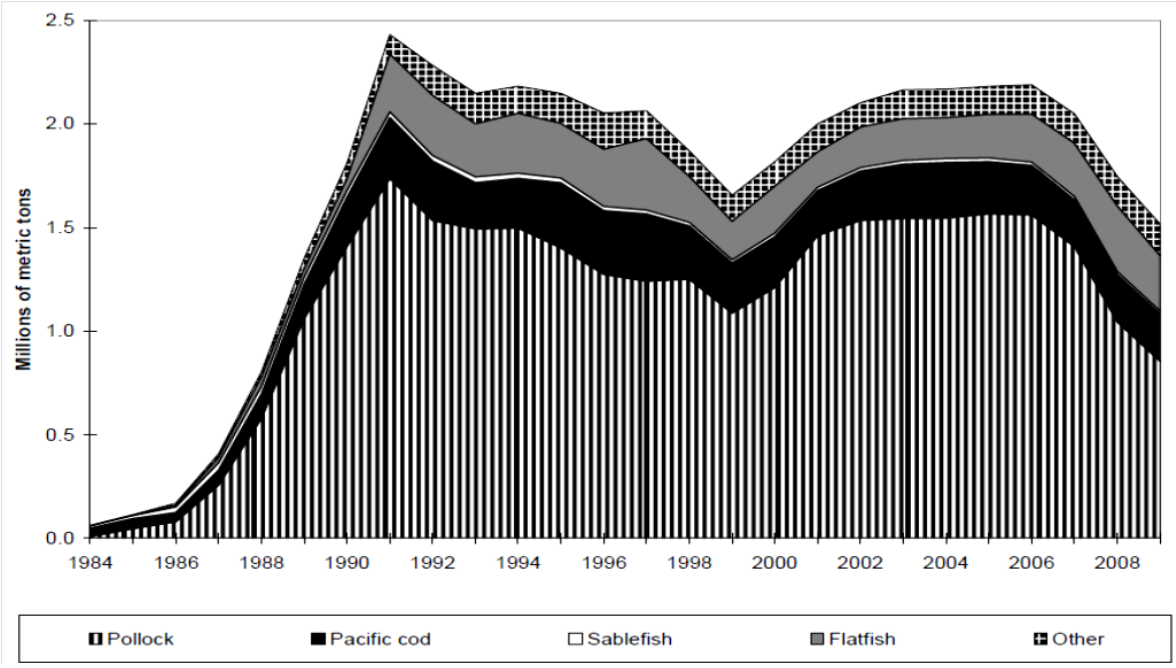


Figure 5. Groundfish catch in the domestic commercial fisheries off Alaska by species, 1984-2009.

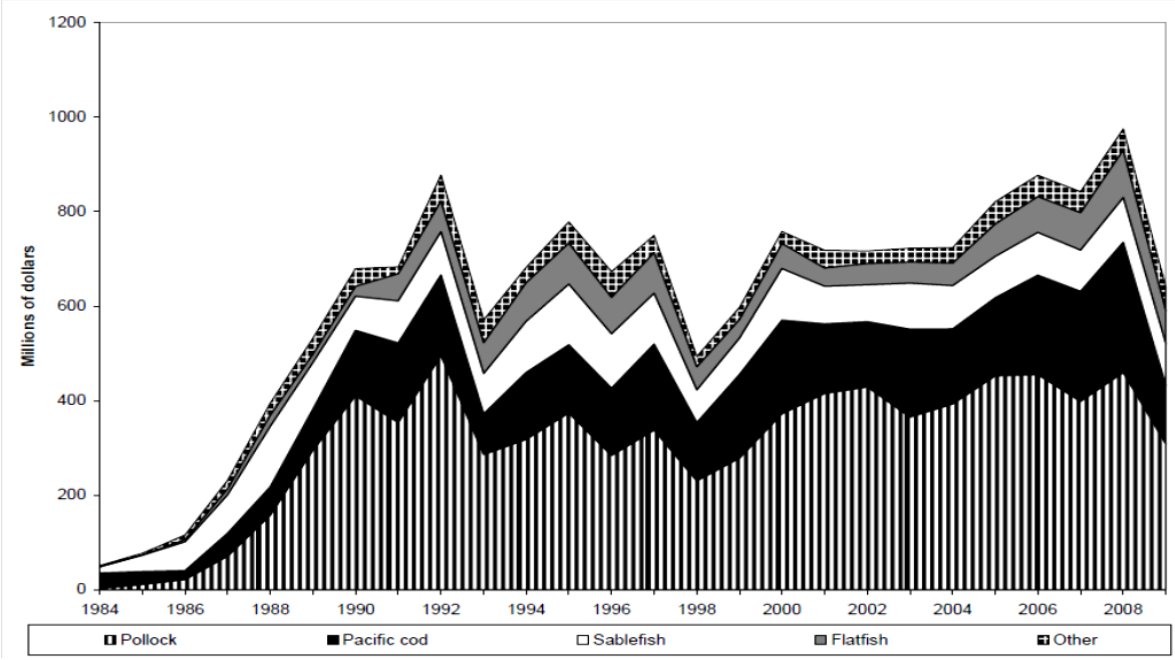


Figure 6. Real ex-vessel value of the groundfish catch in the domestic commercial fisheries off Alaska species, 1994-2009 (base year 2009). Estimates include federal and state fisheries of Alaska.

As a result of its high oil content, sablefish is an excellent fish for smoking. In addition, as a premium-quality whitefish with a delicate texture and moderate flavour, sablefish is prized in up-scale restaurants. Sablefish has several market names in its processed forms. The U.S. consumer may see smoked sablefish as smoked Alaskan cod or sable, and fresh and frozen fillets as butterfish or black cod. Sablefish is a mature market [largely headed and gutted (H&G) in an eastern cut—head removed just behind the collar bone] that is sensitive to relatively minor changes in supply, indicated by prices which in general respond inversely to fluctuations in the Alaska sablefish harvest (Figure 7). Despite that, the export value of sablefish per pound has been steadily increasing over the last ten years (Figure 8).

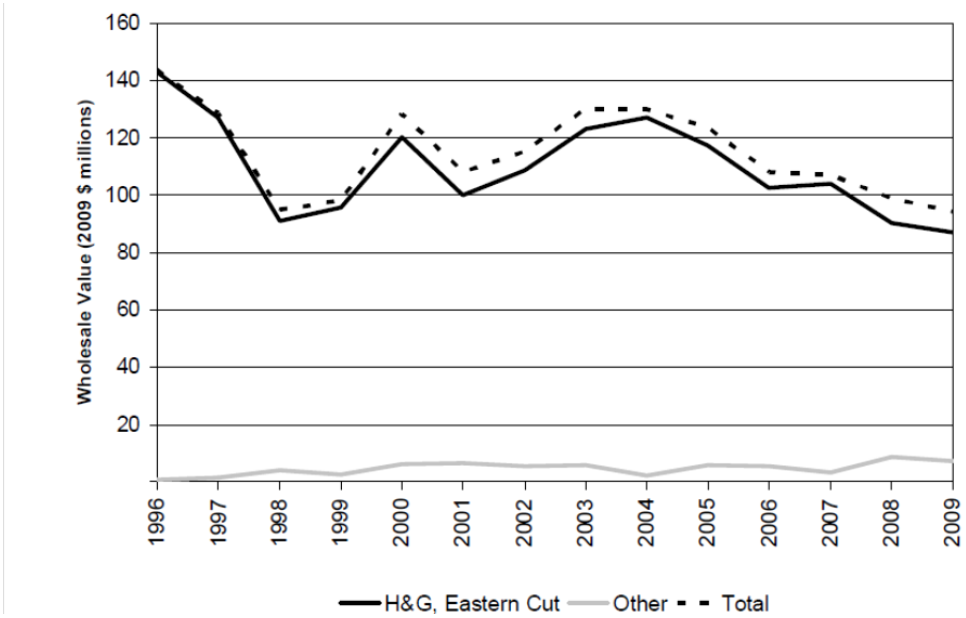


Figure 7. Wholesale value of Alaska primary production of sablefish by product type, 1996-2009.

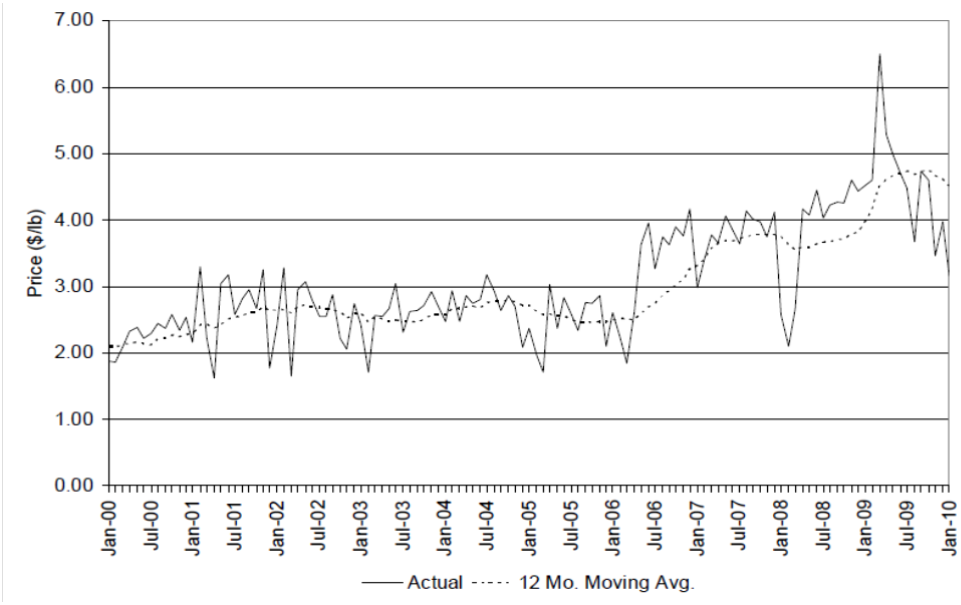


Figure 8. Nominal U.S. Export Prices of Sablefish to All Countries, 2000-2009.

4. Proposed Units of Assessment

The proposed units of Assessment submitted at the time of application were reviewed with respect to their appropriateness for undertaking a full assessment.

The assessors have reviewed the proposed units of assessment with respect to the application of management functions across all jurisdictions and an examination of the characteristics of each of the management regions to assess their similarities and potential differences.

The proposed Units of Assessment within the Unit of Certification are listed below.

Unit of Certification			
U.S. ALASKA SABLEFISH (Black Cod) COMMERCIAL FISHERIES			
Fish Species (Common & Scientific Name)	**Geographical Location of Fishery**	**Gear Type**	**Principal Management Authority**
Sablefish (black-cod) (*Anoplopoma fimbria)*	Gulf of Alaska and Bering sea and Aleutian Islands	Benthic longline Pot Trawl	National Marine Fisheries Service (NMFS) North Pacific Fishery Management Council (NPFMC) Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)

5. Consultation Meetings

5.1 Initial Consultation Meetings

Initial consultation meetings were held in late June and early July 2010. The objectives of the consultation meetings were to provide information and understanding of the activities of the Certification Body and to discuss each of the fishery management organizational roles in the management of the Alaska sablefish fishery resources. Further investigation into the approach that a full assessment might undertake with respect to the current definition of the Unit of Certification was also undertaken during this stage of the assessment.

Further consultation meetings were held during the main assessment step based on the Validation work finalized in October and the initial review activities undertaken to identify the key management organizations and participants. The initial consultation meetings were not designed to be inclusive of all organizations and representatives of the Alaska sablefish fisheries. However, the consultation plan was designed to strategically capture sufficient information to ensure understanding and confidence with respect to full assessment planning.

There were other important functions that the on-site consultation also served. These included:

- Responding to questions and comments raised by participants in the fishery at this initial stage in the assessment.
- Introduction to the Certifying Body.
- Overview and confirmation of the assessment overview and plan (a standard power point presentation was used, also made available on ASMI website for all participants to review).
- General discussion on the specifics of the particular meeting:
    - Units of Certification.
    - Initial site visit objectives and investigative approach.
    - Address any immediate questions raised by management and participatory organizations.
    - Document information that would form part of the full assessment.

All consultation meetings were conducted by Dave Garforth, Assessment Leader, and Stephen Grabacki, contracted Fishery Assessor. Randy Rice, ASMI Seafood Technical Program Director was also present at some meetings as representative of the fishery applicant representative organization. Meetings were held between the 21st June to 2nd July 2010, in Anchorage, Seward, Juneau, and Seattle, WA. Consultation meetings are intended to provide a briefing of the certification process and link to management organizations for the purposes of carrying out the fishery assessments and to support the next step in the assessment, the planning of full assessments for the fisheries in application.

A list of organizations consulted at the initial step in the assessment is presented in **Table 5**.

Table 5. Initial Consultation Meetings

Date	Organization	Staff Represented	Overview/Key Items
21st June 2010	**Icicle Seafoods Inc.** 601 Port Av. Seward, AK 99664	Charles McEldowney, Plant Manager	Icicle Seafoods Inc. is a ground fish (vessel owner and processor). The meeting reviewed the operational management, sourcing and requirements for official reporting/recording of catches at landing and at processing. Review and understanding of fish landing recording and reporting procedure for Alaska ground fish fisheries (sablefish) and for Alaska salmon. The meeting supported the understanding of catch recording and reporting requirements for groundfish and salmon fisheries and provided an overview of processing operations, fish yield calculation and product traceability for these fish products.
22nd June 2010	**North Pacific Fishery Management Council,** 605 West 4th Av. #306 Anchorage, AK 99501-2252	Chris Oliver, Executive Director David Witherell, Deputy Director Jane Dicosimo, Senior Plan Coordinator	The NPFMC has primary responsibility for groundfish management in the GOA and BSAI, including cod, pollock, flatfish, Atka mackerel, sablefish, and rockfish species harvested mainly by trawlers, longliners, and pot fishermen. The Council also makes allocation and IFQ decisions for sablefish and halibut fisheries. Established by the MSA in 1976 to oversee management of the nation's fisheries, the meeting supported the understanding of the role, responsibilities and interaction of the Council with other management organizations in the groundfish fisheries.
27th June 2010	**At-sea Processors Assn.** 217, 2nd St. #201A Juneau AK 99801	Stephanie Madsen, Executive Director	The At-sea Processors Association (APA) is a trade association representing five companies that own and operate 19 U.S.-flag catcher/processor vessels that participate principally in the Alaska pollock fishery and west coast (USA) Pacific whiting fishery. Members include; American Seafood Company, Arctic Storm Management Group, Glacier Fish Co, Starbound LLC and Trident Seafoods. Although APA is not directly involved in sablefish fishing, one of the members operate across a range of species and fisheries, including sablefish, hence have been included in consultation meetings.

28th June 2010	**United Fishermen of Alaska**, 211 4TH St. Suite 110 Juneau AK 99801-1172 (meeting took place at ASMI Juneau office)	Mark Vinsel, Executive Director	United Fishermen of Alaska (UFA) is an umbrella association representing 37 Alaska commercial fishing organizations from fisheries throughout Alaska and its offshore waters. Their mission is to promote and protect the common interest of Alaska's commercial fishing industry, as a vital component of Alaska's social and economic well-being. Core functions include; providing a legislative presence for members, act as a forum for communication within the fishing industry, maintain a state wide trade organization with staffed office and provide public relations and educational programs on behalf of members.
28th June 2010	**Commercial Fisheries Entry Commission**, 8800 Glacier Hwy, #109 PO Box 110302 Juneau AK 99811-0302	Frank Homan, Chairman, Peter Froehlich, Commissioner, Bruce Twomley, Commissioner, Doug Rickey, Law Specialist; Kurt Iverson, Fisheries Analyst	The Commercial Fisheries Entry Commission (CFEC) is the state body responsible for the allocation of permits and vessel licenses for entry to Alaska fisheries. Established in 1973 in response to declining salmon harvests, the CFEC determines when a fishery should be limited and also provides due process hearings and appeals. To date, 65 fisheries have limited entry permits in Alaska. Some key features of the Limited Entry Program include; issuance to natural persons only, prohibiting permit leasing, prevent the use of permits as collateral for loans, and allowing for free transferability. The Limited Entry law also defined entry permits as a use-privilege that can be modified by the legislature without compensation. Free transferability has resulted in maintaining high percentages of residents within Alaska's fisheries and has been upheld by Alaska's Supreme Court. Permit holders are free to transfer their permits to family members or any other individual who is able to participate in the fishery by means of gift, inheritance or sale.
28th June 2010	**Alaska Department of Public Safety, Division of Alaska Wildlife Troopers**, 2760 Sherwood Lane, Suite 1A PO Box 111201, Juneau AK 99811-1201	Lt. Steven Hall	AWT is a Division of the Alaska Department of Public Safety with responsibility for the protection of Alaska fisheries within state waters. The Division's resources and strategy for monitoring fishery activity and enforcement purposes and interaction with other agencies (ADFG, NMFS, US Coast Guard, and BOF) were discussed.

28th June 2010	**U.S. Department of Commerce, National Oceanic & Atmospheric Administration, National Marine Fisheries Service**, Alaska Region PO Box 21668 709 W 9th St Juneau AK 99802-1668	Robert Mecum, Deputy Regional Administrator, Alaska Region.	NOAA's NMFS is responsible for the management, conservation, and protection of living marine resources within the U.S. Exclusive Economic Zone. They are the primary agency involved in enforcement of regulations for the Alaska sablefish. The Alaska Region of NOAA Fisheries oversees fisheries that produce about half the fish caught in US waters, with responsibilities covering 842,000 square nautical miles off Alaska. NMFS works with the fishery management councils and commissions to develop and implement management regulations and also for the conservation of wildlife such as marine mammals and habitat conservation. The meeting provided an opportunity to discuss the assessment and management approach for a variety of fisheries including the Alaska sablefish fishery.
28th June 2010	**Alaska Department of Fish and Game**, Division of Commercial Fisheries PO Box 115526 1255 W 8th St. Juneau AK 99811-5526	Eric Volk, Chief of Research for Anadromous Fisheries Sue Aspelund, Deputy Director Denby Lloyd, Commissioner (present for introductions)	ADFG's mission is to protect, maintain, and improve the fish, game, and aquatic plant resources of the state, and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle. Their main role is to conserve and develop the fishery resources of the state. For sablefish, this refers to the groundfish fishery resources within the state territorial waters (0-3nm). ADFG manages five state fisheries. The meeting provided an opportunity to present the key features of the assessment process, discuss the broad mission and responsibility of ADFG and address questions with respect to the assessment of the sablefish commercial fishery.
29th June 2010	**U.S. Department of Homeland Security, Coast Guard**, District 17 P.O Box 25517, Juneau, Alaska 99802-5517	Cpt. Michael Cerne	The United States Coast Guard is a military, multi-mission, maritime service within the Department of Homeland Security. Its core roles are to protect the public, the environment, and U.S. economic and security interests in any maritime region in which those interests may be at risk, including international waters and America's coasts, ports, and inland waterways. They protect America's maritime borders from all intrusions by: preventing illegal fishing; and suppressing violations of federal law in the maritime arena. The US Coast Guard is responsible for fishery law enforcement beyond the 3 mile zone.

			Operations are combined with both State and other federal resources. The US Coast Guard shares intelligence and seacraft (often include AWT staff) with the other agencies involved in MCS (Monitoring, Control and Surveillance), including NMFS and ADFG. The US Coast Guard also attends the fishery conferences and meetings of the principal management agencies, ADFG, NPFMC and IPHC where understanding and contribution through advice on the practical implementation of management proposals and regulations can be transferred to support effective enforcement-based activities. During the visit, attendance at the daily, morning briefing for staff and a visit to the surveillance control center also took place, as well as discussions on US Coast Guard responsibilities for the 5 year strategic fishery plan and resources for monitoring, control and enforcement for all Alaska state fisheries including sablefish fisheries.
2nd July 2010	**U.S. Department of Commerce, National Oceanic & Atmospheric Administration, National Marine Fisheries Service,** Alaska Fishery Science Center 7600 Sand Point Way NE Seattle WA 98115	Dr. Bill Karp, Deputy Director for Science and Research	The AFSC is the research branch of the National Oceanic and Atmospheric Administration's NMFS responsible for research on living marine resources in the coastal oceans off Alaska and off parts of the west coast of the United States. The mission of the AFSC is to generate the scientific information and analysis necessary for the conservation, management, and utilization of the region's living marine resources. The Center provides scientific data and analysis and technical advice to the NMFS Alaska Regional Office, NPFMC, state of Alaska, Alaskan coastal subsistence communities, and U.S. representatives participating in international fishery and marine mammal negotiations and to the fishing industry and its constituents. The Center also coordinates fisheries habitat and marine mammal research, with other Federal and state agencies, academic institutions, and foreign nations. Among many functions, the Alaska Fishery Science Center manages the Groundfish observer program and carries out groundfish fisheries surveys and compiles the Stock Assessment and Fishery Evaluation (SAFE) reports. The sablefish fishery is served accordingly by the AFSC.

2nd July 2010	**Pacific Seafood Processors Association** 199 W. Emerson Place Suite 205 Seattle WA 98119	Glenn Reed, President	The Pacific Seafood Processors Association (PSPA) is a non-profit trade organization established in 1914 to address legislative issues of concern to member seafood companies including both at sea processors and shore based processors. Current Corporate members include: Alaska General Seafood's, Alyssa Seafood's Inc., Golden Alaska Seafood's LLC, North Pacific Seafood's Inc., Peter Pan Seafood's Inc., Phoenix Processor Limited Partnership, Trident Seafood's, Inc**.** and UniSea Inc., Westward Seafood's Inc. PSPA members produce and market products from salmon, crab, pollock, sablefish, halibut, cod and a variety of other seafood species. These products are marketed domestically and around the globe. Key points of discussion focused on the assessment approach, the definition of non conformances and the merits of eco-labeling in the supply chain.

5.2. On-Site Witnessed Assessment and Consultation Meetings

On-site visits took place from Tuesday 30th Nov to Wed 8th Dec 2010. These were additional visits to the initial consultation meetings reported in the previous section. There are two types of on-site assessment activities; meetings with fishery management organizations to discuss various aspects of the assessment and witnessed assessment, which takes the form of witnessing specific management processes and functions, such as publically accessible Council meetings where possible.

The schedule of on-site activities is provided in **Table 5.1 below** with a summary of the activity, meeting and discussion. Meetings were used to document information that either confirmed clarified or substantiated aspects of the assessment or also gave an opportunity to organizations to contribute with information to support the assessment.

A feature of the FAO-Based RFM assessment approach is to witness the management activities and procedures *in situ* where possible. In this regard, members of the Assessment Team attended part of the NPFMC December 6th -14th 2010 cycle of meetings held in Anchorage. The purpose of attending these meeting was to 'witness' the management proceedings first hand with respect to the decision making process for issues of the day in order to verify whether this functioned in accordance with the policies, procedures and legislature defining Alaska sablefish fisheries management.

Table 5.1. On-site witnessed assessment and consultation meetings

Date	Meeting/event or activity/Present	Summary Outcome
Tue 30th Nov 2010 Seattle	**ASMI Seafood Technical Committee meeting:** Global Trust: Dave Garforth, Stephen Grabacki	A presentation was provided to the ASMI Seafood Technical Committee on the certification program and on the current progression of the Alaska sablefish fishery assessment. A discussion was held with respect to the various stages in the assessment process.
Fri 3rd Dec 2010	**NMFS Alaska Fisheries Science Center, Seattle, Washington,** William Karp, Loh-Lee Low Global Trust: Dave Garforth, Stephen Grabacki	Items for discussion included the groundfish observer program. Currently, there is no requirement for observation of the smaller classification of vessels (<60ft length); 60-125ft length vessels are required to pay for observation for 30% of fishing days, regardless of gear type or target fishery; vessels greater than 125ft length are required to carry observers 100% of the time. The greater proportion of the GOA fleet is made up of vessels with 30% or less observation coverage. The effect on the possible errors in estimation of sablefish bycatch of this current program may be significant. The Council had reported that the current deployment of the program could result in bias through non representative fishing and requested that NMFS review various options for revising the program in 2010. Various options have been submitted to the NPFMC and form part of the overall consultation on the objectives that will decide the final outcome of the program. Costs, number of observer days and observer training and contracting were discussed. Likely scenarios of outcomes would include alternatives that would see NMFS taking responsibility for deployment of observers based on statistical sampling.
Mon 6th-Wed 8th Dec 2010	**Witnessed Council Meeting:** **NPFMC Meeting** 201st Plenary Session North Pacific Fishery Management Council	Members of the Assessment Team attended the NPFMC meeting in Anchorage, from dates including 6th-8th December 2010. http://www.alaskafisheries.noaa.gov/npfmc/Agendas/1210Agenda.pdf The Council meeting process consists of three major meetings. The SSC and the Advisory Panel (AP) provide recommendations to the Council. The SSC is made up of scientists and

	December 8-14, 2010. Hilton Hotel, Anchorage, Alaska. Meeting included SSC, AP, and Council plenary sessions. Global Trust: Dave Garforth, Stephen Grabacki	economists, and the AP's membership covers a variety of fishing industry sectors as well as conservation groups. Representatives on the SSC, Council, and AP are from Oregon, Washington, and Alaska. The public can comment in each meeting. Recommendations of the Plan Teams with respect to ABCs, TACs etc. are vetted by the SSC. The SSC recommendations are reviewed by the AP. At this stage in a proposal process, resource users and interested parties can comment on the recommendations. The recommendations proposed through the SSC and AP is read at the Council's plenary sessions who make the final decision on recommendations. The Council reports the decision on recommendations to the Secretary of Commerce who has ultimate authority, although decisions are virtually never disapproved. Plan Teams and the SSCs are tasked with conservation decisions which take place without input from users in order that conservation is maintained separate from allocative issues. The AP and NPFMC make allocation and management decisions based on these conservation decisions. **Agenda items specific to sablefish fisheries on the December round of meetings included:** C-4 Halibut/Sablefish IFQ Program (b) Review discussion paper on CQE in Area 4B. (c) Initial review/Final action to add up to four new eligible CQE communities. (d) Initial review/Final action on Area 4B D shares on C vessels.

6. Assessment Outcome Summary

This section provides a summary of the outcome of evidence that has been evaluated by the Assessment Team for the conformance of US Alaska sablefish fisheries to the FAO-Based RFM Conformance Criteria. The summary information is presented for each of the fundamental clauses (1 to 14) that form the FAO-Based RFM Conformance Criteria. These are divided into the 6 key components of responsible fisheries management (A-F).

A. The Fisheries Management System
B. Science and Stock Assessment Activities
C. The Precautionary Approach
D. Management measures
E. Implementation, Monitoring and Control
F. Serious Impacts of the Fishery on the Ecosystem

Section 7 documents the more detailed outcomes of the evidence that has been reviewed, evaluated and presented for each of the individual supporting clauses of the FAO-Based Conformance Criteria.

A. The Fisheries Management System

1. There must be a structured and legally mandated management system based upon and respecting International, National and local fishery laws and considering other coastal resource users, for the responsible utilization of the stock under consideration and conservation of the marine environment.

In federal waters (3-200 nm), Alaska sablefish fisheries are managed by the NPFMC and the NMFS Alaska Regional Office, subject to their Groundfish Fishery Management Plans (FMPs). NPFMC recommends regulations to govern the directed sablefish fisheries in waters off Alaska; and makes allocation decisions among sablefish users and user groups fishing off Alaska. NPFMC sablefish management measures include a TAC which is divided among gear types (trawl and fixed) and an IFQ program for the majority of fixed gear. Fixed gear (longlines and pots) harvests around 85% of the sablefish quota and trawl gear about 15%. In 1995, NPFMC and NOAA Fisheries Service Alaska Regional Office implemented an IFQ system for the Alaska sablefish and halibut fisheries. The NMFS conducts stock surveys, stock assessment reports and a multitude of biological and environmental studies, and in connection with the United States Coast Guard (USCG) enforces regulations. These agencies, and all of their activities and decisions, are subject to the MSA. The FMPs are written and amended subject to MSA; the FMPs govern the management of the fisheries.

In state waters (0-3 nm), Alaska sablefish fisheries are managed by the ADFG and the BOF outside the IFQ program. Two minor state fisheries are the ones in Cook Inlet and the Aleutian Islands, open-access fisheries managed using a Guideline Harvest Level (GHL), which is determined based on harvest history, fishery performance, and the federal survey for the area. The Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC

28.640) governs the harvest of sablefish in the Area as described in 5 AAC 28.555(b). Three major state fisheries exist which are limited entry and are located in Prince William Sound, Chatham and Clarence Strait (the latter two in Southeast Alaska).

The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey fishery catch per unit effort and biological characteristics of the population. In addition, in Chatham Strait an annual stock assessment is performed which includes a mark-recapture estimate of the population abundance. 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272. Southeast Alaska State managed sablefish regulations are specified under 5AAC28 Groundfish Commercial Fisheries Regulations. The Alaska Wildlife Troopers enforce fisheries regulations in state waters.

The GOA and BSAI sablefish stocks are both considered to be parts of the same stock, but separate from sablefish further south along the west coast of North America. The GOA & BSAI SAFE report consider all sources of mortality: fishing (directed and incidental), and natural. In addition each SAFE report contains a wealth of information on the ecosystem effects of the fishery and vice versa.

Research on Alaska sablefish is mostly conducted by NMFS, with participation from ADFG and university scientists. It forms the basis of the SAFEs, and it also informs and guides the deliberations of the Plan Teams which formulate TAC for consideration by NPFMC and NMFS. Because sablefish stocks are not generally considered to be trans-boundary, there is little need for cooperation between NMFS/NPFMC and other institutions outside of Alaska. The formulation of sablefish TACs involves a great deal of collaboration among – NMFS scientists, NPFMC staff, and NPFMC's Scientific & Statistical Committee. The allocation of sablefish TACs, and all other management decisions and measures, involves a great deal of collaboration among NMFS managers, NPFMC staff, NPFMC's Advisory Panel, the seafood industry, and other stakeholders.

NPFMC's management arrangements and decision making processes for the fishery are organized in a very transparent manner. The NPFMC provides a great deal of information on their website, including agenda of meetings, discussion papers, and records of decisions. The Council actively encourages stakeholder participation, and all Council deliberations are conducted in open, public session. Similarly, the BOF process is transparent, and open to all stakeholders. Anyone may submit regulatory proposals, and all such proposals are given due consideration by the BOF.

2. Management Organizations must participate in coastal area management related institutional frameworks, decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and the avoidance of conflict among users.

The NMFS and the NPFMC participates in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. These include decision-making processes and activities relevant to fishery resources and users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users.

Every agency in the executive branch of the Federal Government has a responsibility to implement NEPA. In NEPA, Congress directed that, to the fullest extent possible, the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in NEPA. To implement NEPA's policies, Congress prescribed a procedure,

commonly referred to as “the NEPA process” or “the environmental impact assessment process.” The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. When a company applies for a permit (for example, for crossing federal lands or impacting waters of the United States) the agency that is being asked to issue the permit must evaluate the environmental effects of the permit decision under NEPA. Each NPFMC fisheries package must go through the NEPA process.

The June 19, 2010 National Ocean Council (NOC) Executive Order of the U.S. established a national ocean policy which provides for Regional Planning and Advisory Committees to develop coastal and marine spatial plans. This order also provides for the development of coastal and marine spatial plans that build upon and improve existing Federal, State, tribal, local, and regional decision making and planning processes. These regional plans will enable a more integrated, comprehensive, ecosystem-based, flexible, and proactive approach to planning and managing sustainable multiple uses across sectors and improve the conservation of the ocean, the US coasts, and the Great Lakes. Under the Coastal and Marine Spatial Planning (CMSP) framework objective of the National Ocean Policy, the United States will be subdivided into nine regional planning areas of which Alaska/Arctic region will be one entity. Each region will have a corresponding regional planning body consisting of Federal, State, and tribal representatives to develop regional goals, objectives, and ultimately regional CMS plans. CMSP has been initiated in some states. Other states, like Alaska, are in the development phase to implement CMSP; which should occur within the next few years.

All the fishery agencies have processes, committees and groups that allow potential coastal zone developments and issues to be brought to formal review and engagement such as the NPFMC meetings or the BOF meetings in the case of ADFG.

With regards to conflict avoidance and resolution between different fisheries, the NPFMC and the BOF tend to avoid conflict by actively involving stakeholders in the process leading up to decision making. The NPFMC and the BOF also have a standing joint committee that meets to resolve management and allocation issues. The Council and BOF also hold an annual coordinating meeting where members consider issues and hear testimony from stakeholders concerning joint Board/Council issues. Both entities provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Council and the BOF actively encourages stakeholder participation, and all their deliberations are conducted in open, public sessions. Effectively, these meetings provide forums for resolution of potential fisheries conflicts. In addition, stakeholders may review and submit written comments to the NMFS on proposed rules published in the Federal Register.

The Council as part of their process assesses economic, social and cultural value of the fishery resources in order to assist decision-making, allocation and use. In 2005, the AFSC compiled baseline socioeconomic information about 136 Alaska communities most involved in commercial fisheries. The AFSC is planning to update the Alaskan community profiles to include new U.S. Census data from 2010 and input from the communities and industry.

The coastal zone is monitored as part of the coastal management process using physical, chemical, biological, economic and social parameters. Involvement include federal and state agencies and programs including the U.S. Forest Service, U.S. Fish and Wildlife Service, NMFS Pacific Marine Environmental Lab (PMEL), the Alaska Department of Environmental Conservation (ADEC) Division of Water, ADFG Habitat Division, the AFSC’s *“Ecosystem Monitoring and Assessment Program”,* The NMFS' Habitat Conservation Division (HCD) and their Essential Fish Habitats (EFH) monitoring and protection program, the U.S. Coast Guard, the NMFS Alaska Regional Office’s Restricted Access Management Program (RAM), the Alaska National Interest Lands Conservation Act (ANILCA) federal

agencies cooperation directive, and the Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP) coordinating the review of large scale projects in the state of Alaska.

NMFS Office for Law Enforcement (OLE) enforcement officers and support personnel routinely make enforcement and conservation presentations to school, scout and civic groups. In all NMFS offices and at NMFS science centres, outreach and education activities are successfully underway.

3. Management objectives must be implemented through management rules and actions formulated in a plan or other framework.

Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. These include Groundfish FMPs for the GOA and the Bering Sea Aleutian Islands (BSAI) which incorporate the sablefish fisheries in those regions.

Both FMPs present long-term management objectives for the Alaska sablefish fishery. These include sections that describe a Summary of Management Measures and Management and Policy Objectives. The MSA, as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. Under the direction of the NPFMC the GOA and BSAI FMPs define nine management and policy objectives that are reviewed annually. They are: 1) Prevent Overfishing; 2) Promote Sustainable Fisheries and Communities; 3) Preserve Food Webs; 4) Manage Incidental Catch and Reduce Bycatch and Waste; 5) Avoid Impacts to Seabirds and Marine Mammals; 6) Reduce and Avoid Impacts to Habitat; 7) Promote Equitable and Efficient Use of Fishery Resources; 8) Increase Alaska Native Consultation and; 9) Improve Data Quality, Monitoring and Enforcement. The national standards and management objectives defined in GOA and BSAI FMPs provide adequate evidence to demonstrate the existence of long-term objectives clearly stated in management plans.

The BSAI and GOA FMPs define specific management measures to avoid excess fishing capacity and maintain economically viable stocks, management objectives to promote economic conditions for responsible fisheries, take into account the interests of subsistence, small-scale, and artisanal fisheries, define three management objectives to conserve biodiversity of aquatic habitats and protect endangered species; and describe management measures to assess environmental impacts from human activities.

In state waters (0-3 nm), five Alaska sablefish fisheries are managed by ADFG and the BOF outside the IFQ program. The Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC 28.640) governs the harvest of sablefish in the Area as described in 5 AAC 28.555(b). 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272. Southeast Alaska State managed sablefish (Chatham and Clarence strait) regulations are specified under 5AAC28 Groundfish Commercial Fisheries Regulations. The Alaska Wildlife Troopers enforce fisheries regulations in state waters.

B. Science and Stock Assessment Activities

4. There must be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.

The NMFS and ADFG collect fishery data and conduct fishery independent surveys to assess the sablefish fishery and ecosystems in GOA and BSAI areas. GOA and BSAI SAFE documents provide complete descriptions of data types and years collected.

Fishery data is collected from fixed gear (longline and pot) vessels which target sablefish in the IFQ fishery plus trawl fisheries that catch sablefish as retained bycatch in other fisheries such as rockfish and sole. Records of catch and effort for these vessels are firstly recorded through the e-landing (electronic fish tickets) catch recording system and secondly collected by observers and by vessel captains in voluntary and required logbooks. This "eLanding" system is an electronic fish ticket system, for all catch data required to be reported in regulation. eLandings is the internet-based Interagency Electronic Reporting System for reporting commercial fishery landings in Alaska. eLandings is used to report landings and/or production data for groundfish, IFQ/CDQ halibut and sablefish, and IFQ/CDQ crab and Community of Adak golden king crab.

The Restricted Access Management Division of NMFS tracks in season catches and IFQ balances. Registered Buyers must report IFQ landings electronically using the Internet (with permission, a backup paper submission system is available). Real-time accounting of individual harvests contributes significantly to accurate and timely management of each IFQ holder's IFQ accounts and supports in season transfers. Of two Internet systems available, the more comprehensive one, the Interagency Electronic Reporting System (IERS) and its data-entry component, eLandings, is the standard reporting method.

Fishery data from the Observer Program are available since 1990. Observers report age, length, and CPUE data for selected vessels. Vessels between 60 and 125 feet carry an observer 30% of the time and vessels >125 feet carry an observer 100% of the time. Since 1999, logbooks have been required for vessels >60 feet. Vessels <60 feet are not required to carry observers or submit logbooks but many do participate in a voluntary logbook program formed in 1997. The NMFS implemented observer program is at present in restructuring phase. The new observer program aims at increasing observer coverage in the <60 feet vessel portion of the fleet and employ the coverage more systematically to allow a scientifically sound catch recording coverage system. The new observer programme should be up and running by 2013.

The NMFS's AFSC conducts longline sablefish surveys to collect catch, effort, age, length, weight, and maturity data. These domestic longline surveys provide an accurate index of sablefish abundance. AFSC describes survey protocol on their website. Earlier, Japan and the United States conducted a cooperative longline survey for sablefish in the GOA annually from 1978 to 1994, adding the Aleutians Islands region in 1980 and the eastern Bering Sea in 1982. Since 1987, the AFSC has conducted annual domestic surveys of the upper continental slope, designed to continue the time series of the Japan-U.S. cooperative survey. The domestic longline survey began annual sampling of the GOA in 1987, biennial sampling of the Aleutian Islands in 1996, and biennial sampling of the eastern Bering Sea in 1997.

Trawl surveys of the upper continental slope that adult sablefish inhabit have been conducted biennially or triennially since 1980 in the Aleutian Islands, and 1984 in the GOA. Trawl surveys of the Eastern Bering Sea slope were conducted biennially from 1979-1991 and standardized for 2002, 2004, and 2008. Trawl surveys of the Eastern Bering Sea shelf are conducted annually.

ADFG conducts mark-recapture and longline surveys in Northern Southeast Alaska Inside (NSEI) waters. This population has been low to moderate recently, with longline surveys confirming the lows in 1999/2000 but showing a mild increase through 2008. However, their most recent abundance estimates from a mark-recapture program, shows a sizeable decline from 2007 to 2008 after increases from 2005-2007.

The Economic and Social Sciences Research Program within NMFS's Resource Ecology and Fisheries Management (REFM) Division provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs. Much of the existing economic data about Alaskan fisheries is collected and organized around different units of analysis, such as counties (boroughs), fishing firms, vessels, sectors, and gear groups. It is often difficult to aggregate or disaggregate these data for analysis at the individual community or regional level. In addition, at present, some relevant community level economic data simply are not collected at all. As a result, the NPFMC, the AFSC, and community stakeholder organizations have identified ongoing collection of community-level socio-economic information that is specifically related to commercial fisheries as a priority. To address this need, the AFSC's Economic and Social Sciences Research (ESSR) Program has been preparing the implementation of the Alaska Community Survey, an annual voluntary data collection program initially focused on Alaska communities for feasibility reasons, in order to improve the socio-economic data available for consideration in North Pacific fisheries management.

5. There must be regular stock assessment activities appropriate for the fishery resource, its range, the species biology and the ecosystem and undertaken in accordance with acknowledged scientific standards to support optimum utilization of fishery resources.

With passage of the MSA in 1976, management jurisdiction occurs out to 200 miles. MSA sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. Guided by these standards, and other legal requirements, the NMFS has a well-established institutional framework for research developed within the AFSC.

The mission of the AFSC is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. The AFSC operates several laboratories (Auke Bay Biological Lab and the National Marine Mammal Lab), and extensive fisheries monitoring and analysis section (Observers), the RACE and the REFM Divisions.

The AFSC conducts annual longline surveys to estimate the relative abundance of major groundfish species on the continental slope of the eastern Bering Sea, Aleutian Islands, and the GOA. The survey is primarily designed to assess sablefish and indices of abundance have been computed since 1979. Catch data from other species are also available. From 1979-1994, the AFSC conducted cooperative annual longline surveys with Japan, and then independently from 1987-present.

The fixed station positions are divided among six NPFMC management areas: Bering Sea, Aleutian Islands, Western GOA, Central GOA, West Yakutat, and East Yakutat/Southeast. Stations are placed 30-50 km apart, and gear is set from 150-1000 m at each slope station. Catches are pooled by management area and an abundance index is computed for use in stock assessment and fishery evaluation reports.

The sablefish population is represented with an age-structured model. The assessment uses a statistical, forward-projecting age structured model which estimates population numbers and mortality rates separately for male and female sablefish. The model is fitted using data on catches, length/age compositions and CPUE from the fisheries, and several series of abundance indices and associated age or length compositions from longline and trawl surveys. The 2008 model represents an incremental improvement over the one developed in the 2007 assessment, by making better use of survey age data and reducing the number of parameters describing fishery selectivity. The new model does not alter the perception of recent biomass trends given by the 2007 assessment. The analysis presented in the 2010 SAFE sablefish report for BSAI and GOA extends earlier age structured models developed by Kimura (1990) and Sigler (1999), which all stem from the work by Fournier and Archibald (1982). The current model configuration follows a more complex version of the GOA Pacific ocean perch model (Hanselman et al. 2005a) with split sexes to attempt to more realistically represent the underlying population dynamics of sablefish. The current configuration was accepted by the Groundfish Plan Team and NPFMC in 2008. The analysis was completed using AD Model Builder software, a C++ based software for development and fitting of general nonlinear statistical models.

The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST).

The AFSC's REFM Division conducts research and data collection to support an ecosystem approach to management of Northeast Pacific and eastern Bering Sea fish and crab resources. This ecosystem approach examines climate and/or environmental changes. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate. REFM scientists in the Status of Stocks and Multispecies Assessments (SSMA) program use biological and oceanographic information coupled with numerical simulation techniques to study the interaction of fish populations, fisheries, and the environment. The Socioeconomic program staff provides economic information to NMFS, industry and other agencies to assist with such projects as evaluating the economic effects of the *Exxon Valdez* oil spill in Prince William Sound, developing guidelines for valuing commercial and recreational fisheries, or evaluating economic impacts of fisheries rationalization programs. Socio-cultural information on Alaskan communities and traditional ecological knowledge is also compiled and evaluated.

For state-managed fisheries, ADFG also has a well-developed research capacity. The state's Policy and Planning Committee establish research priorities. For example, in 1988, the department began annual longline research surveys in both NSEI and SSEI to assess the relative abundance of sablefish over time and differing environmental conditions. Fixed sampling stations were randomly assigned within statistical areas in both Chatham and Clarence Strait, where the majority of state fleet fishing effort is focused. Once established, the same stations are fished in a similar manner each year to estimate change in relative abundance over time. A general linear multivariate model has been used to detect significant CPUE trends over time. Biological data collected during the surveys include length, weight, sex, stage of maturity and otoliths (aging structures). This data is used to describe the

age and size structure of the populations and detect recruitment events. ADFG standardized survey methods with NMFS survey. In 2000 the department constructed and purchased survey gear to ensure standardization between survey vessels. Mark-recapture studies for sablefish are also carried out in Southeast Alaska. The two minor Cook Inlet and the Aleutian Islands open-access fisheries are managed using a Guideline Harvest Level (GHL), which is determined based on harvest history, fishery performance, and the federal survey for the area. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model.

C. The Precautionary Approach

6. The current state of the stock must be defined in relation to reference points or relevant proxies or verifiable substitutes allowing for effective management objectives and target. Remedial actions must be available and taken where reference point or other suitable proxies are approached or exceeded.

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The tier system specifies the maximum permissible ABCs and of the Overfishing Level (OFLs) for each stock in the complex (usually individual species but sometimes species groups). NPFMC inaugurated the Tier system in fisheries management. In this, the harvest control rule depends on the amount of information available. In Tier 1, information is abundant enough and compelling enough to determine the statistical distribution of maximum sustainable yield. In this Tier is only one stock: BSAI walleye pollock. Most of the larger and commercially important stocks are in Tier 3, which has sufficient information to determine *F40%* and its corresponding biomass *B40%*.

The sablefish stock in Alaska is managed under tier 3. For these stocks, the spawner-recruit relationship is uncertain, so that MSY cannot be estimated with confidence. Hence, a surrogate based on *F40%* is used, following findings in the scientific literature in the 1990s. In Tiers 1–3, sufficient information is available to determine a target biomass level, which would be obtained at equilibrium when fishing according to the control rule with recruitment at the average historical level. The control rule is a biomass-based rule, for which fishing mortality is constant when biomass is above the target and declines linearly down to a threshold value when biomass drops below the target. The updated sablefish point estimates of *B40%, F40%,* and *F35%* from the latest assessment are 110,108 t (combined across the EBS, AI, and GOA), 0.097, and 0.115, respectively. Projected female spawning biomass (combined areas) for 2011 is 102,139 t (93% of B40%), placing sablefish in sub-tier "b" of Tier 3. The maximum permissible value of F_{ABC} under Tier 3b is 0.089, which translates into a 2011 ABC (combined areas) of 16,040 t. The OFL fishing mortality rate is 0.106 which translates into a 2011 OFL (combined areas) of 18,950 t. Model projections indicate that this stock is neither overfished nor approaching an overfished condition. For Tier 3 stocks, the MSY level is defined as *B35%.* Projected 2011 spawning biomass is 37% of unfished spawning biomass. Spawning biomass has increased from a low of 30% of unfished biomass in 2002 to 37% projected for 2011.

NPFMC estimated the posterior probability that projected abundance will fall below thresholds of 17.5% [minimum stock size threshold (MSST) or limit reference point] of the unfished spawning biomass based on the posterior probability estimates over the next 14 years. The probability was 0. In NPFMC settings, thresholds are defined in the Council harvest rules. These are when the spawning

biomass falls below MSY or *B35%* and when the spawning biomass falls below ½ MSY or *B17.5%* which calls for a rebuilding plan under the MSA.

7. Management actions and measures for the conservation of stock and the aquatic environment must be based on the Precautionary Approach. Where information is deficient a suitable method using risk assessment must be adopted to take into account uncertainty.

The MSA is the primary domestic legislation governing management of the nation's marine fisheries. In 1996, the United States Congress reauthorized the MSA to include, among other things, a new emphasis on the precautionary approach in U.S. fishery management policy.

For the past 25 years, the Council management approach has incorporated forward-looking conservation measures that address differing levels of uncertainty. This management approach has in recent years been labelled the precautionary approach. Recognizing that potential changes in productivity may be caused by fluctuations in natural oceanographic conditions, fisheries, and other, non-fishing activities, the Council intends to continue to take appropriate measures to insure the continued sustainability of the managed species. It will carry out this objective by considering reasonable, adaptive management measures, as described in the MSA and in conformance with the National Standards, the Endangered Species Act, the National Environmental Policy Act, and other applicable law. The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The Precautionary Approach can be seen in many actions.

The first element is the precautionary approach of for the groundfish complexes in the Bering Sea / Aleutian Islands (BSAI) and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The range for BSAI is 1.4 to 2.0 million mt; the range for GOA is 116 to 800 thousand mt. In practice, only the upper OY limit in the BSAI has been a factor in altering harvests. These total groundfish harvest limits the total groundfish harvest that can be taken from the BSAI and GOA marine ecosystems, effectively adopting a conservative ecosystem approach to fisheries.

The second element of precautionary approach is that the *Tier* system based on knowledge and uncertainties of the stock in question. NPFMC inaugurated the Tier system in fisheries management: the harvest control rule depends on the amount of information available. The less the information about a given stock, the more conservative is the catch allowed. Currently, sablefish in Alaska is managed under tier 3, where sufficient information is available to determine a target biomass level, which would be obtained at equilibrium when fishing according to the control rule with recruitment at the average historical level.

The third element of the precautionary approach is the OFL, ABC and TAC system. ABC is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. OFL is a limiting catch level, corresponding to fishing at MSY level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. In application, the NPFMC sets TAC ≤ ABC < OFL. Since 1981, actual groundfish harvests have averaged approximately 90% of the cumulative TAC and 65% of the cumulative ABC because of the complex array of accountability measures governing these fisheries. In practice, NMFS attempts to manage a fishery so that total catch (including all discards) is less than, but very close to the TAC. Ideally, the directed fisheries are closed well before TAC is reached, so that when by-catch needs for that stock in other fisheries are factored in, the annual total catch is less than but very close to TAC.

When a directed fishery is closed, by-catch of that stock is limited by a Maximum Retainable By-catch amount (MRB), which is determined as a percentage of retained catch (not including arrowtooth flounder). If it appears that the TAC may be exceeded due to unanticipated circumstances, and ABC is being approached, NMFS managers will prohibit retention of that species by all fisheries, in order to eliminate any 'top off' activity for by-catch of valuable species. If ABC is exceeded, and OFL is being approached, NMFS can prohibit or close any fisheries that might possibly take that species as by-catch.

Sablefish fisheries in Alaska peaked around 1972. Evidence of declining population and passage of the MSA lead to significant fishery restrictions during this time period, and total catches reduced substantially. The population had recovered by 1980. During the development of the fishery by the American fleet, regulations were established that resulted in a sustainable fishery, culminating with the current IFQ fleet in 1995. Regulatory revisions continue to occur through the NPMFC process.

Both the NPFMC and the BOF develop appropriate management plans to address fishing effort and harvest, including contingency plans. If adverse environmental changes occur (e.g. oil spills) or harvest levels exceed established limits, both bodies have options that can make temporary adjustments through Emergency Regulation to provide federal and state in season managers the necessary tools to make changes to established plans.

D. Management Measures

8. Management must adopt and implement effective measures including; harvest control rules and technical measures applicable to sustainable utilization of the fishery and based upon verifiable evidence and advice from available scientific and objective, traditional sources.

The AFSC's REFM Division conducts research and data collection to support an ecosystem approach to management of Northeast Pacific and eastern Bering Sea fish and crab resources. More than twenty-five groundfish and crab stock assessments are developed annually and used by the NPFMC to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate.

One tool to accomplish this is through a rights-based fishery approach, or the use of IFQs. IFQ management has increased fishery catch rates and decreased the harvest of immature fish. Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging US$3.1 million annually. Under the major State managed sablefish fisheries, the use of an equal quota share system is very much like individual fishery quotas, and produces the same efficiencies. Decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery.

MSFCMA's National Standard 9 governs federal regulators. It states that 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. Regulations in place address waste, discard, bycatch, and endangered species interactions in the sablefish fisheries. The NMFS promulgates these regulations through the NPFMC. The Council's objective is to develop incentive programs for bycatch reduction including the development of mechanisms to facilitate the formation of bycatch pools, vessel bycatch allowances, or other bycatch incentive systems. They also encourage research programs to evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available.

As an example, specific regulations were put in place intended to reduce the incidental mortality of the short-tailed albatross and other seabird species with revision in 1998 and 2008. The short-tailed albatross is a listed species under the Endangered Species Act (ESA). The BOF enacted changes to state law, mirroring regulations within state waters for groundfish fisheries.
These measures now include the use of streamer (tory) lines, night setting, line shooter and lining tubes, and have been shown to reduce seabird interactions when setting or retrieving gear. The catch of seabirds in the sablefish fishery averages 17% of the total bycatch. The trend in seabird catch is variable but appears to be decreasing, presumably due to widespread use of these measures to reduce bycatch.

The shift from an open-access to an IFQ fishery has nearly doubled catching efficiency, while it has reduced the number of hooks deployed. The IFQ fishery likely has also reduced discards of other species because of the slower pace of the fishery and the incentive to maximize value from the catch. IFQ management has also increased fishery catch rates and decreased the harvest of immature fish). Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging US$3.1 million annually. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery.

The NMFS and the ADFG have well-established regulations on fishing seasons and legal gear use. Discards of sablefish in the longline fishery are small, typically less than 5% of total catch. The catch of sablefish in the longline fishery typically consists of a high proportion of sablefish, 90% or more. However at times grenadiers may be a significant catch and they are almost always discarded. The trawl fishery operates under strict maximum retainable allowances for sablefish. The discards from trawl fisheries decreased from a 1994-2003 average of 825 t to an average of 262 mt for 2004-2009, while hook and line fisheries decreased slightly from 525 t down to 462 t.

Longline gear and the manner of fishing have been developed over a long period of time to be selective of target species. Pot gear use mandates the inclusion of escape devices, should the pot be lost. The Alaska Administrative Code 5 AAC 39.145, as well as federal regulations under 50 CFR 679.2 state that pot gear in Alaska crab and bottomfish fisheries is required to have an escape mechanism consisting of an opening closed by 100% cotton twine no larger than 30-thread. Under the Individual Quota Fishery system in Alaska's federal fisheries and the equal quota share in the major state waters fisheries, much less gear is used and consequently lost than in the historical race for fish scenario. Market forces ensure that gear is cost effective.

9. There must be defined management measures designed to maintain stocks at levels capable of producing maximum sustainable levels.

The management system for the NPFMC groundfish fisheries is a complex suite of measures comprised of harvest controls—e.g., OY, ABC, TAC, OFL—effort controls (ITQs, licenses, cooperatives), time and/or area closures (also known as habitat protection, marine reserves), by-catch controls (PSC limits, retention and utilization requirements), monitoring and enforcement (observer program), social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions and to avoid seabirds). The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information.

When the sablefish open access fishery was in place, seasons became shorter as more entrants fished harder to capture fish before it was closed. At that period, the fishery was overcapitalized. Under the IFQ share system in place for the Alaska sablefish, fishing capacity (vessels and gear) has been reduced. Additional goals of the IFQ Program were to keep the historic fleet structure of the fishery, limit and discourage corporate ownership, limit windfall profits to participants granted quota, discourage speculative entry, and reward participants who invested in the fishery (long-time participants and active participants).

Through a public process at the NPFMC, extensive staff analysis was presented, analyzed, and selected to ensure that the proposed level of fishing was commensurate with the sustainable use of the fishery resource. The number of vessels, and the class of those vessels, established a fishing fleet with less capacity, and with ownership in the resource. With carefully established TACs, and extended seasons, market conditions greatly improved, as more fresh fish was made available. This helped assure that fishermen operated under economic conditions that promoted responsible fisheries.

10. Fishing operations must be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.

The State of Alaska, Department of Labor & Workforce Development (ADLWD) includes AVTEC (formerly called Alaska Vocational Training & Education Center, now called Alaska's Institute of Technology). One of AVTEC's main divisions is the Alaska Maritime Training Center. The goal of the Alaska Maritime Training Center is to promote safe marine operations by effectively preparing captains and crew members for employment in the Alaskan maritime industry.

The Alaska Maritime Training Center is a United States Coast Guard (USCG) approved training facility located in Seward, Alaska, and offers USCG/STCW-compliant maritime training. (STCW is the international Standards of Training, Certification, & Watch keeping.) In addition to the standard courses offered, customized training is available to meet the specific needs of maritime companies. Courses are delivered through the use of their world class ship simulator, state-of-the-art computer-based navigational laboratory, and modern classrooms equipped with the latest instructional delivery technologies.

The Center's mission is to provide Alaskans with the skills and technical knowledge to enable them to be productive in Alaska's continually evolving maritime industry. Supplemental to their on-campus classroom training, the Alaska Maritime Training Center has a partnership with the Maritime Learning System to provide mariners with online training for entry-level USCG Licenses,

endorsements, and renewals.

In addition, MAP conducts sessions of their Alaska Young Fishermen's Summit. Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation, to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. Additional education is provided by the Fishery Industrial Technology Center, in Kodiak, Alaska.

Obtaining sablefish IFQ share most often will require the purchaser to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. This competence and professionalism is a learned experience with the culmination of entrants into the fishery starting at deck hand level working their way up through proof of competence.

E. Implementation, Monitoring and Control

11. An effective legal and administrative framework must be established and compliance ensured through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska fisheries laws and regulations, especially 50CFR679. All sablefish landings must be reported to NMFS via its mandatory "e-landings" reporting system. Commercial harvests of pollock, sablefish and halibut are the primary enforcement responsibilities of OLE. The IFQ, Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities. Within the American EEZ off Alaska, sablefish harvesting is monitored and enforced by NMFS OLE, and USCG.

In any given year, OLE Agents and Officers spend an average 10,000-11,000 hours conducting patrols and investigations, and an additional 10,000-11,000 hours on outreach activities. The OLE maintains 19 patrol boats around the country to conduct a variety of patrols including Protected Resources Enforcement Team (PRET) boarding's, protection of National Marine Sanctuaries and various undercover operations. Working with federally-deputized state marine enforcement agents and the U.S. Coast Guard, the OLE is able to garner even more patrol hours. Although the OLE continues to expand cooperation with a variety of other agencies, the U.S. Coast Guard remains the OLE's closest partner in the protection of Federal fisheries.

All in all, information collection and monitoring of all logbook information, fish tickets at landing is carried out by NMFS's OLE. In addition, they extensively inspect and cross check at landings and processors records for reconciliation.

For the state fisheries, the Alaska Wildlife Troopers (AWT) has increased undercover fisheries operations for sport and commercial fisheries over last 3 years. A fully staffed investigations unit dedicates time to commercial investigations. This includes cooperation, as jurisdictionally appropriate, with USCG and NMFS OLE. While catches are usually seized at the onset of an investigation, violators can also be assessed both civil penalties and criminal fines; and on occasion boats are seized and individuals are sent to Federal prison.

12. There must be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations

The MSA provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy). NOAA's OLE Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL).

GCEL can then assess a civil penalty in the form of a Notice of Permit Sanctions (NOPs) or Notice of Violation and Assessment (NOVAs), or they can refer the case to the U.S. Attorney's Office for criminal proceedings. For perpetual violators or those whose actions have severe impacts upon the resource criminal charges may range from severe monetary fines to boat seizures and/or imprisonment may be levied by the United States Attorney's Office.

There are very few repeat offenders. Sanctions include the possibility of temporary or permanent revocation of fishing privileges. Withdrawal or suspension of authorizations to serve as masters or officers of a fishing vessel are also among the enforcement options. Within the USA EEZ, penalties can range up through forfeiture of the catch to forfeiture of the vessel, including financial penalties and prison sentences.

The health and sustainability of Alaska's fisheries does not, in itself, prove that Alaska's regulatory enforcement is effective, but sustainability would be impossible without effective enforcement. In general, USCG's enforcement efforts focus on two types of "significant violations" -- those which would do harm to the resource, and those which would create an economic advantage to the violator. The incidence of, and trends in these significant violations are monitored closely.

Another measure is the "triple correlation" of regulatory compliance with observed violations with enforcement presence. The objective of regulatory enforcement is to ensure compliance. An essential element of this effort is the public perception of a high level of patrol and enforcement, which creates the view that "It doesn't pay to cheat". Finally, the cooperation of citizens and industry is cultivated through programs such as AWT's Fish & Wildlife Safeguard program, which encourages the reporting of violations, and "leverages" the range of enforcers.

F. Serious Impacts of the Fishery on the Ecosystem

13. **Considerations of fishery interactions and effects on the ecosystem must be based on best available science, local knowledge where it can be objectively verified and using a risk based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem must be appropriately assessed and effectively addressed.**

NPFMC and NOAA/NMFS conduct assessments and research on environmental factors on sablefish and associated species and their habitats. Findings and conclusions are published in SAFE document, annual Ecosystem Considerations documents, and research reports. Also, the SAFE reports include sections for 1) Ecosystem effects on the stock; and 2) Effects of the sablefish fishery on the ecosystem. SAFE reports also describe results of first-order trophic interactions for sablefish from the ECOPATH model, an ecosystem modeling software package. While prominence of some interactions may be the result of insufficient data, estimation of prey interactions of adult sablefish in the GOA appear reasonable. The Resource Ecology and Ecosystem Management group at the Alaska Fishery Science Center (AFSC) provides up-to-date ecosystem information and assessments in annual *Ecosystem Considerations* documents.

The *Final Programmatic Supplemental Environmental Impact Statement for the Alaska Groundfish Fisheries* (PSEIS) (NMFS 2004) provides information about affects of the fishery on the ecosystem and effects of the ecosystem on the groundfish fishery. It evaluates the historical effects of the spatial concentration of the state fishery and regime changes on sablefish stocks.

Ecosystem impact on the fishery. The PSEIS document provides evidence that physical oceanographic factors, particularly climate, have a controlling influence on biological community composition in the BSAI and GOA. An important conclusion to be drawn from these studies is that any effects of human activities on the marine environment should be considered in the context of the powerful physical forces that appear to be driving the BSAI and GOA ecosystems. In general, species richness and diversity peaked at water depths of about 200-300 m in the GOA. Higher abundance, lower species richness and diversity, and a different species composition of demersal fishes were found in the western GOA as compared to the eastern GOA. Mueter concluded that these large-scale spatial patterns were related to upwelling differences between the two regions.

Total biomass of commercially-fished species in shelf and slope areas had increased since 1984, despite a considerable, concurrent increase in harvest effort. At the same time, the abundances of unexploited (or underexploited) species including skate, some shark species, forage species, arrowtooth flounder, and other flatfish had increased. Populations of an overexploited species, the Pacific Ocean perch, had also rebounded from low population levels. The controlling factor for these increases appeared to be environmental, with changes in community species composition in near shore areas linked to an increase in advection in the Alaska Coastal Current. Scientists concluded that cyclical weather patterns increased flow around the GOA and enhanced the supply of nutrients and plankton on the shelf and upper slope areas, resulting in higher productivity.

Young-of-the-year sablefish prey mostly on euphausiids and copepods while juvenile and adult sablefish are opportunistic feeders. Larval sablefish abundance has been linked to copepod abundance and young-of-the-year abundance may be similarly affected by euphausiid abundance because of their apparent dependence on a single species. The dependence of larval and young-of-the-year sablefish on a single prey species may be the cause of the observed wide variation in annual sablefish recruitment.

Fishery impact on the ecosystem**.** In considering the impacts of the fishery on the ecosystem, researchers have defined possible concern for benthic species in habitat areas of particular concern (HAPC), seabirds, and by-catch of grenadiers, spiny dogfish, and other shark species.

Bycatch. The sablefish fishery catches the majority of grenadier total catch (average 66%) and the trend is stable. The catch of seabirds in the sablefish fishery averages 17% of the total catch. The trend in seabird catch is variable but appears to be decreasing, presumably due to widespread use of measures to reduce seabird catch. Sablefish fishery catches of other species is minor.

The USFWS is the lead federal agency for managing and conserving seabirds. As a result of ESA Section 7 consultations between the USFWS and NOAA to protect short-tailed albatross, NOAA Fisheries required the BSAI and GOA groundfish longline fleet to employ specified seabird avoidance measures to reduce incidental take in 1997 (62 FR 23176). In order to protect short-tailed albatross in other North Pacific fisheries, NOAA Fisheries required seabird avoidance measures to be used by vessels fishing for Pacific halibut and sablefish in U.S. EEZ waters off Alaska in 1998 (63 FR 11161). These measures focused primarily on collecting seabird and fishery interaction data and on requiring longliners to use specific types of gear and fishing techniques to avoid seabird incidental take.

Based on research findings NPFMC made recommendations to NOAA Fisheries which published regulations that have been in effect since February 2004. Specific requirements vary by length of vessel, area fished, type of gear, and other factors. As of 2004, longline vessels over 26 ft LOA are required to use either single or paired streamer lines (or in some cases for smaller vessels, a buoy bag line) to reduce incidental take of seabirds.

In 1992, fisheries observers reported eight sea otters taken incidentally by the Aleutian Island sablefish pot fishery. During that year, only a third of the fisheries were observed, yielding an estimate of 24 otters killed in pot gear in the sablefish fishery. No other sea otter takes were reported from observed fisheries in the range of the southwest stock from 1993 through 2000. In 1997, the BSAI groundfish trawl fishery reported one sea otter taken (USFWS 2002b).

Sperm whale diets overlap with commercial fisheries harvests more than any other species of toothed whales, but the degree of overlap is at least partly because of direct interactions with longline gear. In addition to consuming primarily medium - to large-sized squids, sperm whales also consume some fish and have been observed feeding off longline gear targeting sablefish and halibut in the GOA. The interactions with commercial longline gear do not appear to have an adverse impact on sperm whales. Much to the contrary, the whales appear to have become more attracted to these vessels in recent years.

Killer whales frequently take fish directly from commercial fishing gear as it is retrieved. Interactions with commercial longline fisheries are well-documented throughout the BSAI. Depredation rates of bottomfish by killer whales on longline catches, based on four different methods of calculation,

suggested that whales took 14 to 60 percent of the sablefish, 39 to 69 percent of the Greenland turbot, and 6 to 42 percent of the arrowtooth flounder caught in commercial gear. Depredation rates can be so high in some areas that fishermen have abandoned particular fisheries even when they are still open. Killer whales fall under the jurisdiction of the NOAA Fisheries PRD, and are protected under the MMPA.

Essential fish habitat (EFH) is defined in the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS, 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST).

14. Where fisheries enhancement is utilized, environmental assessment and monitoring must consider genetic diversity and ecosystem integrity

N/A. Fishery enhancement is not a utilized practice in the sablefish fishery principally managed by the NMFS and NPFMC.

6.1. Conformity statement

The Assessment Team recommend that the management system of the applicant fishery, the U.S. Alaska sablefish commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ) is awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

For the Alaska sablefish commercial fishery management system, only one medium confidence rating was assigned against clause 4.2. Currently there is limited observer coverage for the directed IFQ sablefish fishery. The Assessment Team reviewed the available information and established that management actions to improve the observer program in the IFQ sablefish commercial fishery are underway (see clause 4.2 section 7) and an assessment of these would be carried out in 2012 during the first surveillance assessment. All other evidence reviewed and analyzed for the remaining clauses were conducive of 'high confidence' ratings.

In **Section 7,** at the beginning of each fundamental clause, a summary table of the confidence ratings assigned for each supporting clause is provided. For example, for fundamental clause 1, there are 13 supporting clauses each of which was assigned a high confidence rating (13 out of 13).

6.2. Future Surveillance Actions

To maintain certification, surveillance assessments are carried out on an annual basis with a full re-assessment taking place for the fifth anniversary of certification. Items categorized for the 2012 surveillance assessment of the sablefish commercial fishery are listed below.

These items are highlighted to survey in detail the management actions implemented to overcome the shortcomings of the Alaska sablefish, namely the absence of an observer program to clearly estimate the bycatch and discards rate and types occurring in this fishery.

Clause		Summary of Surveillance Actions Proposed
4.2	**An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures must be established.**	Developments on the Observer Restructuring Program and the related implications in improving bycatch and discards estimation in the Alaska sablefish fishery will be monitored and appropriately assessed during the surveillance assessment. A complete re-evaluation of the Observer Program will then take place between years 4 and 5.

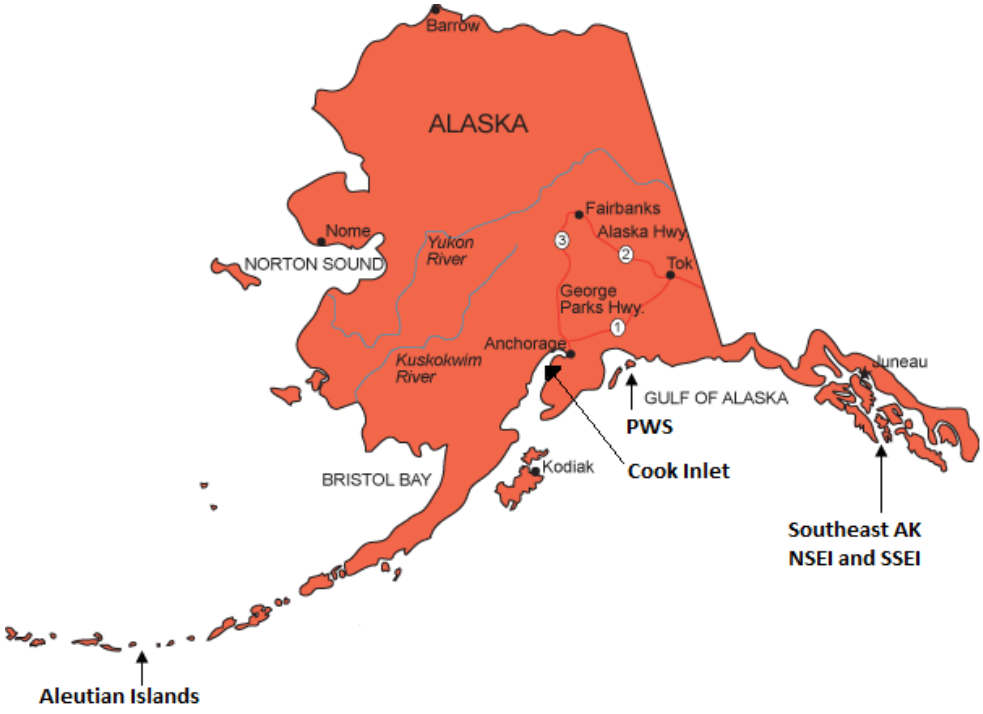
7. FAO-Based RFM Conformance Criteria Assessment Outcome

A. The Fisheries Management System

1.	**There must be a structured and legally mandated management system based upon and respecting International, National and local fishery laws and considering other coastal resource users, for the responsible utilization of the stock under consideration and conservation of the marine environment.**					
	FAO 7.1.3/7.1.4/7.1.9/7.3.1/7.3.2/7.3.4/7.6.8/7.7.1/10.3.1					
Confidence Ratings	**Low**	**0 out of 13**	**Medium**	**0 out of 13**	**High**	**13 out of 13**

Clause: **1.1 There must be an effective legal and administrative framework established at the local and national level appropriate, for fishery resource conservation and management.** ***FAO CCRF* 7.7.1**	
Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause	**Evidence**
1.1	In federal waters (3-200 nm), Alaska sablefish fisheries are managed by the NPFMC and the NMFS Alaska Region, subject to their Groundfish Fishery Management Plans (FMPs). NMFS conducts biological studies, stock survey and stock assessment reports and, in connection with the United States Coast Guard (USCG), enforces regulations. The NPFMC sets OFLs, determines all sources of mortality, annually defines the TAC limits, allocates fisheries resources among users and user groups (IFQ longline and pot users), and makes numerous more management decisions (such as the IFQ program, outlined later in this document). These agencies, and all of their activities and decisions, are subject to the MSA. The FMPs are written and amended subject to MSA; the FMPs govern the management of the fisheries. In certain state waters (0-3 nm), Alaska sablefish fisheries are managed by ADFG and the BOF. State managed fisheries for sablefish occur in Southeast Alaska, Prince William Sound, Cook Inlet, and in the Aleutian Islands. For Southeast Alaska they include: Northern Southeast Inside Subdistrict, and Southern Southeast Inside Subdistrict, as defined in 5AAC28 (AAC = Alaska Administrative Code), in the eastern GOA.

The Figure below shows the five Alaska state managed sablefish fisheries.



For parallel fisheries (these occurring within 3 nautical miles outside the Coast of Alaska, the state uses NMFS rules) in the BSAI, ADFG adopts the seasons, bycatch limits, and allowable gear types consistent with federal adjacent EEZ, promulgated by the NMFS, except where BOF regulation take precedent.

The Aleutian Islands state waters sablefish GHL is not deducted from the ABC in setting the NMFS's TAC. However, harvest from the Aleutian Islands state-waters fishery makes up less than 1% of the state-wide sablefish harvest, a negligible amount given the precision of the sablefish abundance estimates (http://www.adfg.alaska.gov/FedAidPDFs/FMR11-28.pdf).

In reviewing this document, the reader is encouraged to keep in mind that the federally managed sablefish fisheries are far larger than are the state-managed fisheries, for example -

* 2008 GOA + BSAI sablefish harvest: 29,218,000 lbs
* 2008 Southeast Alaska sablefish harvest: 2,248,374 lbs

sources of evidence –

www.fakr.noaa.gov/regs/summary.htm
MSA: www.alaskafisheries.noaa.gov/sustainablefisheries/msa/amended07.pdf
NPFMC: www.fakr.noaa.gov/npfmc/default.htm
NMFS AK Region: www.fakr.noaa.gov/

	FMPs – www.fakr.noaa.gov/npfmc/fmp/goa/goa.htm www.fakr.noaa.gov/npfmc/fmp/bsai/bsai.htm State of Alaska: 5AAC28 -- at this page – http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial -- download – 2010-2011 Statewide Commercial Groundfish Fishing Regulations

Clause:

1.2 Management measures must take into account the whole stock unit over its entire area of stock distribution.

1.2.1 The area through which the species migrates during its life cycle must be considered by the management system.

1.2.2 The biological unity and other biological characteristics of the stock must be considered within the management system.

1.2.3 All fishery removals and mortality must be considered by the management system.

1.2.4 Previously-agreed management measures established and applied in the same region must be taken into account by the management system.

FAO Criteria 7.3.1

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause:	Evidence:
1.2	The Council and NMFS produce annual Stock Assessment & Fishery Evaluation (SAFE) reports for each fishery under federal jurisdiction, including Alaska sablefish. A small portion of the sablefish stock is harvested under State of Alaska jurisdiction. Both state and federal assessment biologists meet at the NPFMC Plan Team meetings and share assessment information and harvest strategies to assure conservation management over the entire stock distribution. The GOA and BSAI sablefish stocks are both considered to be parts of the same stock, but separate from sablefish further south along the west coast of North America.

	But for clarity of management, there are two SAFEs for Alaska sablefish – one for the fishery in the GOA, and the other for the BSAI fishery. ***sources of evidence –*** www.afsc.noaa.gov/refm/stocks/assessments.htm -- scroll down to the BSAI Sablefish and GOA Sablefish chapters.
Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause:	**Evidence:**
1.2.1	The GOA and BSAI sablefish stocks are both considered to be parts of the same stock, but separate from sablefish further south along the west coast of North America. Juvenile sablefish spend a portion of their life in shallow water, including State waters, prior to migrating to deep water where harvest occurs. No directed harvest occurs for juvenile sablefish, but State and federal biologists assess incidental/total mortalities that are then considered when developing harvest limits and assessments models. ***sources of evidence –*** (see SAFEs, as cited in 1.2 above)
Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause:	**Evidence:**
1.2.2	The GOA and BSAI sablefish stocks are both considered to be parts of the same stock, but separate from sablefish further south along the west coast of North America. To account for the biological unity of the stock, harvest is restricted to spawning adult sablefish, and seasons are set to assure each fish has at least one opportunity to spawn. Further, they are managed by discrete regions to distribute exploitation throughout their wide geographical range, including both State and federal waters. ***sources of evidence –*** (see SAFEs, as cited in 1.2 above)

Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause:	**Evidence:**
1.2.3	The SAFEs are comprehensive documents, which thoroughly assess the stocks, and which evaluate the impact of the fisheries on the stocks. The SAFEs do consider all mortality: fishing (directed and incidental), and natural. Strictly enforced landing reports, at sea and shore based fishery enforcement, fishery observers and an extensive mandatory and voluntary logbook program verify and ground-truth total mortality estimates. ***sources of evidence –*** (see SAFEs, as cited in 1.2 above)
Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause:	**Evidence:**
1.2.4	The Alaska sablefish fishery management system (NPFMC + NMFS) routinely takes into account all previously-agreed management measures. For example, the fishery has been managed under a system of IFQ for many years. That IFQ system, and the rules which govern it, are considered by NPFMC and NMFS whenever modifications (e.g.- seabird avoidance measures) are proposed. The sablefish IFQ system, issues regarding seabird bycatch, and any other aspect of sablefish fishery management are re-visited on a routine, as-needed basis by NPFMC. Similarly, for the sablefish fisheries in state waters, ADFG and the Board routinely take into account all previously-agreed management measures. For example, at its meeting in Ketchikan, Alaska, scheduled for 24 February – 4 March 2012, the BOF will address "Southeast and Yakutat Finfish", which will include the sablefish fisheries. At those Board meetings, anyone (ADFG staff, harvesters, and other stakeholders) is encouraged to propose changes to any regulation which deals with the fisheries under discussion. ***sources of evidence –*** www.fakr.noaa.gov/npfmc/conservation-issues/seabird.html www.fakr.noaa.gov/ram/ifq.htm

Clause:

1.3 Where trans-boundary, straddling or highly migratory fish stocks and high seas fish stocks are exploited by two or more States, the Applicant Management Organizations concerned must cooperate to ensure effective conservation and management of the resources.

1.3.1 The management system of the Applicant fishery must take part in formal fishery commission or arrangements that have been appointed for the management of shared, straddling, high seas or highly migratory fish stocks.

1.3.2 Conservation and management measures established for such stock within the jurisdiction of the relevant States for shared; straddling, high seas and highly migratory stocks must be compatible.

FAO CCRF 7.1.3 Others 7.1.4/7.3.2

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause	Evidence
1.3	The GOA and BSAI sablefish stocks are both considered two parts of the same stock, but separate from sablefish further south along the west coast of North America. To the extent appropriate, NMFS and the Council liaise with other agencies, such as Pacific States Marine Fisheries Commission. As discussed elsewhere in this document, fisheries researchers and scientists from Alaska work closely with those from Canada on assessing the health of sablefish populations in the North Pacific. The Technical Subcommittee (TSC) of the Canada-U.S. Groundfish Committee meets annually to discuss sablefish and other fisheries. ***sources of evidence –*** ** On this page – www.afsc.noaa.gov/refm/stocks/assessments.htm -- scroll down to the BSAI Sablefish and GOA Sablefish chapters. *See also* – www.psmfc.org/ www.psmfc.org/tsc2/

Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause	**Evidence**
1.3.1	Please see response to 1.3, above.
Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause	**Evidence**
1.3.2	Please see response to 1.3, above.

Clause: **1.4 Organizations within the Management System must cooperate with neighbouring coastal states with respect to common and shared fishery resources for their conservation and for the conservation of the environment.** ***FAO CCRF 10.3.1***	
Evidence adequacy rating: **☑High** **☐ Medium** **☐ Low**	
Clause	**Evidence**
1.4	The GOA and BSAI sablefish stocks are both considered to parts of the same stock, but separate from sablefish further south along the west coast of North America. To the extent appropriate, NMFS and the Council liaise with other agencies, such as Pacific States Marine Fisheries Commission, and Canada's Department of Fisheries & Oceans. ***sources of evidence –*** www.afsc.noaa.gov/refm/stocks/assessments.htm www.psmfc.org/ www.pac.dfo-mpo.gc.ca/fm-gp/index-eng.htm

Clause:

1.5 The Applicant fishery's management system must actively foster cooperation between States with regard to:

- **Fisheries research**
- **Fisheries management**
- **Fisheries development**

FAO CCRF 7.3.4

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause	Evidence
1.5	RESEARCH – Research on Alaska sablefish is mostly conducted by NMFS, with participation from ADFG and university scientists. That research forms the basis of the SAFEs, and it also informs and guides the deliberations of the Plan Teams which formulate TACs for consideration by NPFMC and NMFS. Because the EEZ off Alaska is very large, and because Alaska sablefish stocks are not generally considered to be trans-boundary, there is little need for cooperation between NMFS/NPFMC and other institutions. The formulation of sablefish TACs involves a great deal of collaboration among – NMFS scientists, NPFMC staff, and NPFMC's Scientific & Statistical Committee. Within State waters, ADFG conducts tagging studies, as well as biological and assessment research which are shared with federal scientists. ***sources of evidence –*** * GOA and BSAI Sablefish SAFE, cited previously MANAGEMENT – The formulation of sablefish TACs involves a great deal of collaboration among – NMFS scientists, NPFMC staff, and NPFMC's Scientific & Statistical Committee. The allocation of those TACs, and all other management decisions and measures, involves a great deal of collaboration among – NMFS managers, NPFMC staff, NPFMC's Advisory Panel, the seafood industry, and other stakeholders. ***sources of evidence –*** * On this page – www.fakr.noaa.gov/npfmc/default.htm

	– download : About the Council Council Meeting FAQ, and Handbook "Navigating the NPFMC process" * http://sustainability.alaskaseafood.org/tools click “Sustainability White Paper” DEVELOPMENT – There is very little fisheries development in the Alaska sablefish fishery. Sablefish are harvested by three well-established gear types: demersal long-line, pots (traps), and trawl. Also, there are no “un-developed” sablefish fisheries in the USA EEZ off Alaska; the SAFEs consider all known sablefish stocks in the EEZ. ***sources of evidence –*** * On this page – www.fakr.noaa.gov/npfmc/fmp/bsai/bsai.htm – download – Groundfish of the BSAI: Species Profile * On this page – www.fakr.noaa.gov/npfmc/fmp/goa/goa.htm – download – Groundfish of the GOA: A Species Profile

Clause:

1.6. Procedures must be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review to revise or abolish them in the light of new information.

- **Review procedures must be established within the management system.**
- **A mechanism for revision of management measures must exist.**

FAO CCRF 7.6.8

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause	Evidence
1.6	Sablefish are covered by NPFMC's Groundfish Fishery Management Plans. NPFMC amends its FMPs as often as necessary; the most recent update is of 2010. Both the NPFMC, for federal waters, and the BOF, for State waters, have a "Call for Proposals" process where stakeholders and the interested public can request review or revision of existing management measures. ***sources of evidence –*** GOA Groundfish Fishery Management Plan (updated 10/10) – www.fakr.noaa.gov/npfmc/fmp/goa/goa.htm BSAI Groundfish Fishery Management Plan (updated 10/10) – www.fakr.noaa.gov/npfmc/fmp/bsai/bsai.htm BOF Proposal process. www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

Clause:

1.7 The management arrangements and decision making processes for the fishery must be organized in a transparent manner.

- **Management arrangements**
- **Decision-making**

FAO CCRF 7.1.9

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause:	Evidence
1.7	NPFMC's management arrangements and decision making processes for the fishery are organized in a very transparent manner. The Council (and NMFS) provides a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Council actively encourages stakeholder participation, and all Council deliberations are conducted in open, public session. Similarly, the BOF process is transparent, and open to all stakeholders. The Board (and ADFG) provides a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Board actively encourages stakeholder participation, and all Board deliberations are conducted in open, public session. Anyone may submit regulatory proposals, and all such proposals are given due consideration by the Board. ***sources of evidence –*** www.fakr.noaa.gov/npfmc/default.htm www.fakr.noaa.gov/ www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

2. Management Organizations must participate in coastal area management related institutional frameworks, decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and the avoidance of conflict among users.

FAO CCRF 10.1.1/10.1.2/10.1.4/10.2.1/10.2.2/10.2.4

Confidence Ratings	Low	0 out of 7	Medium	0 out of 7	High	7 out of 7

Clause:

2.1 An appropriate policy, legal and institutional framework must be adopted in order to achieve sustainable and integrated use of living marine resources, taking into account the fragility of coastal ecosystems and the finite nature of their natural resources and the needs of coastal communities.

FAO CCRF 10.1.1

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause:	Evidence
2.1	The NMFS, managing most groundfish fisheries (including sablefish) off the Alaskan coast, participates in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. Federal agencies, including the NPFMC, are also responsible for producing NEPA documents each time they renew or amends regulations. Therefore, all of the NPFMC documents include NEPA considerations. NEPA, therefore, is a comprehensive process to provide checks and balances against changes to the environment that may impact ecosystems and the natural processes. Every agency in the executive branch of the Federal Government has a responsibility to implement NEPA. In NEPA, Congress directed that, to the fullest extent possible, the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in NEPA. To implement NEPA's policies, Congress prescribed a procedure, commonly referred to as "the NEPA process" or "the environmental impact assessment process." Frequently, private individuals or companies will become involved in the NEPA process when they need a permit issued by a Federal agency. When a company applies for a permit (for example, for crossing federal lands or impacting waters of the United States) the agency that is being asked to issue the permit must evaluate the environmental effects of the permit decision under NEPA. Federal agencies might require the private company or developer to pay for the preparation of analyses, but the agency remains responsible for the scope and accuracy of the analysis (http://ceq.hss.doe.gov/nepa/Citizens_Guide_Dec07.pdf).

	The NEPA processes provide public information and a robust opportunity for public involvement. Decisions are made through public processes and involvement of fishery managers, fishermen, fishing organizations and fishing communities. Stakeholders are actively invited through publicly advertized and scheduled meetings. Assessing the social and cultural value of coastal resources is stated as an explicit part of the decision making process for allocation and use of resources. Released by the U.S. Commission on Ocean Policy on September 20, 2004, An Ocean Blueprint for the 21st Century contains the Commission's findings and recommendations for a new, coordinated and comprehensive national ocean policy. Additionally, the June 19, 2010 National Ocean Council (NOC) Executive Order established a national ocean policy which provides for Regional Planning and Advisory Committees to develop coastal and marine spatial plans. The order by Barack Obama adopts the recommendations of the Interagency Ocean Policy Task Force and directs executive agencies to implement those recommendations under the guidance of a National Ocean Council. To develop its recommendations, the Task Force reviewed Federal, State, and foreign policies and models, past and pending legislation, the recommendations contained in the two earlier Ocean Commissions' reports, and public comments. The Task Force also initiated a robust public engagement process to receive input from a diversity of voices across the country. On behalf of the Task Force, the Council on Environmental Quality (CEQ) hosted 38 expert roundtables to hear from a broad range of stakeholder groups. The Task Force also hosted six regional public meetings, and created a website to accept public comments through CEQ. The Task Force received more than 5,000 public comments, with many of the groups commenting representing constituencies of hundreds or thousands of members. Based on those recommendations, this order establishes a national policy to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources, enhance the sustainability of ocean and coastal economies, preserve the US maritime heritage, support sustainable uses and access, provide for adaptive management to enhance the understanding of and capacity to respond to climate change and ocean acidification, and coordinate with national security and foreign policy interests. This order also provides for the development of coastal and marine spatial plans that build upon and improve existing Federal, State, tribal, local, and regional decision making and planning processes. These regional plans will enable a more integrated, comprehensive, ecosystem-based, flexible, and proactive approach to planning and managing sustainable multiple uses across sectors and improve the conservation of the ocean, the US coasts, and the Great Lakes. (http://www.whitehouse.gov/ files/documents/2010stewardship-eo.pdf). Coastal and Marine Spatial Planning (CMSP) is one of the nine priority objectives described in the Final Task Force Recommendations. The CMSP framework for the United States is a comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analysing current and anticipated uses of ocean, coastal, and Great Lakes areas. In practical terms, CMSP provides a public policy process for society to better determine how these areas are sustainably used and protected The CMSP provides a definition of CMSP, identifies the reasons for engaging in CMSP, and describes its geographic scope. It articulates national CMSP objectives and

	describes how CMSP and CMS Plans are regional in scope and developed cooperatively among Federal, State, tribal, local authorities, and regional governance structures, with substantial stakeholder and public input. CMSP is intended to yield substantial economic, ecological, and social benefits. (http://www.whitehouse.gov/administration/eop/oceans/cmsp). Under the CMSP framework, the United States will be subdivided into nine regional planning areas: Northeast, Mid-Atlantic, South Atlantic, Great Lakes, Caribbean, Gulf of Mexico, West Coast, Pacific Islands, and Alaska/Arctic regions. Each region will have a corresponding regional planning body consisting of Federal, State, and tribal representatives to develop regional goals, objectives, and ultimately regional CMS plans. The NOC will work with the States and Federally-recognized tribes to create the regional planning bodies for the development of CMS plans. CMSP has been initiated in some states. Other states, like Alaska, are in the development phase to implement CMSP; which should occur within the next few years. Recent Commerce, Justice and Science subcommittee appropriations, allow funding for Regional Ocean Partnership Grants, an indirect approach to continue implementing coastal CMS planning (http://www.seafoodnews.com/). The NOAA Regional Ocean Partnership Funding Program - FY2011 Funding Competition purpose is to advise eligible state, local, territory and tribal governments, regional ocean partnerships, institutions of higher learning, and non-profit and for-profit organizations that NOAA is soliciting proposals for competitive funding for Regional Ocean Partnerships that include or emphasize regional Coastal and Marine Spatial Planning (CMSP) efforts. This competition is focused on advancing effective coastal and ocean management through regional ocean governance and the goals for national ocean policy set out in the July 2010 Final Recommendations of the Interagency Ocean Policy Task Force, which includes a national CMSP Framework. The Regional Ocean Partnership Funding Program (ROPFP) will support two categories of activities: (1) Implementation of activities that contribute to achieving the priorities identified by Regional Ocean Partnerships (ROPs) while also advancing CMSP as envisioned in the national CMSP Framework; and (2) ROP Development and Governance Support for administration and operations of existing ROPs, and for start-up costs of those regions beginning ROPs. Total anticipated funding is approximately $20,000,000 and subject to the availability of FY 2011 appropriations. Additional funds of approximately $10,000,000 from NOAA or other Federal agencies may be used for FY 2011 or multi-year awards from this competition. The start date on proposals should be the first day of July, August or September, but no later than October 1, of 2011. Statutory authority for this program is provided under Coastal Zone Management Act, 16 U.S.C. 1456c (Technical Assistance) (http://www.federalregister.gov/articles/2010/09/13/2010-22645/noaa-regional-ocean-partnership-funding-program-fy2011-funding-competition). The members of the regional planning bodies will consist of Federal, State, and tribal authorities relevant to CMSP for that area. In addition, the regional planning bodies will provide a formal mechanism for consultation with their respective Regional Fishery Management Councils (RFMCs) on fishery related issues (http://www.whitehouse.gov/administration/eop/oceans/cmsp/regional-planning).

	Up to July 1st 2011, Alaska also participated in the NOAA coastal zone management (CZM) program as one of the 34 states with approved coastal management plans. Approval of the ACMP was through a formal review process in the U.S. Department of Commerce National Oceanic and Atmospheric Administration in accordance with Coastal Zone Management Act (CZMA) section 306 that requires extensive federal review, public hearings and coordination with the National Environmental Policy Act (NEPA). http://coastalmanagement.noaa.gov/programs/czm.html The Department of Environmental Conservation (DEC) implements statutes and regulations affecting air, land and water quality. DEC is the lead state agency for implementing the federal Clean Water Act and its authorities provide considerable opportunity to maintain high quality fish and wildlife habitat through pollution prevention (http://www.dec.state.ak.us/). The Department of Fish and Game protects estuarine and marine habitats primarily through cooperative efforts involving other state and federal agencies and local governments. The Department of Natural Resources (DNR) manages all state-owned land, water and natural resources except for fish and game. This includes most of the state's tidelands out to the three mile limit and approximately 34,000 miles of coastline. DNR authorizes the use of log-transfer sites, access across state land and water, set-net sites for commercial gill net fishing, mariculture sites for shellfish farming, lodge sites and access for the tourism industry, and water rights and water use authorizations. DNR also uses the state Endangered Species Act to preserve natural habitat of species or subspecies of fish and wildlife that are threatened with extinction (http://dnr.alaska.gov/). NMFS' Habitat Conservation Division (HCD) works in coordination with industries, stakeholder groups, government agencies, and private citizens to avoid, minimize, or offset the adverse effects of human activities on Essential Fish Habitat (EFH) and living marine resources in Alaska. This work includes conducting and/or reviewing environmental analyses for a large variety of ventures/activities ranging from commercial fishing to coastal development to large transportation and energy projects. HCD identifies technically and economically feasible alternatives and offers realistic recommendations for the conservation of valuable living marine resources. HCD focuses on activities in habitats used by federally managed fish species located offshore, near shore, in estuaries, and in freshwater areas important to anadromous salmon (http://www.fakr.noaa.gov/habitat/default.htm). In addition, the BOF and the NPFMC are openly public processes. Any individual or group can submit proposals for discussion of management and research for sablefish fisheries in Alaska. The BOF meets in communities throughout coastal Alaska, while the NPFMC meets in communities in Alaska as well as in Washington and Oregon to provide public opportunities. Written comments are accepted when it is not possible to attend in person. http://www.fakr.noaa.gov/npfmc/; http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main.

Clause:

2.2 Representatives of the fisheries sector and fishing communities must be consulted in the decision-making processes involved in other activities related to coastal area management planning and development.

FAO CCRF 10.1.2

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
2.2	The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. Decisions are made through public processes and involvement of fishery managers, fishermen, fishing organizations and fishing communities; actively invited through publicly advertized and scheduled meetings (http://www.epa.gov/aboutepa/states/ak.html). In addition, the BOF and the NPFMC are openly public processes. Any individual or group can submit proposals for discussion of management and research for sablefish fisheries in Alaska. The BOF meets in communities throughout coastal Alaska, while the NPFMC meets in communities in Alaska as well as in Washington and Oregon to provide public opportunities. Written comments are accepted when it is not possible to attend in person (http://www.fakr.noaa.gov/npfmc/ and http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main). Assessing the social and cultural value of coastal resources is stated as an explicit part of the decision making process for allocation and use of resources.

Clause:

2.3 Fisheries practices that avoid conflict among bottom resource users and other users of the coastal area must be adopted.

2.3.1 Procedures and mechanisms must be established at the appropriate administrative level to settle conflicts which arise within the fisheries sector and between fisheries resource users and other users of the coastal area.

FAO CCRF 10.1.4/10.1.5

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
2.3	The NPFMC is responsible for allocation of the sablefish resource among user groups in Alaska waters. Conflict among bottom users is avoided with the use of a TAC which is divided among gear types (trawl and fixed) and an IFQ program for the majority of fixed gear. Fixed gear (longlines and pots) harvests around 85% of the sablefish quota and trawl gear about 15%. ADFG manages state fisheries that harvest sablefish outside the IFQ program (managed under a shared quota system - all permit holders receive an equal share of the annually determined catch quota) (http://www.nmfs.noaa.gov/fishwatch/species/sablefish.htm). The IFQ program provides for an expanded fishing season (approximately 9 months) that aids in the separation of trawl and fixed gear harvests; and allows for retention if IFQ sablefish when fixed gear is targeting halibut or Pacific cod. This reduces competition of gear on the fishing grounds and State groundfish seasons and areas are also constructed to avoid bottom gear conflict; this occurs as the BOF amends and adopts regulations with the aid of public impute. Both the BOF and the NPFMC allow for various users to participate in the decision making for sablefish use through their normal cycle of meetings, proposals and comments. (http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main, http://www.fakr.noaa.gov/npfmc/threemeetingoutlook.pdf). The NEPA process, deliberately takes into account all resources and users of those resources in order to resolve potential conflicts among users before project approvals are given. Conflict resolution mechanisms include both administrative (through governmental agencies) and legal (through courts of law) procedures. However, in most cases project approvals are withheld until substantive conflicts are resolved. (http://www.epa.gov/aboutepa/states/ak.html).

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
2.3.1	The meetings of the NPFMC and the BOF provide forums for resolution of potential fisheries conflicts. Additionally, stakeholders may review and submit written comments to the NMFS on proposed rules published in the Federal Register. The NPFMC works

	closely with ADFG and the BOF to coordinate fishery management programs in state and federal waters off Alaska to address fish habitat concerns catch limits, allocation issues and other management issues. (http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/findings/ff97170a.pdf). The NPFMC widely distributes Newsletters after each of the five annual meetings that describe the items covered and the actions taken. The NPFMC, NMFS, ADFG and BOF all provide current and extensive education to the interested public regarding their activities, research and pertinent background information. National Public Radio and local TV and radio coverage of BOF and Council actions also keep the public advised on the current list of issues. As for conflicts between fisherman and other coastal stakeholders, the NEPA process, deliberately takes into account all resources and users of those resources in order to resolve potential conflicts among users before project approvals are given. Conflict resolution mechanisms include both administrative (through governmental agencies) and legal (through courts of law) procedures. However, in most cases project approvals are withheld until substantive conflicts are resolved. ADFG, NMFS and NPFMC will participate in the NEPA processes whenever resources under their management may be affected by other developments (http://www.epa.gov /aboutepa/states/ak.html).
Clause: **2.4 The public must be kept aware on the need for the protection and management of coastal resources and the participation in the management process by those affected.** ***FAO CCRF 10.2.4***	
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
2.4	**Educating the public is instrumental in accomplishing compliance.** While NMFS Office for Law Enforcement (OLE) is tasked with enforcing the laws and regulations that serve to protect our nation's living marine resources, continuous education of the American public and ocean resource users is key in protection and conservation. OLE special agents, enforcement officers and support personnel routinely make presentations to school, scout and civic groups. These presentations cover a vast array of subjects within enforcement and conservation. Marine mammal protection, endangered species, sustainable fisheries, vessel monitoring systems, new Federal fishing regulations, and proper stranding procedures are just a few of the topics that they address. Special agents and enforcement officers are engaged in their communities and can be solicited directly through the local field office (http://www.nmfs.noaa.gov/pr/education/). NOAA's NMFS Protected Resources Outreach and Education Plan of 2006 strives to give direction to the myriad efforts currently underway across the NMFS Protected Resources (PR) regional and headquarters offices and NMFS science centers. This plan incorporates visions and mandates from NOAA, NMFS, and PR into an outline and plan of action

	addressing outreach and education for the next three to five years. Workshop participants identified challenges to outreach and education, most effectively addressed at a national level, which form the basis of the Outreach and Education plan. In all NMFS/PR offices and at NMFS science centers, outreach and education activities are successfully underway. The work is carried out by full time outreach specialists, program staff with partial outreach responsibilities, and by interested staff who integrate outreach and education into their regular duties. Outreach and education will improve the public's perspective of Protected Resource's programs by increasing the public's knowledge of the status of species, threats to their continued survival, and how NMFS science and management are working to address them (http://www.nmfs.noaa.gov/pr/pdfs/education/strategic_plan.pdf). **Participation in management is an integral part of the BOF and the NPFMC.** The regular meetings of the NPFMC and the BOF provide a forum for participation of the public into fisheries regulation's decision making process. All the planned meetings are advertised on the NFMC and ADFG websites. In addition, stakeholders may review and submit written comments to the NMFS on proposed rules published in the Federal Register. Furthermore, the BOF allows for public input in decision making through cycle meetings, proposals and comments. (http://www.nmfs.noaa.gov/pr/pdfs/education/strategic_plan.pdf ; http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2011-2012/2011-2012-BOF-schedule.pdf). The NPFMC, NMFS and ADFG all have staff economists that participate in the economic, social and cultural evaluation and review process of fishery management proposals. They advise the NPFMC and BOF members, as well as their agency heads who help lead the regulation amendment process. Another important state effort requested by the US Congress is the development of a wildlife action plan, known technically as a Comprehensive Wildlife Conservation Strategy (CWCS). The intent of the CWCS is to initiate or expand partnerships with other agencies and non-governmental organizations (NGO's) to conserve, improve, and manage Alaska's habitats for aquatic species, develop education and outreach programs and materials related to aquatic species and their habitats, and to develop curricula and supporting material that describes the relationship between aquatic species, sport-fished species, and the importance of aquatic habitats by providing targeted audiences with educational programs that focus on aquatic resource-based stewardship principles and encourage active stewardship practices. In 2003, at the start of the CWCS project, in order to get broad input on process, goals, and species with conservation needs, the planning team reached out to a range of partners including government agencies, conservation interests, landowners, resource users, representatives of the Native community, and the state's 77 ADFG advisory committees, as well as to the general public. This was followed by two-day meetings and months of work with more than 100 scientific experts, peers, and others with Alaskan expertise on species and habitats in 14 major animal groups. The planning team provided an eight week window in which to review the draft CWCS, announcing the opportunity via email or letter to nearly 2,000 individuals and groups, and notice to the general public through a press release, newsletters, Alaska's CWCS website, and a notice published in major instate newspapers.

	The team considered hundreds of comments received from universities, government agencies, and organizations including The Wildlife Society, Tanana Tribal Council, National Rifle Association, Territorial Sportsmen, Defenders of Wildlife, and Alaska Bird Observatory. http://www.wildlifeactionplans.org/pdfs/action_plan_summaries/alaska.pdf. http://www.adfg.alaska.gov/static/species/wildlife_action_plan/cwcs_main_text_combined.pdf

Clause:

2.5 The economic, social and cultural value of coastal resources must be assessed in order to assist decision-making on their allocation and use.

- **Economic assessment**
- **Social and cultural assessment**

FAO CCRF 10.2.

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
2.5	From an economic, institutional and social perspective, the value of sablefish and other commercially important living marine resources is regularly assessed in order to assist decision makers with allocation and use decisions. Each NPFMC decision package includes the NEPA evaluation that describes the social and economic impacts of the proposed action on the resource, the stakeholders, communities and the public at large. In 2005, the AFSC compiled baseline socioeconomic information about the 136 Alaska communities most involved in commercial fisheries. Communities were selected by assessing fishery-involvement indicators including landings, processors, vessel homeports, vessel ownership, crew licenses, and gear operator permits. The profiles compile information from the US Census, ADFG, CFEC, NMFS Restricted Access Management Division, Alaska Department of Community and Economic Development, and various community groups, websites, and archives. The 5-page profiles for each community follow the same general outline: • People and Place (Location, Demographics, History). • Infrastructure (Current Economy, Governance, Facilities). • North Pacific Fisheries involvement (Commercial, Recreational, Subsistence Fishing). The profiles were published as NOAA Technical Memorandum NMFS-AFSC-160 in December 2005. The report can be downloaded as a complete document (17.6 MB) from http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-160/NOAA-TM-AFSC-160.pdf.

	The AFSC is planning to update the Alaskan community profiles to include new U.S. Census data from 2010 and input from the communities and industry. The Economic status of the groundfish fisheries off the GOA and BSAI area can be found at http://www.afsc.noaa.gov/ REFM/docs/2010/economic.pdf. NMFS Alaska Regional Office's Restricted Access Management Program (RAM) is responsible for managing Alaska Region permit programs, including those that limit access to the Federally-managed fisheries of the North Pacific. RAM responsibilities include: providing program information to the public, determining eligibility and issuing permits, processing transfers, collecting landing fees and related activities. RAM prepares and distributes reports on landings in the sablefish and Pacific halibut IFQ program (http://www.fakr.noaa.gov/ram/). The economic value of the commercial sablefish fishery is tracked by NMFS and NPFMC through the IFQ Halibut/Sablefish reports. Harvest and landing reports are available at http://www.fakr.noaa.gov/ram/ifqreports.htm.

Clause:

2.6 In accordance with capacities, measures must be taken to establish or promote the establishment of systems to monitor the coastal environment as part of the coastal management process using physical, chemical, biological, economic and social parameters.

FAO CCRF 10.2.4

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
2.6	Monitoring of the coastal environment in Alaska is performed by federal and state agencies including the U.S. Forest Service, U.S. Fish and Wildlife Service, and the NMFS as well as many institutions of higher learning including the University of Alaska Institute of Marine Science (IMS). IMS faculty and research staff provides expertise in marine biology, biological oceanography, physical, chemical and geological oceanography. With an annual research budget of approximately $5.5 million, current IMS projects include Northeast Pacific near-surface monitoring of temperature, salinity and fluorescence, polycyclic aromatic hydrocarbon research, and Arctic ocean biodiversity. (http://www.ims.uaf.edu/) Economic and social parameters are assessed by the staff of the NPFMC, NMFS and ADFG either during the NEPA review of plan amendments or during their on-going studies and evaluations. For Oceanography, the North Pacific Research board (NPRB) has funded million of dollars for numerous studies describing baseline oceanographic parameters and supported environmental buoy arrays (http://www.nprb.org). Additionally, NMFS Pacific Marine Environmental Lab (PMEL) regularly collects oceanographic and environmental data which is important to understanding the changing habitat of sablefish and other marine species. (http://www.pmel.noaa.gov) **ADEC** The Alaska Department of Environmental Conservation (ADEC) Division of Water establishes standards for water cleanliness; regulates discharges to waters and wetlands; provides financial assistance for water and wastewater facility construction, and water body assessment and remediation; trains, certifies and assists water and wastewater system operators; and monitors and reports on water quality (http://dec.alaska.gov/water/ MoreAboutWater.htm). ADEC Division of Spill Prevention and Response prevents spills of oil and hazardous substances, prepares for when a spill occurs and responds rapidly to protect human health and the environment (http://dec.alaska.gov/spar/index.htm). **ADFG** ADFG Habitat Division conducts research on watersheds, active mining sites, fire-impacted woodlands, anadromous fish streams, and coastal and marine environments throughout Alaska in an effort to document and mitigate human-related impacts, changes in habitat & species abundance (http://www.adfg.alaska.gov/index.cfm?adfg=habitatresearch. main).

AFSC

The AFSC's *"Ecosystem Monitoring and Assessment Program"* (EMA) main goal is to improve and reduce uncertainty in stock assessment models of commercially important fish species through the collection of observations of fish and oceanography. Fishery observers and survey scientists collect information regarding fish abundance, size, distribution, diet and energetic status. Oceanographic observations include temperature, conductivity, salinity, density, light transmission, photosynthetically available radiation (PAR), oxygen, Chlorophyll a, and estimates of the composition and biomass of phytoplankton and zooplankton (includes jellyfish) species. These fish and oceanographic observations are used to connect climate change and variability in large marine ecosystems to early marine survival of commercially important fish species in the GOA, Bering Sea, and Arctic.

The oceanographic component of EMA investigates various physical and biological parameters in the eastern Bering Sea. Spatial and temporal patterns illustrated by these data provide critical insight into how the ecosystem functions. Oceanographic data is analyzed alone and in conjunction with fisheries data for comparisons of water mass characteristics. Water samples collected above and below the pycnocline are analyzed for Chlorophyll a concentration to explore productivity and are used in primary production experiments to explore growth rates. Phytoplankton forms the base of the food web and perform a critical role in the Bering Sea ecosystem.

Zooplankton and jellyfish are collected for species ID, biomass, and abundance. Zooplankton are an important prey item of numerous Bering Sea fishes including forage fishes and the juvenile stages of many commercially important species. Understanding the links among phytoplankton, zooplankton, and fishes will further AFSC's understanding of changes in fisheries population dynamics and the influence of climate change in this region (http://www.afsc.noaa.gov/ABL/EMA/EMAOceanography.php).

NMFS

The NMFS' Habitat Conservation Division (HCD) works in coordination with industries, stakeholder groups, government agencies, and private citizens to avoid, minimize, or offset the adverse effects of human activities on Essential Fish Habitat (EFH) and living marine resources in Alaska. This work includes conducting and/or reviewing environmental analyses for a large variety of activities ranging from commercial fishing to coastal development to large transportation and energy projects. HCD identifies technically and economically feasible alternatives and offers realistic recommendations for the conservation of valuable living marine resources. HCD focuses on activities in habitats used by federally managed fish species located offshore, near shore, in estuaries, and in freshwater areas (http://www.fakr.noaa.gov/habitat/default.htm).

USCG

Protecting the U.S. EEZ and key areas of the high seas is an important mission for the US Coast Guard. The Coast Guard enforces fisheries laws at sea, both domestic and international fishing agreements as tasked by the MSA. Furthermore, the goal of the USCG's marine protected species program is to assist the NMFS and the FWS in the development and enforcement of those regulations necessary to help recover and

	maintain the country's marine protected species and their marine ecosystems. Coast Guard objectives include assisting in preventing the decline of marine protected species populations, promoting the recovery of marine protected species and their habitats, partnering with other agencies and organizations to enhance stewardship of marine ecosystems and ensuring internal compliance with appropriate legislation, regulations and management practices (http:// www.uscg.mil/hq/cg5/cg531/LMR.asp). **RAM** The NMFS Alaska Regional Office's Restricted Access Management Program (RAM) is responsible for managing Alaska Region permit programs, including those that limit access to the Federally-managed fisheries of the North Pacific. RAM prepares and distributes reports on landings in the Pacific halibut and sablefish IFQ (http://www.fakr.noaa.gov/ram/). The economic value of the commercial sablefish fishery is tracked by NMFS and NPFMC through the IFQ Halibut/Sablefish report. Harvest and landing reports are available at http://www.fakr.noaa.gov/ram/ ifqreports.htm. **ANILCA** In addition, the Alaska National Interest Lands Conservation Act (ANILCA) directs federal agencies to consult and coordinate with the state of Alaska. State agencies responsible for natural resources, tourism, and transportation work as a team to provide input throughout federal planning processes (http://dnr.alaska.gov/commis/opmp/anilca/anilca.htm). **OPMP** Moreover, the Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP) coordinates the review of larger scale projects in the state. Because of the complexity and potential impact of these projects on multiple divisions or agencies, these projects typically benefit from a single primary point of contact. A project coordinator is assigned to each project in order to facilitate interagency coordination and a cooperative working relationship with the project proponent. The office deals with a diverse mix of projects including transportation, oil and gas, mining, federal grants, ANILCA coordination, and land use planning. Every project is different and involves a different mix of agencies, permitting requirements, statutory responsibilities, and resource management responsibilities (http://dnr.alaska.gov/commis/opmp/).

3. Management objectives must be implemented through management rules and actions formulated in a plan or other framework. ***FAO 7.3.3/7.2.2/7.6.10***						
Confidence Ratings	**Low**	**0 out of 8**	**Medium**	**0 out of 8**	**High**	**8 out of 8**

Clause:

3.1 Long-term management objectives shall be translated into a plan or other management document and be subscribed to by all interested parties.

FAO CCRF 7.3.3

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	**Evidence**
3.1	Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. **These include FMPs for sablefish fisheries in the GOA and the BSAI**. Both FMPs present long-term management objectives for the Alaska sablefish fishery. These include sections that describe a Summary of Management Measures and Management and Policy Objectives. To guide specific policies they list the: 1) National Standards for Fishery Conservation and Management contained in the MSA; and 2) Management Approach for the GOA Groundfish Fisheries with nine specific Management Objectives for each fishery. These long-term objectives provide guidelines for related laws, regulations, research, review and public participation in the fisheries. **National Standards for Fishery Conservation and Management** The MSA, as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. They are: 1. Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry. 2. Conservation and management measures shall be based upon the best scientific information available. 3. To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in

close coordination.

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 United States 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 manner that no particular individual, corporation, or entity acquires an excessive share of such privileges.

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.

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

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

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.

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.

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

Management Objectives
Under the direction of the NPFMC, the GOA and BSAI FMPs define nine management and policy objectives that are reviewed annually. They are:

- Prevent Overfishing
- Promote Sustainable Fisheries and Communities
- Preserve Food Webs
- Manage Incidental Catch and Reduce Bycatch and Waste
- Avoid Impacts to Seabirds and Marine Mammals
- Reduce and Avoid Impacts to Habitat
- Promote Equitable and Efficient Use of Fishery Resources
- Increase Alaska Native Consultation
- Improve Data Quality, Monitoring and Enforcement

The national standards and management objectives defined in GOA and BSAI FMPs provide adequate evidence to demonstrate the existence of long-term objectives clearly stated in management plans. They provide more detailed evidence for additional clauses in this section.

	Besides its regular mandates for resource conservation management, the BOF developed guiding principles for the groundfish fisheries under 5 AAC 28.089 so that coordination with the NPFMC and MSA goals could be adopted. In state waters (0-3 nm), five Alaska sablefish fisheries are managed by ADFG and the BOF outside the IFQ program. The Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC 28.640) governs the harvest of sablefish in the Area as described in 5 AAC 28.555(b). 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272. Southeast Alaska State managed sablefish (Chatham and Clarence strait) regulations are specified under 5AAC28 Groundfish Commercial Fisheries Regulations. The Alaska Wildlife Troopers enforce fisheries regulations in state waters. **Sources of evidence:** http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf State Groundfish Fisheries chapter 28 http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial

Clause:

3.2 Management measures shall provide inter alia that:

3.2.1 Excess fishing capacity is avoided and exploitation of the stocks remains economically viable;

3.2.2 The economic conditions under which fishing industries operate promote responsible fisheries;

3.2.3 The interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries, are taken into account;

3.2.4 Biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected;

3.2.5 Depleted stocks are allowed to recover or, where appropriate, are actively restored;

3.2.6 Adverse environmental impacts on the resources from human activities are assessed and, where appropriate, corrected;

3.2.7 Pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species are minimized, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost effective fishing gear and techniques.

FAO Main CCRF 7.2.2 Other 7.6.10

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
3.2.1	The BSAI and GOA FMPs described in Section 3.2 define specific management measures taken by the NPFMC to avoid excess fishing capacity and maintain economically viable stocks. The specific management objectives and sub-objectives to avoid excess fishing capacity and maintain economically viable stocks include: **Prevent Overfishing:** 1. Adopt conservative harvest levels for multi-species and single species fisheries and specify optimum yield. 2. Continue to use the existing optimum yield cap for the GOA groundfish fisheries. 3. Provide for adaptive management by continuing to specify optimum yield as a range. 4. Provide for periodic reviews of the adequacy of *F40* and adopt improvements, as

	appropriate. 5. Continue to improve the management of species through species categories. **Promote Sustainable Fisheries and Communities:** 6. Promote conservation while providing for optimum yield in terms of the greatest overall benefit to the nation with particular reference to food production, and sustainable opportunities for recreational, subsistence, and commercial fishing participants and fishing communities. 7. Promote management measures that, while meeting conservation objectives, are also designed to avoid significant disruption of existing social and economic structures. 8. Promote fair and equitable allocation of identified available resources in a manner such that no particular sector, group or entity acquires an excessive share of the privileges. **Promote Equitable and Efficient Use of Fishery.** 31. Provide economic and community stability to harvesting and processing sectors through fair allocation of fishery resources. 32. Maintain the license limitation program, modified as necessary, and further decrease excess fishing capacity and overcapitalization by eliminating latent licenses and extending programs such as community or rights-based management to some or all groundfish fisheries. 33. Provide for adaptive management by periodically evaluating the effectiveness of rationalization programs and the allocation of access rights based on performance. 34. Develop management measures that, when practicable, consider the efficient use of fishery resources taking into account the interest of harvesters, processors, and communities. **TAC.** To implement these objectives and to avoid excess fishing the NPFMC sets TACs each year based on stock assessments reported in SAFE documents. Also, the Council limits access to the sablefish fishery through the IFQ system implemented in 1995 and restrictions to foreign fishing since 1990. **IFQs.** Amendment 20 to the GOA Fishery Management Plan and 15 to the BSAI Fishery Management Plan established IFQ management for sablefish beginning in 1995. This form of limited entry fishing replaced the open access fisheries for sablefish. Fixed Gear is defined to include all hook and line fishing gears (longlines, jigs, handlines, troll gear, and pot gear) but sablefish longlines usually refer to baited hooks attached to a longline on the sea bottom floor. Following domestication of the pre-IFQ fishery domestic operations expanded rapidly, leading to overcapitalization. The fixed gear fleet grew from less than 90 in 1982 to

nearly 1,000 vessels by 1992. Season length decreased in the GOA from 12 months to 1-2 months, and in some areas, the open-access fishery shortened to 10 days; warranting the label "derby" fishery. Accompanying the increase in vessel numbers was a doubling of individual fishing power with the appearance of circle hooks. Quality and price of sablefish suffered. IFQ management has increased fishery catch rates and decreased the harvest of immature fish. Vessel participation reduced from 700 when the program was initiated in 1995 to 389 by 2009. Under the current season structure the decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. The sablefish IFQ fishery is concurrent with the halibut IFQ fishery, which further reduces bycatch mortality.

Initial quota shares were awarded to qualified persons who landed fish in 1988, 1989, or 1990. Quota shares were assigned initially for each management subarea to qualified persons based on recorded landings, as documented through fish tickets or other documentation for fixed gear landings from the quota share base period from 1985 through 1990. NMFS selected a person's best five years from the quota share base period to calculate their quota shares for each management subarea. The sum of the catch in each person's five selected years for each area shall equal that person's quota shares for that area. All quota share in any area are added together to form the "Quota Share Pool" for that area.

The IFQ program also allocated 20% of the fixed gear allocation of sablefish to a CDQ reserve for the BSAI.

GOA IFQs. The GOA sablefish regulatory Eastern regulatory area is divided into two districts, West Yakutat and Southeast Outside. In the Eastern regulatory area, vessels using hook-and-line gear will be permitted to take up to 95% of the TAC, and vessels using trawl gear up to 5%. In the Western and Central regulatory areas, vessels using hook-and-line gear will be permitted to take up to 80% of the TAC, and vessels using trawl gear up to 20%. The increased trawl allocation in these latter two areas reflects the customary bycatch rates when trawl vessels targeted rockfish and other groundfish.

BSAI IFQs. Vessels using fixed gear may harvest no more than 50% of the TAC in the Bering Sea and 75% of the TAC in the Aleutian Islands; vessels using trawl gear may harvest no more than 50% of the TAC in the Bering Sea and 25% of the TAC in the Aleutian Islands. As part of CDQ program, 20% of the fixed gear allocation of the TAC and 7.5% of the trawl allocation of the TAC will be reserved for CDQs.

Limits to foreign fishing. Foreign fishers, especially Japanese, took large catches of sablefish in the 1970s. The groundfish resources off Alaska have been harvested and processed entirely by U.S.-flagged vessels since 1991. No portion of the annual optimum yield is allocated to foreign harvesters or foreign processors. Title II of the MSA establishes the system for the regulation of foreign fishing within the U.S. EEZ. These regulations are published in 50 CFR 600. The regulations provide for the setting of a total allowable level of foreign fishing (TALFF) for species based on the portion of the optimum yield that will not be caught by U.S. vessels. At the present time, no TALFF is available for the fisheries for GOA and BSAI Groundfish FMPs, because the U.S. has the

	capacity to harvest up to the level of optimum yield of all species subject to this FMP. Also, U.S. fish processors have the capacity to process the entire optimum yield of GOA groundfish. **Sources of evidence:** FMPs: http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf SAFE reports: http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf Sablefish Fishery: www.afsc.noaa.gov/ABL/MESA/mesa_sa_sable_fi.htm www.fakr.noaa.gov/npfmc/sci_papers/ifqpaper.htm
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
3.2.2	GOA and BSAI FMPs describe management objectives to promote economic conditions for responsible fisheries. Specific FMP management objectives and sub-objectives include: **Promote Sustainable Fisheries and Communities** 6. Promote conservation while providing for optimum yield in terms of the greatest overall benefit to the nation with particular reference to food production, and sustainable opportunities for recreational, subsistence, and commercial fishing participants and fishing communities. 7. Promote management measures that, while meeting conservation objectives, are also designed to avoid significant disruption of existing social and economic structures. 8. Promote fair and equitable allocation of identified available resources in a manner such that no particular sector, group or entity acquires an excessive share of the privileges. 9. Promote increased safety at sea. **IFQs.** The IFQ system promotes sustainable economic conditions and limits access to the sablefish fishery. Also, the US government restricts foreign fishing under the MSA. See more details in Section 3.2.1. The current IFQ system for the fixed gear sablefish fishery defines provisions for:

- Management Areas
- Initial Allocation of Quota Shares
- Initial Recipients
- Vessel Categories
- Quota Share Blocks
- Transfer Provisions
- Use and Ownership Provisions
- Annual Allocation of Quota Share/IFQ

CDQ. CDQs provide limited access for selected Alaskan communities. Fishery Management Plans (FMPs) for the GOA and Bering Sea Aleutian Islands (BSAI) define rights and privileges for CDQs, including:

- Community Quota Share Purchase
- Eligible Communities
- Management Area
- Use and Ownership Provisions
- Transfer Provisions

IFQ results. The sablefish fishery in Alaska is primarily a small boat fishery with nearly 400 vessels, and the season lasts from approximately March 1 - November 15. This is a significant reduction in capacity from the nearly 1,000 vessels fishing pre-IFQ, resulting in increased economic returns to each fisherman. The sablefish IFQ fishery runs concurrently with the halibut IFQ fishery, reducing operating costs to the fleet and resulting in the retention of fish that would have been released with some associated mortality. IFQ management has increased fishery catch rate and decreased the harvest of immature fish, as well as increasing efficiency resulting in a savings in operating costs averaging $3.1 million annually. The directed sablefish fishery is primarily a hook-and-line fishery, although sablefish are also caught incidentally during directed trawl fisheries for species groups such as rockfish and deepwater flatfish.

IFQ management has increased fishery catch rates and decreased the harvest of immature fish Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging US$3.1 million annually. Decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery.

Safety statistics compiled by the U.S. Coast Guard show that, as the IFQ program progressed, a substantial drop in search and rescue missions for the sablefish and halibut fisheries occurred. Furthermore, a survey of sablefish fishermen revealed that more than 90 percent reported weather as an important factor in determining when to fish quota.

	Economic SAFE. SAFE documents provide economic statistics and analysis of the sablefish fishery in an Appendix to SAFE documents. For example: "Economic Status of the Groundfish Fisheries off Alaska, 2005." It describes annual catch by gear type, vessel, and management area and it describes values of catches. It also provides statistics of discards, discard rates, bycatch of prohibited species in the sablefish fishery. These statistics show the relatively high value of sablefish compared to other ground fish. For example in the GOA ex-vessel prices in 2004 show: $ 1.691 per pound for sablefish, $0.102 per pound for pollock, and $0.251 per pound for Pacific cod. While the 2004 ex-vessel price looks impressive, a check on the 2011 price at one processor showed dressed weight prices from $7.50 to $9.10 depending on weight category of the fish. Dressed weight is not the same as round weight, and the official ex-vessel value will be a weighted average of the season's round weight price. But these numbers do illustrate the value of the sablefish fishery. Despite their lower catch volumes, sablefish represents the highest value catches in the GOA as total values in 2004 show: $ 69.2 million for sablefish, $ 12.2 million for cod; and $ 31.3 million for Pacific cod. The statistics also show that most catch comes from vessels less than 65 feet in length. **Annual TAC.** In setting TACs each year, the NPFMC considers socioeconomic considerations including promotion of efficiency, optimum marketable size of fish, impacts on prohibited species and dependent domestic fisheries, desire to enhance depleted stocks, seasonal access to the groundfish fishery by U.S. vessels, commercial importance to local communities, subsistence needs, and the need to promote utilization of certain species. **Sources of evidence:** http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf http://www.afsc.noaa.gov/refm/docs/2005/economic.pdf http://www.fakr.noaa.gov/npfmc/summary_reports/species2001.pdf http://www.msc.org/documents/fisheries-factsheets/net-benefits-report/US-North-Pacific-sablefish.pdf

Evidence adequacy rating: ☑ High ☐ Medium ☐ Low	
Clause:	**Evidence**
3.2.3	**The interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries are taken into account.** GOA and BSAI FMPs describe management measures to take into account the interests of subsistence, small-scale, and artisanal fisheries. Specific FMP management objectives and sub-objectives include: **Promote Sustainable Fisheries and Communities:** 7. Promote management measures that, while meeting conservation objectives, are also designed to avoid significant disruption of existing social and economic structures. 8. Promote fair and equitable allocation of identified available resources in a manner such that no particular sector, group or entity acquires an excessive share of the privileges. **Promote Equitable and Efficient Use of Fishery Resources:** 32**.** Provide economic and community stability to harvesting and processing sectors through fair allocation of fishery resources. 34. Develop management measures that, when practicable, consider the efficient use of fishery resources taking into account the interest of harvesters, processors, and communities. **Increase Alaska Native Consultation:** 35. Continue to incorporate local and traditional knowledge in fishery management. 36. Consider ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge in fishery management where appropriate. 37. Increase Alaska Native participation and consultation in fishery management. **The IFQ program** takes the interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries into account. This was done in the design of the program elements that incorporated protections against consolidation by large vessels and freezer processors. These included: restricting of quota to size of vessel initially issued (categories <60’ or >60’); restricting freezer vessels from purchase of catcher vessel quota shares; restricting purchase of quota to qualified crewmembers (those with experience in NPFMC fisheries); implementation of the Block program that left small blocks of quota {5,000 lbs} available for purchase by small entities; and a leasing

program that limited leasing to encourage owners on board.

www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf

BSAI CDQs. To consider the interests of subsistence, small-scale, and artisanal fisheries, the Amendment 15 to the BSAI Fishery Management Plan set aside 20% of the fixed gear allocation of sablefish to a CDQ reserve for the BSAI. CDQ programs for pollock, sablefish, and halibut for the BSAI in the early to mid-1990s and expanded into the multispecies CDQ Program in 1999.

The CDQ Program addresses the fishery dependence of coastal and western Alaska communities has provided the following for the CDQ communities: 1) additional employment in the harvesting and processing sectors of the groundfish fisheries; 2) training; and 3) income generated by fishing the CDQ allocations. In many cases, CDQ royalties have been used to increase the ability of the residents of the CDQ communities to participate in the regional commercial fisheries, or residents themselves have fished the CDQ.

The purpose of the CDQ Program was to provide western Alaska fishing communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. The program was intended to help western Alaska communities to diversify their local economies and to provide new opportunities for stable, long-term employment. The original Council guidance for implementing the CDQ Program focused on using the allocations to develop a self- sustaining fisheries economy.
http://www.fakr.noaa.gov/regs/679c30.pdf

As a result of these policy guidelines and management practices, 20 percent of the fixed gear allocations in the Bering Sea are reserved for use by CDQ program participants, which includes 65 eligible communities organized into six groups and was designed to ensure fishing access, support economic development, alleviate poverty, and provide economic and social benefits to residents of western Alaska communities.
http://www.edf.org/documents/11391_alaska-ifq.pdf

GOA CQE. The GOA program is a Community Quota Entity (CQE) program as opposed to the BSAI CDQ program, with much different goals and objectives than the CDQ program. The Community Quota Entity (CQE) Program, which was approved by the Council in 2002 and implemented by NMFS in 2004, under Amendment 66 to the GOA Fishery Management Plan. The program was developed in order to allow a distinct set of small, remote coastal communities located in the GOA to form non-profit organizations for the purpose of purchasing catcher vessel quota share (QS) under the existing halibut and sablefish IFQ Program.

Previously under the IFQ Program, only IFQ crewmembers or initial recipients of catcher vessel QS were allowed to purchase catcher vessel QS. As 2011, 42 communities located in south-central and southeast Alaska are listed in Table 21 to 50 CFR Part 679 as eligible to participate in the program. The Council is considering amending Federal regulations

to potentially add four new communities to the list of communities eligible to participate, based on the same criteria used to determine eligibility for the original program. If determined eligible, these new communities would be subject to the same provisions and restrictions as all other eligible communities. The communities evaluated for eligibility in Dec 2010 analysis were Game Creek, Naukati Bay, Cold Bay, and Kupreanof.
http://www.fakr.noaa.gov/npfmc/PDFdocuments/halibut/C4c_EligibleCommunities.pdf

State fisheries. Five State of Alaska fisheries land sablefish outside the IFQ program; the major State fisheries occur in the Prince William Sound, Chatham Strait, and Clarence Strait and the minor fisheries in the northern GOA and Aleutian Islands. The minor state fisheries were established by the State of Alaska in 1995, the same time as NMFS established the IFQ fishery, primarily to provide open-access fisheries to fishermen who could not participate in the IFQ fishery.

http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf

Effects of CDQs. The broad conclusion gathered from collective sources is that fishing plays a role in the identity of all of the proposed communities – nearly all of the communities are reliant on subsistence harvests, and commercial fishing, whether for sablefish, halibut, or otherwise, is the dominant source of jobs and income in most of these communities.

In BSAI a detailed analysis of the effects of the FMP on the human environment, including fishery participants and fishing communities, was conducted in the *Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement* (NMFS 2004). The following is a brief summary from this analysis.

The FMP has instituted privilege-based management programs in the some groundfish fisheries, and fishery managers, under the guidance of the FMP management policy, are moving towards extending privilege-based allocations to other groundfish fisheries.

1. The FMP promotes increased social and economic benefits through the promotion of privilege-based allocations to individuals, sectors and communities. For this reason, it is likely to increase the commercial value generated from the groundfish fisheries.
2. As the race-for-fish is eliminated, the FMP could result in positive effects in terms of producer net revenue, consumer benefits, and participant health and safety.
3. The elimination of the race-for-fish will likely result in a decrease in overall participation levels. In the long-run, communities are likely to see fewer persons employed in jobs related to the fishing industry (fishing, processing, or support sectors), but the jobs that remain could be more stable and provide higher pay.
4. The FMP's promotion of privilege-based allocations is also expected to increase consumer benefits and health and safety of participants.

The FMP has adopted a variety of management measures to promote the sustainability of the groundfish fisheries and dependent fishing communities.
• Management measures to account for uncertainty ensure the sustainability of the

	managed species by maintaining a spawning stock biomass for the target species with the potential to produce sustained yields. • The transition to privilege-based management in the short-term could disrupt stability, however in the long-term; the stability of fisheries would be increased in comparison to a derby-style fishery. • Communities would also tend to experience an increase in stability as a result of built-in community protections to the privilege-based management programs. **Sources of evidence:** http://www.fakr.noaa.gov/regs/679c30.pdf http://www.edf.org/documents/11391_alaska-ifq.pdf http://www.fakr.noaa.gov/npfmc/fmp/bsai/BSAIfmpAPPENDIX.pdf www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
3.2.4	**Biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected.** BSAI and GOA FMPs define three management objectives to conserve biodiversity of aquatic habitats and protect endangered species. The three objectives and their sub-objectives are: **Preserve Food Web** 10. Develop indices of ecosystem health as targets for management. 11. Improve the procedure to adjust acceptable biological catch levels as necessary to account for uncertainty and ecosystem factors. 12. Continue to protect the integrity of the food web through limits on harvest of forage species. 13. Incorporate ecosystem-based considerations into fishery management decisions, as appropriate. To monitor the effectiveness of these management measures, the annual Stock Assessment and Fishery Analysis (SAFE) documents for the GOA and BSAI present analyses of ecosystem considerations. Also, the annual GOA and BSAI FMPs summarize status and trends of ecosystem characteristics of all targeted groundfish fisheries, including sablefish. See Section 13.

	Manage Incidental Catch and Reduce Bycatch and Waste 14. Continue and improve current incidental catch and bycatch management program. 15. Develop incentive programs for bycatch reduction including the development of mechanisms to facilitate the formation of bycatch pools, vessel bycatch allowances, or other bycatch incentive systems. 16. Encourage research programs to evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available. 17. Continue program to reduce discards by developing management measures that encourage the use of gear and fishing techniques that reduce bycatch which includes economic discards. 18. Continue to manage incidental catch and bycatch through seasonal distribution of TAC and geographical gear restrictions. 19. Continue to account for bycatch mortality in TAC accounting and improve the accuracy of mortality assessments for target, prohibited species catch, and noncommercial species. 20. Control the bycatch of prohibited species through prohibited species catch limits or other appropriate measures. 21. Reduce waste to biologically and socially acceptable levels. To implement bycatch limitation measures, the FMP specifies regulations for legal gear types, time and area closures, and restrictions on prohibited species. The fishery collects bycatch data through observer programs and logbook data. See Sections 4 and 13. **Avoid Impacts to Seabirds and Marine Mammals:** 22. Continue to cooperate with the U.S. Fish and Wildlife Service (USFWS) to protect ESA listed species, and if appropriate and practicable, other seabird species. 23. Maintain or adjust current protection measures as appropriate to avoid jeopardy of extinction or adverse modification of critical habitat for ESA-listed Steller sea lions. 24. Encourage programs to review status of endangered or threatened marine mammal stocks and fishing interactions and develop fishery management measures as appropriate.

25. Continue to cooperate with NMFS and USFWS to protect ESA-listed marine mammal species, and if appropriate and practicable, other marine mammal species.

Seabirds. There are two major laws that protect seabirds and require the Council to address seabird conservation in their Fishery Management Plans. The first is the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712), as amended over the years. This law pertains to all of the seabird species found in the BSAI and GOA area (66 FR 52282) and governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests. The second law is the ESA which provides broad protection for species that are listed as threatened or endangered. Presently there are three species listed under the ESA that spend all or part of their time in the BSAI and GOA and that may be affected by the groundfish fisheries: short-tailed albatross (endangered), Steller's eider (threatened), and spectacled eider (threatened).

The USFWS is the lead federal agency for managing and conserving seabirds. As a result of ESA Section 7 consultations between the USFWS and NOAA to protect short-tailed albatross, NOAA Fisheries required the BSAI and GOA groundfish longline fleet to employ *Tori lines* (or scarelines) as seabird avoidance measures to reduce incidental take in 1997 (62 FR 23176). In order to protect short-tailed albatross in other North Pacific fisheries, NOAA Fisheries required seabird avoidance measures to be used by vessels fishing for Pacific halibut and sablefish in U.S. EEZ waters off Alaska in 1998 (63 FR 11161). These measures focused primarily on collecting seabird and fishery interaction data and on requiring longliners to use specific types of gear and fishing techniques to avoid seabird incidental take.

In 1999 and 2000 NOAA Fisheries in partnership with the Washington Sea Grant Program conducted a comprehensive scientific study to experimentally determine the effectiveness of seabird deterrent measures in the IFQ halibut and sablefish longline fishery. It was the largest study of its kind in the world with over 1.2 million hooks set in the sablefish fishery and over 6.3 million hooks set in the cod fishery. The results of the study were presented to NPFMC in October 2001 in its final report, "Solutions to Seabird Bycatch in Alaska's Demersal Longline Fisheries" The study found that paired streamer lines of specified performance and material standards successfully reduced seabird incidental take in both years, regions, and fleets by 88 to 100 percent relative to controls with no deterrent. Single streamer lines of specified performance and material standards were slightly less effective than paired streamer lines, reducing seabird incidental take by 96 percent and 71 percent relative to controls with no deterrent in the sablefish and cod fisheries, respectively.

Based on these research findings NPFMC made recommendations to NOAA Fisheries that resulted in regulations that have been in effect since February 2004. As of 2004, longline vessels over 26 ft LOA are required to use either single or paired streamer lines (or in some cases for smaller vessels, a buoy bag line) to reduce incidental take of seabirds.
Such regulations vary by length of vessel, area fished, type of gear, and other factors.
See: http://www.fakr.noaa.gov/protectedresources/seabirds.html

	Observers collect incidental take data in the trawl and pot sectors of the fishery. USFWS and the trawl sector of the fishing industry are collaborating on research into minimizing the effects of the trawl —third wire (a cable from the vessel to the trawl net monitoring device) on incidental take of seabirds. The trawl wire that birds sometime hit is the "third wire". However, there have been no regulatory or Fishery Management Plan-level efforts to mitigate seabird incidental take in the trawl and pot sectors. For species listed as threatened or endangered under the ESA, the U.S. Fish and Wildlife Service (USFWS) may establish a threshold number of incidental takes that are allowed before mitigation measures are reviewed and perhaps changed. Although this is sometimes viewed as a limit on the number of birds (e.g., short-tailed albatross) that can be taken, the result of exceeding this threshold number is a formal consultation process between NMFS and USFWS, not an immediate shutdown of the fishery. Another management tool that may affect incidental take of seabirds is the regulation of who is allowed to fish. Limited entry and rationalization programs such as IFQ and CDQ programs may impact seabird incidental take if the number or size of fishing vessels changes because regulations on protective measures are based on the size of the vessel. Since different types of fishing gear are more prone to take different kinds and numbers of seabirds, allocation of TAC among the different gear sectors can also have a substantial impact on incidental take. **Sources of evidence** http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_7.pdf www.fakr.noaa.gov/npfmc/fmp/bsai/BSAIfmpAPPENDIX.pdf www.fakr.noaa.gov/protectedresources.seabirds.html **Marine mammals.** There are two major laws that protect marine mammals and require the NPFMC to address their conservation in the FMPs. The first is the Marine Mammal Protection Act (MMPA) of 1972 (amended 1994). The goal of the MMPA is to provide protection for marine mammals so that their populations are maintained as a significant, functioning element of the ecosystem. The MMPA established a moratorium on the taking of all marine mammals in the United States with the exception of subsistence use by Alaska Natives. The second law is Endangered Species Act (ESA) that was enacted in 1973 and reauthorized in 1988. This law provides broad protection for species that are listed as threatened or endangered under the Act. The species listed under the ESA that spend all or part of their time in the BSAI and GOA and that may be affected by the groundfish fisheries. Since sperm whales are one of eight whale species listed as endangered under ESA, sablefish fishery interactions involving sperm whales depredation may raise concerns under provisions of the ESA. The BSAI and GOA Groundfish FMPs also describe specific marine mammal conservation measures available to managers. Such measures specify regulations to prevent interactions between commercial fishing operations and marine mammal populations by restricting fishing in areas near breeding and nursery grounds, haul out sites, and foraging areas that are important to adult and juvenile marine mammals during sensitive life stages.

	Sources of evidence: http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf **Reduce and Avoid Impacts to Habitat** 26. Review and evaluate efficacy of existing habitat protection measures for managed species. 27. Identify and designate essential fish habitat and habitat areas of particular concern pursuant to MSA rules, and mitigate fishery impacts as necessary and practicable to continue the sustainability of managed species. 28. Develop a Marine Protected Area policy in coordination with national and state policies. 29. Encourage development of a research program to identify regional baseline habitat information and mapping, subject to funding and staff availability. 30. Develop goals, objectives and criteria to evaluate the efficacy and suitable design of marine protected areas and no-take marine reserves as tools to maintain abundance, diversity, and productivity. Implement marine protected areas if and where appropriate. **Habitat protection areas.** To implement management objectives to reduce and avoid impacts to habitats, the GOA and BSAI FMPs provide measures to address identified habitat problems. They allow the Secretary of Commerce, upon the recommendation of the NPFMC, to a) propose regulations establishing gear, timing, or area restrictions for purposes of protecting particular habitats of species in the GOA groundfish fishery; b) propose regulations establishing area or timing restrictions to prevent the harvest of fish in contaminated areas; and/or c) propose regulations restricting disposal of fishing gear by vessels. **Essential Fish Habitat**. The MSA defines essential fish habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." In order to protect EFH, certain EFH habitat conservation areas have been designated. A habitat conservation area is an area where fishing restrictions are implemented for the purposes of habitat conservation. To incorporate the regulatory guidelines for review and revision of EFH FMP components, the NPFMC conducts a complete review of all the EFH components of each FMP once every five years and will amend those EFH components as appropriate to include new information. Additionally, the Council may use the FMP amendment cycle every three years to solicit proposals for habitat areas of particular concern and/or conservation and enhancement measures to minimize the potential adverse effects from fishing. Those proposals that the Council endorses would be implemented through FMP amendments. An annual review of existing and new EFH information will be conducted and this information will be provided to the GOA Groundfish Plan Team for

their review during the annual SAFE report process. This information is included in the "Ecosystems Considerations" chapter of the SAFE report.

The BSAI and GOA FMP define specific EFH for sablefish. The 2010 Appendix to BSAI FMP defines EFH for sablefish. It also describes the impacts of longline fishing gear on benthic habitat as mostly unknown, but suggests it may affect growth and survival of sablefish. See Section 13 for more details. http://www.fakr.noaa.gov/npfmc/fmp/bsai/BSAIfmpAPPENDIX.pdf

Habitat Areas of Particular Concern (HAPC). A habitat protection area is an area of special, rare habitat features where fishing activities that may adversely affect the habitat are restricted. 50 CFR 600.815(a)(8) provides guidance to the Council in identifying habitat areas of particular concern (HAPCs). HAPCs are areas within EFH that are of particular ecological importance to the long-term sustainability of managed species, are of a rare type, or are especially susceptible to degradation or development. HAPCs are meant to provide for greater focus of conservation and management efforts. HAPCs are those areas of special importance that may require additional protection from adverse effects. Regulations at 50 CFR 600.815(a)(8) provide the following:

FMPs should identify specific types or areas of habitat within EFH as habitat areas of particular concern based on one or more of the following considerations:
(i) The importance of the ecological function provided by the habitat.
(ii) The extent to which the habitat is sensitive to human-induced environmental degradation.
(iii) Whether, and to what extent, development activities are, or will be, stressing the habitat type.
(iv) The rarity of the habitat type.

Based on this legislation, the GOA FMP defines protected areas and restrictions for bottom contact gear and anchoring (as described in 50 CFR part 679) for :

- GOA Coral Habitat Protection Areas
- Alaska Seamount Habitat Protection Areas (three HAPCs and five sub-areas)
- Sitka Pinnacles Marine Reserve

The BSAI FMP prohibits the use of bottom contact gear and anchoring (as described in 50 CFR part 679) in the following areas:

- Aleutian Islands Coral Habitat Protection Areas
- Alaska Seamount Habitat Protection Area in the Aleutian Islands Subarea.

EFH Environmental Impact Statement. The MSA requires that a fishery management plan (FMP) include a fishery impact statement that assesses, specifies, and describes the likely effects of the FMP measures on participants in the fisheries and fishing communities affected by the FMP. For the BSAI and GOA groundfish fishery, a detailed analysis of the effects of the FMPs on the human environment, including fishery participants and fishing communities, was conducted in the *Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement* (NMFS 2004). This earlier

	report provides additional background to the 2010 Appendix to BSAI defines sablefish EFH and describes potential impacts of longline gear. The 2010 Appendix to BSAI FMP defines EFH for sablefish. The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST). However, it also points out that juvenile sablefish are substantially dependent on benthic prey (18% of diet by weight) and the availability of benthic prey may be adversely affected by fishing. Little is known about effects of fishing on benthic habitat or the habitat requirements for growth to maturity. Although sablefish do not appear to be directly dependent on physical structure, reduction of living structure is predicted in much of the area where juvenile sablefish reside and this may indirectly reduce juvenile survivorship by reducing prey availability or by altering the abilities of competing species to feed and avoid predation. **Source of evidence.** http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Exec_sum.pdf http://www.fakr.noaa.gov/npfmc/fmp/bsai/BSAIfmpAPPENDIX.pdf
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
3.2.5	There are mechanisms in place in the fishery to reduce harvest as and when required to maintain productivity and these mechanisms are responsive, relevant and timely. There is annual stock assessment and quotas are set annually. The MSA as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. The first standard addresses measures to prevent overfishing: Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry. To meet the goals of this overall management approach, the NPFMC Council and National Marine Fisheries operate under a Groundfish FMP that outlines ten management and policy objectives. The first objective defines sub-objectives to prevent overfishing, as: **Prevent Overfishing:** 1. Adopt conservative harvest levels for multi-species and single species fisheries and

specify optimum yield.

2. Continue to use the existing optimum yield cap for the GOA groundfish fisheries.

3. Provide for adaptive management by continuing to specify optimum yield as a range.

4. Provide for periodic reviews of the adequacy of F40 and adopt improvements, as appropriate.

5. Continue to improve the management of species through species categories.

Moreover, under the MSA, the Secretary of Commerce is required to report on the status of each U.S. fishery with respect to overfishing. This report involves the answers to three questions: 1) Is the stock being subjected to overfishing? 2) Is the stock currently overfished? 3) Is the stock approaching an overfished condition?
(GOA FMP).

To address these questions, NPFMC evaluates seven harvest scenarios designed to satisfy the requirements of Amendment 56, the National Environmental Policy Act, and the MSA, OFL and ABC rates are based on tiers defined under Amendment 56.Sablefish are managed under Tier 3 of NPFMC harvest rules which specify that the fishing rate be adjusted downward when biomass is below the target reference biomass. Under this definition, 2001 OFL for sablefish is based on a tier 3b fishing mortality rate where F_{OFL}= $F_{35\%}$ adjusted (=0.15). ABC is based on a tier 3b harvest strategy where FABC = $F_{40\%}$ adjusted (=0.12).

The official catch estimate for the most recent complete year (2009) is 14,335 t. This is less than the 2009 OFL of 19,000 t. Therefore, the stock is not overfished and is not approaching an overfished condition.

Sources of evidence:
FMPs:
http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf
http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf

SAFE reports:
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

http://www.fakr.noaa.gov/npfmc/summary_reports/species2001.pdf

Evidence adequacy rating: ☑ High ☐ Medium ☐ Low	
Clause:	**Evidence**
3.2.6	GOA and BSAI FMPs describe management measures to assess environmental impacts from human activities. Specific management objectives in GOA and BSAI FMPs include: ***Manage Incidental Catch and Reduce Bycatch and Waste:*** 16. Encourage research programs to evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available. 19. Continue to account for bycatch mortality in TAC accounting and improve the accuracy of mortality assessments for target, prohibited species catch, and non-commercial species. ***Avoid Impacts to Seabirds and Marine Mammals:*** 25. Encourage programs to review status of endangered or threatened marine mammal stocks and fishing interactions and develop fishery management measures as appropriate. ***Reduce and Avoid Impacts to Habitat:*** 27. Review and evaluate efficacy of existing habitat protection measures for managed species. 28. Identify and designate essential fish habitat and habitat areas of particular concern pursuant to MSA rules, and mitigate fishery impacts as necessary and practicable to continue the sustainability of managed species. 29. Develop a Marine Protected Area policy in coordination with national and state policies. 30. Encourage development of a research program to identify regional baseline habitat information and mapping, subject to funding and staff availability. 31. Develop goals, objectives and criteria to evaluate the efficacy and suitable design of marine protected areas and no-take marine reserves as tools to maintain abundance, diversity, and productivity. Implement marine protected areas if and where appropriate. In this context, FMPs define Essential Fish Habitat and conduct reviews of impacts from fishing. NOAA/NMFS also conducts research on impacts to seabirds and marine mammals.

	Fisheries Monitoring and Analysis (FMA): FMA oversees and runs the observer program for the NPFMC. Vessels carry onboard fishery observers to assess the biological and statistical parameters within the catch and bycatch of the groundfish fishery off Alaska. Additionally, they can collect information about threatened and endangered species and impacts on habitat or the ecosystem. This information is feed back into the stock analysis and will impact the annual harvest estimates or future FMP amendments. www.afsc.noaa.gov/FMA/default.htm **EIS for Essential Fish Habitat Identification and Conservation in Alaska** In 2005 NMFS and the Council completed the Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska (EFH EIS) (NMFS 2005). The EFH EIS provided a thorough analysis of alternatives and environmental consequences for amending the Council's FMPs to include EFH information pursuant to Section 303(a) (7) of the MSA and 50 CFR 600.815(a). Specifically, the EFH EIS examined three actions: (1) describing and identifying EFH for Council managed fisheries, (2) adopting an approach to identify HAPCs within EFH, and (3) minimizing to the extent practicable the adverse effects of fishing on EFH. The Council's preferred alternatives from the EFH EIS were implemented through Amendment 78 to the BSAI Groundfish FMP and corresponding amendments to the Council's other FMPs. The Council is required to conduct a complete review of EFH once every five years, and in between will solicit proposals on Habitat Areas of Particular Concern and/or conservation and enhancement measures to minimize potential adverse effects from fishing. Annually, EFH information will be reviewed in the "Ecosystems Considerations" chapter of the SAFE report. The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST). Most longline gear type is highly selective due to the size of the hook and the fact that skates (industry term for longlines) are laid along the seabed only in known sablefish habitat. As a result there is minimal damage to benthic or pelagic habitats. However little is known about effects of fishing on benthic habitat or the habitat requirements for growth to maturity. Although sablefish do not appear to be directly dependent on physical structure, reduction of living structure is predicted in much of the area where juvenile sablefish reside and this may indirectly reduce juvenile survivorship by reducing prey availability or by altering the abilities of competing species to feed and avoid predation. **Source of evidence.** http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Exec_sum.pdf http://www.fakr.noaa.gov/npfmc/fmp/bsai/BSAIfmpAPPENDIX.pdf

Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
3.2.7	BSAI and GOA FMPs define management objectives to conserve biodiversity of aquatic habitats and protect endangered species. The key objective and their sub-objectives are: **Manage Incidental Catch and Reduce Bycatch and Waste:** 14. Continue and improve current incidental catch and bycatch management program. 15. Develop incentive programs for bycatch reduction including the development of mechanisms to facilitate the formation of bycatch pools, vessel bycatch allowances, or other bycatch incentive systems. 16. Encourage research programs to evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available. 17. Continue program to reduce discards by developing management measures that encourage the use of gear and fishing techniques that reduce bycatch which includes economic discards. 18. Continue to manage incidental catch and bycatch through seasonal distribution of TAC and geographical gear restrictions. 19. Continue to account for bycatch mortality in TAC accounting and improve the accuracy of mortality assessments for target, prohibited species catch, and noncommercial species. 20. Control the bycatch of prohibited species through prohibited species catch limits or other appropriate measures. 21. Reduce waste to biologically and socially acceptable levels. The fishery uses three types of gear: longline, pots, and trawl gear. The directed fishery is primarily a hook-and-line fishery. Sablefish also are caught as bycatch during directed trawl fisheries for other species groups such as rockfish and deepwater flatfish. NMFS, the NPFMC, and the State of Alaska have implemented measures to promote effective fishing techniques and the use of selective gear and mitigation devices on longlines. **Effective gear type**. Hook and line (longline) gear in Alaska is fished on-bottom. Most longline gear targeting sablefish is highly selective due to the size of the hook and the

fact that gear are laid along the seabed only in known sablefish habitat. As a result there is minimal damage to benthic or pelagic habitats. The gear usually is deployed from the vessel stern with the vessel traveling at 5-7 knots. Some vessels attach weights to the longline, especially on rough or steep bottom, so that the longline stays in place and lays on-bottom. Fishers use circle hooks rather than J hooks, to allow easy release of live by-caught fishes. As a result, the fishery is highly selective with small amounts of discards and bycatch. Discards of sablefish in the longline fishery are small, typically less than 5% of total catch. The catch of sablefish in the longline fishery typically consists of a high proportion of sablefish, 90% or more. However, at times grenadiers may be a significant catch and they are almost always discarded.

By limiting trawl gear in the sablefish fishery, management takes measures to avoid bycatch. Amendment 14 to the GOA Fishery Management Plan allocated the sablefish quota by gear type: 80% to fixed gear (including pots) and 20% to trawl in the Western and Central GOA, and 95% to fixed gear and 5% to trawl in the Eastern GOA, effective 1985. Amendment 13 to the BSAI Fishery Management Plan, allocated the sablefish quota by gear type, 50% to fixed gear and 50% to trawl in the eastern Bering Sea, and 75% to fixed gear and 25% to trawl gear in the Aleutians, effective 1990. These quotas by gear type generally reflect the historic trawl bycatch of sablefish in each area, when trawlers are targeting other target species.

Also management measures set maximum retainable allowances for sablefish in other target fisheries. GOA FMP amendments in 1997 defined acceptable percentages depends for related fisheries as: 1% for pollock, Pacific cod, Atka mackerel, “other species”, and aggregated amount of non-groundfish species. Fisheries targeting deep flatfish, rex sole, flathead sole, shallow flatfish, Pacific ocean perch, shortraker and rougheye rockfish, other rockfish, northern rockfish, pelagic rockfish, demersal shelf rockfish in the Southeast Outside district, and thornyheads are allowed to retain 7% sablefish in their catch. Arrowtooth flounder fisheries are not allowed to retain any sablefish.
http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

Marine mammals. Interactions with marine mammals mostly involves depredation by whales eating fish off longline. Killer whale depredation occurs in the Bering Sea, Aleutian Islands, and Western GOA. Sperm whale depredation occurs in the Central and Eastern GOA. Most sperm whale depredation has been occurring in the Eastern GOA near Yakutat. There are few deterrents to whale depredation in the longline fishery although AFSC conducts research to mitigate impacts. For example, the Southeast Alaska Sperm Whale Avoidance Project (SEASWAP) in collaboration with the AFSC is deploying acoustic receivers on the longline survey to count the number of times a sperm whale creaks (makes a squeaking sound) which may be an indication of a depredation event. This method of quantifying depredation can also be used to compare survey depredation rates to fishery rates. SEASWAP is also doing some work on deterrents.

Pot fishing for sablefish has increased in the BSAI as a response to depredation of longline catches by killer whales. In 2000 the pot fishery accounted for less than ten percent of the fixed gear sablefish catch in the BSAI. Since 2004, pot gear has accounted

for over half of the Bering Sea fixed gear IFQ catch and up to 34% of the catch in the Aleutians. In 2009, pot fishing remained a high portion of the fixed gear catch in the BS (70%). In the Aleutian Islands pot fishery, pot fishing appeared to decrease from 22% to 7.6% of the fixed gear catch in 2009. However, this was not due to vessels changing back to longline gear, but solely due to the fact that two of the pot vessels did not fish the Aleutian Islands in that year.

Seabird interactions. Laws and management actions further reduce interactions with seabirds in both the federal and state sablefish fisheries. The catch of seabirds in the sablefish fishery averages 17% of the total catch. The trend in seabird catch is variable but appears to be decreasing, presumably due to widespread use of Tori lines to reduce seabird catch.

In order to protect short-tailed albatross in other North Pacific fisheries, NOAA Fisheries required seabird avoidance measures to be used by vessels fishing for Pacific halibut and sablefish in U.S. EEZ waters off Alaska in 1998 (63 FR 11161). These measures focused primarily on collecting seabird and fishery interaction data and on requiring longliners to use specific types of gear and fishing techniques to avoid seabird incidental take. NMFS Alaska Region (AKR) has been actively addressing seabird incidental take in longline (hook-and-line) fisheries off Alaska since 1989. In 1998, AKR appointed a Seabird Coordinator to focus on seabird-related issues. AKR seabird-related responsibilities and activities include: consultations under the Endangered Species Act, data collection by fishery observers, public and industry outreach and education, research, regulatory action, and participation in the development of an international and national plan of action to reduce the incidental take of seabirds in longline fisheries. The Alaska Region plays a proactive role in its coordination with local, regional, national, and international agencies, organizations, and experts in its efforts to reduce seabird incidental take in hook-and-line fisheries.

As of 2004, longline vessels over 26 ft LOA are required to use either single or paired streamer lines (or in some cases for smaller vessels, a buoy bag line) to reduce incidental take of seabirds. Such regulations vary by length of vessel, area fished, type of gear, and other factors. See: http://www.fakr.noaa.gov/protectedresources/seabirds.html

Furthermore, Alaska state laws seek to avoid seabird bycatch, notably: 5 AAC 28.055. SEABIRD AVOIDANCE MEASURES IN GROUNDFISH FISHERIES mandates: When commercial fishing for groundfish with a longline in state waters, the operator of a vessel that is greater than 26 feet in overall length shall comply with the seabird avoidance measures described in 50 C.F.R. 679.24, revised as of April 27, 2009.

Observers collect incidental take data in the trawl and pot sectors of the fishery. USFWS and the trawl sector of the fishing industry are collaborating on research into minimizing the effects of the trawl; such as fixing a cable from the vessel to the trawl net monitoring device to determine the incidental take of seabirds. However, there have been no regulatory or Fishery Management Plan-level efforts to mitigate seabird incidental take in the trawl and pot sectors.

	Further, the Council has another program called Improved Retention / Improved Utilization (IR/IU) which seeks to minimize discards and wastage and improve retention and utilization. **Sources of evidence** www.fakr.noaa.gov/protectedresources/seabirds.htm 50CFR679: www.fakr.noaa.gov/regs/default.htm 50CFR679.21 Prohibited species bycatch management 50CFR679.22 Closures 50CFR679.24 Gear Limitation 50CFR679.27 Improved Retention/Improved Utilization Program www.fakr.noaa.gov/npfmc/current_issues/bycatch/bycatch.htm GOA Groundfish Fishery Management Plan (updated 10/10) – www.fakr.noaa.gov/npfmc/fmp/goa/goa.htm BSAI Groundfish Fishery Management Plan (updated 10/10) – www.fakr.noaa.gov/npfmc/fmp/bsai/bsai.htm http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Exec_sum.pdf

B. Science and Stock Assessment Activities

4. There must be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes. ***FAO 7.1.9/7.4.4/7.4.5/7.4.6/8.4.3/12.4 ECO 29.1***						
Confidence Ratings	**Low**	**0 out of 5**	**Medium**	**1 out of 5**	**High**	**4 out of 5**

Clause:

4.1 Reliable and accurate data required to assess the status of fisheries and ecosystems – including data on retained catch of fish, bycatch, discards and waste must be collected.

4.1.1 These data must be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery.

FAO CCRF 7.4.6 Others 12.4/29

4.1.2 Timely and reliable statistics must be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices and in sufficient detail to allow sound statistical analysis for stock assessment.

FAO CCRF 7.4.4

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	**Evidence**
4.1	The NMFS and the ADFG collect fishery data and conduct fishery independent surveys to assess the sablefish fishery and ecosystems in GOA and BSAI areas. GOA and BSAI SAFE documents provide complete descriptions of data types and years collected. The following Table summarizes data used by the agencies document to manage sablefish stocks as described in annual Stock Assessment and Fishery Evaluation (SAFE) report.

Source	Data	Years
Fisheries	Catch	1960-2010
Japanese longline fishery	Catch-per-unit-effort (CPUE)	1964-1981
U.S. longline fishery	CPUE, length	1990-2009
	Age	1999-2009
U.S. trawl fisheries	Length	1990,1991,1999, 2005-2009
Japan-U.S. cooperative longline survey	CPUE, length	1979-1994
	Age	1981, 1983, 1985, 1987, 1989, 1991, 1993
Domestic longline survey	CPUE, length	1990-2010
	Age	1996-2009
NMFS GOA trawl survey	Abundance index	1984, 1987, 1990, 1993, 1996, 1999, 2001, 2003, 2005, 2007,
	Lengths	1984, 1987, 1990, 1993, 1996, 1999, 2003, 2005, 2007, 2009

	Fishery data. ` Fishery data is collected from fixed gear (longline and pot) vessels which target sablefish in the IFQ fishery plus trawl fisheries that catch sablefish as retained bycatch in other fisheries such as rockfish and sole. Records of catch and effort for these vessels are firstly recorded through the eLandings (electronic fish tickets) catch recording system. In the summer of 2005, after five years of collaboration, the first fish tickets went electronic. The first to go electronic (known as eLandings) were crab. Within six months the groundfish and halibut tickets were also electronic. eLandings provide for less data entry, data that is only entered once, by one person, creating fewer data entry errors. There are also checks in the system to eliminate errors. For instance, processors can't enter the wrong statistical area number. eLandings reduces redundant reporting. The eLandings System records the information required by ADFG, the NMFS IFQ and production reports, and the International Pacific Halibut Commission. Agency fisheries managers favour eLandings because they provide real time harvest data. With eLandings, all report information is stored on one server and data is available to all three agencies. Fish ticket information, NMFS report information, and IFQ report information used to all be separate reports. Now all that information is consolidated. One eLanding report can record and submit an entire harvest offloaded, recording all permits associated with the landing report at the same time. With paper fish tickets, a ticket had to be filled out for each permit holder. For small communities with intermittent quality internet, eLandings can be stored on desktop and sent as batches (http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=247&issue_id=43 ; http://elandings.alaska.gov/). Secondly, fishery data is collected by vessel captains in voluntary and required logbooks. By law (AS 16.05.251), 5 AAC 28.052 on Logbooks states that: "the operator of a vessel that is registered with the National NMFS to fish in a federal groundfish fishery, that is fishing in state waters of Alaska, and that is being used to take any groundfish species managed under a federal fisheries management plan that requires maintenance and submittal of logbooks, shall maintain, while fishing in state waters, the same logbook records as those required under 50 C.F.R. 679 (updated December 10, 1997), and shall submit the logbook records in the same manner as required for the federal logbooks" (http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section052.htm). Fishery data from the Observer Program are available since 1990. Observers report age, length, and CPUE data for selected vessels. Vessels between 60 and 125 feet carry an observer 30% of the time and vessels >125 feet carry an observer 100% of the time. Since 1999, logbooks have been required for vessels >60 feet. Vessels <60 feet are not required to carry observers or submit logbooks but many do participate in a voluntary logbook program formed in 1997. **Sources of evidence**: SAFE reports: http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

	Survey data. The NMFS AFSC conducts longline sablefish surveys to collect catch, effort, age, length, weight, and maturity data. These domestic longline surveys provide an accurate index of sablefish abundance. AFSC describes survey protocol on their website http://www.afsc.noaa.gov/ABL/MESA/pdf/LSprotocols.pdf. Earlier, Japan and the United States conducted a cooperative longline survey for sablefish in the GOA annually from 1978 to 1994, adding the Aleutians Islands region in 1980 and the eastern Bering Sea in 1982. Since 1987, the AFSC has conducted annual domestic surveys of the upper continental slope, designed to continue the time series of the Japan-U.S. cooperative survey. The domestic longline survey began annual sampling of the GOA in 1987, biennial sampling of the Aleutian Islands in 1996, and biennial sampling of the eastern Bering Sea in 1997. Longline surveys include research to better understand depredation. Depredation rates by sperm whales during the survey have been estimated and photographic identification of sperm whales is done to help understand the number and movements of sperm whales in the GOA. Sperm whales have been tagged from the survey using satellite tags to better understand movement and diving behaviours and genetic biopsies have been collected to investigate stock structure. In addition, depredation events and the presence of whales are recorded during the survey, which will help determine if depredation is increasing over time (http://www.afsc.noaa.gov/ABL/MESA/mesa_sfs_fi.htm). Trawl surveys of the upper continental slope that adult sablefish inhabit have been conducted biennially or triennially since 1980 in the Aleutian Islands and 1984 in the GOA. Trawl surveys of the Eastern Bering Sea slope were conducted biennially from 1979-1991 and standardized for 2002, 2004, and 2008. Trawl surveys of the Eastern Bering Sea shelf are conducted annually. Trawl survey abundance indices were not previously used in the sablefish assessment because they were not considered good indicators of the sablefish relative abundance. However, there is a long time series of data available and given the trawl survey's ability to sample smaller fish; it may be a better indicator of recruitment than the longline survey. There is some difficulty with combining estimates from the BSAI with the GOA estimates since they occur on alternating years. ADFG conducts mark-recapture and longline surveys in Northern Southeast Alaska Inside (NSEI) waters. This population has been low to moderate recently, with longline surveys confirming the lows in 1999/2000 but showing a mild increase through 2008. However, their most recent abundance estimates from a mark-recapture program, shows a sizeable decline from 2007 to 2008 after increases from 2005-2007. Additional whale depredation studies have been conducted under NPRB funded research. NPRB Projects: 0309, 0527 & 0626 (http://project.nprb.org/filter.do;jsessionid=F785139A950FADAD2338CDAC93CEC3C5) **Sources of evidence**: SAFE reports: http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

Evidence adequacy rating: ☑ High ☐ Medium ☐ Low	
Clause:	**Evidence**
4.1.1	Several management organizations collect, aggregate and disseminate data related to the sablefish fishery, including the NPFMC, NMFS's AFSC, NMFS Alaska Region and ADFG. NMFS and ADFG collect data that is fully sufficient to produce stock synthesis analysis to annually determine OFL and TAC for the sablefish stock, enforce landings requirements, and certify that harvest quotas are not exceeded. Sections below describe their roles and responsibilities and the data they manage. **North Pacific Fishery Management Council** Stock Assessment and Fishery Evaluation Report The *Stock Assessment and Fishery Evaluation* (SAFE) report is compiled annually by the BSAI Groundfish Plan team, which is appointed by the Council. The sections are authored by AFSC and State of Alaska scientists. As part of the SAFE report, a volume assessing the *Economic Status of the Groundfish Fisheries off Alaska* is also prepared annually, as well as a volume on *Ecosystem Considerations*. The SAFE report provides information on the historical catch trend, estimates of the maximum sustainable yield of the groundfish complex as well as its component species groups, assessments on the stock condition of individual species groups; assessments of the impacts on the ecosystem of harvesting the groundfish complex at the current levels given the assessed condition of stocks, including consideration of rebuilding depressed stocks; and alternative harvest strategies and related effects on the component species groups. The SAFE report annually updates the biological information base necessary for multispecies management. It also provides readers and reviewers with knowledge of the factual basis for TAC decisions, and illustrates the manner in which new data and analyses are used to obtain individual species group estimates of acceptable biological catch and maximum sustainable yield. Much of the information produced by the Council can be accessed through its website, to be found at: http://www.fakr.noaa.gov/npfmc The information available through the website includes the following: • FMPs: summaries of the FMPs as well as the FMPs themselves are available on the website. • Meeting agendas and reports: annual quota specifications, amendments to the FMPs or implementing regulations, and other current issues are all discussed at the five annual meetings of the Council. Meeting agendas, including briefing materials where possible, and newsletter summaries of the meeting are available on the website, as well as minutes from the meetings. • Current issues: the website includes pages for issues that are under consideration by the Council, including amendment analyses where appropriate.

NMFS's AFSC

AFSC conducts research and monitoring in the sablefish fishery. It provides information on its website including:

- Species summaries: a summary of each groundfish species, including AFSC research efforts addressing specific species where applicable.
- Issue summaries: a summary of major fishery issues is also available, such as bycatch or fishery gear effects on habitat.
- Research efforts: a summary of the research efforts for each of the major AFSC divisions is provided on the website.
- Observer Program: the homepage describes the history of the program and the sampling manuals that describe, among other things, the list of species identified by observers.
- Survey reports: the groundfish stock assessments are based in part on the independent research surveys that are conducted annually, biennially, and triennially in the management areas. Reports of the surveys are made available as NMFS-AFSC National Oceanic and Atmospheric Administration (NOAA) Technical Memoranda, and are available on the website; the data maps and data sets are also accessible.
- Publications: the AFSC Publications Database contains more than 4,000 citations for publications authored by AFSC scientists. Search results provide complete citation details and links to available on-line publications.
- Image library: the website contains an exhaustive library of fish species.

See: http://www.afsc.noaa.gov/

NMFS Alaska Region

NMFS Alaska region maintains in season and end of year catch statistics for the groundfish fishery dating back to 1993, or earlier for some fisheries; annual harvest specifications and season opening and closing dates; and reports on share-based fishery programs (such as the IFQ program for fixed-gear sablefish) On its website it also provides:

- Status of analytical projects
- Habitat protection: maps of essential fish habitat, including a queriable database; status of marine protected areas and habitat protections in Alaska Permit information: applications for and information on permits for Alaska fisheries; data on permit holders.
- Enforcement: reports, requirements, and guidelines.
- News releases: recent information of importance to fishers, fishery managers, and the interested public.
- Regulations: the FMP's implementing regulations can be found on the Alaska region website, as well as links to the MSA, the American Fisheries Act, the International Pacific Halibut Commission, and other laws or treaties governing Alaska's fisheries .

NMFS Alaska region is also responsible for the *Final Programmatic Supplemental Environmental Impact Statement for the Alaska Groundfish Fisheries* (NMFS 2004). Published in 2004, it is a programmatic evaluation of the BSAI and GOA groundfish fisheries, including sablefish. The document includes several alternative management

	policies for the fisheries, and provides the supporting analysis for Amendment 81 to the BSAI FMP, which changed the FMP management policy. The document contains a detailed evaluation of the impact of the FMP on groundfish resources, other fish and marine invertebrates, habitat, seabirds, marine mammals, economic and socioeconomic considerations, and the ecosystem as a whole. The impacts are evaluated in comparison to a baseline condition (for most resources this is the condition in 2002) that is comprehensively summarized and includes the consideration of lingering past effects. Additionally, sections of the document describe the fishery management process in place for the Alaska federal fisheries, and the changes in management since the implementation of the FMP in 1982. See website at: http://www.fakr.noaa.gov/ **eLandings and electronic reporting.** Sablefish taken in Alaska are reported through the eLandings system. This system is an electronic fish ticket system, for all catch data required to be reported in regulation. eLandings is the internet-based Interagency Electronic Reporting System for reporting commercial fishery landings in Alaska. eLandings is used to report landings and/or production data for groundfish, IFQ/CDQ halibut and sablefish, and IFQ/CDQ crab and Community of Adak golden king crab. In the future, the system will include landings for shellfish and salmon. This system is a collaborative effort of ADFG, the International Pacific Halibut Commission, and the NOAA Fisheries. The Restricted Access Management Division of NMFS tracks in season catches and IFQ balances. Registered Buyers must report IFQ landings electronically using the Internet (with permission, a backup paper submission system is available). Real-time accounting of individual harvests contributes significantly to accurate and timely management of each IFQ holder's IFQ accounts and supports in season transfers. Of two Internet systems available, the more comprehensive one, the Interagency Electronic Reporting System (IERS) and its data-entry component, eLandings, is the standard reporting method (http://www.fakr.noaa.gov/ram/rtf09.pdf). Landings, buying and production data for Alaska sablefish are recorded on ADFG fish tickets or through the eLandings system and the Commercial Operators Annual report, as required by Alaska Statute (Section 16.05.690 Record of Purchases) the Alaska Administrative Code (5 AAC 39.130 Reports required of processors, buyers, fishermen, and operators of certain commercial fishing vessels; transporting requirements). The State of Alaska specifically protects confidentiality through statute (AS 16.05.815 Confidential nature of certain reports and records). Specifically, records required by regulations of the department concerning the landings of fish, shellfish, or fishery products, and annual statistical reports of fishermen, buyers, and processors required by regulation of the department are confidential and may not be released by the department or by the Alaska Commercial Fisheries Entry Commission except as under certain conditions describe in regulations. To ensure confidentiality, fishery data are routinely redacted from ADF&G reports if the data were obtained from a small number of participants. For example: Annual management report for groundfish

	fisheries in the Kodiak, Chignik, and South Alaska Peninsula Management Areas; by ADF&G Fishery Management Report No.10-33, Anchorage, 2010. However summarized data are routinely made available to members of the public, industry, state, federal and university personnel upon request. AFSC maintains longline survey data and disseminates data as described in Section 4.1.2. http://www.afsc.noaa.gov/ABL/MESA/mesa_sfs_lsd.htm **Source of evidence:** http://www.afsc.noaa.gov/ http://www.fakr.noaa.gov/npfmc http://www.fakr.noaa.gov/ http://www.legis.state.ak.us/basis/folio.asp http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.requests www.fakr.noaa.gov/regs/summary.htm http://elandings.alaska.gov/ http://www.afsc.noaa.gov/ABL/MESA/mesa_sfs_lsd.htm
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
4.1.2	The eLandings procedure described above, the onboard observer assessment described below and the following information illustrate that the data collected is both timely and statistically reliable to produce stock synthesis analysis in order to annually determine OFL and TAC for the sablefish stock assessment. **Survey data.** The AFSC conducts annual longline surveys to estimate the relative abundance of sablefish and other major groundfish species on the continental slope of the eastern Bering Sea, Aleutian Islands, and the GOA. The survey is primarily designed to assess sablefish and indices of abundance have been computed since 1979. From 1979-1994, the AFSC conducted cooperative annual longline surveys with Japan, and then independently from 1987-present. Length, catch, and effort data were historically collected from the Japanese and U.S. longline and trawl fisheries. Now AFSC conducts the longline survey and maintains data. AFSC conducts longline surveys, compiles data, and disseminates data through their website: http://www.afsc.noaa.gov/ABL/mesa/mesa_sfs_lsd.htm

	Available survey data include: **Survey type and year** Data is available from annual longline surveys conducted cooperatively by Japan and the U.S. NMFS, AFSC. Japanese surveys were conducted from 1979 - 1994 (labeled Japan in the data tables), and surveys conducted independently by the U.S. from 1988 -present (labeled United States). From 1979 - 1994 a Japanese vessel was used to conduct the survey. Starting in 1988, the U.S. also used a survey vessel creating overlap between the two countries from 1988 - 1994. Since 1994, the U.S. has conducted the survey independently. **Management Areas** Bering Sea = Stations 1-34 Aleutian Islands = Stations 35-61 Western GOA = Stations 62-71 Central GOA = Stations 72-88 (slope stations) and 120-135 (gully stations) West Yakutat = Stations 89-96 (slope stations) and 136-139 (gully stations) East Yakutat/Southeast = Stations 97-108 (slope stations) and 140-149 (gully stations) **Skate** – unit of longline gear 100m long containing 45 hooks spaced 2m apart. **Station Effort** – At each station 160 skates (7,200 hooks) are set starting at 150 m and continuing down the slope to ~1000 m. The exceptions are gullies and Bering Sea stations. At the gully stations (120-149), in the Central GOA and the East Yakutat/Southeast areas, each station is only 80 skates long, and two stations are placed closely together within the gully. In the Bering Sea, from 1979-1994 stations had from 160-180 skates set, and from 1997 - present stations have 180 skates instead of the typical 160. **CPUE** – Catch per unit effort, expressed as number of fish per skate, and also referred to as catch rate. **RPN** – Relative population number (RPN) is a relative index of the number of fish for each NPFMC sablefish management area. RPN is calculated by extrapolating catch rates from the survey stations to entire management areas. **RPW** – Relative population weight is a relative index of the biomass of fish for each management area. RPW is calculated by extrapolating catch rates and species weights from the survey stations to entire management areas. **Total Catch** – The number of fish caught at a station. **Mean weight (kg)** – Lengths of 12 groundfish species are measured on the longline survey at each station. Weights are calculated from a length weight relationship established for each species. From this, an average weight is computed by station for each species based on the lengths collected. **Latitude and Longitude** – The latitude and longitude for each station are presented in

	decimal degrees. **Fishery data.** Data from longline, trawl, and pot fisheries comes from at-sea observers on selected vessels and from required and voluntary logbooks. Observers collect age, length, and CPUE data. No age data were systematically collected from the fisheries until 1999 because of the difficulty of obtaining representative samples from the fishery and because only a small number of sablefish can be aged each year. http://www.afsc.noaa.gov/ABL/mesa/mesa_sfs_lsd.htm Only sets targeting sablefish are included in catch rate analyses. For observer data, a sablefish targeted set is defined as a set where sablefish weight was greater than any other species. For logbook data, the target is declared by the captain. The weights reported in logbooks are usually approximate because the captain typically estimates the catch for each set while at sea without an accurate scale measurement. An accurate weight for the entire trip is measured at landing and recorded as the IFQ landing report. NMFS estimates the actual set weight by multiplying the IFQ landing report weight by the proportion of the trip weight that was caught in the set, from logbook reported weights. Hook spacing for both data sets was standardized to a 39 inch (1m) spacing following the method used for standardizing halibut catch rates. Each set's catch rate was calculated by dividing the catch in weight by the standardized number of hooks. These catch rates are used to compute average catch rates by vessel and NPFMC region. Extensive filtering of the logbook and observer data occurs before the catch information for a set is included in analyses. All sets that experienced killer whale depredation are excluded from the observer fishery catch rate analysis since any depredation would bias CPUE downward. From 1990-2009 an average of 22% of observed sets in the Bering Sea were affected by killer whale depredation (avg. number of non-depredated sets = 23; range 6-56, avg. number of depredated sets = 7; range 1-37). In other areas killer whales depredate only 0-2% of observed sets. Additionally, some logs are excluded because of other issues. Sets were excluded whenever data were missing for a set and a catch rate could not be calculated or assigned to a season, area, or a year. Some sets use multiple gear configurations with more than one hook spacing. A standardized catch rate cannot be calculated because the number of sablefish caught on each configuration is unknown; logbook sets with multiple configurations were excluded. In logbooks, if catch is reported in number instead of weight, the trip is excluded. A small number of sets were eliminated from the logbook data because skipper estimated trip weight was very different than the IFQ reported trip weight. Current SAFE assessments include catch data from State-managed fisheries in the northern GOA and in the Aleutian Islands region and fish caught in these State waters are reported using the area code of the adjacent Federal waters in Alaska Regional Office catch reporting system. Minor State fisheries catches averaged 180 t from 1995-1998 (ADFG), about 1% of the average total catch. Most of the catch (80%) is from the Aleutian Islands region. The sablefish population is analyzed with an age-structured model. The current model was accepted by the Groundfish Plan Team and NPFMC in 2008.

	Sources of evidence: http://www.afsc.noaa.gov/ABL/mesa/mesa_sfs_lsd.htm SAFE reports: http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

Clause:

4.2 An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures must be established.

***FAO CCRF** 8.4.3*

Evidence adequacy rating:

☐ **High** ☑ **Medium** ☐ **Low**

Clause:	**Evidence**
4.2	Except for small vessels less than 60 feet and halibut vessels, all vessels fishing for groundfish in federal waters are required to carry NMFS-certified observers, at their own expense, for at least a portion of their fishing time. Vessels >60' and <125" carry an observer on 30% of their target harvest trips by quarter. The largest vessels, those 125 feet or longer, are generally required to carry observers 100% of the time, with multiple observers required on catcher/processors and in certain fisheries. Fishing vessels and shore side processors that receive groundfish caught in the EEZ, are required to accommodate observers as specified in regulations, in order to verify catch composition and quantity, including at-sea discards, and collect biological information on marine resources. Available observer coverage data of the sablefish fleet are provided below. Coverage tables from the 2010 Economic SAFE Report of the NPFMC available in the Economic SAFE 2010 (http://www.afsc.noaa.gov/REFM/docs/2010/economic.pdf). In 2009, the Sablefish fishery (longline) catcher vessel weeks observed were: • 220 vessel weeks observed 30% of the time, • 0 vessel weeks observed 100% of the time while • 720 vessel weeks were not observed. Catcher trawlers that bycatch and legally land sablefish experienced a 30% observer coverage in 2009. In 2009, the Sablefish fisheries (longline and pot fisheries) catcher/processor vessel weeks observed were: • 77 vessel weeks observed 30% of the time, • 30 vessel weeks observed 100% of the time while

- 11 vessel weeks were not observed.

The pot groundfish fisheries did not operate <60 feet vessels and therefore whatever portion catches sablefish receives at least a 30% rate of observer coverage.

Catcher, catcher processors and motherships (floating processors) require a federal permit to fish/process. All motherships have 100% or more observer coverage, logbook and reporting requirements. At the time of landing, catches are observed by onshore observers.

Transshippers require permits for operations. NMFS Office of Law Enforcement (OLE) must obtain 24 hours notice to inspect in case a vessel wants to tranship. The USCG and OLE monitors such operations. No IFQ processed sablefish may be transhipped without authorization from a local clearing officer. All catch reports are through e-landings (Code of federal regulations title 50 wildlife and fisheries pt 660-end).

The sablefish fishery in Alaska is primarily a small boat fishery with nearly 400 vessels, and the season lasts from approximately March 1 - November 15. The median vessel length is 56 feet. Observer data used in BSAI SAFE analyses represent on average only 14% of the annual IFQ hook and line catch. The percent of the IFQ catch observed was lowest in the East Yakutat/SE (5%), highest in West Yakutat and Aleutian Islands (~22%), and moderate in the Bering Sea, Central Gulf, and Western Gulf (10-14%). Although the percent of catch observed is not highest in the Central Gulf, the number of sets and vessels observed is greatest in this area and lowest in the Bering Sea.

In the Bering Sea fewer than 10 sets were observed from 2002-2005; however, since 2006 more sets have been observed. Observer coverage in the Aleutian Islands was consistent in all years except 2005 when only 23 sets from six vessels were observed. Since then observed sets increased and in 2009, there were 335. Low sample sizes for longline fishing in the Bering Sea are likely a result of poor observer coverage for sablefish directed trips and because pot fishing accounts for such a large proportion of the catch in these areas. Additionally, killer whales impact sablefish catch rates in these areas. For example, in 2009, 14% of observed sets in the Bering Sea were affected by killer whale depredation; these sets were eliminated from the analysis.

In the October 2010 NPFMC Public Review Draft *Restructuring the Program for Observer Procurement and Deployment in the North Pacific* , the Council approved the following problem statement for restructuring the Observer Program:

”The North Pacific Groundfish Observer Program (Observer Program) faces a number of longstanding problems that result primarily from its current structure. *The existing program design is driven by coverage levels based on vessel size that, for the most part, have been established in regulation since 1990 and do not include observer requirements for either the <60’ groundfish sector or the commercial halibut sector*. The quality and utility of observer data suffers because coverage levels and deployment patterns cannot be effectively tailored to respond to current and future management needs and circumstances of individual fisheries. In addition, the existing program does not allow fishery managers to control when and where observers are deployed. This results in

	potential sources of bias that could jeopardize the statistical reliability of catch and bycatch data. The current program is also one in which many smaller vessels face observer costs that are disproportionately high relative to their gross earnings. Furthermore, the complicated and rigid coverage rules have led to observer availability and coverage compliance problems. The current funding mechanism and program structure do not provide the flexibility to solve many of these problems, nor do they allow the program to effectively respond to evolving and dynamic fisheries management objectives". The proposed action would replace the existing observer service delivery model, in which industry contracts directly with observer providers to meet observer coverage requirements in Federal regulations, with a new system (i.e., restructuring) in which NMFS would contract directly with observer providers and to determine when and where observers are deployed. Vessels and processors under the restructured observer program would pay either a fee based on a percentage of ex-vessel revenue (not to exceed 2%), or a daily observer fee, to fund the program. **Proposed Alternatives for restructuring** The NPFMC is considering the following alternatives for restructuring the observer program. Two options are also proposed, which are applicable under any of the action alternatives. One of the primary decision points under Alternatives 2 – 5 is the ex-vessel value fee percentage to be assessed, the maximum of which can be 2% under current law. Option 1 proposes to assess an ex-vessel value fee equal to half of that selected under the overall alternative, on halibut landings and groundfish landings from vessels either <40', <50', or <60' length overall. For example, if the ex-vessel value fee selected by the Council under a specified alternative was 2%, halibut landings and groundfish landings from small vessels would be assessed a 1% fee. **Alternative 1**. Status quo; continue the current service delivery model. **Alternative 2**. GOA-based restructuring alternative. Restructure the program in the GOA, including shoreside processors; and include all halibut and <60' vessels participating in groundfish fisheries (including sablefish) in the GOA and BSAI. Vessels in the restructured program would pay an exvessel value based fee. Retain current service delivery model for vessels ≥60' and shoreside processors in the BSAI. **Alternative 3.** Coverage-based restructuring alternative. Restructure the program for all fisheries and shoreside processors with coverage of less than 100 percent. Vessels in the restructured program would pay an ex-vessel value based fee. Leave vessels and processors with at least 100 percent coverage under the current service delivery model. **Alternative 4**. Comprehensive restructuring alternative with hybrid fee system. Restructure program for all groundfish and halibut fisheries off Alaska. Vessels and shoreside processors with 100 percent or greater coverage would pay a daily observer fee; vessels and shoreside processors with less than 100 percent coverage would pay an ex-vessel value based fee.

Alternative 5. Comprehensive restructuring alternative that would assess the same ex-vessel value based fee on all vessels and shoreside processors in the groundfish and halibut fisheries in the GOA and BSAI.

The following options can be selected under Alternatives 2 – 5:

Option 1: For halibut fishery landings and landings by vessels less than (40', 50', or 60') participating in groundfish fisheries (fisheries and sectors not currently subject to the observer program), vessels and shoreside processors would pay one-half the ex-vessel value based fee established under the alternative.

Option 2: The agency shall release a draft observer program sampling design and deployment plan annually by September 1, available for review and comment by the Groundfish Plan Team at their September meeting. The SSC and Council shall review and approve the plan annually (http://alaskafisheries.noaa.gov/npfmc/currentissues/observer /Observerrestructuring910.pdf).

In addition to the Council action, based on a recent (2010) NMFS-AFSC Technical Memorandum series of the AFSC report, Electronic Monitoring (EM) Technology (cameras) was found to provide an additional tool for catch monitoring in the commercial halibut fishery. EM was not deemed an alternative to observers for the collection of certain biological specimens (e.g., otoliths, scales, etc.) from the catch. With the further development of EM systems and procedures, estimation of bycatch species composition in numbers of fish in the Pacific halibut fishery could be achieved with a high degree of accuracy. Weight of fish would not be gathered directly with this technology.

The report concluded that EM technology could provide viable catch monitoring capability for small boats, a large portion of which may be unsuitable for observer coverage (http://www.afsc.noaa.gov/publications/AFSC-TM/NOAA-TM-AFSC-213.pdf).

The NPFMC's Observer Advisory Committee – Meeting Agenda March 22, 2011, was focused on the restructuring of the observer program and the development of focused EM program/design for the small boat fleet (http://alaskafisheries.noaa.gov/npfmc/current_issues/observer/OACagenda311.pdf).

In terms of implementation, the plan is for a restructured observer program up and running by 2013, possibly, with an integrated EM component. (http://www.fakr.noaa .gov/npfmc/newsletters/news211.pdf, http://www.fakr.noaa.gov/npfmc/current_issues/observer/observer.htm)

Sources of evidence:

http://www.afsc.noaa.gov/ABL/MESA/mesa_sa_sable_fi.htm
http://www.fakr.noaa.gov/npfmc/current_issues/observer/observer.htm

	SAFE reports: http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf GOA and BSAI FMPs: http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf Code of federal regulations title 50 wildlife and fisheries pt 660-end: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title50/50tab_02.tpl Other: http://www.alaskafisheries.noaa.gov/ram/rtf09.pdf. http://www.fakr.noaa.gov/npfmc/current_issues/observer/observer.htm http://www.afsc.noaa.gov/ABL/MESA/mesa_sa_sable_fi.htm

Clause: **4.3 Sufficient knowledge of social, economic and institutional factors relevant to the fishery in question must be developed through data gathering, analysis and research.** ***FAO CCRF 7.4.5***	
Evidence adequacy rating **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
4.3	The MSA's National Standard 8 mandates that 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. Accordingly, the NMFS and ADF&G hold public meetings throughout the year in a variety of convenient locations. Participation is actively pursued. Moreover, the GOA and BSAI FMPs define two long-term management and policy objectives that provide an enabling framework to develop knowledge of social, economic, and institutional factors relevant to the sablefish fishery. These objectives and their sub-objectives are: **Promote Equitable and Efficient Use of Fishery Resources:** 31. Provide economic and community stability to harvesting and processing sectors through fair allocation of fishery resources.

	32. Maintain the license limitation program, modified as necessary, and further decrease excess fishing capacity and overcapitalization by eliminating latent licenses and extending programs such as community or rights-based management to some or groundfish fisheries. 33. Provide for adaptive management by periodically evaluating the effectiveness of rationalization programs and the allocation of access rights based on performance. 34. Develop management measures that, when practicable, consider the efficient use of fishery resources taking into account the interest of harvesters, processors, and communities. **Increase Alaska Native Consultation:** 35. Continue to incorporate local and traditional knowledge in fishery management. 36. Consider ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge in fishery management where appropriate. 37. Increase Alaska Native participation and consultation in fishery management. Social, economic, and institutional information comes from the annually (or biennially for some species) updated *Stock Assessment and Fishery Evaluation* report (NPFMC 2003), in particular the *Economic Status of the Groundfish Fisheries off Alaska* appendix (Hiatt *et al.* 2003). Also, estimates of ex-vessel value by area, gear, type of vessel, and species, are included in the annual Economic Status appendix to the SAFE report. CDQs. The fishery dependence of coastal and western Alaska communities was addressed through the creation of the pollock, sablefish, and halibut CDQ programs for the BSAI in the early to mid-1990s and the expansion of those programs into the multispecies CDQ Program with the addition of all other groundfish species by 1999. The CDQ Program has provided the following for the CDQ communities: 1) additional employment in the harvesting and processing sectors of the groundfish fisheries; 2) training; and 3) income generated by fishing the CDQ allocations. In many cases, CDQ royalties have been used to increase the ability of the residents of the CDQ communities to participate in the regional commercial fisheries, or residents themselves have fished the CDQ. The purpose of the CDQ Program was to provide western Alaska fishing communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. The program was intended to help western Alaska communities to diversify their local economies and to provide new opportunities for stable, long-term employment. The original Council guidance for implementing the CDQ Program focused on using the allocations to develop a self- sustaining fisheries economy (http://www.fakr.noaa.gov/regs /679c30.pdf).

	As a result of these policy guidelines and management practices, 20 percent of the fixed gear allocations in the Bering Sea are reserved for use by CDQ program participants, which includes 65 eligible communities organized into six groups and was designed to ensure fishing access, support economic development, alleviate poverty, and provide economic and social benefits to residents of western Alaska communities (http://www.edf.org/documents/11391_alaska-ifq.pdf). **NMFS economic and social information.** The Economic and Social Sciences Research Program within NMFS's REFM provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs. Much of the existing economic data about Alaskan fisheries is collected and organized around different units of analysis, such as counties (boroughs), fishing firms, vessels, sectors, and gear groups. It is often difficult to aggregate or disaggregate these data for analysis at the individual community or regional level. In addition, at present, some relevant community level economic data simply are not collected at all. As a result, the NPFMC, the AFSC, and community stakeholder organizations have identified ongoing collection of community-level socio-economic information that is specifically related to commercial fisheries as a priority. To address this need, the AFSC's Economic and Social Sciences Research (ESSR) Program has been preparing the implementation of the Alaska Community Survey, an annual voluntary data collection program initially focused on Alaska communities for feasibility reasons, in order to improve the socio-economic data available for consideration in North Pacific fisheries management (http://www.afsc.noaa.gov/REFM/Socioeconomics/Default.php). **Public process.** The BOF and the NPFMC are openly public processes. Any individual or group can submit proposals for discussion of management and research for sablefish fisheries in Alaska. The BOF meets in communities throughout coastal Alaska, while the NPFMC meets in communities in Alaska as well as in Washington and Oregon to provide public opportunities. Written comments are accepted when it is not possible to attend in person (http://www.fakr.noaa.gov/npfmc/ and http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main). The Council, as outlined in policy, also continues to incorporate local and traditional knowledge in fishery management, considers ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge in fishery management where appropriate. They also actively work to increase Alaska Native participation and consultation in fishery management through community workshops (http://www.alaskafisheries.noaa.gov/npfmc/fmp/goa/GOA.pdf). The NPRB, whose research supports the NPFMC process, specifically sets aside research funds to study social or economic factors effecting coastal communities and incorporate Traditional Knowledge from native Alaskan communities. In particular the NPRB requires each of its research projects to conduct outreach to these communities and the public so that they become aware of the scientific research and analysis being conducted on their door step. Lastly, the NEPA process is incorporated into each NPFMC amendment that renews or modifies existing regulations. NEPA specifically requires the evaluation of social and economic data that is used in the analysis and will describe how the proposed action may impact the communities regarding those factors.

5. There must be regular stock assessment activities appropriate for the fishery resource, its range, the species biology and the ecosystem and undertaken in accordance with acknowledged scientific standards to support optimum utilization of fishery resources. ***FAO 7.2.1/7.4.2/12.2/12.3/12.5/12.6/12.7/12.17***						
Confidence Ratings	**Low**	**0 out of 9**	**Medium**	**0 out of 9**	**High**	**9 out of 9**

Clause:

5.1 An appropriate institutional framework must be established to determine the applied research which is required and its proper use fishery management purposes.

FAO Main CCRF 12.2 Others 12.5

Evidence adequacy rating

☑ High **☐ Medium** **☐ Low**

Clause:	**Evidence**
5.1	Alaska's sablefish fisheries are managed by ADFG in waters from 0-3 miles from shore, and by the NMFS in waters 3-200 miles. Federally managed sablefish fisheries account for the greatest harvest in Alaska. With passage of the MSA in 1976, management jurisdiction occurs out to 200 miles. MSA sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent (see http://www.nmfs.noaa.gov/sfa/magact/mag3.html#s301). These mandates, and Council policy, require NMFS to conduct stock assessment and research on the stocks for which they are responsible. In like manner, the state has mandatory obligations from its Constitution and Statutes that require stock assessments, research and analysis to meet MSY mandates. Guided by these standards, and other legal requirements, the NMFS has a well-established institutional framework for research developed within the AFSC. The mission of the AFSC is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. The AFSC operates several laboratories (Auke Bay Biological Lab and Kodiak Biological Laboratories, and the National Marine Mammal Lab), and extensive fisheries monitoring and analysis section (Observers), the RACE and the REFM Division (http://www.afsc.noaa.gov/default.htm). Scientists and researchers conduct research on sablefish in Alaska each year. The AFSC's REFM Division conducts research and data collection to support an ecosystem approach to management of Northeast Pacific and eastern Bering Sea fish and crab resources. More than twenty-five groundfish and crab stock assessments are developed annually and used

by the NPFMC to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate.

Fishery information is available from longline, and pot vessels that target sablefish in the IFQ fishery. It is also available for trawl maximum retainable allowances (legal bycatch). Sablefish fixed gear IFQ must not be used to harvest sablefish with trawl gear in any IFQ regulatory area, or with pot gear in any IFQ regulatory area of the GOA. Records of catch and effort for these vessels are collected by observers and by vessel captains in voluntary and required logbooks. Fishery data from the Observer Program are available since 1990 see (http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf); http://www.nmfs.noaa.gov/fishwatch/species/sablefish.htm).

Catch, effort, age, length, weight, and maturity data are collected during sablefish longline surveys. These longline surveys likely provide an accurate index of sablefish abundance (Sigler 2000).

State management occurs from 0-3 miles from the coastline. The state of Alaska establishes seasons and Guideline Harvest Levels (GHL) through the BOF process. State scientists, managers and regulators determine research priorities during annual Policy and Planning Committee (PPC) meetings. The PPC is comprised of Headquarters' upper level staff, as well as regional supervisors for Alaska's major fishing regions, and senior scientists. The department undertakes assessment surveys and tagging studies as well. These are described at: http://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2002.02.pdf.

Sablefish Stock Assessment

The stock assessment for sablefish appears to be well suited for proper use of the fishery resource and for management purposes. The AFSC conducts annual longline surveys to estimate the relative abundance of major groundfish species on the continental slope of the eastern Bering Sea, Aleutian Islands, and the GOA. The survey is primarily designed to assess sablefish and indices of abundance have been computed since 1979. Catch data from other species are also available. From 1979-1994, the AFSC conducted cooperative annual longline surveys with Japan, and then independently from 1987-present.

The fixed station positions are divided among six NPFMC management areas: Bering Sea, Aleutian Islands, Western GOA, Central GOA, West Yakutat, and East Yakutat/Southeast. Stations are placed 30-50 km apart, and gear is set from 150-1000 m at each slope station. Catches are pooled by management area and an abundance index is computed for use in stock assessment and fishery evaluation reports.

Model Structure

The sablefish population is represented with an age-structured model. The analysis presented in the 2010 SAFE sablefish report for BSAI and GOA extends earlier age structured models developed by Kimura (1990) and Sigler (1999), which all stem from the work by Fournier and Archibald (1982). The current model configuration follows a more complex version of the GOA Pacific ocean perch model (Hanselman et al. 2005a) with split sexes to attempt to more realistically represent the underlying population dynamics of sablefish.

The current configuration was accepted by the Groundfish Plan Team and NPFMC in 2008 (Hanselman et al. 2008). The population dynamics and likelihood equations are described in Box 1 of the 2010 sablefish SAFE report. The analysis was completed using AD Model Builder software, a C++ based software for development and fitting of general nonlinear statistical models (http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf).

Multiple changes have been implemented into the sablefish (*Anoplopoma fimbria*) assessment during the period since the last independent review. Nonetheless, recently there have been stakeholder concerns over a real apportionment of harvest and depredation of survey catches by whales. Therefore, NOAA Fisheries' AFSC requested a thorough review of the Alaskan sablefish assessment. Accordingly the Center for Independent Experts (CIE) appointed a panel of independent experts to undertake a review of the 2008 assessment of Alaskan sablefish. The Panel comprised three CIE reviewers, Dr. Michael Armstrong (CEFAS, UK), Dr. John Casey (CEFAS, UK) and Dr. Neil Klaer (CSIRO, Australia); and the review was Chaired by Jim Ianelli (AFSC, Seattle). The review was held at the AFSC laboratory at Lena Point from Tuesday, 17 March 2009, through Thursday, 19 March 2009. Here below one of the peer reviewer's summary is provided that describes and evaluates the 2008 sablefish stock assessment survey for 2009 advice.

Dr. Armstrong Peer Review Summary of the 2008 Sablefish SAFE Report.

The sablefish assessment uses a statistical, forward-projecting age structured model which estimates population numbers and mortality rates separately for male and female sablefish. The model is fitted using data on catches, length/age compositions and CPUE from the fisheries, and several series of abundance indices and associated age or length compositions from longline and trawl surveys. The 2008 model represents an incremental improvement over the one developed in the 2007 assessment, by making better use of survey age data and reducing the number of parameters describing fishery selectivity. The new model does not alter the perception of recent biomass trends given by the 2007 assessment.

The chosen form of assessment is appropriate for the types of data available. The input data having most influence on the assessment (mainly from the longline fishery and survey) appear to be derived from well-designed surveys and from fishery sampling schemes that have improved over time. Some other data sets, for example the trawl fishery length compositions, are based on more limited sampling. The domestic longline survey is particularly influential in the assessment model. Although its ability to provide indices directly proportional to fish abundance has been studied in relation to gear saturation or competition with other species, the assumption of constant catchability should be reviewed at intervals in the light of any substantive change in conditions that could affect catch rates independent of sablefish density.

The new assessment appears to adequately characterize the long-term trends in sablefish biomass. The model suffers from retrospective bias in estimates of recent biomass, although the bias is much reduced in the last two years. Although the retrospective bias could be eliminated by fixing catchability at the estimates from the most recent assessment, or allowing natural mortality to drift, the causes of the bias remain poorly understood. The raw longline survey and fishery CPUE trends do not suggest the trough in 4+ biomass estimates from the mid 1990s to the early 2000s given by the full assessment

	model. There are also some unusual trends in the relative abundance of males and females estimated by the split-sex model, suggesting that future assessments may benefit from including sex ratio in the estimation procedure. Fitting combined-sex length based selectivity curves for the different fleets may also help. Despite the bias issues, the current assessment model provides the most appropriate basis for determining stock trends, short-term projections and catch options for 2009 based on the existing biological reference points. The uncertainties around the projections are correctly characterised by the MCMC simulations that also capture the uncertainties in the historical assessment. The assessment and forecasts would benefit from better information on abundance of more recent year classes recruiting to the fishery. The GOA trawl fishery data should provide useful data although it is not annual and the length compositions are not well fitted in the assessment. Other sources of index data on young sablefish should be evaluated for possible inclusion in the assessment, and further work on climate and ecosystem related drivers of sablefish population dynamics should be pursued. The effect of whale depredation on the longline survey indices and on catch apportionment calculations was of concern to stakeholders. Depredation is very regional, and although previous estimates of numbers of sablefish removed from the lines are relatively small, the incidence of sperm whale depredation has been increasing in the eastern GOA. Further work is needed to evaluate ways of quantifying and reducing whale depredation. The AFSC has a substantial data base of conventional tagging results from releases carried out over many years, as well as a growing data set from archival tagging. The data appear to be under-utilised and there is considerable potential for incorporating the tagging data into spatial models of sablefish dynamics that could be used both for developing operating models to test assessment and management procedures, and for implementing a spatially resolved assessment model. If a spatially resolved model can be successfully fitted, with robust estimates of regional selectivity and catchability parameters, it would also provide a sounder basis for evaluating catch apportionment schemes. CIE Reviews available at: http://www.alfafish.org/fish-species.shtml Since the last CIE review, the following changes have been made to the sablefish stock assessment model. ***2009 SAFE Report (Advice for 2010) Summary of major changes*** Relative to 2008's assessment, AFSC made the following substantive changes in the current assessment. *Input data:* Addition of relative abundance and length data from the 2009 longline survey, relative abundance and length data from the 2008 longline and trawl fisheries, and age data from the 2008 longline survey and longline fishery were added to the assessment model. A NMFS GOA trawl survey was conducted in 2009 and its biomass estimate and associated lengths were also added.

	Model changes: No model changes were recommended for 2010. A modelling workshop to begin implementing CIE recommendations and evaluate industry concerns was planned for winter 2010. AFSC initial responses to the CIE review are in Appendix 3C. http://www.afsc.noaa.gov/refm/docs/2009/BSAIsablefish.pdf ***2010 SAFE Report (Advice for 2011) Summary of major changes*** Relative to the 2009's assessment, AFSC made the following substantive changes in the current assessment. *Input data*: AFSC added relative abundance and length data from the 2010 longline survey, relative abundance and length data from the 2009 longline and trawl fisheries, age data from the 2009 longline survey and 2009 longline fishery, updated 2009 catch and estimated 2010 catch to the assessment model. As recommended in the 2009 CIE review and 2010 sablefish modelling workshop, AFSC eliminated the longline surveys' relative population weight (RPW) indices from the model to avoid double use of the information from those surveys. Now AFSC only fits relative population numbers (RPN) from the longline surveys. *Model changes*: AFSC recommended minor adjustments to the variance assumptions in the model. By eliminating an index, it was appropriate to rebalance data weightings. AFSC used the standard deviation of the normalized residuals (SDNR) as a criterion to reweight the compositional likelihoods. This resulted in a model with better balance between likelihood components and less weight on length information when ages were available. http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf **Additional review and comments from the NPFMC SSC** Every year the SAFE report and findings originated at the AFSC is passed on to the NPFMC' SSC for comment and review. Review and comments details are available in each SAFE report and should be consulted if further information is required.

Clause:

5.2 The state of the stocks under management jurisdiction, including the impacts of ecosystem changes resulting from fishing pressure, pollution or habitat alteration must be monitored.

5.2.1 The research capacity necessary to assess the effects of climate or environment change on fish stocks and aquatic ecosystems must be established.

FAO CCRF 12.5

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
5.2	In Alaska, managers routinely assess ecosystem changes for potential impacts to sablefish fisheries. For example, water mass movements and temperature changes appear related to recruitment success. Above-average recruitment was somewhat more likely with northerly winter currents and much less likely for years when the drift was southerly. Recruitment was above average in 61% of the years when temperature was above average, but was above average in only 25% of the years when temperature was below average. Growth rate of young-of-the-year sablefish is higher in years when recruitment is above average (Sigler et al. 2001). The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST) (http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf). Juvenile sablefish are substantially dependent on benthic prey (18% of diet by weight) and the availability of benthic prey may be adversely affected by fishing or the ecosystem adjusting to warming oceans. Little is known about effects of fishing on benthic habitat or the habitat requirements for growth to maturity. Although sablefish do not appear to be directly dependent on physical structure, reduction of living structure is predicted in much of the area where juvenile sablefish reside and this may indirectly reduce juvenile survivorship by reducing prey availability or by altering the abilities of competing species to feed and avoid predation. ADFG conducts mark-recapture and a longline survey in Northern Southeast Alaska Inside (NSEI) waters. This population is treated as a separate population, but some migration into and out of Inside waters has been confirmed with tagging studies (http://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2002.02.pdf; http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf). Impacts of pollution are assessed by ADEC, as well as by the federal government's Environmental Protection Agency. Alaskan waters are relatively free of industrial pollutants, which are aggressively monitored by the Alaska Department of Environmental Conservation (ADEC or DEC). These include wastewater discharge, storm water discharge, seafood water discharge, placer mining discharge, log transfer discharge, and others (http://dec.alaska.gov/water/index.htm).

	As mandated by the United States Clean Water Act, each state must develop a program to monitor and report on the quality of its surface and groundwater and prepare a report describing the status of its water quality. The 2010 Integrated Report produced by DEC is a state-wide water quality assessment. It describes whether the existing condition of each Alaska water body is sufficient to maintain multiple designated uses of that water body. Alaska water quality standards designate seven uses for fresh waters (drinking water; agriculture; aquaculture; industrial; contact recreation; non-contact recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife) and seven uses for marine waters (aquaculture; seafood processing; industrial; contact recreation; non-contact recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting raw mollusks or other raw aquatic life for human consumption). Sources of information used by DEC to develop the biannual water quality assessment include monitoring data (e.g., water testing), professional knowledge, and evaluations such as those provided by water resource managers, fish and wildlife biologists, and aquatic biologists. Alaska is rich in water quantity, water quality, and aquatic resources; almost half of the total surface waters of the United States are located within the state. Because of the size, sparse population, and remote character of Alaska, the vast majority of its water resources are in pristine condition. More than 99.9% of Alaska's waters are considered unimpaired. Among the state's vast water resources are more than 3 million lakes, 714,000 miles of streams and rivers, 44,000 miles of coastline, and approximately 174,683,900 acres of wetlands. Less than 0.1% of these water resources have been identified as impaired. DEC actively solicits all existing and readily available water quality data and information in accordance with EPA guidance. The information gathered is not limited to waters for which water quality problems have been reported by local, state, or federal agencies; members of the public; or academic institutions. Organizations and groups are contacted for research they may be conducting or reporting. University researchers, the U.S. Department of Agriculture, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), and the U.S. Fish and Wildlife Service (USF&WS) are examples of such sources of field data (http://dec.alaska.gov/water/index.htm).
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause	**Evidence**
5.2.1	The Alaska Fisheries Science Centre's REFM Division conducts research and data collection to support an ecosystem approach to management of Northeast Pacific and eastern Bering Sea fish and crab resources. This ecosystem approach examines climate and/or environmental changes. More than twenty-five groundfish and crab stock assessments are developed annually and used by the NPFMC to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis.

	Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate. REFM scientists in the Status of Stocks and Multispecies Assessments (SSMA) program use biological and oceanographic information coupled with numerical simulation techniques to study the interaction of fish populations, fisheries, and the environment. The Fishery Interaction Team of SSMA conducts field studies to examine potential commercial fishery impacts on prey including reduction in the abundance or availability of prey at local scales and disturbance of prey fields. Ecosystem assessments and information and multispecies and ecosystem models on the relationship between predators and prey developed by the Division's Resource Ecology and Ecosystem Modelling staff also contribute to management advice. The Age and Growth program is primarily focused on providing age data that contributes to a basic understanding of a species, whether it is in the context of sustainable fisheries, species conservation, or species biology. These age data are critical to development of age-structured models and fishery management advice. The Socioeconomic program staff provides economic information to NMFS, industry and other agencies to assist with such projects as evaluating the economic effects of the *Exxon Valdez* oil spill in Prince William Sound, developing guidelines for valuing commercial and recreational fisheries, or evaluating economic impacts of fisheries rationalization programs. Sociocultural information on Alaskan communities and traditional ecological knowledge is also compiled and evaluated (http://www.afsc.noaa.gov/REFM/). The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST). Stock assessments for both the GOA and the Bering Sea sablefish populations occur annually. For state-managed fisheries, ADFG also has a well-developed research capacity. The state's Policy and Planning Committee establish research priorities. For example, in 1988, the department began annual longline research surveys in both NSEI and SSEI to assess the relative abundance of sablefish over time and differing environmental conditions. Previous research indicates some movement of sablefish into and out of NSEI and substantial movement into and out of SSEI. The extents of movement in unknown, therefore department surveys are conducted a few weeks prior to the start of each fishery to examine stock condition of sablefish near the time of these fisheries. Fixed sampling stations are randomly assigned within statistical areas in both Chatham and Clarence Strait, where the majority of fleet fishing effort is focused. Once established, the same stations are fished in a similar manner each year to estimate change in relative abundance over time. A general linear multivariate model has been used to detect significant CPUE trends over time. Biological data collected during the surveys include length, weight, sex, stage of maturity and otoliths (aging structures). This data is used to describe the age and size structure of the populations and detect recruitment events. The department standardized survey methods with the NMFS survey. In 2000 the department constructed and purchased survey gear to ensure standardization between survey vessels.

	Another example is the work done in 1997 and 1998, which included a mark-recapture study to estimate absolute abundance in NSEI (single event-Petersen method). Over 5,000 sablefish in the NSEI survey were tagged and released each year and a small proportion of the tags were recaptured in the fishery. Tags may be useful to estimate an annual exploitation rate and to describe movement patterns of sablefish between the internal waters of Alaska, the GOA, and British Columbia in relation to climate variability. Application of an age-structured model (ASA) using fishery and survey data is also being explored to estimate abundance of sablefish. The NMFS uses an ASA for the Bering Sea and GOA sablefish assessment. In February of 2002 ADFG convened a multi-agency panel to conduct an independent review of the stock assessment program for the NSEI sablefish fishery. A report detailing past stock assessment and management programs was prepared and given to the review committee in advance of the panel meeting (Carlile et al. 2002). The panel met with ADF&G staff to discuss the stock assessment report and to gain further insight into the details of the fishery and assessment. They then convened privately to draft recommendations for consideration (Leaman et al. 2002). Based, in part, on this review and on additional assessment data available in 2002, the department took a new approach for setting the Annual Harvest Objective (AHO) for NSEI sablefish. The AHO was set based on a harvest rate applied to an estimate of biomass. A Peterson estimator applied to mark-recapture data from tail-clipped fish was calculated (Seber 1982). Previous AHOs have been set based on historical catch levels and evaluation of fishery and survey data. In the Southern Southeast Inside district, research assessed change in relative abundance of sablefish using survey and fishery Catch Per Unit of Effort data as well as age and length frequency distributions. Sablefish appear to move in and out of this area, which violates assumptions of a closed population. Consequently Peterson mark-recapture estimates of abundance or exploitation rate are not possible for this fishery (http://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2002.46.pdf; http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf).

Clause:

5.3 Management organizations must cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources.

5.3.1 States must stimulate the research required to support national policies related to fish as food.

FAO CCRF 12.7

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause	Evidence
5.3	Catch, effort, age, length, weight, and maturity data are collected during sablefish longline surveys. These longline surveys likely provide an accurate index of sablefish abundance (Sigler 2000). Japan and the United States conducted a cooperative longline survey for sablefish in the GOA annually from 1978 to 1994, adding the Aleutians Islands region in 1980 and the eastern Bering Sea in 1982 (Sasaki 1985, Sigler and Fujioka 1988). Since 1987, the AFSC has conducted annual longline surveys of the upper continental slope, referred to as domestic longline surveys, designed to continue the time series of the Japan-U.S. cooperative survey (Sigler and Zenger 1989). The domestic longline survey began annual sampling of the GOA in 1987, biennial sampling of the Aleutian Islands in 1996, and biennial sampling of the eastern Bering Sea in 1997 (Rutecki et al. 1997). The domestic survey also samples major gullies of the GOA in addition to sampling the upper continental slope (http://www.afsc.noaa.gov/abl/MESA/pdf/LSprotocols.pdf). Fisheries researchers and scientists from Alaska work closely with those from Canada on assessing the health of sablefish populations in the North Pacific. The Technical Subcommittee (TSC) of the Canada-U.S. Groundfish Committee, was created by the International Trawl Fishery Committee (now the Canada-U.S. Groundfish Committee) at the latter's initial meeting in Seattle, Washington, on November 4, 1959. The committee meets annually. Their discussions incorporate: • the exchange of information on the status of groundfish stocks of mutual concern and coordinate, whenever possible, desirable programs of research. • Recommendation of the continuance and further development of research programs having potential value as scientific basis for future management of the groundfish fishery. • Review of the scientific and technical aspects of existing or proposed management strategies and their component regulations relevant to conservation of stocks or other scientific aspects of groundfish conservation and management of mutual interest. • Transmission of approved recommendations and appropriate documentation to appropriate sectors of Canadian and U.S. governments and encourage implementation of these recommendations (http://www.psmfc.org/tsc2/).

Evidence adequacy rating:		
☑ **High**	☐ **Medium**	☐ **Low**

Clause	**Evidence**
5.3.1	State and national policies regarding seafood are guided and driven by the Alaska Seafood Marketing Institute (ASMI), Food and Drug Administration (FDA), Department of Agriculture (USDA), the National Institute of Health (NIH) and many others. ASMI is a public-private partnership between the State of Alaska and the Alaska seafood industry established to foster economic development of renewable natural seafood resources and primarily responsible for increasing the economic value of Alaskan seafood through marketing programs, quality assurance, industry training, and sustainability certification. The powers of the ASMI board include: conducting or contracting for scientific research to develop and discover health, dietetic, or other uses of seafood harvested and processed in the state, and prepare market research and product development plans for the promotion of any species of seafood and their by products (Alaska Statute 16.51.090 Powers of Board). The State of Alaska also operates the Fishery Industrial Technology Center as a component of the University of Alaska (http://www.sfos.uaf/fitc/). The Fishery Technology Center provides training for harvesting, processing, and conservation of fisheries resources of Alaska, provides research and development activities to adapt existing or create new technologies to enhance the economic value of the industry, and encourages joint projects between the fishing industry and government to enhance the productivity of the fishing industry. Alaska regulations also stipulate that the harvest of the resource will be in a manner that emphasizes the quality and value of the fishery product (5 AAC 28.089. GUIDING PRINCIPLES FOR GROUNDFISH FISHERY REGULATIONS, (6) harvest of the resource in a manner that emphasizes the quality and value of the fishery product). http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:%27Title5Chap28%27]/doc/%7B@1%7D?firsthit

Clause:

5.4 The fishery management organizations must directly, or in conjunction with other States, develop collaborative technical and research programmes to improve understanding of the biology, environment and status of trans-boundary aquatic stocks.

FAO CCRF 12.17

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence	
5.4	The NMFS in conjunction with the ADF&G regularly collaborate on technical and research programs. The biology of sablefish in Alaska is well documented and understood. The preparation of the stock assessment and fishery evaluation (SAFE) reports (more than 3,000 pages) provides the scientific basis for groundfish catch recommendations. These reports present analysis of the extensive data collected by NMFS-trained fisheries observers and AFSC scientists aboard dedicated research surveys. The Council's Plan Teams in conjunction with other State, federal and University staff produce SAFE documents (http://www.afsc.noaa.gov/Quarterly/ond2010/divrptsREFM10.htm). State and Federal biologists, biometricians, economists, and other academic professionals make up the NMFS's Groundfish Plan Teams for the Bering Sea and the GOA. Plan Teams make recommendations for ABCs, TAC and OFLs. For transboundary stock status, see 5.3. Fisheries researchers and scientists from Alaska work closely with those from Canada on assessing the health of sablefish populations in the North Pacific. The Technical Subcommittee (TSC) of the Canada-U.S. Groundfish Committee, was created by the International Trawl Fishery Committee (now the Canada-U.S. Groundfish Committee) at the latter's initial meeting in Seattle, Washington, on November 4, 1959. The committee meets annually.	

Clause:

5.5 Data generated by research must be analyzed and the results of such analyses published in a way that confidentiality is respected where appropriate

5.5.1 Results of analyses must be distributed in a timely and readily understandable fashion in order that the best scientific evidence is made available as a contribution to fisheries conservation, management and development.

5.5.2 In the absence of adequate scientific information, appropriate research must be initiated in a timely fashion.

FAO Main CCRF 12.3 Others 7.4.2

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**	
5.5	Landings, buying and production data for Alaska sablefish are recorded on Department of Fish and Game fish tickets or through the eLandings system (internet-based electronic filing), and the Commercial Operators Annual report, as required by Alaska Statute (Section 16.05.690 Record of Purchases) the Alaska Administrative Code (5 AAC 39.130 Reports required of processors, buyers, fishermen, and operators of certain commercial fishing vessels; transporting requirements).The State of Alaska specifically protects confidentiality through statute (AS 16.05.815 Confidential nature of certain reports and records). Specifically, records required by regulations of the department concerning the landings of fish, shellfish, or fishery products, and annual statistical reports of fishermen, buyers, and processors required by regulation of the department are confidential and may not be released by the department or by the Alaska Commercial Fisheries Entry Commission except as set out in this subsection. To ensure confidentiality, fishery data are routinely redacted from ADF&G reports if the data were obtained from a small number of participants (for example: Annual management report for groundfish fisheries in the Kodiak, Chignik, and South Alaska Peninsula Management Areas, 2009, Sagalkin et al, ADFG, Fishery Management Report No.10-33, Anchorage, 2010). Summarized data is routinely made available to members of the public, industry, state, federal and university personnel upon request. Likewise, the NMFS has similar federal regulations protecting confidentiality of data collected from reports required of processors, buyers, fishermen, and operators of commercial fishing vessels, and transporting companies. See MSA in section 402 (16 U.S.C. 1881a), which addresses information collection by NMFS and the confidentiality of that information. Regulations on the confidentiality of information collected under MSA can also be found at 50 CFR Subpart E (50 CFR sections 600.405 - 600.425). http://www.legis.state.ak.us/basis/folio.asp http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.requests	

Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause	**Evidence**
5.5.1	NMFS, NPFMC and ADFG staff uses the best available science in developing their comprehensive reports. The State of Alaska has a thorough fishery harvest and production database that is available for the creation of ad hoc reports of non-confidential fisheries data during all working hours. http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.requests The NMFS AFSC has a searchable database accessible at http://access.afsc.noaa.gov/pubs/search.cfm. Professional staff within the In season Management Section also can provide ad-hoc reports upon request. The BOF and the NPFMC receive numerous comprehensive staff reports during their meetings – held multiple times each year. Readily understandable reports are available in printed form as well as online. http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main http://www.fakr.noaa.gov/npfmc/default.htm
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause	**Evidence**
5.5.2	Both federal and state researchers and managers operate from long established, well-defined programs. While the NPFMC process has access to tremendous access to data resources, so absence of adequate scientific information is likely the result of data needs responding to new questions (For example a marginally studied species becoming designated “Endangered” under ESA), changing conditions or new policy concerns which may need new information not currently collected. In these cases appropriate research must be initiated in a timely fashion. Such new requests require new research to supply answers for policy makers and management biologists. The NPFMC, SSC, ADFG and the NPRB annually develop a list of priority research needs based on such requests and seek funding to support management needs. Agencies look first within their own funding priorities and staff commitments to conduct new relevant research and may turn to the annual NPRB proposal cycle to seek funding if internal sources are not available.

	Research needs and priorities are then recommended by the NPFMC Groundfish Plan Teams (BSAI and GOA), as well as by the department's PPC. Recommendations are provided to the NPFMC and Commissioner's Office, respectively, for further consideration and action (http://www.fakr.noaa.gov/npfmc/membership/plan_teams/plan_teams.htm). Another example occurred when Amendments to the Essential Fish Habitat Fishery Management Plan text of Alaska sablefish included suggestions for future consideration of small, unobtrusive research closures in areas of intense fishing. This prompted a Council request to provide information regarding all factors influencing sablefish recruitment (http://www.fakr.noaa.gov/npfmc/membership/plan_teams/Minutes/1110Sablefish.pdf). Another example: Observer coverage within the fleet does not operate on vessels less than 60 feet in overall length. Lacking data on catches, discards, and bycatch, the NPFMC and NMFS still manages the sablefish population in a sustainable fashion. The NPFMC is undertaking a thorough review of the observer program, with a possible review of observer requirements for smaller vessels commercial fishing in Alaskan waters. Currently, 86%-88% of the Bering Sea fisheries are observed. In contrast, the GOA areas (e.g., eastern, central, and western subareas) have much lower levels of observer coverage. During 2004-2007, the percent observed catch ranged mainly from 28 to 38%. These levels are much lower than what is seen in the Bering Sea because of the overall smaller vessel sizes, which have lower observer coverage requirements. Adoption of regulations for the small boat fleet would improve the scope of scientific data available to researchers and regulators (http://www.fakr.noaa.gov/npfmc/current_issues/observer/observer.htm).	

6. The current state of the stock must be defined in relation to reference points or relevant proxies or verifiable substitutes allowing for effective management objectives and target. Remedial actions must be available and taken where reference point or other suitable proxies are approached or exceeded.

FAO 7.5.2/7.5.3

Confidence Ratings	Low	0 out of 4	Medium	0 out of 4	High	4 out of 4

Clause:

6.1 States shall determine for the stock both safe targets for management (Target Reference Points) and limits for exploitation (Limit Reference Points), and, at the same time, the action to be taken if they are exceeded.

6.1.1 Target reference point(s) shall be established.

6.1.2 Limit reference points shall be established.

6.1.3 Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points.

6.1.4 Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded.

FAO Main CCRF 7.5.2 Others 7.5.3

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
6.1.1	**NPFMC Harvest Strategy: BSAI and GOA Groundfish Fisheries** The management system for the NPFMC groundfish fisheries is a complex suite of measures comprised of harvest controls—e.g., OY, ABC, TAC, OFL—effort controls (ITQs, licenses, cooperatives), time and/or area closures (also known as habitat protection, marine reserves), by-catch controls (PSC limits, retention and utilization requirements), monitoring and enforcement (observer program, social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions and to avoid seabirds). The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. *Optimum Yield* The first element is the specification of for the groundfish complexes in the BSAI and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The range for BSAI is 1.4 to 2.0 million mt; the range for GOA is 116 to 800 thousand mt. In practice, only the upper OY limit in the BSAI has been a factor in altering harvests. Because of high productivity, Acceptable Biological Catches (ABCs) in the BSAI have summed to well above 2.0 million metric tons for several years. Some people believe this OY limit has been the main reason that the fisheries in the BSAI have held up so well. The lower limits in both the BSAI and the GOA have never been approached in recent time, so they have not received recent attention.

The Tier System
The second element is the specification of maximum permissible ABCs and of OFLs for each stock in the complex (usually individual species but sometimes species groups). NPFMC inaugurated the Tier system in fisheries management: the harvest control rule depends on the amount of information available.

In Tier 1, information is abundant enough and compelling enough to determine the statistical distribution of maximum sustainable yield. In this Tier there is only one stock: BSAI walleye pollock.

Most of the larger and commercially important stocks are in Tier 3, which has sufficient information to determine *F40%* and its corresponding biomass *B40%*. The sablefish stock in Alaska for example is managed under tier 3. For these stocks, the spawner-recruit relationship [the concept that the number of young fish (recruits) entering a population is related to the number of parent fish (spawners)] is uncertain, so that MSY cannot be estimated with confidence. Hence, a surrogate based on *F40%* is used, following findings in the scientific literature in the 1990s (i.e. Clark W.G. 1991. Groundfish exploitation Rates Based on Life History Parameters. Can. J. Fish. Aquat. Sci. 48:734-750).
A large number of the remaining stocks (generally of lower magnitude) are in Tier 5, in which natural mortality is the basis of the maximum permissible ABC. A few are in Tier 6, in which biomass and reference points cannot be determined, so that the rule is a function of average catch.

In Tiers 1–3, sufficient information is available to determine a target biomass level, which would be obtained at equilibrium when fishing according to the control rule with recruitment at the average historical level. The control rule is a biomass-based rule, for which fishing mortality is constant when biomass is above the target and declines linearly down to a threshold value when biomass drops below the target. Fishing mortality is 0 below the threshold, which is currently set to 0.05 of the target biomass. In Tiers 4 and 5, a Biological Reference Point (BRP) cannot be determined, so fishing occurs at a constant fishing mortality, which is chosen to be conservative according to findings in the scientific literature. In Tier 6, such a fishing mortality cannot be determined, so catch is constrained to be 75% of the average historical catch.

Sablefish are managed under Tier 3 of NPFMC harvest rules. Reference points are calculated using recruitments from 1979-2008. The updated point estimates of *B40%, F40%,* and *F35%* from the latest assessment are 110,108 t (combined across the EBS, AI, and GOA), 0.097, and 0.115, respectively. Projected female spawning biomass (combined areas) for 2011 is 102,139 t (93% of B40%), placing sablefish in sub-tier “b” of Tier 3. The maximum permissible value of FABC under Tier 3b is 0.089, which translates into a 2011 ABC (combined areas) of 16,040 t. The OFL fishing mortality rate is 0.106 which translates into a 2011 OFL (combined areas) of 18,950 t. Model projections indicate that this stock is neither overfished nor approaching an overfished condition. For Tier 3 stocks, the MSY level is defined as *B35%*. Scientific evidence points out that the majority of groundfish stocks in the North Pacific can be managed under a biomass based control rule, and by keeping the spawning stock biomass at 35% the unfished spawning biomass level, 75% of the MSY level could be harvested continuously within a relatively safe margin of certainty (Clark 1991)

Projected 2011 spawning biomass is 37% of unfished spawning biomass. Spawning biomass has increased from a low of 30% of unfished biomass in 2002 to 37% projected

for 2011. The 1997 year class has been an important contributor to the population but has been reduced and should comprise 10% of the 2011 spawning biomass. The 2000 year class appears to be larger than the 1997 year class, and is now 95% mature and should comprise 24% of the spawning biomass in 2011. The 2002 year class is beginning to show signs of strength and will comprise 9% of spawning biomass in 2011 and is 86% mature.

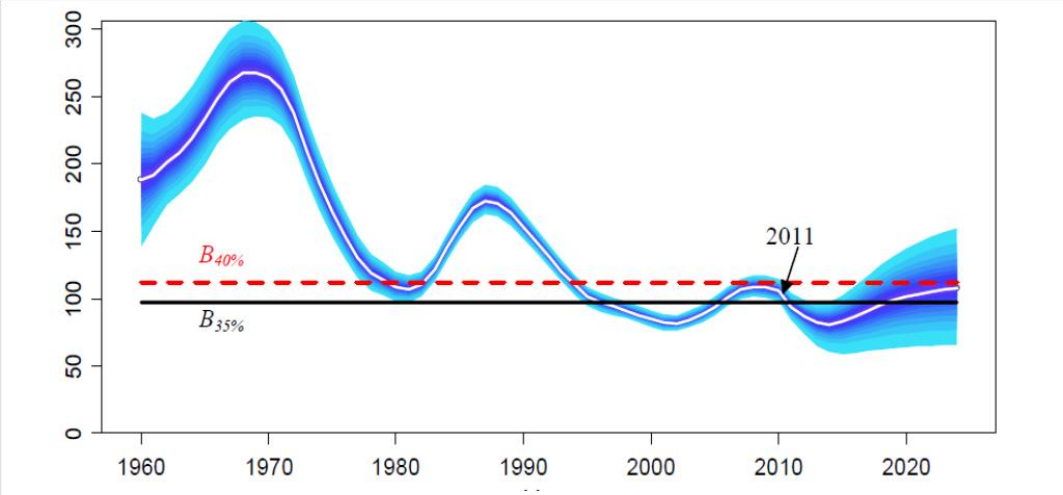


Figure 3.27. Estimates of female spawning biomass (thousands t) and their uncertainty. White line is the median and shaded fills are 5% increments of the posterior probability distribution of spawning biomass based on 10,000,000 MCMC simulations. Width of shaded area is the 95% credibility interval. Harvest policy is least conservative with catch at maximum permissible ABC.

Projections and Harvest Alternatives

The following is a summary of key reference points from the 2010 assessment of sablefish in Alaska:

Natural mortality: (M) 0.10
Tier: 3b
Equilibrium unfished spawning biomass: 275,270
Reference point spawning biomass, B40% 110,108
Reference point spawning biomass, B35% (MSY) 96,345
Spawning biomass 102,139
2010 total (age 4+) biomass 221,000

Maximum permissible fishing level

F40% 0.097
F40% adjusted 0.089
F40% adjusted Yield **16,040**

Overfishing level

F35% 0.115
F35% adjusted 0.106
F35% adjusted Yield 18,950

Authors' recommendation

F 0.089

	ABC **16,040 t.** **Evidence** http://icesjms.oxfordjournals.org/content/67/9/1861.full http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
6.1.2	***Bayesian analysis and calculation of uncertainty*** Since the 1999 assessment, NPFMC developed a limited Bayesian analysis that considered uncertainty in the value of natural mortality as well as survey catchability. The Bayesian analysis has been modified in various ways since the 1999 assessment. In the 2010 assessment, the Bayesian analysis considers additional uncertainty in the remaining model parameters, but not natural mortality. The multidimensional posterior distribution is mapped by Bayesian integration methods. The posterior distribution was computed based on 10 million MCMC simulations drawn from the posterior distribution and thinned to 5,000 parameter draws to remove serial correlation between successive draws and a burn-in of 1 million draws was removed from the beginning of the chain. This was determined to be sufficient through simple chain plots, and comparing the means and standard deviations of the first half of the chain with the second half. NPFMC estimated the posterior probability that projected abundance will fall below thresholds of 17.5% [minimum stock size threshold (MSST) or limit reference point] and 35% (maximum sustainable yield or MSY) of the unfished spawning biomass based on the posterior probability estimates. Abundance was projected for 14 years. In the projections, future recruitments varied as random draws from a lognormal distribution with the mean and standard deviation of the 1979-2008 recruitment, in addition to the uncertainty propagated during the MCMC simulations. In previous assessments, the decision analysis thresholds were based on Mace and Sissenwine (1993). However, in the NPFMC setting, thresholds are defined in the Council harvest rules. These are when the spawning biomass falls below MSY or *B35%* and when the spawning biomass falls below ½ MSY or *B17.5%* which calls for a rebuilding plan under the MSA. For the previous analysis based on Mace and Sissenwine (1993), see Hanselman et al. 2005b. The estimates of ending spawning biomass are well-defined by the available data. Most of the probability lies between 95,000 and 105,000 t (Figure 3.24 of 2010 Sablefish SAFE Report, reproduced here below).

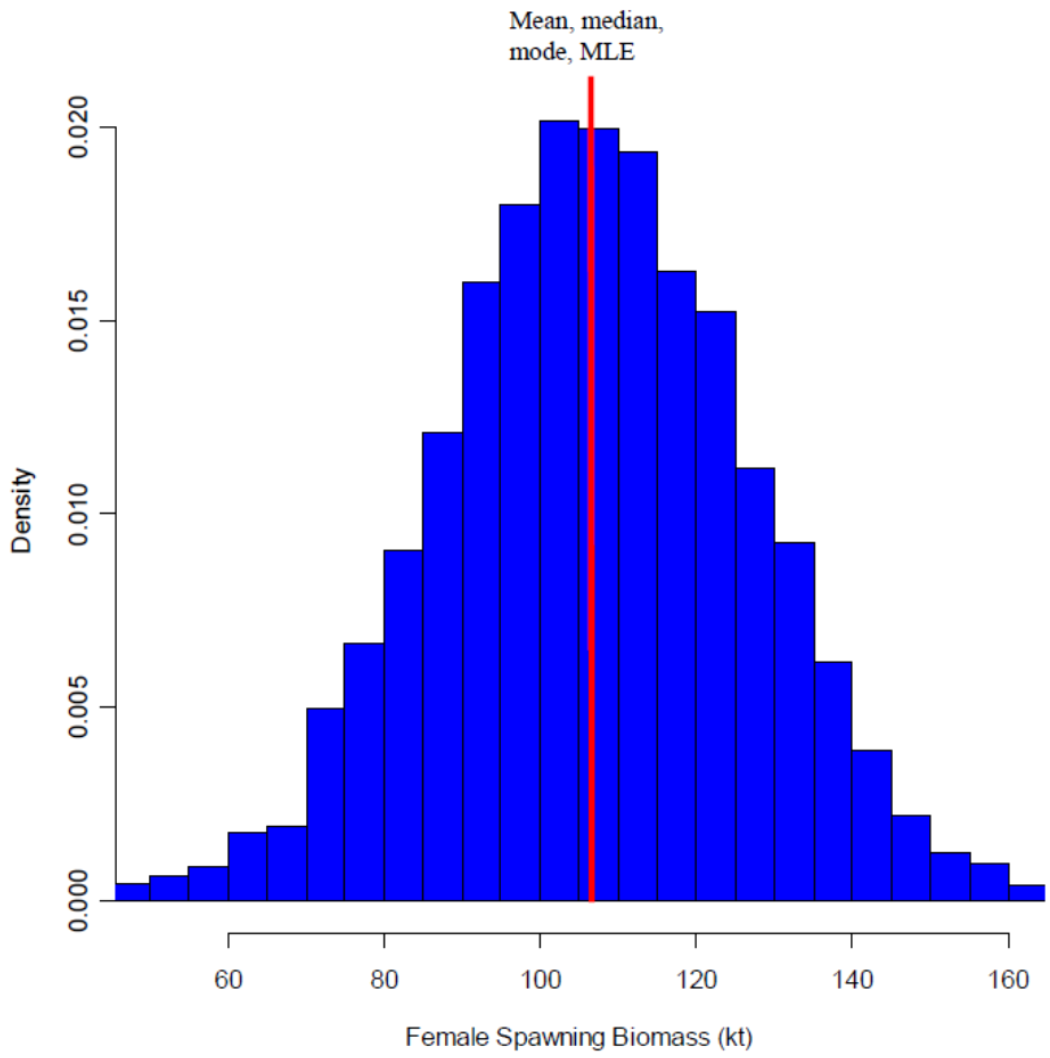


Figure 3.24. Posterior probability distribution for projected spawning biomass (thousands t) in 2011.

AFSC estimated the posterior probability that projected abundance will fall, or stay below thresholds of 17.5% (MSST), and 35% (MSY), and 40% (*Btarget*) of the unfished spawning biomass based on the posterior probability estimates. Abundance was projected for 14 years. For management, it is important to know the risk of falling under these thresholds.

The probability that spawning biomass falls below key biological reference points was estimated based on the posterior probability distribution for spawning biomass. The probability that next year's spawning biomass was below *B35%* was 0.33. During the next three years, the probability of falling below B17.5% is near zero, the probability of falling below B35% is 0.99, and the probability of staying below B40% is near 100% (Figure 3.26 of 2010 Sablefish SAFE Report, reproduced here below).

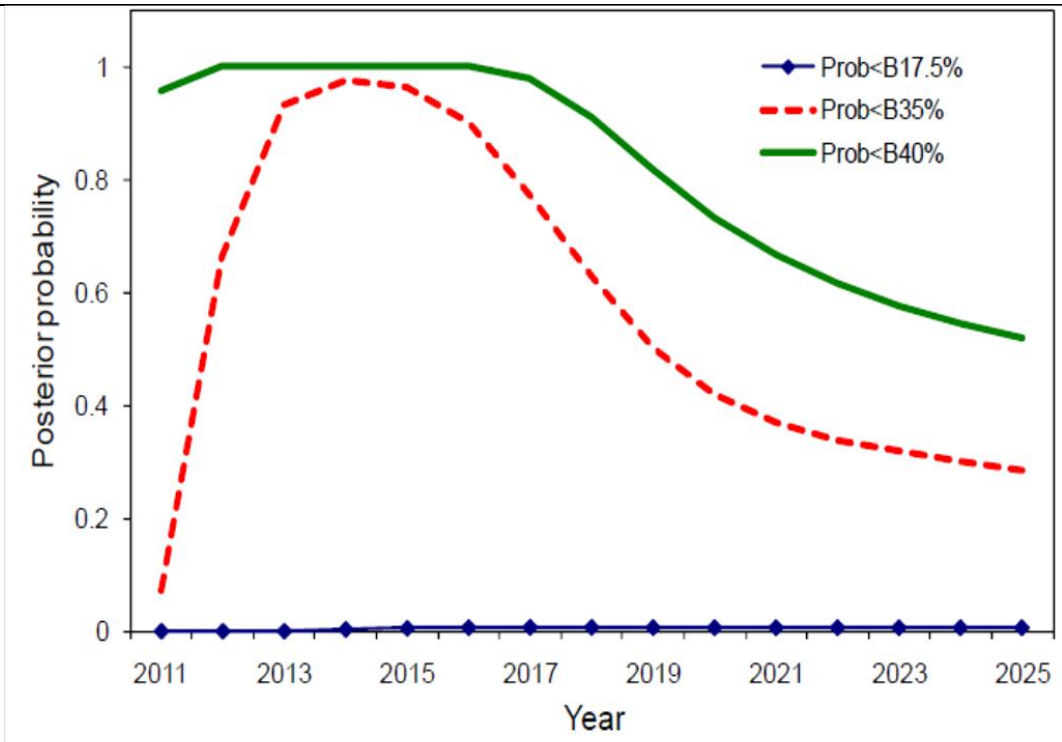


Figure 3.26. Probability that projected spawning biomass (from MCMC) will fall below $B_{40\%}$, $B_{35\%}$ and $B_{17.5\%}$.

Evidence
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause	Evidence
6.1.3	**Tracking management path** Goodman et al. (2002) suggested that sablefish stock assessment authors use a "management path" graph as a way to evaluate management and assessment performance over time. Previously, AFSC used the management path as suggested by Goodman et al. (2002), but several reviews have suggested a similar phase-plane plot that shows the harvest control rules. In this "management path" AFSC plotted estimated fishing mortality relative to the (current) limit value and the estimated spawning biomass relative to target spawning biomass (B40%). Figure 3.21 of the 2010 sablefish SAFE Report (provided below) shows that recent management has generally constrained fishing mortality below the limit rate, but has not been able to keep the stock above the B40% target.

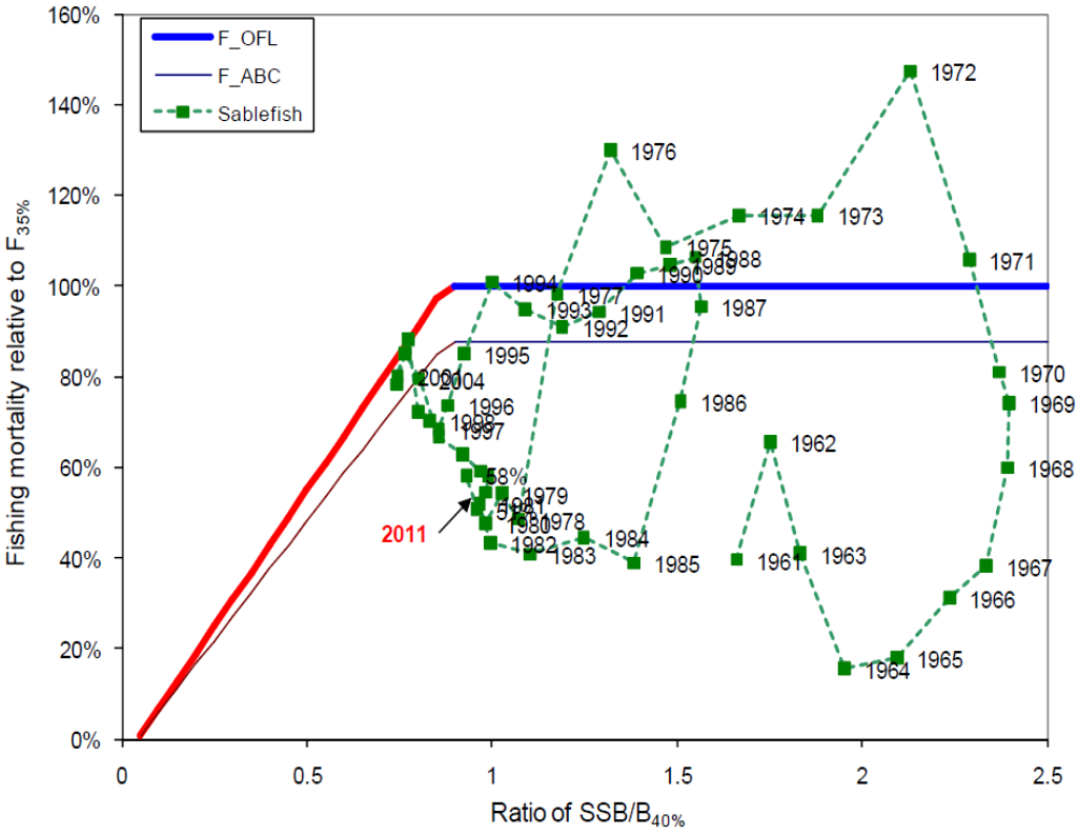


Figure 3.21. Phase-plane diagram of time series of sablefish estimated spawning biomass relative to the unfished level and fishing mortality relative to F_{OFL} for author recommended model.

Evidence
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause	Evidence
6.1.4	In the NPFMC setting, thresholds are built in within the Council harvest rules. These are when the spawning biomass falls below MSY or *B35%* and when the spawning biomass falls below ½ MSY or *B17.5%* which calls for a rebuilding plan under the MSA. **Evidence** http://icesjms.oxfordjournals.org/content/67/9/1861.full

C. The Precautionary Approach

7. Management actions and measures for the conservation of stock and the aquatic environment must be based on the Precautionary Approach. Where information is deficient a suitable method using risk assessment must be adopted to take into account uncertainty. ***FAO 7.5.1/7.5.4/7.5.5*** ***ECO 29.6/32***

Confidence Ratings	**Low**	**0 out of 7**	**Medium**	**0 out of 7**	**High**	**7 out of 7**

Clause:

7.1 The precautionary approach shall be applied widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment.

7.1.2 The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.

FAO Main CCRF 7.5.1 Others 29.6/32

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
7.1	The imperfections in the fisheries management system, including uncertainties in management objectives, fishery and biological data, environmental oscillations, stock assessment methods, economic parameters, management advice, management measures and fishermen's behaviour have been recognized long ago (http://www.fao.org/docrep/003/w1238E/W1238E03.htm). Both state and federal researchers and managers are keenly aware of this. Accordingly, the NPFMC's policy is to apply judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations. The productivity of the North Pacific ecosystem is acknowledged to be among the highest in the world. For the past 25 years, the Council management approach has incorporated forward-looking conservation measures that address differing levels of uncertainty. This management approach has in recent years been labelled the precautionary approach. Recognizing that potential changes in productivity may be caused by fluctuations in

natural oceanographic conditions, fisheries, and other, non-fishing activities, the Council intends to continue to take appropriate measures to insure the continued sustainability of the managed species. It will carry out this objective by considering reasonable, adaptive management measures, as described in the MSA and in conformance with its National Standards, the Endangered Species Act, the National Environmental Policy Act, and other applicable law. This management approach takes into account the National Academy of Science's recommendations on Sustainable Fisheries Policy (http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf).

Practical examples of the Precautionary Approach in the NPFMC Harvest Strategy: BSAI and GOA Groundfish Fisheries

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The Precautionary Approach can be seen in many actions.

Optimum Yield
The first element is the precautionary approach of for the groundfish complexes in the Bering Sea / Aleutian Islands (BSAI) and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The range for BSAI is 1.4 to 2.0 million mt; the range for GOA is 116 to 800 thousand mt. In practice, only the upper OY limit in the BSAI has been a factor in altering harvests. That is, that the sum of the TACs exceeded the upper range so harvest was constrained to not exceed the OY cap. The council originally adopted the 2.0 million mt cap to meet the needs of the ecosystem. These total groundfish harvest limits the total groundfish harvest that can be taken from the BSAI and GOA marine ecosystems, effectively adopting a conservative ecosystem approach to fisheries.

Maximum Sustainable Yield
To comply with section 303 (a) of the Sustainable Fisheries Act, maximum sustainable yield is treated as a limit, rather than a target. Overfishing is defined as any amount of fishing in excess of prescribed maximum allowable rate. This maximum allowable rate is prescribed through a set of six tiers, which are listed in descending order of preference, corresponding to whether a given item of information is reliable for the purpose of this definition.

The Tier System
The second element of precautionary approach is that of maximum permissible ABCs and of OFLs for each stock in the complex (usually individual species but sometimes species groups) is conservative. NPFMC inaugurated the Tier system in fisheries management: the harvest control rule depends on the amount of information available. The less the information about a given stock, the more conservative or precautionary is the catch allowed.

The ABC and OFL system
ABC is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. OFL is a limiting catch level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. The TAC is an adjustment downward from ABC that takes into account social and economic factors and the OY range.

In practice, NMFS attempts to manage a fishery so that total catch (including all discards) is less than, but very close to, TAC. Ideally, the directed fisheries are closed well before TAC is reached, so that when by-catch needs for that stock in other fisheries are factored in, the annual total catch is less than but very close to TAC. When a directed fishery is closed, by-catch of that stock is limited by a Maximum Retainable Bycatch amount (MRB), which is determined as a percentage of retained catch (not including arrowtooth flounder). If it appears that the TAC may be exceeded due to unanticipated circumstances, and ABC is being approached, NMFS managers will prohibit retention of that species by all fisheries, in order to eliminate any 'top off' activity for bycatch of valuable species. If ABC is exceeded, and OFL is being approached, NMFS can prohibit or close any fisheries that might possibly take that species as bycatch.

The Council determines the TAC based on social and economic considerations. In application, the NPFMC sets TAC ≤ ABC < OFL. Actual groundfish harvests have averaged approximately 90% of the cumulative TAC and 65% of the cumulative ABC (Figure below), because of the complex array of accountability measures governing these fisheries.

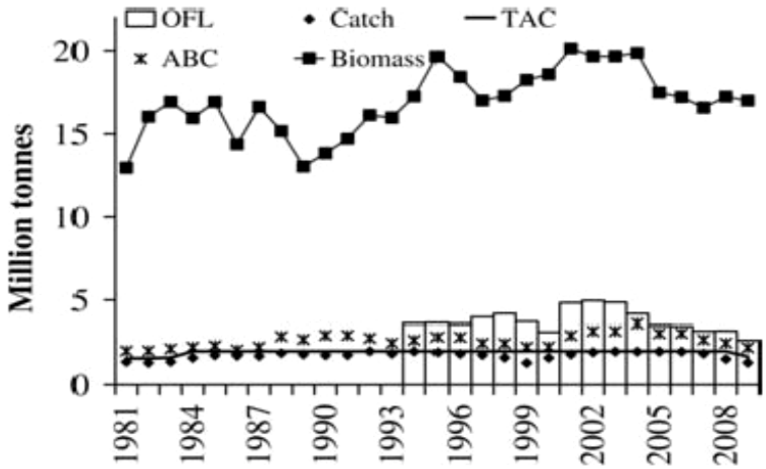


Figure 2. Cumulative estimates of biomass, overfishing level (OFL), acceptable biological catch (ABC), total allowable catch (TAC), and actual catch (all in million tonnes) across all groundfish species in the Northeast Pacific, 1981–2009.

(from Dicosimo *et al*. 2010 http://icesjms.oxfordjournals.org/content/67/9/1861.full)

Evidence

http://users.soe.ucsc.edu/~msmangel/Goodman%20et%20al%202002.pdf
http://icesjms.oxfordjournals.org/content/67/9/1861.full

Evidence adequacy rating:		
☑ **High**	☐ **Medium**	☐ **Low**

Clause:	**Evidence**
7.1.2	Management information on catches uses cutting edge technology. Sablefish taken in trawl fisheries are reported through the eLandings system. This system is an electronic fish ticket system, for all catch data required to be reported in regulation. The Restricted Access Management Division of NMFS tracks Inseason catches and IFQ balances. Registered Buyers must report IFQ landings electronically using the Internet (with permission, a backup paper submission system is available). Real-time accounting of individual harvests contributes significantly to accurate and timely management of each IFQ holder's IFQ accounts and supports in season transfers. Of two Internet systems available, the more comprehensive one, the Interagency Electronic Reporting System (IERS) and its data-entry component, eLandings, is the standard reporting method (http://www.fakr.noaa.gov/ram/rtf09.pdf). Staff from the In season Management Section produce total catch estimates in the groundfish fisheries off Alaska that are used to manage about 600 separate groundfish quotas and prohibited species catch limits in the BSAI and GOA. Each year, quotas are established in the Catch Accounting System (CAS) that matches the annual harvest specification tables. The system uses information from multiple data sources to provide an estimate of total groundfish catch, including at-sea discards, as well and estimates of prohibited species catch and other non-groundfish bycatch. Observer information, dealer landing reports ("fish tickets"), and at-sea production reports are combined to provide an integrated source for fisheries monitoring and in-season decision making. (http://www.alaskafisheries.noaa.gov/npfmc/fmp/goa/GOA.pdf) Observer coverage within the fleet does not operate on vessels less than 60 feet in overall length. Lacking data on catches, discards and bycatch, the NPFMC and NMFS still manages the sablefish population in a sustainable fashion. The NPFMC is undertaking a thorough review of the observer program, with a possible review of observer requirements for smaller vessels commercial fishing in Alaskan waters. Currently, 86%-88% of the Bering Sea fisheries are observed. In contrast, the GOA areas (e.g., eastern, central, and western subareas) have much lower levels of observer coverage. During 2004-2007, the percent observed catch ranged mainly from 28 to 38%. These levels are much lower than what is seen in the Bering Sea because of the overall smaller vessel sizes, which have lower observer coverage requirements. Adoption of new regulations for the small boat fleet will improve the scope of scientific data available to researchers and regulators (http://www.fakr.noaa.gov/npfmc/current_issues/observer/observer.htm). For state waters fisheries, department biologists are guided by state regulations 5 AAC 28.089. GUIDING PRINCIPLES FOR GROUNDFISH FISHERY REGULATIONS. (a) With state groundfish management expanding to cover the groundfish resources in the waters of Alaska, the BOF will be receiving regulatory proposals for these fisheries.

	The board will, to the extent practicable, consider the following guiding principles when taking actions associated with the adoption, amendment, or repeal of regulations regarding groundfish fisheries: (1) conservation of the groundfish resource to ensure sustained yield, which requires that the allowable catch in any fishery be based upon the biological abundance of the stock; (2) minimization of bycatch of other associated fish and shellfish and prevention of the localized depletion of stocks; (3) protection of the habitat and other associated fish and shellfish species from non sustainable fishing practices; (4) maintenance of slower harvest rates by methods and means and time and area restrictions to ensure the adequate reporting and analysis necessary for management of the fishery; (5) extension of the length of fishing seasons by methods and means and time and area restrictions to provide for the maximum benefit to the state and to regions and local areas of the state; (6) harvest of the resource in a manner that emphasizes the quality and value of the fishery product; (7) use of the best available information presented to the board; and (8) cooperation with the NPFMC and other federal agencies associated with groundfish fisheries. http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:%27Title5Chap28%27]/doc/%7B@1%7D?firsthit	

Clause:

7.2 For new and exploratory fisheries, procedures shall be in place for promptly applying precautionary management measures, including catch or effort limits.

7.2.1 Provisions shall be made for the gradual development of new or exploratory fisheries while information is being collected on the impact of these fisheries, allowing an assessment of the impact of such fisheries on the long-term sustainability of the stocks.

7.2.2 Precautionary management provisions shall be established early on.

7.2.3 Information collection shall be initiated early to allow impact assessment.

FAO Main CCRF 7.5.4

7.2.4 Contingency plans must be agreed in advance for the appropriate temporary management response to serious threats to the resource as a result of overfishing or adverse environmental changes or other phenomena adversely affecting the resource. Measures shall be temporary and shall be based on best scientific evidence available.

FAO CCRF 7.5.5

Evidence adequacy rating

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
7.2	Sablefish fisheries in Alaska peaked in about 1972. Evidence of declining population and passage of MSA lead to significant fishery restrictions during this time period; total catches reduced substantially. The population had recovered by 1980. No exploratory fisheries existed after the mid-1980s (http://www.nmfs.noaa.gov/fishwatch/species/sablefish.htm). Today, as part of its policy, the Council intends to consider and adopt, as appropriate, measures that accelerate the Council's precautionary, adaptive management approach through community-based or rights-based management, ecosystem-based management principles that protect managed species from overfishing, and where appropriate and practicable, increase habitat protection and bycatch constraints. All management measures will be based on the best scientific information available. Given this intent, the fishery management goal is to provide sound conservation of the living marine resources; provide socially and economically viable fisheries for the well-being of fishing communities; minimize human-caused threats to protected species; maintain a healthy marine resource habitat; and incorporate ecosystem-based considerations into management decisions (http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf) With the implementation of IFQs, sablefish effort has been restricted and reduced.

Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
7.2.1	After passage of the MSA in 1976, foreign fleet effort diminished to joint venture operations. That fleet was phased out in 1991. During the development of the fishery by the American fleet, regulations were established that resulted in a sustainable fishery, culminating with the current IFQ fleet in 1995. Regulatory revisions continue to occur through the NPMFC process. The west coast sablefish population is at 96% of its target level; Alaska sablefish is 6% above its target level. The resource is fully exploited at this juncture, and no new fisheries should develop. http://www.nmfs.noaa.gov/fishwatch/species/sablefish.htm
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
7.2.2	The MSA had always sought to prevent overfishing, and NPFMC guidelines adopted these early, resulting in a precautionary approach within their regulations. But until reauthorization of MSA in 1996, the mechanisms for accomplishing the objective with federal law did not exist. In that new version of MSA, changes to National Standard 1, incorporated the prevention of overfishing and the rebuilding of overfished resources. This new authority allowed the NPFMC to strengthen its precautionary measures." (http://icesjms.oxfordjournals.org/content/56/6/853.full.pdf). Additionally, the development phase of the sablefish IFQ program sought to reduce excess capacity and bycatch, spread effort across the stock, continue a season that provided protection for spawning stocks, and manage and enforce regulations toward a rational fishery. The AFSC's REFM Division conducts research and data collection to support an ecosystem approach to management of Northeast Pacific and eastern Bering Sea fish and crab resources. More than twenty-five groundfish and crab stock assessments are developed annually and used by the NPFMC to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate. REFM scientists in the Status of Stocks and Multispecies Assessments (SSMA) program use biological and oceanographic information coupled with numerical simulation techniques to study the interaction of fish populations, fisheries, and the environment. The Fishery

	Interaction Team of SSMA conducts field studies to examine potential commercial fishery impacts on prey including reduction in the abundance or availability of prey at local scales and disturbance of prey fields. Ecosystem assessments and information and multispecies and ecosystem models on the relationship between predators and prey developed by the Division's Resource Ecology and Ecosystem Modelling staff also contribute to management advice. The Age and Growth program is primarily focused on providing age data that contributes to a basic understanding of a species, whether it is in the context of sustainable fisheries, species conservation, or species biology. These age data are critical to development of age-structured models and fishery management advice. The Socioeconomic program staff provides economic information to NMFS, industry and other agencies to assist with such projects as evaluating the economic effects of the *Exxon Valdez* oil spill in Prince William Sound, developing guidelines for valuing commercial and recreational fisheries, or evaluating economic impacts of fisheries rationalization programs. Socio-cultural information on Alaskan communities and traditional ecological knowledge is also compiled and evaluated (http://www.afsc.noaa.gov/REFM/)
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
7.2.3	Fishery landings data is mandated by state and federal regulation. Landings data dates back to the turn of the 20th century in Alaska. Effort in developing an extensive institutional framework necessary to studying and managing this resource began many years ago with the federal and state governments regulating sustainable management plans and establishing harvest limits through the NPFMC and BOF. Surveys have taken place for the past 23 years. The survey is a joint effort involving the AFSC's Auke Bay Laboratories (ABL) and the RACE Division. It replicates as closely as practical the Japan-U.S. cooperative longline survey conducted from 1978 to 1994 and also samples gullies not sampled during the cooperative longline survey. All of this has lead to development of a strong impact assessment. http://www.afsc.noaa.gov/quarterly/ond2010/divrptsABL2.htm See Section 5.5 for the collection of harvest data.

Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
7.2.4	Both the NPFMC and the BOF develop appropriate management plans to address fishing effort and harvest, including contingency plans. If adverse environmental changes occur (e.g. oil spills) or harvest levels exceed established limits, both bodies have options that can make temporary adjustments through Emergency Regulation to provide federal and state in season managers the necessary tools to make changes to established plans. Under MSCFMA Section 305 (c) EMERGENCY ACTIONS AND INTERIM MEASURES— (1) If the Secretary finds that an emergency or overfishing exists or that interim measures are needed to reduce overfishing for any fishery, he may promulgate emergency regulations or interim measures necessary to address the emergency or overfishing, without regard to whether a fishery management plan exists for such fishery. (2) If a Council finds that an emergency or overfishing exists or that interim measures are needed to reduce overfishing for any fishery within its jurisdiction, whether or not a fishery management plan exists for such fishery (A) the Secretary shall promulgate emergency regulations or interim measures under paragraph (1) to address the emergency or overfishing if the Council, by unanimous vote of the members who are voting members, requests the taking of such actions; and (B) the Secretary may promulgate emergency regulations or interim measures under paragraph (1) to address the emergency or overfishing if the Council, by less than a unanimous vote, requests the taking of such action. (3) Any emergency regulation or interim measure which changes any existing fishery management plan or amendment shall be treated as an amendment to such plan for the period in which such regulation is in effect. Any emergency regulation or interim measure promulgated under this subsection— (A) shall be published in the Federal Register together with the reasons therefore; (B) shall, except as provided in subparagraph (C), remain in effect for not more than 180 days after the date of publication, and may be extended by publication in the Federal Register for one additional period of not more than 180 days, provided the public has had an opportunity to comment on the emergency regulation or interim measure, and, in the case of a Council recommendation for emergency regulations or interim measures, the Council is actively preparing a fishery management plan, plan amendment, or proposed regulations to address the emergency or overfishing on a permanent basis;

(C) that responds to a public health emergency or an oil spill may remain in effect until the circumstances that created the emergency no longer exist, *provided,* that the public has an opportunity to comment after the regulation is published, and, in the case of a public health emergency, the Secretary of Health and Human Services concurs with the Secretary's action; and

(D) may be terminated by the Secretary at an earlier date by publication in the Federal Register of a notice of termination, except for emergency regulations or interim measures promulgated under paragraph (2) in which case such early termination may be made only upon the agreement of the Secretary and the Council concerned (http://www.nmfs.noaa.gov /sfa/magact/mag3a.html)

For State fisheries, emergency regulations may be adopted. They are in effect for 120 days unless made permanent under the Administrative Procedures Act (http://www.touchngo.com/lglcntr/akstats/Statutes/Title44/Chapter62/Section250.htm and http://www.law.state.ak.us/pdf/manuals/2009-AugManual_AdminRegs.pdf).

State and federal managers also have the ability to impose or modify the rules during the fishing season, rather than only between seasons. This in season management ability means that fishery managers can modify the fishery, to adapt it to the realities of the stock, the weather, and other parameters (http://sustainability.alaskaseafood.org/wp-content/uploads/SustainabilityWhitePaper.pdf)

Federal in season managers may make in season adjustments and even shut down a fishery with due cause. For state fisheries, rapid measures also exist. Emergency Order authority granted to ADF&G managers allows them to make prompt adjustments in season. See Sec. 16.05.060. Emergency order: (a) This chapter does not limit the power of the commissioner or an authorized designee, when circumstances require, to summarily open or close seasons or areas or to change weekly closed periods on fish or game by means of emergency orders.
See: http://www.legis.state.ak.us/basis/ folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/stattx09/query=[JUMP:'AS1605060']/doc/{@1}?firsthit

D. Management Measures

8. Management must adopt and implement effective measures including; harvest control rules and technical measures applicable to sustainable utilization of the fishery and based upon verifiable evidence and advice from available scientific and objective, traditional sources. ***FAO 7.1.1/7.1.2/7.1.6/7.4.1/7.6.1/7.6.9*** ***Eco 29.2/29.4/30***

Confidence Ratings	Low	0 out of 8	Medium	0 out of 8	High	8 out of 8

Clause: **8.1 Conservation and management measures shall be based on the best scientific evidence available.** ***8.1.1*** **Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of optimum utilization.** ***FAO Main Criteria7.1.1 Others 7.4.1/29.2/29.4***
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence
8.1	The management system for the NPFMC groundfish fisheries is a complex suite of measures comprised of harvest controls—e.g., OY, ABC, TAC, OFL—effort controls (ITQs, licenses, cooperatives), time and/or area closures (also known as habitat protection, marine reserves), by-catch controls (PSC limits, retention and utilization requirements), monitoring and enforcement (observer program, social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions and to avoid seabirds). The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. http://icesjms.oxfordjournals.org/content/67/9/1861.full.pdf?keytype=ref&ijkey=Rr1hA2GwWtqE2TZ

	The AFSC's REFM Division conducts research and data collection to support an ecosystem approach to management of Northeast Pacific and eastern Bering Sea fish and crab resources. More than twenty-five groundfish and crab stock assessments are developed annually and used by the NPFMC to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate (http://www.afsc.noaa.gov/REFM/) ADFG similarly conducts research and data collection on the stocks it manages within state waters so that they can meet their mandate to manage resources sustainably and supply the BOF with the best science available for them to make management decisions. www.adfg.alaska.gov/index.cfm?adfg=fishingcommercial.main
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
8.1.1	The MSA is the primary domestic legislation governing management of the nation's marine fisheries. In 1996, the United States Congress reauthorized the MSA to include, among other things, a new emphasis on the precautionary approach in U.S. fishery management policy. The MSA contains ten national standards, with which all fishery management plans (FMPs) must conform and which guide fishery management. National Standard 1 mandates that Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry (http://www.nmfs.noaa.gov/sfa/magact/). One tool to accomplish this is through a rights-based fishery approach, or the use of IFQ. IFQ management has increased fishery catch rates and decreased the harvest of immature fish (Sigler and Lunsford 2001). Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging US$3.1 million annually. Under the major State managed sablefish fisheries, the use of an equal quota share system is very much like individual fishery quotas, and produces the same efficiencies. Decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery.

Clause:

8.2 States shall seek to identify domestic parties having a legitimate interest in the use and management of fisheries resources.

8.2.1 Arrangements shall be made to consult these parties and gain their collaboration

FAO Main CCRF 7.1.2 Others 7.1.6

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
8.2	The MSFCMA's National Standard 8 mandates that 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. Accordingly, the NMFS and ADF&G hold public meetings throughout the year in a variety of convenient locations. Participation is actively pursued. Additionally, twenty percent of the fixed gear allocations in the Bering Sea are reserved for use by CDQ program participants, which includes 65 eligible communities organized into six groups and was designed to ensure fishing access, support economic development, alleviate poverty, and provide economic and social benefits to residents of western Alaska communities (http://www.edf.org/documents/11391_alaska-ifq.pdf). The fishery dependence of coastal and western Alaska communities was addressed through the creation of the pollock, sablefish, and halibut CDQ programs for the BSAI in the early to mid-1990s and the expansion of those programs into the multispecies CDQ Program with the addition of all other groundfish species by 1999. The CDQ Program has provided the following for the CDQ communities: 1) additional employment in the harvesting and processing sectors of the groundfish fisheries; 2) training; and 3) income generated by fishing the CDQ allocations. In many cases, CDQ royalties have been used to increase the ability of the residents of the CDQ communities to participate in the regional commercial fisheries, or residents themselves have fished the CDQ. The purpose of the CDQ Program was to provide western Alaska fishing communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. The program was intended to help western Alaska communities to diversify their local economies and to provide new opportunities for stable, long-term employment. The original Council guidance for implementing the CDQ Program focused on using the allocations to develop a self-sustaining fisheries economy (http://www.fakr.noaa.gov/regs/679c30.pdf).

	Additionally, the Economic and Social Sciences Research Program within NMFS's REFM provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs. Much of the existing economic data about Alaskan fisheries is collected and organized around different units of analysis, such as counties (boroughs), fishing firms, vessels, sectors, and gear groups. It is often difficult to aggregate or disaggregate these data for analysis at the individual community or regional level. In addition, at present, some relevant community level economic data simply are not collected at all. As a result, the NPFMC, the AFSC, and community stakeholder organizations have identified ongoing collection of community-level socio-economic information that is specifically related to commercial fisheries as a priority. To address this need, the AFSC's Economic and Social Sciences Research (ESSR) Program has been preparing the implementation of the Alaska Community Survey, an annual voluntary data collection program initially focused on Alaska communities for feasibility reasons, in order to improve the socio-economic data available for consideration in North Pacific fisheries management (http://www.afsc.noaa.gov/REFM/Socioeconomics/Default.php).
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
8.2.1	See 8.2. The BOF and the NPFMC are openly public processes. Any individual or group can submit proposals for discussion of management and research for sablefish fisheries in Alaska. The BOF meets in communities throughout coastal Alaska, while the NPFMC meets in communities in Alaska as well as in Washington and Oregon to provide public opportunities. Written comments are accepted when it is not possible to attend in person (http://www.fakr.noaa.gov/npfmc/ http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main) The Council, as outlined in policy, also continues to incorporate local and traditional knowledge in fishery management, considers ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge in fishery management where appropriate. They also actively work to increase Alaska Native participation and consultation in fishery management through community workshops (http://www.alaskafisheries.noaa.gov/npfmc/fmp/goa/GOA.pdf). Lastly, the NPFMC advises the public through its newsletters and web pages so that the public will be knowledgeable about the proposed Council actions when they consult and collaborate. NMFS, ADFG and the BOF also provide such information access and outreach.

Clause:

8.3 The level of fishing permitted shall be commensurate with the current state of the fishery resources.

FAO Main CCRF 7.6.1

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
8.3	The MSA, as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. National Standard 1 mandates that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry. One federal tool in Alaska in practice to accomplish this balance of fishing effort to fishing resource is the use of IFQs. The sablefish IFQ program represents a dramatic change from the open access fishery that preceded it. Following domestication of the pre-IFQ fishery domestic operations expanded rapidly, leading to overcapitalization. The fixed gear fleet grew from less than 90 in 1982 to nearly 1,000 vessels by 1992. Season length decreased in the GOA from 12 months to 1-2 months, and in some areas, the open-access fishery shortened to 10 days; warranting the label "derby" fishery. Accompanying the increase in vessel numbers was a doubling of individual fishing power with the appearance of circle hooks. Quality and price of sablefish suffered. IFQ management has increased fishery catch rates and decreased the harvest of immature fish. Vessel participation reduced from 700 when the program was initiated in 1995 to 389 by 2009. This is the balance of resource and fishermen the Council sought (www.fakr.noaa.gov/npfmc/resources-publications/ifqpaper.htm) Alaska's Constitution will not permit the use of IFQs in state waters. However, Article VIII, Section 15 allows the State to limit entry into any fishery for purposes of resource conservation and to prevent economic distress among fishermen and those dependent upon them for a livelihood. Therefore, fishermen participating in state waters must hold approved entry permits (commercial fishing licenses/gear cards), and fish from licensed vessels. Licenses must be renewed annually with the Commercial Fisheries Entry Commission (CFEC) (http://www.cfec.state.ak.us/). ADFG manages sablefish within waters under the jurisdiction of the State of Alaska under regulations and guidelines established by the BOF. Some significant sablefish fisheries within state waters have been placed under limited entry programs by the CFEC. Other, smaller sablefish fisheries occurring in state waters remain open access (requiring a current license – or gear card), although IFQ permit holders who participate in these open access state fisheries must record their landings under the sablefish IFQ program and any harvest is subtracted against their IFQ. In the significant sablefish fisheries within state waters (Prince William Sound (PWS) and Southeast Alaska) the BOF utilized the constraints of the CFEC limited entry programs to develop an equal share fishery that mimics the benefits of the IFQ program. In Southeast all of the catch is equally divided, but in PWS half the GHL is divided equally among "registered" permit holders and the remainder is divided according to the percentages by vessel size.

Clause:

8.4 Appropriate measures shall be applied to minimize:

- waste and discards

- catch of non-target species (both fish and non-fish species)

- impacts on associated, dependent or endangered species

8.4.1 Technical measures shall be taken in relation to:

- fish size

- mesh size or gear

- discards

- closed seasons

- closed areas

- areas reserved for particular (e.g. artisanal) fisheries

- protection of juveniles or spawners

8.4.2 Suitable arrangements in place to promote, to the extent practicable, the development and use of selective, environmentally safe and cost-effective gear and techniques

FAO Main CCRF 7.6.9 Other 30

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
8.4	MSFCMA's National Standard 9 governs federal regulators. It states that conservation and management measures shall, to the extent practicable, A) minimize bycatch and B) to the extent where bycatch cannot be avoided; minimize the mortality of such bycatch. Regulations in place address waste, discard, bycatch, and endangered species interactions in the sablefish fisheries. The NMFS promulgates these regulations through the NPFMC. The Council's objective is to develop incentive programs for bycatch reduction including the development of mechanisms to facilitate the formation of bycatch pools, vessel bycatch allowances, or other bycatch incentive systems. They also encourage research programs to

	evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available (http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf). As an example, specific regulations were put in place intended to reduce the incidental mortality of the short-tailed albatross and other seabird species (see http://www.fakr.noaa.gov/protectedresources/seabirds/fr11161.pdf and revisions in http://www.fakr.noaa.gov/frules/72fr71601.pdf) in 1998 and revised again in 2008. The short-tailed albatross is a listed species under the Endangered Species Act (ESA). The Alaska BOF enacted changes to state law, mirroring federal regulations within state waters for groundfish fisheries to protect seabirds from longline bycatch – see: (http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:'5+aac+28!2E055']/doc/{@1}?firsthit). These measures now include the use of streamer (Tory) lines, night setting, line shooter and lining tubes. These measures have been shown to reduce seabird interactions when setting or retrieving gear. The catch of seabirds in the sablefish fishery averages 17% of the total bycatch. The trend in seabird catch is variable but appears to be decreasing, presumably due to widespread use of these measures to reduce bycatch. A significant portion of the sablefish fishery's bycatch in some years consists of spiny dogfish and other sharks, but there is no distinct trend through time. The majority of this fishery's bycatch consists of grenadiers (average 66%) and this trend is stable. Sablefish fishery catches of other species is minor; and the use of circle hooks provides for safe release of unwanted bycatch. The shift from an open-access to an IFQ fishery has nearly doubled catching efficiency, while it has reduced the number of hooks deployed (Sigler and Lunsford 2001). Although the effects of longline gear on bottom habitat are poorly known, the reduced number of hooks deployed during the IFQ fishery must reduce the effects on benthic habitat. The IFQ fishery likely has also reduced discards of other species because of the slower pace of the fishery and the incentive to maximize value from the catch. IFQ management has increased fishery catch rates and decreased the harvest of immature fish (Sigler and Lunsford 2001). Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging US$3.1 million annually. Decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery. http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.alaskafisheries.noaa.gov/npfmc/fmp/goa/GOA.pdf

Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
8.4.1	There is a well established observer program, harvest landing interviews and summer assessment surveys that collect important information about fish size, discards, and location of juveniles or spawners. Closed seasons protect spawners by regulation, and closed areas are currently only to protect endangered species. Also, the NMFS and the ADF&G have well-established regulations on fishing seasons and legal gear use. Discards of sablefish in the longline fishery are small, typically less than 5% of total catch. The catch of sablefish in the longline fishery typically consists of a high proportion of sablefish, 90% or more. However at times grenadiers may be a significant catch and they are almost always discarded. IFQ management has increased fishery catch rates and decreased the harvest of immature fish (Sigler and Lunsford 2001). Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging US$3.1 million annually. Decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery (http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf). Artisanal fisheries were protected by the design elements of the IFQ program. With vessel size categories to prevent consolidation in the larger vessels so that small vessels operating out of remote coastal villages would not be bought out by more prosperous fishers from urban communities. Additionally, the Block program, ownership limits, leasing options and other social constraints attempted to maintain the flavour of the small boat coastal fisheries. The program through its design reduced gear conflict and bycatch mortality, improved safety, product quality and price, which greatly improved the economic returns to the fleet. For a complete review of the changes and benefits see Pautzke and Oliver (1997). (www.fakr.noaa.gov/npfmc/resources-publications/ifqpaper.htm) Prior to the IFQ fishery, selection of younger fish during short open-access seasons likely was due to crowding of the fishing grounds, so that some fishermen were pushed to fish shallower water that young fish inhabit (Sigler and Lunsford 2001). Reductions in fleet size through the development of IFQs, as well as protracted seasons have allowed the fleet options of when and where to fish, always where fish are largest. Pot fishing for sablefish has increased in the BSAI as a response to depredation of longline catches by killer whales. In 2000 the pot fishery accounted for less than ten percent of the fixed gear sablefish catch in the BSAI. Since 2004, pot gear has accounted for over half of the Bering Sea fixed gear IFQ catch and up to 34% of the catch in the Aleutians. In 2009, pot fishing remained a high portion of the fixed gear catch in the BS (70%). In the Aleutian Islands pot fishery, pot fishing appeared to decrease from 22% to 7.6% of the fixed gear catch in

	2009. However, this was not due to vessels changing back to longline gear, but solely due to the fact that two of the pot vessels did not fish the Aleutian Islands in that year. All groundfish pots must have biodegradable escape panels by law. The trawl fishery operates under strict maximum retainable allowances for sablefish. Discards have decreased in recent years. From 1994 to 2003 discards averaged 1,357 t for the GOA and BSAI combined. The highest amount was 800 t in 2004, of which 667 t occurred in the GOA and 133 t occurred in the BSAI. Discards decreased after 2003, down to an average in 2004-09 of 697 mt, 89% of which occurred in the GOA. The discards from trawl fisheries decreased from a 1994-2003 average of 825 t to an average of 262 mt for 2004-2009, while hook and line fisheries decreased slightly from 525 t down to 462 t. Grenadiers are by far the most abundant bycatch in the sablefish fishery. Commercially valuable species taken in the sablefish fishery include thornyhead rockfish, shortraker rockfish, rougheye rockfish, and Pacific cod (http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf).
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
8.4.2	Longline gear and the manner of fishing have been developed over a long period of time to be selective of target species. The fleet almost exclusively uses circle hooks to expedite safe release of unwanted fish. Pot gear use mandates the inclusion of escape devices, should the pot be lost. The Alaska Administrative Code 5 AAC 39.145, as well as federal regulations under 50 CFR 679.2 state that pot gear in Alaska crab and bottom-fish fisheries is required to have an escape mechanism consisting of an opening closed by 100% cotton twine no larger than 30-thread. See: http://cfr.vlex.com/vid/679-2-definitions-19896163#ixzz1GVGaRtfD ; http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:'5+aac+39!2E145']/doc/{@1}?firsthit Under the Individual Quota Fishery system in Alaska's federal fisheries and the equal quota share in the major state waters fisheries, much less gear is used and consequently lost than in the historical race for fish scenario. Market forces ensure that gear is cost effective.

9. There must be defined management measures designed to maintain stocks at levels capable of producing maximum sustainable levels.

FAO 7.1.8/7.4.3/7.6.3/7.6.6/7.6.10/8.4.5/8.4.6/8.5.1/8.5.3/8.5.4/8.11.1/12.10

Confidence Ratings	Low	0 out of 11	Medium	0 out of 11	High	11 out of 11

Clause:

9.1 Attempts shall be made to measure fleet capacity operating in the fishery.

9.1.1 Mechanisms shall be established where excess capacity exists to reduce capacity to levels commensurate with sustainable use of the resource.

FAO Main CCRF 7.1.8 Others 7.6.3

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence
9.1	When the open access fishery was in place, seasons became shorter as more entrants fished harder to capture fish before it was closed. Under traditional management, the fishery was overcapitalized. Under the IFQ share system in place for the Alaska sablefish, fishing capacity (vessels and gear) has been reduced, and is well accounted for.

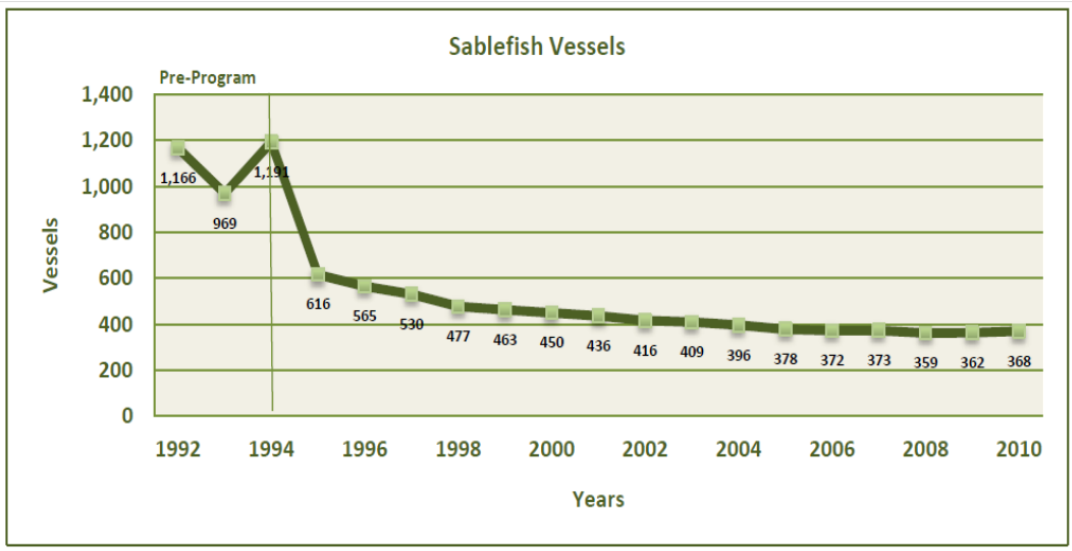


Figure 3.5b Vessel Participation in the IFQ Sablefish Fisheries, 1992–2010

http://www.fakr.noaa.gov/ram/rtf10.pdf

Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
9.1.1	See 9.1. When the open access fishery was in place, participation was difficult to judge. But with the annual issue of IFQ shares, eLandings and oversight of inseason quota transfer, participation is accurately controlled and evaluated. Following domestication of the pre-IFQ fishery domestic operations expanded rapidly, leading to overcapitalization. The fixed gear fleet grew from less than 90 in 1982 to nearly 1,000 vessels by 1992. Season length decreased in the GOA from 12 months to 1-2 months, and in some areas, the open-access fishery shortened to 10 days; warranting the label "derby" fishery. Accompanying the increase in vessel numbers was a doubling of individual fishing power with the appearance of circle hooks. Quality and price of sablefish suffered. IFQ management was implemented in 1995 and vessel participation reduced from 700 to 389 by 2009. This is the balance of resource and fishermen the Council sought. (www.fakr.noaa.gov/npfmc/resources-publications/ifqpaper.htm). For the State fishery, the BOF used the state license limitation to develop an equal share program which mimicked the IFQ results of reducing capacity to match resource size. The analysis provided to the NPFMC to implement IFQs in Alaska was exhaustive, and the process took several years to move through the system. The number of vessels, and the class of those vessels, established a fishing fleet with less capacity, and with ownership in the resource. With carefully established TACs, and extended seasons, market conditions greatly improved, as more fresh fish was made available. This helped assure that fishermen operated under economic conditions that promoted responsible fisheries. Fishermen also pay an annual assessment to cover incremental program costs to NMFS to ensure the fisheries are managed responsibly, and that proper enforcement exists. For state waters fisheries, the responsibility of assigning fishing privileges and rights falls to the CFEC (http://www.cfec.state.ak.us/index.htm). The BOF used the state license limitation to develop an equal share program which mimicked the IFQ results of reducing capacity to match resource size.

Clause:

9.2 Measures shall be introduced to identify and protect depleted resources and those resources threatened with depletion, and to facilitate the sustained recovery of such stocks.

FAO Main CCRF 7.6.10 Others 7.4.3

Evidence adequacy rating:

☑ High ☐ Medium ☐ Low

Clause:	Evidence
9.2	Council and BOF guidelines, state and federal regulations and MSA with its National Standards all define to management agencies what must be done if a stock becomes depressed." See evidence from clause 5.2 and 6.1.1 – 6.1.3. The sablefish fishery in Alaska is not overfished, nor does overfishing occur on this resource. Careful stock analysis done annually by staff from the NMFS and ADFG ensure populations remain at sustainable levels. See evidence from clause 5.2. Sablefish are managed under Tier 3 of NPFMC harvest rules. Reference points are calculated using recruitments from 1979-2008. The updated point estimates of *B40%, F40%,* and *F35%* from the latest assessment are 110,108 t (combined across the EBS, AI, and GOA), 0.097, and 0.115, respectively. Projected female spawning biomass (combined areas) for 2011 is 102,139 t (93% of B40%), placing sablefish in sub-tier "b" of Tier 3. The maximum permissible value of FABC under Tier 3b is 0.089, which translates into a 2011 ABC (combined areas) of 16,040 t. The OFL fishing mortality rate is 0.106 which translates into a 2011 OFL (combined areas) of 18,950 t. Model projections indicate that this stock is neither overfished nor approaching an overfished condition. For Tier 3 stocks, the MSY level is defined as *B35%*. Scientific evidence points out that the majority of groundfish stocks in the North Pacific can be managed under a biomass based control rule, and by keeping the spawning stock biomass at 35% the unfished spawning biomass level, 75% of the MSY level could be harvested continuously within a relatively safe margin of certainty (Clark 1991). **Projected 2011 spawning biomass is 37% of unfished spawning biomass.** Spawning biomass has increased from a low of 30% of unfished biomass in 2002 to 37% projected for 2011. See: http://edocket.access.gpo.gov/2011/2011-4538.htm, http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf, and http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf.

Clause:

9.3 When deciding on use, conservation and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood.

FAO Main CCRF 7.6.6

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence
9.3	National Standard 8 states that 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 (http://www.nmfs.noaa.gov/sfa/magact/mag3.html#s301). Native Alaskans did not likely target this deep water species in historic times; it was out of the reach of their historic gear. But the NPFMC provided a 20% set aside of the fixed gear IFQ allocation to Western Alaskan villages a CDQ allocation of sablefish to consider the interests of subsistence, small-scale, and artisanal fisheries, under Amendment 15 to the BS/AI FMP. **BSAI CDQ**. The purpose of the CDQ Program was to provide western Alaska fishing communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. The program was intended to help western Alaska communities to diversify their local economies and to provide new opportunities for stable, long-term employment. The original Council guidance for implementing the CDQ Program focused on using the allocations to develop a self- sustaining fisheries economy (http://www.fakr.noaa.gov/regs/679c30.pdf). **GOA CQE.** The GOA program is a Community Quota Entity (CQE) program as opposed to the BSAI CDQ program, with much different goals and objectives than the CDQ program. The Community Quota Entity (CQE) Program, which was approved by the Council in 2002 and implemented by NMFS in 2004, under Amendment 66 to the GOA Fishery Management Plan. The program was developed in order to allow a distinct set of small, remote coastal communities located in the GOA to form non-profit organizations for the purpose of purchasing catcher vessel quota share (QS) under the existing halibut and sablefish IFQ Program (http://www.commerce.state.ak.us/bsc/CDQ/cqe/cqe.htm).

Clause: **9.4 States and relevant groups from the fishing industry shall encourage the development and implementation of technologies and operational methods that reduce discards.** ***FAO Main CCRF 8.4.5***	
Evidence adequacy rating: **☑ High ☐ Medium ☐ Low**	
Clause:	**Evidence**
9.4	With the implementation of IFQs in the fishery in Alaska, extended seasons reduced the Olympic race for fish mentality and therefore reduced discards in the fishery. (http://www.edf.org/documents/11391_alaska-ifq.pdf). The value of sablefish and the possibility of free quota shares resulted in a pre-IFQ fishery that attracted participation of nearly 1,000 vessels. Many participants used additional gear to pre-empt grounds from competing users. Grounds crowding pushed many fishermen off prime fishing areas onto marginal ones where bycatch of juvenile sablefish and non-target species was excessive. The implementation of IFQ has reduced those 1,000 vessels to less than 400 vessels today. With less competition and an extended season, the use of gear more evenly matches the quota held by a fisherman, and fishing is restricted to prime areas.

Clause: **9.5 Technologies, materials and operational methods shall be applied to minimize the loss of fishing gear and the ghost fishing effects of lost or abandoned fishing gear.** ***FAO Main CCRF 8.4.6***	
Evidence adequacy rating: **☑ High ☐ Medium ☐ Low**	
Clause:	**Evidence**
9.5	With the implementation of IFQs in the fishery in Alaska, extended seasons reduced the Olympic race for fish mentality and therefore reduced the amounts of gear deployed, and lost during the fishery. Most causes of loss were eliminated with implementation of the IFQ program (see Clause 9.4).

	In State waters, the major fisheries operate under an equal quota share system – in essence an IFQ through area fishermen agreements. (http://www.edf.org/documents/11391_alaska-ifq.pdf ; http://www.iser.uaa.alaska.edu/Projects/ifqsurv/discards.pdf). Fixed gear accounts for about 80% of the sablefish catch in Alaska. Groundfish pot gear is not legal in the GOA, and in the BSAI, use mandates the inclusion of escape devices should the pot be lost. The Alaska Administrative Code 5 AAC 39.145 states that pot gear in Alaska crab and bottom fish fisheries is required to have an escape mechanism consisting of an opening closed by 100% cotton twine no larger than 30-thread. Studies have shown twine degradation over time permits fish to escape (http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:'5+aac+39!2E145']/doc/{@1}?firsthit ; http://www.sf.adfg.state.ak.us/FedAidPDFs/fds08-05.pdf) In a NMFS report on a working group reviewing ghost fishing, the group determined that longline garnered a "Low Priority Recommendations" when compared to pot & net gears (http://swfsc.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFSC154_P1216.PDF) While pot gear is legal in the Bering Sea, its use is limited and accounts for only about 10% of the catch in that region. Trawl gear bycatch accounts for about 20% of the GOA catch. Trawl bycatch operates under strict Maximum Retainable Allowances.

Clause:

9.6 There shall be a requirement that fishing gear, methods and practices where practicable, are sufficiently selective as to minimize waste, discards, and catch of non-target species - both fish and non-fish species and impacts on associated or dependent species.

9.6.1 The intent of related regulations shall not be circumvented by technical devices and information on new developments and requirements shall be made available to all fishers.

FAO Main CCRF 8.5.1

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause	Evidence
9.6	Federally managed sablefish are taken under an IFQ fishery. Major state fisheries operate on an equal quota share system. Both operational systems reduce the race for fish (See Clause 8.5 and others dealing with bycatch). This has been demonstrated to result in less waste, fewer discards, and lowered bycatch (http://www.iser.uaa.alaska.edu/Projects/ifqsurv/discards.pdf). As an example, specific regulations were put in place intended to reduce the incidental mortality of the short-tailed albatross and other seabird species (see http://www.fakr.noaa.gov/protectedresources/seabirds/fr11161.pdf and revisions in

http://www.fakr.noaa.gov/frules/72fr71601.pdf) in 1998 and revised in 2008. The short-tailed albatross is a listed species under the Endangered Species Act (ESA).
The Alaska BOF enacted changes to state law, mirroring regulations within state waters for groundfish fisheries.

http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:'5+aac+28!2E055']/doc/{@1}?firsthit

These measures now include the use of streamer (Tory) lines, night setting, line shooter and lining tubes. These measures have been shown to reduce seabird interactions when setting or retrieving gear. Also, the fleet now almost exclusively uses circle hooks to expedite safe release of unwanted fish.

Each groundfish pot must comply with the following:

(i) Biodegradable panel. Each pot used to fish for groundfish must be equipped with a biodegradable panel at least 18 inches (45.72 cm) in length that is parallel to, and within 6 inches (15.24 cm) of, the bottom of the pot, and that is sewn up with untreated cotton thread of no larger size than No. 30.

(ii) Tunnel opening. Each pot used to fish for groundfish must be equipped with rigid tunnel openings that are no wider than 9 inches (22.86 cm) and no higher than 9 inches (22.86 cm), or soft tunnel openings with dimensions that are no wider than 9 inches (22.86 cm). (http://cfr.vlex.com/vid/679-2-definitions-19896163).

Pot fishing is quite selective, data from the 2010 sablefish assessment report indicate that the BSAI pot fishery had an average sablefish discard rate of 2% between the 1994-2008 period. Discard and retention of other species is also low as can be seen in the table below. Non target catch caught in pot and longline gear is returned alive to sea.

Table of the average catch (t) of the most abundant species caught in the 2003-2009 sablefish fishery are shown below. Grenadiers are by far the most abundant bycatch in the sablefish fishery. Commercially valuable species taken in the sablefish fishery include thornyhead rockfish, shortraker rockfish, rougheye rockfish, and Pacific cod.

	Hook and Line			Other Gear			All Gear		
Species	Discard	Retained	Total	Discard	Retained	Total	Discard	Retained	Total[1]
Grenadiers	-	-	8,834	-	-	104	-	-	8,938
Thornyhead rockfish	46	377	423	2	14	16	49	391	440
Arrowtooth flounder	321	87	408	110	18	128	431	105	536
Other skates	202	8	209	1	1	2	203	8	211
Shortraker rockfish	79	119	199	4	3	6	83	122	205
Longnose skate	167	6	173	1	1	2	168	7	175
Spiny dogfish	170	0	170	0	0	0	170	0	170
Rougheye rockfish	40	89	128	3	1	4	42	89	132
Pacific cod	32	74	106	1	6	8	33	81	114
Greenland turbot	40	53	93	20	5	25	60	58	118
Other	92	32	124	24	22	46	117	53	170
Total All Species	1,420	11,707	21,961	184	1,260	1,548	1,605	12,967	23,510

[1] Data from Terry Hiatt (AKFIN database), only includes catch where sablefish were defined as the target.

http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
(See also Clause 8.5 and others dealing with bycatch).

Evidence adequacy rating:		
☑ **High**	☐ **Medium**	☐ **Low**

Clause :	**Evidence**
9.6.1	State and Federal regulations can be readily modified to address technical devices designed to circumvent the intent of law. Regulations are developed and adopted through a public process before the NPFMC and BOF. Regulations are readily available in written and electronic format. See: http://www.fakr.noaa.gov/regs/summary.htm and http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:%27Title5Chap28%27]/doc/%7B@1%7D?firsthit .

Clause:

9.7 International cooperation shall be encouraged with respect to research programs for fishing gear selectivity and fishing methods and strategies, dissemination of the results of such research programs and the transfer of technology.

FAO Main CCRF 8.5.4

Evidence adequacy rating:		
☑ **High**	☐ **Medium**	☐ **Low**

Clause:	**Evidence**
9.7	Fisheries researchers and scientists from Alaska work closely with those from Canada on assessing the health of sablefish populations in the North Pacific. The Technical Subcommittee (TSC) of the Canada-U.S. Groundfish Committee, was created by the International Trawl Fishery Committee (now the Canada-U.S. Groundfish Committee) at the latter's initial meeting in Seattle, Washington, on November 4, 1959. The committee meets annually (http://www.psmfc.org/tsc2/). Also, the International Symposium on the Biology and Management of Sablefish (ISBMS) was convened in 1983 in Anchorage, AK and in 1993, at the AFSC in Seattle, Washington. Results of the symposium are available at: http://spo.nwr.noaa.gov/tr130.pdf.

Clause:

9.8 States and relevant institutions involved in the fishery shall collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies.

FAO Main CCRF 8.5.3/12.10

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
9.8	See Clause 9.7. Also, state, federal and academic biologists, researchers and economists comprise the NPFMC's Groundfish Plan Teams for both the BSAI and GOA. Discussions routinely cover fish gear, fishing methods and strategies (http://www.fakr.noaa.gov/npfmc/membership/plan teams/plan_teams.htm) National and international scientists keep abreast of current developments in gear development and would advise each other of any new technology.

Clause:

9.9 Policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures, placed with due regard to the safety of navigation.

FAO Main CCRF 8.11.1

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
9.9	Alaska's waters and rearing habitat are pristine, and extremely productive. The sablefish population remains healthy. Other than a very few man made reefs (usually sunken vessels) benefiting diving opportunities, there has been little effort or need to enhance habitat. These structures have had little to no impact on sablefish in the area and are likewise unlikely to affect sablefish fishing. Sablefish are found in such deep water and do not seem to be attracted to structure, so there is no value to place artificial structure to increase stocks.

10. Fishing operations must be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.

FAO 8.1.7/8.1.10/8.2.4/8.4.5

Confidence Ratings	Low	0 out of 4	Medium	0 out of 4	High	4 out of 4

Clause:

10.1 States shall enhance through education and training programs the education and skills of fishers and, where appropriate, their professional qualifications. Such programs shall take into account agreed international standards and guidelines.

FAO Main CCRF 8.1.7

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence
10.1	An element of the IFQ program is that any sablefish aspirant fisherman must have 150 days of NPFMC fishing experience before being able to purchase sablefish IFQs. Also, obtaining sablefish IFQ share most often will require the purchaser (aspirant sablefish fisherman) to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. This competence and professionalism is a learned experience, through proof of competence, with the culmination of entrants into the fishery starting at the level of deck hand and working their way up. The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional sablefish crew members must pass. Training ranges from firefighting on a vessel, damage control, man- overboard, MARPOL, etc., and The Sitka-based Alaska Marine Safety Education Association alone has trained more than 10,000 fishermen in marine safety and survival through a Coast Guard-required class on emergency drills (http://www.npfvoa.org/ ; http://www.adn.com/2011/04/27/1832381/workplace-fatalities-fall-sharply.html#ixzz1Xt1ESQqh). The State of Alaska, Department of Labor & Workforce Development (ADLWD) includes AVTEC (formerly called Alaska Vocational Training & Education Center, now called Alaska's Institute of Technology). One of AVTEC's main divisions is the Alaska Maritime Training Center. The goal of the Alaska Maritime Training Center is to promote safe marine operations by effectively preparing captains and crew members for employment in the Alaskan maritime industry. The Alaska Maritime Training Center is a United States Coast Guard (USCG) approved

	training facility located in Seward, Alaska, and offers USCG/STCW-compliant maritime training. (STCW is the international Standards of Training, Certification, & Watch keeping.) In addition to the standard courses offered, customized training is available to meet the specific needs of maritime companies. Courses are delivered through the use of their world class ship simulator, state-of-the-art computer-based navigational laboratory, and modern classrooms equipped with the latest instructional delivery technologies. The Center's mission is to provide Alaskans with the skills and technical knowledge to enable them to be productive in Alaska's continually evolving maritime industry. Supplemental to their on-campus classroom training, the Alaska Maritime Training Center has a partnership with the Maritime Learning System to provide mariners with online training for entry-level USCG Licenses, endorsements, and renewals. The Center's course offerings include – Video Tutorials – * How to get your Merchant Mariner's Credential; * Which Course Do You Need? U.S. Coast Guard Approved/STCW-Compliant Courses – * Able Seaman; * Assistance Towing Operations; * Automatic Radar Plotting Aids (ARPA) Operations; * Basic Safety Training - STCW'95; includes: ** First Aid & CPR; ** Personal Safety and Social Responsibility; ** Basic Fire Fighting; ** Personal Survival Techniques; Bridge Resource Management (BRM); Global Maritime Distress & Safety System (GMDSS); * Master Not More Than 200 Tons Program; * Meteorology; * Operator of Uninspected Passenger Vessels (OUPV); * Proficiency in Survival Craft; * Qualified Member of Engine Department (QMED) Oiler; * Radar Observer (Unlimited), Original; * Radar Observer (Unlimited), Refresher; * Radar Observer (Unlimited), Recertification; * Rating Forming Part of a Navigational Watch; * Seafood Processor Orientation and Safety Course; * Shipboard Emergency Medicine. * Tankship – Dangerous Liquids (P.I.C.); * Visual Communications/Flashing Lights; * Medical Care Provider Additional AVTEC Maritime Courses

	* FCC Marine Radio Operators Permit Examination The University of Alaska Sea Grant Marine Advisory Program (MAP) provides education and training in several other sectors, including – * better process control; * HACCP (Hazard Analysis / Critical Control Point); * sanitation control procedures; * marine refrigeration technology; * net mending; * icing & handling; * direct marketing; * financial management for fishermen; * maximizing fuel efficiency In addition, MAP conducts sessions of their Alaska Young Fishermen's Summit. Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation, to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. Additional education is provided by the Fishery Industrial Technology Center, in Kodiak, Alaska. ***sources of evidence –*** http://www.avtec.edu/AMTC.htm http://www.stcw.org/ http://seagrant.uaf.edu/map/ http://seagrant.uaf.edu/map/fishbiz/index.php http://www.sfos.uaf.edu/fitc/academicprograms/ http://www.npfvoa.org/ http://www.adn.com/2011/04/27/1832381/workplace-fatalities-fall-sharply.html#ixzz1Xt1ESQqh

Clause:

10.2 States, with the assistance of relevant international organizations, shall endeavour to ensure through education and training that all those engaged in fishing operations be given information on the most important provisions of this Code, as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations.

FAO Main CCRF 8.1.10

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
10.2	The University of Alaska Sea Grant Marine Advisory Program (MAP) provides education and training in several sectors, including fisheries management, in the forms of seminars and workshops. In addition, MAP conducts sessions of their Alaska Young Fishermen's Summit. Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation (e.g. - MSA), to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. While there is not much education and training which explicitly deals with the Code, the Alaska fishery management process itself is an excellent *de facto* educational process. Alaska's fisheries are extremely compliant with the Code, as demonstrated by the Alaska Seafood Marketing Institute's checklist. Therefore, anyone who seeks to understand Alaska's fisheries management process unavoidably winds up becoming very familiar with the Code. ***sources of evidence –*** http://seagrant.uaf.edu/map/ http://sustainability.alaskaseafood.org/fao

Clause:

10.3 Fishing gear shall be marked in accordance with national legislation in order, that the owner of the gear can be identified. Gear marking requirements shall take into account uniform and internationally recognizable gear marking systems.

FAO Main CCRF 8.2.4

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
10.3	Three gear types may be used to harvest sablefish in the GOA and BSAI – demersal longline (a passive gear type), pots (= traps, another passive gear type), and trawl (an active gear type). All of these gear types must be marked and operated in accordance with federal fisheries regulations – 50 CFR Part 679: Fisheries of the Exclusive Economic Zone Off Alaska. Similar requirements apply to sablefish fisheries in state waters. (*note*: CFR = Code of Federal Regulations) ***sources of evidence –*** 50CFR679.24: www.fakr.noaa.gov/regs/default.htm 5 AAC 28.130. LAWFUL GEAR FOR EASTERN GULF OF ALASKA AREA 2010-2011 State wide Commercial Groundfish Fishing Regulations (PDF 507 kB), including those for sablefish, may be downloaded from – www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial

Clause:

10.4 States and relevant groups from the fishing industry shall be encouraging the development and implementation of technologies and operational methods that reduce discards.

***FAO Main CCRF* 8.4.5**

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
10.4	Bycatch and discards are reduced by a combination of technology (e.g. - use of circle hooks rather than J hooks, to allow easy release of live by-caught fishes), management preference of non-trawl fishing gear, and closure or restriction of certain fishing grounds. The bycatch of seabirds is managed and minimized in both the federal and state sablefish fisheries – 5 AAC 28.055. SEABIRD AVOIDANCE MEASURES IN GROUNDFISH FISHERIES mandates: When commercial fishing for groundfish with a longline in state waters, the operator of a vessel that is greater than 26 feet in overall length shall comply with the seabird avoidance measures described in 50 C.F.R. 679.24, revised as of April 27, 2009. NMFS Alaska Region (AKR) has been actively addressing seabird incidental take in longline (hook-and-line) fisheries off Alaska since 1989. In 1998, AKR appointed a Seabird Coordinator to focus on seabird-related issues. AKR seabird-related responsibilities and activities include: consultations under the Endangered Species Act, data collection by fishery observers, public and industry outreach and education, research, regulatory action, and participation in the development of an international and national plan of action to reduce the incidental take of seabirds in longline fisheries. The Alaska Region plays a proactive role in its coordination with local, regional, national, and international agencies, organizations, and experts in its efforts to reduce seabird incidental take in hook-and-line fisheries. Further, NPFMC has an active and expanding effort of bycatch reduction Improved Retention / Improved Utilization (IR/IU), which seeks to minimize discards and wastage. ***sources of evidence –*** www.fakr.noaa.gov/protectedresources/seabirds.htm 50CFR679: www.fakr.noaa.gov/regs/default.htm 50CFR679.21 Prohibited species bycatch management 50CFR679.22 Closures 50CFR679.24 Gear Limitation 50CFR679.27 Improved Retention/Improved Utilization Program www.fakr.noaa.gov/npfmc/current_issues/bycatch/bycatch.htm GOA Groundfish Fishery Management Plan (updated 10/10) – www.fakr.noaa.gov/npfmc/fmp/goa/goa.htm BSAI Groundfish Fishery Management Plan (updated 10/10) – www.fakr.noaa.gov/npfmc/fmp/bsai/bsai.htm

E. Implementation, Monitoring and Control

11. An effective legal and administrative framework must be established and compliance ensured through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.

FAO 7.1.7/7.7.3/7.7.5/7.6.2/8.1.1/8.1.4/8.2.1

ECO 29.5

Confidence Ratings	Low	0 out of 3	Medium	0 out of 3	High	3 out of 3

Clause:

11.1 Effective mechanisms shall be established for fisheries monitoring, surveillance, control and enforcement to ensure compliance with the conservation and management measures for the fishery in question

FAO Main CCRF 7.1.7 Others 7.7.3/8.1.1/29.5

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence
11.1	The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce fisheries laws and regulations, especially 50CFR679. The USCG made the following boardings in the sablefish fishery for fiscal year 2011.

Boardings for Fiscal Year 2011 (01 October 2010 - 30 September 2011)

Date	Vessel Name	Type	Doc #	SPECIES	AREA
05/10/2010	EVE	FLL	512639	710	SE
06/10/2010	SHERRIE MARIE	FLL	509415	710	SE
17/03/2011	KIMBER	FLL	548803	710	SE
18/03/2011	CAROLE D	FLL	519314	710	SE
27/03/2011	NORTHERN ENDURANCE	FLL	1182027	710	SE
28/03/2011	IDA JUNE	FLL	588691	710	WY
31/03/2011	NEPTUNE	FLL	613250	710	CG
05/04/2011	GAFF RK	FLL	573936	710	SE
05/04/2011	PACIFIC SOJOURN	FPB	664245	710	BS
07/04/2011	ALITAK	FLL	908934	710	SE

	09/04/2011	JON K	FLL	590282	710	SE
	09/04/2011	LORELEI II	FLL	251968	710	SE
	11/04/2011	NIP N TUCK	FLL	611459	710	WY
	14/04/2011	CASCADE MARINER	FPB	128742	710	BS
	27/04/2011	WONIYA	FLL	636605	710	CG
	29/04/2011	CAPE RELIANT	FLL	1000086	710	CG
	04/05/2011	SPECTRE	FLL	1048304	710	3A/CG
	05/05/2011	CHIKAMIN	FLL	595214	710	SE
	05/05/2011	DISTANT	FLL	529899	710	SE
	06/05/2011	NORTH STAR	FLL	536941	710	SE
	06/05/2011	ODIN	FLL	978500	710	SE
	06/05/2011	SARA DAWN	FLL	693942	710	SE
	06/05/2011	VIKING SPIRIT	FLL	593860	710	SE
	06/05/2011	SEYMOUR	FLL	210939	710	CG
	09/05/2011	CASTAWAY	FLL	555318	710	WY
	12/05/2011	BALLYHOO	FPB	501812	710	BS
	18/05/2011	LETUN	FLL	961005	710	BS
	23/05/2011	CASTAWAY	FLL	555318	710	CG
	24/05/2011	ANDRONICA	FLL	622780	710	BS
	24/05/2011	VIGOROUS	FLL	250226	710	CG
	25/05/2011	DRAKE	FLL	285525	710	SE
	26/05/2011	BLACK PEARL	FLL	1209559	710	WG
	26/05/2011	STILLWATER	FLL	971677	710	WG
	28/05/2011	TORDENSKJOLD	FLL	209487	710	WY
	28/05/2011	KRUZOF	FLL	1048486	710	AI
	29/05/2011	MISS LORI	FLL	288635	710	WG
	29/05/2011	VIS	FLL	973035	710	WG
	30/05/2011	EVENING STAR	FLL	248539	710	WG
	30/05/2011	STILLWATER	FLL	971677	710	WG
	30/05/2011	FRONTIER MARINER	FLL	951440	710	AI
	30/05/2011	SEA VENTURE	FLL	525572	710	AI
	01/06/2011	BLACK PEARL	FLL	1209559	710	WG
	01/06/2011	SPECTRE	FLL	1048304	710	WG
	03/06/2011	KRISTIANA	FLL	247187	710	CG
	05/06/2011	PERSEVERANCE	FLL	615642	710	CG
	06/06/2011	CAROLYN	FLL	617246	710	CG
	06/06/2011	RESOLUTE	FLL	223668	710	CG
	07/06/2011	TEMPEST	FLL	570926	710	CG
	13/06/2011	BOLD PACIFIC	FLL	602437	710	CG
	14/07/2011	NORTHERN SPIRIT	FLL	613825	710	CG
	16/07/2011	ALLSTAR	FLL	578815	710	CG
	28/07/2011	ALLSTAR	FLL	578815	710	WG

09/08/2011	KJEVOLJA	FLL	612616	710	BS
14/08/2011	SANDRA L	FLL	256941	710	BS
15/08/2011	LORELEI II	FLL	251968	710	CG
09/09/2011	WESTERN MARINER	FPB	585926	710	BS
17/09/2011	JUDI B	FLL	562772	710	AI
20/09/2011	ALEUTIAN BEAUTY	FLL	536852	710	AI

OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. According to OLE –

> "While a vast majority of commercial and recreational fishermen comply with the enacted conservation measures, there are still those fishermen - both domestic and foreign - who attempt to thwart the law and conduct fraudulent business. In recent years, the OLE has stepped up its presence in the international scene as more and more fish are imported and exported into and out of the United States.
>
> "Major fishing companies, commercial fishermen, recreational boaters and sport fishermen and other ocean users are ultimately responsible for the conservation of the ocean, therefore they must be vigilant of their actions which might inflict damage upon the numerous ecosystems within our oceans.
>
> "While catches are usually seized at the onset of an investigation, violators can also be assessed both civil penalties and criminal fines; and on occasion boats are seized and individuals are sent to Federal prison.
>
> "NOAA Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL)."

GCEL can then assess a civil penalty in the form of a Notice of Permit Sanctions (NOPs) or Notice of Violation and Assessment (NOVAs), or they can refer the case to the U.S. Attorney's Office for criminal proceedings.

For perpetual violators or those whose actions have severe impacts upon the resource criminal charges may range from severe monetary fines, boat seizures and/or imprisonment may be levied by the United States Attorney's Office.

All landings of sablefish must be reported to NMFS. An IFQ permit authorizes participation in fixed-gear harvests of most sablefish fisheries off Alaska. The permits are not specific to vessels. Permits are issued annually, at no charge, to persons holding fishable sablefish Quota Share (QS); or to those who are recipients of IFQ-only transfers from QS holders.

	Authorized pounds for annual IFQ permits are determined by the number of QS units held, the total number of QS units in the "pool" for a species and area, and the total amount of sablefish allocated for IFQ fisheries in a particular year. IFQ permits are authorized at 50 CFR Part 679.4(d). For fisheries in state waters, landings, buying and production data for Alaska sablefish are recorded on Department of Fish and Game fish tickets or through the eLandings system (internet-based electronic filing), and the Commercial Operators Annual report, as required by Alaska Statute (Section 16.05.690 Record of Purchases) the Alaska Administrative Code (5 AAC 39.130 Reports required of processors, buyers, fishermen, and operators of certain commercial fishing vessels; transporting requirements). Landings are recorded by the eLandings system for both federal and state fisheries – http://elandings.alaska.gov/ Compliance is ensured by audits of reports, inspection of catches, and in-season monitoring on the fishing grounds. ***sources of evidence –*** 50CFR679: www.fakr.noaa.gov/regs/default.htm NMFS OLE, Alaska region: www.nmfs.noaa.gov/ole/ak_alaska.html USCG, Alaska region: www.uscg.mil/d17/ IFQ: www.fakr.noaa.gov/ram/ifq.htm

Clause: **11.2**	**Fishing vessels shall not be allowed to operate on the resource in question without specific authorization.** ***FAO Main CCRF 7.6.2 Other 8.2.1***
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
11.2	All vessels harvesting sablefish must be authorized and permitted to fish, in accordance with federal regulations, 50CFR679. Further, all sablefish harvesting must be conducted in accordance with the NPFMC's IFQ program.

	sources of evidence – 50CFR679: www.fakr.noaa.gov/regs/default.htm 50CFR679.4 Permits 50CFR679, Subpart D – IFQ Management Measures www.fakr.noaa.gov/ram/ifq.htm

Clause: **11.3**	**States involved in the fishery shall, in accordance with international law, within the framework of sub-regional or regional fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance and enforcement of applicable measures with respect to fishing operations and related activities in waters outside their national jurisdiction.** ***FAO Main CCRF 8.1.4 Other 7.7.5***
Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**	
Clause:	**Evidence**
11.3	There is no legal harvesting of sablefish in North Pacific waters outside the national jurisdiction of the USA or Canada. Similarly, there is no sablefish harvesting by American vessels in Canadian waters, or by Canadian vessels in American waters. Within the American EEZ off Alaska, sablefish harvesting is monitored and enforced by NMFS OLE, and USCG. The Coast Guards of the USA and Canada coordinate enforcement activities, as necessary. Within state waters, ADFG and Alaska Wildlife Troopers are primarily responsible for enforcement, but the USCG and NMFS Enforcement also participate. ***sources of evidence –*** 50CFR679: www.fakr.noaa.gov/regs/default.htm NMFS OLE, Alaska region: www.nmfs.noaa.gov/ole/ak_alaska.html USCG, Alaska region: www.uscg.mil/d17/

12. There must be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.

FAO 7.7.2/8.2.7

Confidence Ratings	Low	0 out of 4	Medium	0 out of 4	High	4 out of 4

Clause:

12.1 National laws of adequate severity shall be in place that provide for effective sanctions.

12.1.1 Sanctions shall be in force that affects authorization to fish in the event of non-compliance with conservation and management measures.

FAO Main CCRF 7.7.2

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
12.1	50CFR600.740 Enforcement policy; this section states – (a) The MSA provides four basic enforcement remedies for violations, in ascending order of severity, as follows: (1) Issuance of a citation (a type of warning), usually at the scene of the offense (see 15 CFR part 904, subpart E). (2) Assessment by the Administrator of a civil money penalty. (3) For certain violations, judicial forfeiture action against the vessel and its catch. (4) Criminal prosecution of the owner or operator for some offenses. It shall be the policy of NMFS to enforce vigorously and equitably the provisions of the MSA by utilizing that form or combination of authorized remedies best suited in a particular case to this end. (b) Processing a case under one remedial form usually means that other remedies are inappropriate in that case. However, further investigation or later review may indicate the case to be either more or less serious than initially considered, or may otherwise reveal

	that the penalty first pursued is inadequate to serve the purposes of the MSA. Under such circumstances, the Agency may pursue other remedies either in lieu of or in addition to the action originally taken. Forfeiture of the illegal catch does not fall within this general rule and is considered in most cases as only the initial step in remedying a violation by removing the ill-gotten gains of the offense. (c) If a fishing vessel for which a permit has been issued under the MSA is used in the commission of an offense prohibited by section 307 of the MSA, NOAA may impose permit sanctions, whether or not civil or criminal action has been undertaken against the vessel or its owner or operator. In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator. ***sources of evidence –*** 50CFR600.740 Enforcement policy
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
12.1.1	Please see evidence in section 12.1 above.

Clause:

12.2 Flag States shall take enforcement measures in respect of fishing vessels entitled to fly their flag which have been found by them to have contravened applicable conservation and management measures, including, where appropriate, making the contravention of such measures an offence under national legislation.

12.2.1 Sanctions applicable in respect of violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur.

FAO Main CCRF 8.2.7

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
12.2	Sanctions include the possibility of temporary or permanent revocation of fishing privileges. Withdrawal or suspension of authorizations to serve as masters or officers of a fishing vessel are also among the enforcement options. Within the USA EEZ, penalties can range up through forfeiture of the catch to forfeiture of the vessel, including financial penalties and prison sentences (see section 12.1 above). ***sources of evidence –*** 50CFR679: www.fakr.noaa.gov/regs/default.htm NMFS OLE, Alaska region: www.nmfs.noaa.gov/ole/ak_alaska.html USCG, Alaska region: www.uscg.mil/d17/

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
12.2.1	There are very few repeat offenders. Sanctions include the possibility of temporary or permanent revocation of fishing privileges. Withdrawal or suspension of authorizations to serve as masters or officers of a fishing vessel are also among the enforcement options. Within the USA EEZ, penalties can range up through forfeiture of the catch to forfeiture of the vessel, including financial penalties and prison sentences (see section 12.1 above). In addition, Alaska Wildlife Troopers (AWT) has increased undercover fisheries operations for sport and commercial fisheries over last 3 years. A fully staffed investigations unit dedicates time to commercial investigations. This includes cooperation, as jurisdictionally appropriate, with USCG and NMFS OLE. The health and sustainability of Alaska's fisheries does not, in itself, prove that Alaska's regulatory enforcement is effective, but our sustainability would be impossible without effective enforcement. In general, USCG's enforcement efforts focus on two types of "significant violations" -- those which would do harm to the resource, and those which

	would create an economic advantage to the violator. The incidence of, and trends in, these significant violations are monitored closely. Another measure is the "triple correlation" of regulatory compliance with observed violations with enforcement presence. The objective of regulatory enforcement is to ensure compliance. An essential element of this effort is the public perception of a high level of patrol and enforcement, which creates the view that "It doesn't pay to cheat". Finally, the cooperation of citizens and industry is cultivated through programs such as AWT's Fish & Wildlife Safeguard program, which encourages the reporting of violations, and "leverages" the range of enforcers. ***sources of evidence –*** AWT: www.dps.state.ak.us/awt/ * Capt. Steven Arlow, AWT * Capt. Steven Hall, AWT * Lt. Bernard Chastain, AWT * Capt. Michael Cerne, USCG * Special Agent-In-Charge Kevin Heck, NMFS, OLE

13. Considerations of fishery interactions and effects on the ecosystem must be based on best available science, local knowledge where it can be objectively verified and using a risk based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem must be appropriately assessed and effectively addressed.

FAO 7.2.3/8.4.7/8.4.8/12.11
ECO 29.3/31

Confidence Ratings	Low	0 out of 6	Medium	0 out of 6	High	6 out of 6

Clause:

13.1 The impacts of environmental factors on target species and those species associated with, or dependent on the target stocks, shall be assessed.

FAO Main CCRF 7.2.3

13.1.1 The most probable adverse impacts shall be considered, taking into account available scientific information, and local knowledge.

13.1.2 Impacts that are likely to have serious consequences shall be addressed. This may take the form of an immediate management response or further analysis of the identified risk.

FAO Main CCRF 29.3 Other 31

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
13.1	NPFMC and NOAA/NMFS conduct assessments and research on environmental factors on sablefish and associated species and their habitats. Findings and conclusions are published in SAFE document, annual Ecosystem Considerations documents, and research reports. **SAFE documents.** In addition Stock Assessment and Fishery Evaluation (SAFE) documents for BSAI and GOA sablefish summarize ecosystem considerations for the stocks. They include sections for 1) Ecosystem effects on the stock; and 2) Effects of the sablefish fishery on the ecosystem. Since 2003 SAFE documents for BSAI and GOA have also included an annual summary Ecosystem Assessment in the appendix. The primary intent of the assessment is to summarize historical climate and fishing effects of the shelf and slope regions of the eastern BSAI, and GOA, from an ecosystem perspective and to provide an assessment of the possible future effects of climate and fishing on ecosystem structure and function. SAFE reports also describe results of first-order trophic interactions for sablefish from the ECOPATH model, an ecosystem modeling software package. While prominence of some interactions may be the result of insufficient data, estimation of prey interactions of adult sablefish in the GOA appear reasonable.

Sources of evidence:
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

Ecosystem Considerations. The Resource Ecology and Ecosystem Management group at the Alaska Fishery Science Center (AFSC) provides up-to-date ecosystem information and assessments in annual *Ecosystem Considerations* documents. Since 1995, this document has been prepared in order to provide information about the effects of fishing from an ecosystem perspective, and the effects of environmental change on fish stocks. Since 1999, the section has included information on indicators of ecosystem status and trends, and more ecosystem-based management performance measures. *Ecosystems Considerations* reviews sablefish stocks as part of the ground fish assessments.

Sources of evidence:
The *Ecosystem Considerations* sections from 2000 to the present are available online at www.afsc.noaa.gov/refm/reem/Assess/Default.htm.

For 2010, see
Appendix C
Ecosystem Considerations for 2011
http://access.afsc.noaa.gov/reem/ecoweb/Eco2010.pdf1444

FATE research. NOAA also supports the Fisheries And The Environment (FATE) program to ensure the sustainable use of US fishery resources under a changing climate. The focus of FATE is on the development, evaluation, and distribution of leading ecological and performance indicators. In 2010, FATE projects included a study to integrate environmental variables into sablefish recruitment and stock assessment models. See:
In the Path of the Polar Front: Reducing recruitment uncertainty through integration of large scale climate indices within the Alaska sablefish stock assessment
http://fate.nmfs.noaa.gov/proposal/Shotwell%20%26%20Belkin%202010.pdf

PSEIS ecosystem considerations. The *Final Programmatic Supplemental Environmental Impact Statement for the Alaska Groundfish Fisheries* (PSEIS) (NMFS 2004) provides information about affects of the fishery on the ecosystem and effects of the ecosystem on the groundfish fishery. It evaluates the historical effects of the spatial concentration of the state fishery and regime changes on sablefish stocks.
There are no known effects on stocks resulting from the Exxon Valdez oil spill.

http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Exec_sum.pdf
http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_5.pdf
http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_10.pdf
www.fakr.noaa.gov.
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

	http://fate.nmfs.noaa.gov/proposal/Shotwell%20%26%20Belkin%202010.pdf http://access.afsc.noaa.gov/reem/ecoweb/Eco2010.pdf www.afsc.noaa.gov/refm/reem/Assess/Default.htm
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
13.1.1	**Ecosystem impact on the fishery.** The PSEIS document provides evidence that physical oceanographic factors, particularly climate, have a controlling influence on biological community composition in the BSAI and GOA. An important conclusion to be drawn from these studies is that any effects of human activities on the marine environment should be considered in the context of the powerful physical forces that appear to be driving the BSAI and GOA ecosystems. In general, species richness and diversity peaked at water depths of about 200-300 m in the GOA. Higher abundance, lower species richness and diversity, and a different species composition of demersal fishes were found in the western GOA as compared to the eastern GOA. Mueter concluded that these large-scale spatial patterns were related to upwelling differences between the two regions. With respect to long-term trends, the lowest species richness was observed in 1984, whereas the lowest species diversity was seen in 1996. General increases in total groundfish biomass were seen from 1984 to 1996 coupled with statistically significant changes in species composition. Community structure in near shore areas around Kodiak Island changed during this same period, with decreasing populations of shrimp and small forage fish and increasing populations of large, fish-eating species such as Pacific cod and flatfish. Also total biomass of commercially-fished species in shelf and slope areas had increased since 1984, despite a considerable, concurrent increase in harvest effort. At the same time, the abundances of unexploited (or underexploited) species including skate, some shark species, forage species, arrowtooth flounder, and other flatfish had increased. Populations of an overexploited species, the Pacific ocean perch, had also rebounded from low population levels. The controlling factor for these increases appeared to be environmental, with changes in community species composition in near shore areas linked to an increase in advection in the Alaska Coastal Current. Scientists concluded that cyclical weather patterns increased flow around the GOA and enhanced the supply of nutrients and plankton on the shelf and upper slope areas, resulting in higher productivity.

Young-of-the-year sablefish prey mostly on euphausiids and copepods while juvenile and adult sablefish are opportunistic feeders. Larval sablefish abundance has been linked to copepod abundance and young-of-the-year abundance may be similarly affected by euphausiid abundance because of their apparent dependence on a single species.

The dependence of larval and young-of-the-year sablefish on a single prey species may be the cause of the observed wide variation in annual sablefish recruitment. Juvenile and adult sablefish feed opportunistically, so diets differ throughout their range. In general, sablefish < 60 cm FL consume more euphausiids, shrimp, and cephalopods, while sablefish > 60 cm FL consume more fish.

The main juvenile sablefish predators are adult coho and chinook salmon, which prey on young-of-the-year sablefish during their pelagic stage. Halibut also consume sablefish in the GOA, but it represents only about 1% of their diet. Although juvenile sablefish may not be a prominent prey item, they also share residence on the continental shelf with arrowtooth flounder, Pacific cod, bigmouth sculpin, big skate, and Bering skate, which are the main piscivorous groundfishes in the GOA. As a result, they also may eat sablefish even though they are not a common prey species due to their low abundance.

Sperm whales are likely a major predator of adult sablefish, since sablefish were found in 8.3% of sperm whale stomachs off of California.

Despite natural fluctuations in abundance and distribution of prey species, researchers conclude that the ecosystem fluctuations had little significant adverse impacts of sablefish populations, as shown in Table 3.12 from GOA FMP. See below.

Table 3.12. Analysis of ecosystem considerations for sablefish fishery.

Indicator	*Observation*	*Interpretation*	*Evaluation*
ECOSYSTEM EFFECTS ON STOCK			
Prey availability or abundance trends			
Zooplankton	None	None	Unknown
Predator population trends			
Salmon	Decreasing	Increases the stock	No concern
Changes in habitat quality			
Temperature regime	Warm increases recruitment	Variable recruitment	No concern (can't affect)
Prevailing currents	Northerly increases recruitment	Variable recruitment	No concern (can't affect)

FISHERY EFFECTS ON ECOSYSTEM			
Fishery contribution to bycatch			
Prohibited species	Small catches	Minor contribution to mortality	No concern
Forage species	Small catches	Minor contribution to mortality	No concern
HAPC biota (seapens/whips, corals, sponges, anemones)	Small catches, except long-term reductions predicted	Long-term reductions predicted in hard corals and living structure	Possible concern
Marine mammals and birds	Bird catch about 10% total	Appears to be decreasing	Possible concern
Sensitive non-target species	Grenadier, spiny dogfish, and unidentified shark catch notable	Grenadier catch high but stable, recent shark catch is small	Possible concern for grenadiers
Fishery concentration in space and time	IFQ less concentrated	IFQ improves	No concern
Fishery effects on amount of large size target fish	IFQ reduces catch of immature	IFQ improves	No concern
Fishery contribution to discards and offal production	sablefish <5% in longline fishery, but 30% in trawl fishery	IFQ improves, but notable discards in trawl fishery	Trawl fishery discards definite concern
Fishery effects on age-at-maturity and fecundity	trawl fishery catches smaller fish, but only small part of total catch	slightly decreases	No concern

Bycatch. An average of 66% of the sablefish fishery bycatch consists of grenadiers and the trend is stable. The catch of seabirds in the sablefish fishery averages 17% of the total bycatch. The trend in seabird bycatch is variable but appears to be decreasing, presumably due to widespread use of measures to reduce seabird catch. Sablefish fishery catches of other species is minor.

Discards. Sablefish discards have decreased in recent years. From 1994 to 2003 discards averaged 1,357 t for the GOA and BSAI combine. The highest amount was 800 t in 2004, of which 667 t occurred in the GOA and 133 t occurred in the BSAI. Discards decreased after 2003, down to an average in 2004-09 of 697 mt, 89% of which occurred in the GOA.

The discards from trawl fisheries decreased from a 1994-2003 average of 825 t to an average of 262 mt for 2004-2009, while hook and line fisheries decreased slightly from 525 t down to 462 t. Grenadiers are by far the most abundant bycatch in the sablefish fishery. Commercially valuable species taken in the sablefish fishery include thornyhead rockfish, shortraker rockfish, rougheye rockfish, and Pacific cod. See Table below.

Table. Catch of prohibited species, forage species, HAPC biota, marine mammals and birds, and other non-target species, such as sharks, in sablefish directed fisheries. Percent of catch refers to that attributable to directed sablefish fisheries in all areas of Alaska.

Biota	2003-2005 average	2006	2007	2008	2009	Average	Average catch (t)
Birds	12.0%	19.0%	25.5%	22.7%	16.8%	17.3%	1.81
Brittle stars	0.5%	0.2%	0.7%	0.2%	5.2%	0.5%	0.15
Corals Bryozoans	1.2%	3.0%	0.4%	3.0%	6.1%	2.0%	0.96
Eelpouts	1.0%	2.1%	1.3%	9.7%	2.5%	2.2%	2.4
Grenadier	64.0%	80.6%	18.8%	46.0%	68.8%	65.6%	4,484.16
Large Sculpins	0.1%	0.1%	0.1%	0.0%	0.3%	0.1%	7.76
Octopus	0.6%	0.1%	0.5%	0.2%	0.2%	0.4%	2.19
Sea anemone	0.1%	0.3%	2.4%	0.6%	1.2%	0.7%	0.99
Sea star	0.0%	0.2%	1.1%	0.1%	0.2%	0.2%	6.81
Shark, Other	7.2%	1.2%	3.5%	15.3%	0.0%	3.8%	4.64
Shark, pacific sleeper	3.1%	4.4%	0.9%	2.0%	1.6%	2.9%	14.39
Shark, salmon	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.17
Shark, spiny dogfish	18.7%	12.4%	19.6%	16.8%	23.5%	17.6%	145
Skate, Big	0.2%	0.7%	0.1%	0.2%	0.1%	0.3%	3.15
Skate, Longnose	3.9%	3.8%	1.5%	3.0%	2.3%	3.1%	16.11
Skate, Other	0.5%	0.9%	0.7%	0.4%	0.6%	0.6%	123.72
Snails	1.6%	4.4%	4.8%	3.3%	8.8%	3.2%	6.06
Sponge	0.3%	0.4%	0.1%	9.3%	0.8%	1.3%	2.75

Sablefish discards have decreased in recent years. From 1994 to 2003 discards averaged 1,357 t for the GOA and BSAI combine. The highest amount was 800 t in 2004, of which 667 t occurred in the GOA and 133 t occurred in the BSAI. Discards decreased after 2003, down to an average in 2004-09 of 697 mt, 89% of which occurred in the GOA.

The discards from trawl fisheries decreased from a 1994-2003 average of 825 t to an average of 262 mt for 2004-2009, while hook and line fisheries decreased slightly from 525 t down to 462 t. Grenadiers are by far the most abundant bycatch in the sablefish fishery. Commercially valuable species taken in the sablefish fishery include thornyhead rockfish, shortraker rockfish, rougheye rockfish, and Pacific cod.

Spatial/Temporal Concentration of Catch/Bycatch

1999 ADF&G data show that the state sablefish fishery is somewhat concentrated; in the PWS, catch was dominated by a few statistical areas; in the Cook Inlet region, catches came from the outer coast; and in the south Alaska Peninsula fishery, catches came predominately from the areas southwest of Unimak Island. The open-access state fisheries in state waters may lead to localized areas of heavy fishing and subsequent adverse impacts to habitats.

Moreover, without a comprehensive IFQ system, state policy may shift fishing effort among

districts. All in all, ADFG recognizes that open access fisheries for high valued sablefish could result in fishing pressure sufficient to overtax management capabilities and/or result in localized depletion.
http://www.cf.adfg.state.ak.us/geninfo/finfish/grndfish/grndhome.php
http://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management

External Exxon Valdez Oil Spill
There are no known effects of the EVOS on sablefish recruitment in the GOA.

External Climate Changes and Regime Shifts
Climate changes and regime shifts are identified as having potentially beneficial or adverse effects on the reproductive success of sablefish, especially in regards to the combination of climate effects and regime shifts on prey availability.

Sources of evidence:
SAFE reports:
http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf
http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

GOA and BSAI FMPs:
http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf
http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence
13.1.2	The USFWS is the lead federal agency for managing and conserving seabirds. As a result of ESA Section 7 consultations between the USFWS and NOAA to protect short-tailed albatross, NOAA Fisheries required the BSAI and GOA groundfish longline fleet to employ specified seabird avoidance measures to reduce incidental take in 1997 (62 FR 23176). In order to protect short-tailed albatross in other North Pacific fisheries, NOAA Fisheries required seabird avoidance measures to be used by vessels fishing for Pacific halibut and sablefish in U.S. EEZ waters off Alaska in 1998 (63 FR 11161). These measures focused primarily on collecting seabird and fishery interaction data and on requiring longliners to use specific types of gear and fishing techniques to avoid seabird incidental take. Based on research findings NPFMC made recommendations to NOAA Fisheries which published regulations that have been in effect since February 2004. Specific requirements vary by length of vessel, area fished, type of gear, and other factors. As of 2004, longline vessels over 26 ft LOA are required to use either single or paired streamer lines (or in some cases for smaller vessels, a buoy bag line) to reduce incidental take of seabirds.

For full description of regulations, see:

Sources of evidence
http://www.fakr.noaa.gov/protectedresources/seabirds.html.
http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_7.pdf

Interactions with marine mammals
In 1992, fisheries observers reported eight sea otters taken incidentally by the Aleutian Island sablefish pot fishery. During that year, only a third of the fisheries were observed, yielding an estimate of 24 otters killed in pot gear in the sablefish fishery. No other sea otter takes were reported from observed fisheries in the range of the southwest stock from 1993 through 2000. In 1997, the BSAI groundfish trawl fishery reported one sea otter taken (USFWS 2002b).

Sperm whale diets overlap with commercial fisheries harvests more than any other species of toothed whales, but the degree of overlap is at least partly because of direct interactions with longline gear. In addition to consuming primarily medium - to large-sized squids, sperm whales also consume some fish and have been observed feeding off longline gear targeting sablefish and halibut in the GOA. The interactions with commercial longline gear do not appear to have an adverse impact on sperm whales. Much to the contrary, the whales appear to have become more attracted to these vessels in recent years.

In 1996, NOAA Fisheries received reports from observers on commercial fishing vessels that sperm whales were preying on sablefish caught on commercial longline gear in the GOA. Three entanglements have been reported in the GOA longline fishery; one in 1997, 1999, and 2000. In two cases (1997 and 2000), the whales were released without serious injury; although the whale entangled in 1999 was alive when released, the extent of injuries to the whale is not known. Several observer reports have noted efforts by fishermen to deter sperm whales from their lines, including yelling at the whales and throwing seal bombs in the water. A pilot project using fishery observers in 1997 and 1998 was initiated to determine the extent of the interactions between sperm whales and the commercial longline fishery in Alaska.

Killer whales frequently take fish directly from commercial fishing gear as it is retrieved. Interactions with commercial longline fisheries are well-documented throughout the BSAI. Depredation rates of bottomfish by killer whales on longline catches, based on four different methods of calculation, suggested that whales took 14 to 60 percent of the sablefish, 39 to 69 percent of the Greenland turbot, and 6 to 42 percent of the arrowtooth flounder caught in commercial gear (Yano and Dahlheim 1995). Depredation rates can be so high in some areas that fishermen have abandoned particular fisheries even when they are still open. Killer whales fall under the jurisdiction of the NOAA Fisheries PRD, and are protected under the MMPA.

During the 1992 killer whale surveys in the BSAI and western GOA, 9 of 182 individual whales (4.9 percent) had evidence of bullet wounds, presumably from irate fishermen. Under provisions of the MMPA, it is illegal to shoot or injure killer whales. The relationship

	between wounding due to shooting and survival is unknown. In PWS, the pod responsible for most of the fishery interactions experienced a 59 percent decline in its members (from 37 to 15) between 1986 and 1991. These whales are believed to have died but the cause of death, whether from gunshot wounds, the EVOS, or some other factor, is unknown. **Sources of evidence:** http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_8.pdf

Clause:

13.2 Assessments/ scientific evaluation shall be carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the introduction on a commercial scale of new fishing gear, methods and operations.

13.2.1 The effect of such gear introduction shall be monitored.

FAO Main CCRF 8.4.7 Other 12.11

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	Evidence
13.2	The directed fishery is primarily a hook-and-line fishery, but it also uses pots and trawls. In the 1996 directed fishery for sablefish, average set length was 9 km and average hook spacing was 1.2 m. The gear is baited by hand or by machine, with smaller boats generally baiting by hand and larger boats generally baiting by machine. Circle hooks usually are used, except for modified J-hooks on some boats with machine baiters. The gear usually is deployed from the vessel stern with the vessel traveling at 5-7 knots. Some vessels attach weights to the longline, especially on rough or steep bottom, so that the longline stays in place and lays on-bottom. **Impacts on Essential Fish Habitat** The MSA defines essential fish habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." In order to protect EFH, certain EFH habitat conservation areas have been designated. A habitat conservation area is an area where fishing restrictions are implemented for the purposes of habitat conservation. The BSAI and GOA FMP define specific EFH for sablefish and evaluate its status each year. To incorporate the regulatory guidelines for review and revision of EFH FMP components, the NPFMC conducts a complete review of all the EFH components of each FMP once every five years and amends those EFH components as appropriate to include new information. Additionally, the Council may use the FMP amendment cycle every three

	years to solicit proposals for habitat areas of particular concern (HAPC) and/or conservation and enhancement measures to minimize the potential adverse effects from fishing. The proposals that the Council endorses would be implemented through FMP amendments. An annual review of existing and new EFH information will be conducted and this information will be provided to the GOA Groundfish Plan Team for their review during the annual SAFE report process. This information is included in the "Ecosystems Considerations" chapter of the SAFE report. Essential fish habitat (EFH) is defined in the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The GOA FMP defines Essential Fish Habitat (EFH) for five stages of the sablefish life cycle; including: **Eggs**: EFH for sablefish eggs is the general distribution area for this life stage, located in deeper waters along the slope (200 to 3,000 m) throughout the GOA. **Larvae**: EFH for larval sablefish is the general distribution area for this life stage, located in epipelagic waters along the middle shelf (50 to 100 m), outer shelf (100 to 200 m), and slope (200 to 3,000 m) throughout the GOA. **Early Juveniles:** No EFH Description Determined. Insufficient information is available. **Late Juveniles**: EFH for late juvenile sablefish is the general distribution area for this life stage, located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulley's along the slope (200 to 1,000 m) throughout the GOA. **Adults**: EFH for adult sablefish is the general distribution area for this life stage, located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulley's along the slope (200 to 1,000 m) throughout the GOA. The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS, 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST). Although sablefish do not appear to be directly dependent on physical structure, reduction of living structure is predicted in much of the area where juvenile sablefish reside and this may indirectly reduce juvenile survivorship by reducing prey availability or by altering the abilities of competing species to feed and avoid predation**.** However, little is known about effects of fishing on benthic habitat or the habitat requirements for growth to maturity. **Sources of evidence:** SAFE reports: http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf In BSAI and GOA FMP Appendix F, further evaluate the impacts of the fishery on fish

	stocks. Although it reports a Minimum Threat (MT) rating for spawning/breeding life stages, it expresses some concern for growth-to-maturity and feeding life stages and states the effects are Unknown (U). It states: Summary of Effects—The estimated productivity and sustainable yield of sablefish have declined steadily since the late 1970s. This is demonstrated by a decreasing trend in recruitment and subsequent estimates of reference points and the inability of the stock to rebuild to target biomass levels despite of the decreasing level of the targets and fishing rates below the target fishing rate. While years of strong young-of-the-year survival have occurred in the 1980s and 1990s, the failure of strong recruitment to the mature stage suggests a decreased survival of juveniles during their residence as 2 to 4 year-olds on the continental shelf. While climate-related changes and/or competition or predation of juveniles from large groundfish stocks observed since the early 1980s are a possible causes for reduced productivity (See Clause 13.1.1), the observations noted above are consistent with possible effects of fishing on habitat and resulting changes in the juvenile ecology of sablefish, possibly through increased competition for food and space. Given the concern for the decline in the sustainable yield of sablefish, the possibility of the role of fishing effects on juvenile sablefish habitat, and the need for a better understanding of the possible causes, an MT rating is not merited, and sablefish growth to maturity and feeding is rated unknown. **Sources of evidence:** BSAI and GOA FMPs: http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf http://alaskafisheries.noaa.gov/npfmc/fmp/bsai/BSAI.pdf http://www.fakr.noaa.gov/npfmc/fmp/bsai/BSAIfmpAPPENDIX.pdf
	Evidence adequacy rating: ☑ **High** ☐ **Medium** ☐ **Low**
Clause	**Evidence**
13.2.1	**The effect of such gear introduction shall be monitored.** Since 2005 AFSC has supported EFH research projects. However, the summary of 2006-2010 habitat research projects does not include habitat studies for sablefish. Other studies have reviewed the impacts of the IFQ fishery on fishing gear and catch rates. It shows that the shift from an open-access to an IFQ fishery has nearly doubled catching efficiency which has reduced the number of hooks deployed. Although the effects of longline gear on bottom habitat are poorly known, the reduced number of hooks deployed during the IFQ fishery must have reduced the effects on benthic habitat. The IFQ fishery likely has also reduced discards of other species because of the slower pace of the fishery and the incentive to maximize value from the catch.

	The shift from an open access to an IFQ fishery has decreased harvest of immature fish and improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased 9% from the derby fishery (1990-1994) to the IFQ fishery (1995-1998). While it is possible that longlines could move small boulders it is unlikely fishing would persist where this would often occur. Relative to the effect on living structures and relative to the effect by bottom tending mobile gear, a significant effect of longlines on bedrock, cobbles, or sand is not easily envisioned. The longline fishery catches mostly medium and large-size fish which are typically mature. The trawl fishery, which on average accounts for about 13% of the total catch, often catches small and medium fish. The trawl fishery typically occurs on the continental shelf where juvenile sablefish occur. Catching these fish as juveniles reduces the yield available from each recruit. Killer whale depredation has been consistently recorded since 1996. Sperm whale depredation has been recorded since 1998. In 2008, a study was published which compared 1998-2004 longline survey catch rates at stations which had sperm whale depredation to stations that did not. This study found a 1.8% removal rate, which was not significant. Preliminary results of a new study that included the most recent years, 1998-2009, indicate there is now a significant trend over time in depredation and sperm whales remove approximately 4.1 kg of sablefish per 100 hooks. Similar depredation studies have shown an average of about a 1.5% removal rate. Apparently the whales target and follow fishing boats. **Sources of evidence:** http://www.afsc.noaa.gov/HEPR/EFH_research_projects.htm SAFE reports: http://www.afsc.noaa.gov/REFM/docs/2010/BSAIsablefish.pdf http://www.afsc.noaa.gov/REFM/docs/2010/GOAsablefish.pdf

Clause:

13.3 Research shall be promoted on the environmental and social impacts of fishing gear and, in particular, on the impact of such gear on biodiversity and coastal fishing communities.

FAO Main CCRF 8.4.8

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
	The Essential Fish Habitat Environmental Impact: Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST). While it is possible that longlines could move small boulders it is unlikely fishing would persist where this would often occur. Relative to the effect on living structures and relative to the effect by bottom tending mobile gear, a significant effect of longlines on bedrock, cobbles, or sand is not easily envisioned. Since 2005 AFSC has supported EFH research projects. However, the summary of 2006-2010 habitat research projects does not include habitat studies for sablefish. http://www.afsc.noaa.gov/HEPR/EFH_research_projects.htm **IFQ fishery.** Fishery data from observers and logbooks have allowed managers to evaluate the changes resulting from the IFQ fishery. Data shows that the shift from an open-access to an IFQ fishery has nearly doubled catching efficiency which has reduced the number of hooks deployed. Although the effects of longline gear on bottom habitat are poorly known, the reduced number of hooks deployed during the IFQ fishery must reduce the effects on benthic habitat. The IFQ fishery likely has also reduced discards of other species because of the slower pace of the fishery and the incentive to maximize value from the catch. The shift from an open access to an IFQ fishery has decreased harvest of immature fish and improved the chance that individual fish will reproduce at least once. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased 9% from the derby fishery (1990-1994) to the IFQ fishery (1995-1998). **Discards.** The percent of sablefish catch discarded during 1995-2000 averaged 2.8 percent in the directed Alaska-wide sablefish longline fishery. Discards also took place in the BSAI Greenland turbot fishery (31 percent), the BSAI Pacific cod longline fishery (41.4 percent), Alaska-wide rockfish trawl fishery (17.4 percent) and Alaska-wide flatfish trawl fishery (42.1 percent). BSAI FMP Amendment 13 and 15/GOA Amendment 20 helped reduce sablefish bycatch and discards by establishing the domestic Observer Program and the sablefish IFQ program, respectively. http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_5.pd

Trawl fishery. The longline fishery catches mostly medium and large-size fish which are typically mature. On the other hand, the trawl fishery, which on average accounts for about 13% of the total catch, often catches small and medium fish. The trawl fishery typically occurs on the continental shelf where juvenile sablefish occur. Catching these fish as juveniles reduces the yield available from each recruit.

Interactions with seabirds. NOAA Fisheries undertake for the first time a comprehensive scientific study to experimentally determine the effectiveness of seabird deterrent measures. This research, conducted by the Washington Sea Grant Program in 1999 and 2000 in the IFQ halibut and sablefish fishery

It was the largest study of its kind in the world with over 1.2 million hooks set in the sablefish fishery and over 6.3 million hooks set in the cod fishery. The results of the study were presented to NPFMC in October 2001 in its final report, "Solutions to Seabird Bycatch in Alaska's Demersal Longline Fisheries" The study found that paired streamer lines of specified performance and material standards successfully reduced seabird incidental take in both years, regions, and fleets by 88 to 100 percent relative to controls with no deterrent. Single streamer lines of specified performance and material standards were slightly less effective than paired streamer lines, reducing seabird incidental take by 96% and 71% relative to controls with no deterrent in the sablefish and cod fisheries, respectively.

Interactions with marine mammals.
Interactions with marine mammals mostly involves depredation by whales eating fish off longline. Killer whale depredation occurs in the Bering Sea, Aleutian Islands, and Western GOA. Sperm whale depredation occurs in the Central and Eastern GOA. Most sperm whale depredation has been occurring in the Eastern GOA near Yakutat.

Killer whales are more particular in what they eat; preferential to oily fish like sablefish and depredation is obvious when it occurs. Sperm whales are more opportunistic and will eat off the line or the offal being released from the stern of the vessel. Compared to killer whales, a sperm whale depredation event is not as distinct, as the whales do not necessarily feed off the line and sometimes are feeding on the head and guts released from the boat. Sperm whales, unlike killer whales, do not take every fish, so detecting depredation can be difficult.
Pot fishing for sablefish has increased in the BSAI as a response to depredation of longline catches by killer whales. In 2000 the pot fishery accounted for less than ten percent of the fixed gear sablefish catch in the BSAI. Since 2004, pot gear has accounted for over half of the Bering Sea fixed gear IFQ catch and up to 34% of the catch in the Aleutians. In 2009, pot fishing remained a high portion of the fixed gear catch in the BS (70%). In the Aleutian Islands pot fishery, pot fishing appeared to decrease from 22% to 7.6% of the fixed gear catch in 2009. However, this was not due to vessels changing back to longline gear, but solely due to the fact that two of the pot vessels did not fish the Aleutian Islands in that year. A small amount of pot fishery data is available from observer and logbook data and is now included in the fishery catch rate section.

In the longline fishery, there are few deterrents to whale depredation. The Southeast Alaska Sperm Whale Avoidance Project in collaboration with the AFSC is deploying acoustic receivers on the longline survey to count the number of times a sperm whale creaks (makes a squeaking sound) which may be an indication of a depredation event. This method of quantifying depredation can also be used to compare survey depredation rates to fishery rates. SEASWAP is also doing some work on deterrents.

In 1992, fisheries observers reported eight sea otters taken incidentally by the Aleutian Island sablefish pot fishery. During that year, only a third of the fisheries were observed, yielding an estimate of 24 otters killed in pot gear in the sablefish fishery. No other sea otter takes were reported from observed fisheries in the range of the southwest stock from 1993 through 2000. In 1997, the BSAI groundfish trawl fishery reported one sea otter taken (USFWS 2002b).

In 1996, NOAA Fisheries received reports from observers on commercial fishing vessels that sperm whales were preying on sablefish caught on commercial longline gear in the GOA. Three entanglements have been reported in the GOA longline fishery; one in 1997, 1999, and 2000. In two cases (1997 and 2000), the whales were released without serious injury; although the whale entangled in 1999 was alive when released, the extent of injuries to the whale is not known. Several observer reports have noted efforts by fishermen to deter sperm whales from their lines, including yelling at the whales and throwing seal bombs in the water. A pilot project using fishery observers in 1997 and 1998 was initiated to determine the extent of the interactions between sperm whales and the commercial longline fishery in Alaska.

Killer whales frequently take fish directly from commercial fishing gear as it is retrieved. Interactions with commercial longline fisheries are well-documented throughout the BSAI. Depredation rates of bottomfish by killer whales on longline catches, based on four different methods of calculation, suggested that whales took 14 to 60 percent of the sablefish, 39 to 69 percent of the Greenland turbot, and 6 to 42 percent of the arrowtooth flounder caught in commercial gear. Depredation rates can be so high in some areas that fishermen have abandoned particular fisheries even when they are still open. Killer whales fall under the jurisdiction of the NOAA Fisheries PRD, and are protected under the MMPA.

During the 1992 killer whale surveys in the BSAI and western GOA, 9 of 182 individual whales (4.9 percent) had evidence of bullet wounds, presumably from irate fishermen. Under provisions of the MMPA, it is illegal to shoot or injure killer whales. The relationship between wounding due to shooting and survival is unknown. In PWS, the pod responsible for most of the fishery interactions experienced a 59 percent decline in its members (from 37 to 15) between 1986 and 1991. These whales are believed to have died but the cause of death, whether from gunshot wounds, the EVOS, or some other factor, is unknown.

13. Ecosystem

FMPs are federal actions, and must conform to the requirements of other environmental legislation and regulations besides the MSFCMA and the regulations which derive from it.

	The most consequential of these are the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA) and the National Environmental Policy Act (NEPA). NEPA very broadly requires federal agencies to give "appropriate consideration" to environmental factors so as to prevent damage to the "environment and biosphere," and it specifically requires documentation of the process whereby this is taken into account in arriving at pertinent decisions. The ESA sets extremely stringent standards for protecting populations that are classified as "endangered." The protection applies to actions with the potential for direct and indirect effects, ranging from direct kill (as in by-catch), through disturbance, to "adverse modification" of habitat. MMPA sets extremely stringent standards for protecting marine mammal populations that are classified as "depleted." The protection applies to actions with the potential for direct effects ranging from incidental take to disturbance. Neither ESA nor MMPA invoke a Precautionary Approach by name, but the implementation and interpretation of both ESA and MMPA employ formally precautionary elements, often in decision theoretic language—more so than MSFCMA itself. The ESA legislation uses probabilistic language ("likelihood") and risk-related language ("jeopardy") and is interpreted as placing a high standard for the burden of proof that the protected population will not be harmed. In practice, critical ESA decisions are often based on probabilistic analysis, with uncertainty taken into account in explicit technical calculations. MMPA is interpreted as placing a burden of proof on showing that protection is not needed. Regulations for implementation of decisions about permitted incidental kill levels, called Potential Biological Removal (PBR), under the MMPA; define a formula that responds to uncertainty through use of a specified confidence limit. The development of that formula stated specific performance criteria that the formula was expected to meet, and these criteria are stated in terms of specified probabilities of outcomes. Of course, both MMPA and ESA are almost wholly protective in their objectives, whereas MSA sets forth utilization objectives and protective objectives, with only limited guidance on how these are to be balanced if they should be in conflict. Of course, both MMPA and ESA are almost wholly protective in their objectives, whereas MSA sets forth utilization objectives and protective objectives, with only limited guidance on how these are to be balanced if they should be in conflict (http://www.fakr.noaa.gov/npfmc/misc_pub/f40review1102.pdf).

14. Where fisheries enhancement is utilized, environmental assessment and monitoring must consider genetic diversity and ecosystem integrity. *FAO 9.1.2/9.1.3/9.1.4/9.1.5/9.3.1/9.3.5*						
Confidence Ratings	**Low**	**0 out of 3**	**Medium**	**0 out of 3**	**High**	**0 out of 3**

Clause: **14.1 States shall promote responsible development and management of aquaculture, including an advance evaluation of the effects of aquaculture development on genetic diversity and ecosystem integrity, based on the best available scientific information.** *FAO Main Criteria 9.1.2*	
Evidence adequacy rating: **☐High ☐ Medium ☐ Low**	
Clause:	**Evidence**
14.1	**N/A**

Clause: **14.2 States shall produce and regularly update aquaculture development strategies and plans, as required, to ensure that aquaculture development is ecologically sustainable and to allow the rational use of resources shared by aquaculture and other activities.** *FAO Main Criteria 9.1.3 Other 9.1.4*	
Evidence adequacy rating: **☐High ☐ Medium ☐ Low**	
Clause:	**Evidence**
14.2	**N/A**

Clause: **14.3 Effective procedures specific to aquaculture of fisheries enhancement shall be established to undertake appropriate environmental assessment and monitoring with the aim of minimizing adverse ecological changes and related economic and social consequences.** *FAO Main Criteria 9.1.5*	
Evidence adequacy rating: **☐ High ☐ Medium ☐ Low**	
Clause:	**Evidence**
14.3	**N/A**

8. External Peer Review

Peer Reviewer A review.

Summary and Recommendation

I agree with the Evidence of Adequacy Rating for all clauses described. From my state, national and international experience, the IFQ sablefish fishery is one of the best managed fisheries in the world. Starting from stock assessment, moving to harvest determination and conservation protections, providing a safe and rational fishery and being overseen by a comprehensive management and enforcement system, this fishery is exceptionally well managed. This document provides the necessary information to evaluate the FAO-based RFM Conformance Criteria. While the existing Evidence text was generally quite adequate, I have provided additions and edits where clarification was needed or where specific points could bolster the line of evidence presented. In some cases I provided additional web sites where evidence was located. I have noted two items that I question about (Clause 13.1.1 and Clause 13.1.2) – though they are cited elsewhere. They just do not seem correct and may be speculation or mistakes being repeated from background documents. It would be a shame to repeat someone else's error.

Summary of review from Peer Reviewer A for each of the fundamental clauses 1-13

SECTION	
A	**Fisheries Management System**
1. There must be a structured and legally mandated management system based upon and respecting International, National and local fishery laws and considering other coastal resource users, for the responsible utilization of the stock under consideration and conservation of the marine environment.	
The document clearly describes the state and federal management system and how the species is managed over its range, lifecycle and further consider its biological characteristics and all removals. I have suggested minor additions to describe the close state/federal working relationship for management of this and other species. Participation of state stock assessment biologists on NPFMC Plan Teams, and policy level coordination between the BOF and the Council who adopted a Joint Protocol agreement February 1998. The BOF has adopted state regulations that cite or mimic federal regulations. This section deserves a "High" rating. Points to make within various Sub-Clauses are: 1.1 - The NPFMC sets OFLs, determines all sources of mortality, and annually defines the TAC limits … 1.2 - A small portion of the sablefish stock is harvested under State of Alaska jurisdiction. Both state and federal assessment biologists meet at the NPFMC Plan Team meetings and share assessment information and harvest strategies to assure conservation management over the entire stock distribution.	

1.2.1 - Juvenile sablefish spend a portion of their life in shallow water, including State waters, prior to migrating to deep water where harvest occurs. No directed harvest occurs for juvenile sablefish, but State and federal biologists assess incidental/total mortalities that are then considered when developing harvest limits and assessments models.
1.2.2 - To account for the biological unity of the stock, harvest is restricted to spawning adult sablefish, and seasons are set to assure each fish has at least one opportunity to spawn. Further, they are managed by discrete regions to distribute exploitation throughout their wide geographical range, including both State and federal waters.
1.2.3 - Strictly enforced landing reports, at sea and shore based fishery enforcement, fishery observers and an extensive mandatory and voluntary logbook program verify and ground-truth total mortality estimates.
1.3, 1.4, 1.5 & 1.6 – Note the state/federal cooperation of assessment and management.

Assessment Team response:
Additions have been made to the report. However, the state/federal cooperation for assessment and management (of sablefish) was not noted as requested in clauses 1.3, 1.4, 1.5 and 1.6 as it was not deemed necessary within an international background.

2. Management organizations must participate in coastal area management related institutional frameworks, decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and the avoidance of conflict among users.

This clause well describes how the management organizations carry out this mandate. The rating of "High" is correct. Points to add to various Sub-Clauses are:

2.1 - Federal agencies, including the NPFMC, are also responsible for producing NEPA documents each time they renew or amends regulations. Therefore, all of the NPFMC documents include NEPA considerations. NEPA, therefore, is a comprehensive process to provide checks and balances against changes to the environment that may impact ecosystems and the natural processes.
2.3 - The IFQ program provides for an expanded fishing season (approximately 9 months) that aids in the separation of trawl and fixed gear harvests; and allows for retention if IFQ sablefish when fixed gear is targeting halibut or Pacific cod. This reduces competition of gear on the fishing grounds. State groundfish seasons and areas are also constructed to avoid bottom gear conflict; this occurs as the BOF amends and adopts regulations with the aid of public impute.
2.4 - The NPFMC widely distributes Newsletters after each of the five annual meetings that describe the items covered and the actions taken. The NPFMC, NMFS, ADFG and BOF all provide current and extensive education to the interested public regarding their activities, research and pertinent background information. National Public Radio and local TV and radio coverage of BOF and Council actions also keep the public advised on the current list of issues.
2.5 - The NPFMC, NMFS and ADFG all have staff economists that participate in the economic, social and cultural evaluation and review process of fishery management proposals. They advise the NPFMC and BOF members, as well as their agency heads who help lead the regulation amendment process.
2.6 – it is worth noting that both onboard fishery observers and assessment scientists (who spend 100's of hours at sea) collect information regarding fish abundance, size, distribution, diet and energetic status.

Assessment Team response: The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer. Only note 2.6 of this section was not incorporated into the report. It was felt that this note was very fishery specific and less relevant to the monitoring of the coastal zone.

3. Management objectives must be implemented through management rules and actions formulated in a plan or other framework.
This section is described and documented. The rating of "High" is correct. Points to add to various Sub-Clauses are: 3.1 – Not the close coordination of the BOF/Council. "Besides its regular mandates for resource conservation management, the BOF developed guiding principles for the groundfish fisheries under 5 AAC 28.089 so that coordination with the NPFMC and MSA goals could be adopted." 3.2.1 – Suggest modifying this clause on how excess fishing capacity is controlled to read "Following domestication of the pre-IFQ fishery domestic operations expanded rapidly, leading to overcapitalization. The fixed gear fleet grew from less than 90 in 1982 to nearly 1,000 vessels by 1992. Season length decreased in the GOA from 12 months to 1-2 months, and in some areas, the open-access fishery shortened to 10 days; warranting the label "derby" fishery. Accompanying the increase in vessel numbers was a doubling of individual fishing power with the appearance of circle hooks. Quality and price of sablefish suffered. IFQ management has increased fishery catch rates and decreased the harvest of immature fish. Vessel participation reduced from 700 when the program was initiated in 1995 to 389 by 2009. Under the current season structure the decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. The sablefish IFQ fishery is concurrent with the halibut IFQ fishery, which further reduces bycatch mortality." 3.2.2 – Worth noting that though the current fleet is less than 400 that "This is a significant reduction in capacity from the nearly 1,000 vessels fishing pre-IFQ, resulting in increased economic returns to each fisherman. The sablefish IFQ fishery runs concurrently with the halibut IFQ fishery, reducing operating costs to the fleet and resulting in the retention of fish that would have been released with some associated mortality." 3.2.2 – This clause notes provides an example in the GOA ex-vessel prices in 2004 which show: $ 1.691 per pound for sablefish, $0.102 per pound for pollock, and $0.251 per pound for Pacific cod. While the 2004 ex-vessel price looks impressive, a check on the 2011 price at one processor showed dressed weight prices from $7.50 to $9.10 depending on weight category of the fish. Dressed weight is not the same as round weight, and the official ex-vessel value will be a weighted average of the season's round weight price. But these numbers do illustrate the value of the sablefish fishery. 3.2.3 - The IFQ program takes the interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries into account. This was done in the design of the program elements that incorporated protections against consolidation by large vessels and freezer processors. These included: restricting of quota to size of vessel initially issued (categories <60' or >60'); restricting freezer vessels from purchase of catcher vessel quota shares; restricting purchase of quota to qualified crewmembers (those with experience in NPFMC fisheries); implementation of the Block program that left small blocks of quota {5,000 lbs} available for purchase by small entities; and a leasing program that limited leasing to encourage owners on board. www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf 3.2.3 – In the GOA – there is no CDQ program. The GOA program is a Community Quota Share (CQS) program, with much different goals and objectives than the CDQ program. 3.2.4 – The bird avoidance device is a "Tori line". The trawl wire that birds sometime hit is a "third wire". 3.2.6 – add: ***Fisheries Monitoring and Analysis (FMA):*** FMA oversees and runs the observer program for the NPFMC. Vessels carry onboard fishery observers to assess the biological and statistical parameters within the catch and bycatch of the groundfish fishery off Alaska. Additionally, they can collect information about threatened and endangered species and impacts on habitat or the ecosystem. This information is feed back into the stock analysis and will impact the annual harvest estimates or future FMP amendments.

www.afsc.noaa.gov/FMA/default.htm

3.2.7 – The correct term for the deep and shallow water flatfish contains the word "water". So it is "deep water flatfish" and "shallow water flatfish". Also – the Council has another program to reduce bycatch and discards: Improved Retention / Improved Utilization (IR/IU), which seeks to minimize discards and wastage.

Assessment Team response:

The Assessment Team acknowledges the requests for addition/changes. Additions have been made to the report as noted by the Peer Reviewer. Reference to the CDQ Program in the GOA has been removed and a new reference to the GAO CQE has been made.

B	**Science and Stock Assessment Activities**

4. **There must be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.**

This clause again rates a high rating on Evidence Adequacy. The document adequately describes the science that supports the stock assessment process used in the North Pacific off Alaska. Additional points of clarification to include in Sub-Clauses are:

4.1 - Additional whale depredation studies have been conducted under NPRB funded research. NPRB Projects: 0309, 0527 & 0626.

http://project.nprb.org/filter.do;jsessionid=F785139A950FADAD2338CDAC93CEC3C5

4.1.1 – That NMFS and ADFG collect data that is fully sufficient to produce stock synthesis analysis to annually determine OFL and TAC for the sablefish stock, enforce landings requirements, and certify that harvest quotas are not exceeded.

4.1.2 – insert "The eLandings procedure described above, the onboard observer assessment described below and the following information illustrate that the data collected is both timely and statistically reliable to produce stock synthesis analysis in order to annually determine OFL and TAC for the sablefish stock assessment."

4.2 - Vessels >60' and <125" carry an observer on 30% of their target harvest trips by quarter.

4.3 - The NPRB, whose research supports the NPFMC process, specifically sets aside research funds to study social or economic factors effecting coastal communities and incorporate Traditional Knowledge from native Alaskan communities. In particular the NPRB requires each of its research projects to conduct outreach to these communities and the public so that they become aware of the scientific research and analysis being conducted on their door step. Lastly, the NEPA process is incorporated into each NPFMC amendment that renews or modifies existing regulations. NEPA specifically requires the evaluation of social and economic data that is used in the analysis and will describe how the proposed action may impact the communities regarding those factors.

Assessment Team response:

The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer.

5. There must be regular stock assessment activities appropriate for the fishery resource, its range, the species biology and the ecosystem and undertaken in accordance with acknowledged scientific standards to support optimum utilization of fishery resources.

The need to have regular stock assessment activities appropriate for the fishery resource and the science behind it to support optimum utilization of the resource clearly rates "High" for this Clause. The NPFMC and the State of Alaska clearly support world class resources with world class science. Points of clarification to add to various Sub-Clauses are:

5.1 - These MSA mandates, and Council policy, require NMFS to conduct stock assessment and

research on the stocks for which they are responsible. In like manner, the state has mandatory obligations from its Constitution and Statutes that require stock assessments, research and analysis to meet MSY mandates.
5.2 – While this Clause speculates on the impact of fisheries on sablefish, it is important to understand that there are possibly significant ecosystem impacts. Coincident with warming oceans starting in 1977, the SAFE documents illustrate that all species of groundfish have increased dramatically since the early 1980's, meaning there is more competition for food for juvenile sablefish and more piscivorous groundfish predators that may impact juvenile sablefish. The SAFE notes that it seems possible that predation of sablefish by other fish is significant to the success of sablefish recruitment even though they are not a common prey item. While the main known juvenile sablefish predators are adult Coho and Chinook salmon, which prey on young-of-the-year sablefish during their pelagic stage, little is known about groundfish predation or competition. Juvenile sablefish are substantially dependent on benthic prey (18% of diet by weight) and the availability of benthic prey may be adversely affected by either fishing or competition.
5.3.1 ASMI is not a State agency. So I added the following: "ASMI is a public-private partnership between the State of Alaska and the Alaska seafood industry established to foster economic development of renewable natural seafood resources."
5.5 - Likewise, the NMFS has a similar federal regulations protecting confidentiality of data collected from reports required of processors, buyers, fishermen, and operators of commercial fishing vessels, and transporting companies. See MSA in section 402 (16 U.S.C. 1881a), which addresses information collection by NMFS and the confidentiality of that information. Regulations on the confidentiality of information collected under MSA can also be found at 50 CFR Subpart E (50 CFR sections 600.405 - 600.425).

5.5.1 – You should probably note that NMFS, NPFMC and ADFG staff all use the best available science in developing their comprehensive reports.
5.5.2 – While the NPFMC process has access to tremendous access to data resources, so absence of adequate scientific information is likely the result of data needs responding to new questions, changing conditions or new policy concerns which may need new information not currently collected. In these cases appropriate research must be initiated in a timely fashion. Such new requests require new research to supply answers for policy makers and management biologists. The NPFMC, SSC, ADFG and the NPRB annually develop a list of priority research needs based on such requests and seek funding to support management needs. Agencies look first within their own funding priorities and staff commitments to conduct new relevant research and may turn to the annual NPRB proposal cycle to seek funding if internal sources are not available.

Assessment Team response:
The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer.

C	**The Precautionary Approach**

6. The current state of the stock must be defined in relation to reference points or relevant proxies or verifiable substitutes allowing for effective management objectives and target. Remedial actions must be available and taken where reference point or other suitable proxies are approached or exceeded.

The precautionary approach for the NPFMC incorporates a sophisticated, complex and multifaceted set of safeguards to protect stocks from overfishing and to rebuild them if they decline due to fishing or ecosystem changes. Clearly a rank of "High" is deserved. The document adequately describes

these safeguards. I saw no additional points of clarification for the various Sub-Clauses.

Assessment Team response:
No response needed.

7. Management actions and measures for the conservation of stock and the aquatic environment must be based on the Precautionary Approach. Where information is deficient, a suitable method using risk assessment must be adopted to take into account uncertainty.

The NPFMC has adopted a structure of management that insures the conservation of the species and incorporates precautionary measures for target and non-target species harvest, bycatch and endangered species. This includes the harvest guidelines and strict limits on non-target species. Again, the "High" rating is clearly deserved and documentation is adequate. Additional points to add to the various Sub-Clauses are:

7.2.2 – This Clause needs a definitive link to "the early development of precautionary measures. I have added: "The MSA had always sought to prevent overfishing, and NPFMC guidelines adopted these early, resulting in a precautionary approach within their regulations. But until reauthorization of MSA in 1996, the mechanisms for accomplishing the objective with federal law did not exist. In that new version of MSA, changes to National Standard 1, incorporated the prevention of overfishing and the rebuilding of overfished resources. This new authority allowed the NPFMC to strengthen its precautionary measures." http://icesjms.oxfordjournals.org/content/56/6/853.full.pdf "Additionally, the development phase of the sablefish IFQ program sought to reduce excess capacity and bycatch, spread effort across the stock, and continue a season that provided protection for spawning stocks, and manage and enforce regulations toward a rational fishery."

Assessment Team response:
The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer.

D	**Management Measures**

8. Management must adopt and implement effective measures including; harvest control rules and technical measures applicable to sustainable utilization of the fishery, and based upon verifiable evidence and advice from available scientific and objective, traditional sources.

The NPFMC has a well developed set of management measures that provide for sustainable resource utilization. These include extensive scientific review and oversight of the various components that yield stock synthesis and exploitation analysis; including a very professional staff of analysts and scientific review teams. A rating of "High" is clearly justified in this section and the team has provided a clear description of the elements. Additional items of clarification to note are:

8.1 - ADFG similarly conducts research and data collection on the stocks it manages within state waters so that they can meet their mandate to manage resources sustainably and supply the BOF with the best science available for them to make management decisions. www.adfg.alaska.gov/index.cfm?adfg=fishingcommercial.main

8.2.1 - Lastly, the NPFMC advises the public through its newsletters and web pages so that the public will be knowledgeable about the proposed Council actions when they consult and collaborate. NMFS, ADFG and the BOF also provide such information access and outreach.

8.3 - Following domestication of the pre-IFQ fishery domestic operations expanded rapidly, leading to overcapitalization. The fixed gear fleet grew from less than 90 in 1982 to nearly 1,000 vessels by 1992. Season length decreased in the GOA from 12 months to 1-2 months, and in some areas, the open-access fishery shortened to 10 days; warranting the label "derby" fishery. Accompanying the

increase in vessel numbers was a doubling of individual fishing power with the appearance of circle hooks. Quality and price of sablefish suffered. IFQ management has increased fishery catch rates and decreased the harvest of immature fish. Vessel participation reduced from 700 when the program was initiated in 1995 to 389 by 2009. This is the balance of resource and fishermen the Council sought. www.fakr.noaa.gov/npfmc/resources-publications/ifqpaper.htm

- Under state management of Clause 8.3 add: "In the significant sablefish fisheries within state waters (Prince William Sound (PWS) and Southeast Alaska) the BOF utilized the constraints of the CFEC limited entry programs to develop an equal share fishery that mimics the benefits of the IFQ program. In Southeast all of the catch is equally divided, but in PWS half the GHL is divided equally among "registered" permit holders and the remainder is divided according to the percentages by vessel size."

8.5 – On the section on non-target fish bycatch – make the following changes: "~~The~~ A significant portion of the sablefish fishery's bycatch in some years consists of ~~catches significant portions of the~~ spiny dogfish and other ~~unidentified~~ sharks ~~total catch~~, but there is no distinct trend through time. The majority of this fishery's bycatch consists of ~~sablefish fishery catches the majority of~~ grenadier's ~~total catch~~ (average 66%) and this trend is stable. Sablefish fishery catches of other species is minor; and the use of circle hooks provides for safe release of unwanted bycatch."

8.5.1 – First describe that: "There is a well established observer program, harvest landing interviews and summer assessment surveys that collect important information about fish size, discards, and location of juveniles or spawners. Closed seasons protect spawners by regulation, and closed areas are currently only to protect endangered species."

Then at the end of this clause note: "Artisanal fisheries were protected by the design elements of the IFQ program. With vessel size categories to prevent consolidation in the larger vessels so that small vessels operating out of remote coastal villages would not be bought out by more prosperous fishers from urban communities. Additionally, the Block program, ownership limits, leasing options and other social constraints attempted to maintain the flavour of the small boat coastal fisheries. The program through its design reduced gear conflict and bycatch mortality, improved safety, product quality and price, which greatly improved the economic returns to the fleet. For a complete review of the changes and benefits see Pautzke and Oliver (1997). www.fakr.noaa.gov/npfmc/resources-publications/ifqpaper.htm"

8.5.2 – Note that the fleet almost exclusively uses circle hooks to expedite safe release of unwanted fish; and that pots have escape panels to stop ghost fishing if pots are lost.

Assessment Team response:

The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer.

9. There must be defined management measures, designed to maintain stocks at levels capable of producing maximum sustainable levels.

The NPFMC has met this clause by developing a restricted access program of IFQs and setting harvest levels to maintain sustainable spawning stocks. The section clearly describes the Council's program and the reasoning for the "High" rating. Additional points to clarify these Sub-Clauses are:

9.1 – It would seem prudent to start this Sub-clause with the statement: "When the open access fishery was in place, participation was difficult to judge. But with the annual issue of IFQ shares, eLandings and oversight of in season quota transfer, participation is accurately controlled and evaluated. " Also note that owner on board and the Transfer provisions supply adequate tracking of participation. And that "the ADFG collects eLandings and conducts harvest landings interviews to follow participation."

9.1.1 – this clause would benefit with some historical context. I suggest: "Following domestication of the pre-IFQ fishery domestic operations expanded rapidly, leading to overcapitalization. The fixed gear fleet grew from less than 90 in 1982 to nearly 1,000 vessels by 1992. Season length decreased in the GOA from 12 months to 1-2 months, and in some areas, the open-access fishery shortened to 10 days; warranting the label "derby" fishery. Accompanying the increase in vessel numbers was a doubling of individual fishing power with the appearance of circle hooks. Quality and price of sablefish suffered. IFQ management was implemented in 1995 and vessel participation reduced from 700 to 389 by 2009. This is the balance of resource and fishermen the Council sought. www.fakr.noaa.gov/npfmc/resources-publications/ifqpaper.htm "
And for the State note "The BOF used the state license limitation to develop an equal share program which mimicked the IFQ results of reducing capacity to match resource size."
9.2 – While stocks are not overfished, or is overfishing occurring, you might note that: "Council and BOF guidelines, state and federal regulations and MSA with its National Standards all define to management agencies what must be done if a stock becomes depressed." See evidence from clause 5.2 and 6.1.1 – 6.1.3.
9.3 – I believe that the first three lines of this sub-clause are incorrect. Suggest the following wording: "(Also see clause 3.2.3) Native Alaskans did not likely target this deep water species in historic times; it was out of the reach of their historic gear. But the NPFMC provided a 20% set aside of the fixed gear IFQ allocation to Western Alaskan villages a CDQ allocation of sablefish to consider the interests of subsistence, small-scale, and artisanal fisheries, under Amendment 15 to the BS/AI FMP. The purpose of the CDQ Program was to provide western Alaska fishing communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. The program was intended to help western Alaska communities to diversify their local economies and to provide new opportunities for stable, long-term employment. The original Council guidance for implementing the CDQ Program focused on using the allocations to develop a self- sustaining fisheries economy.

http://www.fakr.noaa.gov/regs/679c30.pdf"
Suggest you delete the Paragraph on NBSRA, I do not see how it is relevant here. It has little to do with sablefish.
9.4 – Add to the 1st paragraph: "The value of sablefish and the possibility of free quota shares resulted in a pre-IFQ fishery that attracted participation of nearly 1,000 vessels. Many participants used additional gear to pre-empt grounds from competing users. Grounds crowding pushed many fishermen off prime fishing areas onto marginal ones where bycatch of juvenile sablefish and non-target species was excessive. The implementation of IFQ has reduced those 1,000 vessels to less than 400 vessels today. With less competition and an extended season, the use of gear more evenly matches the quota held by a fisherman, and fishing is restricted to prime areas. (See also previous Clauses on bycatch reduction for further evidence.)"
9.5 – useful to note that most causes of loss were eliminated with implementation of the IFQ program. (see Sub-Clause 9.4)
9.6 – reference (See Clause 9.4 and others dealing with bycatch).
9.7 – note that national and international scientists all keep abreast of current developments in gear development and would advise each other of any new technology.
9.8 – On increasing stocks with artificial structure – you should note: "That sablefish are found in such deep water and do not seem to be attracted to structure, so there is no value to place artificial structure to increase stocks."

Assessment Team response:
The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer.

10. Fishing operations must be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.

The fisheries for the NPFMC have good access to educational and training facilities for skippers and crew. Also the IFQ program requires that any new purchaser of IFQ have at least 150 days at sea onboard a vessel in the North Pacific. This clause rates "High" and the team has adequately described the process. I have provided a few additional points:

10.1 - An element of the IFQ program is that any sablefish aspirant fisherman must have 150 days of NPFMC fishing experience before being able to purchase sablefish IFQs. Also, obtaining sablefish IFQ share most often will require the purchaser (aspirant sablefish fisherman) to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. This competence and professionalism is a learned experience, through proof of competence, with the culmination of entrants into the fishery starting at the level of deck hand and working their way up.

The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional sablefish crew members must pass. Training ranges from firefighting on a vessel, damage control, man- overboard, MARPOL, etc., and The Sitka-based Alaska Marine Safety Education Association alone has trained more than 10,000 fishermen in marine safety and survival through a Coast Guard-required class on emergency drills. http://www.npfvoa.org/ ; http://www.adn.com/2011/04/27/1832381/workplace-fatalities-fall-sharply.html#ixzz1Xt1ESQqh

Assessment Team response:
The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer.

E	**Implementation, Monitoring and Control**

11. An effective legal and administrative framework must be established and compliance ensured, through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.

The enforcement and legal/administrative aspects of the sablefish IFQ fishery are fully adequate to strictly manage the fishery; deserving a "High" rating. The team's description of this clause is clear and concise; I offer only minor additions:
11.3 – add: "Within state waters, ADFG and Alaska Wildlife Troopers are primarily responsible for enforcement, tough the USCG and NMFS Enforcement also participate."

Assessment Team response:
The Assessment Team acknowledges the requests for addition. Additions have been made to the report as noted by the Peer Reviewer.

12. There must be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.

This section is very complete and needs no additional comment. It again deserves a "High" rating.

Assessment Team response:
No response needed.

F	Serious Impacts of the Fishery on the Ecosystem

13. Considerations of fishery interactions and effects on the ecosystem must be based on best available science, local knowledge where it can be objectively verified and using a risk based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem must be appropriately assessed and effectively addressed.

This section covers the concerns of interactions of the fishery with the ecosystem. While the section does deserve a "High" rating, I found two sub-clauses that gave me pause, and should be reviewed. Also may I suggest a few minor additions:
Section 13.1.1 says "The state fishery is found to have had an adverse effect on the spatial/temporal distribution of the sablefish stock due to the spatial/temporal concentration of the catch. However, there are no observable lingering negative effects on the sablefish population." From my knowledge of the state water fishery and how conservative it is managed, this seems like a mischaracterization. I wonder if this is a quote from a minor document (gray literature) without peer review?

Section 13.1.2 indicates that 8 Sea Otters were taken in Aleutian Islands pot fishery. This is odd since adult sablefish are found at depths of 200 – 1000 m. Sea otters on average dive from 9 – 18 m, though one otter was thought to dive to 100 m. Finding 8 otters in pots set in water deeper greater than 200 m is very strange. I wonder if these were some other kind of pots from a different fishery?
13.2 – In the discussion on climate change, add: "While climate-related changes and/or competition or predation of juveniles from large groundfish stocks observed since the early 1980s are a possible causes for reduced productivity (See Clause 13.1.1)".

Assessment Team response:

Reviewer Comment:
"Section 13.1.2 indicates that 8 Sea Otters were taken in Aleutian Islands pot fishery. This is odd since adult sablefish are found at depths of 200 – 1000 m. Sea otters on average dive from 9 – 18 m, though one otter was thought to dive to 100 m. Finding 8 otters in pots set in water deeper greater than 200 m is very strange. I wonder if these were some other kind of pots from a different fishery?"

Assessment Team response:
The reviewer makes a good point. Sablefish and sea otters live mostly in different habitats and pot fishing at great depths should not entrap or entangle sea others. However, gear retrieval, especially with fish on, may attract sea otters in surface and near-shore environments. In this way, they may become entangled in fishing gear. More often, however, sea otter interactions seem to be infrequent events and their potential by-catch does not change the High rating for criteria 13.1.2.

The specific citation questioned from the Reviewer comes from a 2005 joint study by USFWS, USGS and the Alaska Sea Life Center. The report states that: "Each year, fishery observers monitor a percentage of commercial fisheries in Alaska and report injury and mortality of marine mammal's incidental to these operations. In 1992, fisheries observers reported eight sea otters taken incidentally by the Aleutian Island Black Cod Pot Fishery. During that year, 33.8% of the Bering Sea area groundfish fisheries were observed, resulting in a total estimate of 24 ± 3 sea otter mortalities for the Bering Sea groundfish fisheries in 1992. No other sea otter kills were reported by observer

programs operating in the region of the Southwest stock from 1993 through 2000 (Perez et al, 1999)."

In this context, the incidental take of eight sea otters in 1992, seems to be an anomaly; since subsequent years of observer data show only infrequent interactions with sea otters.

An additional source of information on the number of sea otters killed or injured in the fishery come from fisher self-reports required of vessel-owners by NMFS. In 1997, fisher self-reports indicated one sea otter kill in the BSAI groundfish trawl. Self-report records were incomplete for 1994, not available for 1995 and reported no kills or injuries in 1996. From 1998 through 2000, there were no further records of incidental take of sea otters by commercial fisheries in this region. Thus, during the period between 1996 and 2000 fisher self-reports resulted in an annual mean of 0.2 sea otter mortalities from interactions with commercial fishing gear. Credle *et al.* (1994) considered this to be a minimum estimate as fisher self-reports and logbook records (self-reports required during 1990-1994) are most likely negatively biased. For these reasons, lack of observer data, especially on small (< 60 ft) boats that fish closer to shore, may underestimate sea otter interactions.

Regardless, the fishery likely has little significant impact on sea otters. The USFWS report concludes: "Based on the available data, sea otter abundance in the Southwest stock is not likely to be significantly affected by commercial fishery interactions at present. The total fishery mortality and serious injury (0.2) is less than 10% of the calculated PBR (830) and, therefore, can be considered insignificant and approaching a zero mortality and serious injury rate (Wade and Angliss 1997). See:
http://alaska.fws.gov/fisheries/mmm/stock/finalsosoutheastalaska.pdf
http://alaska.fws.gov/fisheries/mmm/stock/finalsosouthcentralalaska.pdf

For these reasons, the consideration of sea otters does not affect the High rating for criteria 13.1.2.

Other marine mammals
In 2005, NOAA elevated the Alaska Bering Sea sablefish pot fishery to a Category II ranking, in their List of Fisheries (LOF) that result in incidental mortality or serious injury of marine mammals. The Category II ranking is pursuant to Section 118 of the MMPA (50 CFR 229.2) that requires all commercial fisheries to be placed into one of three categories, based on the frequency of incidental take (serious injuries and mortalities) relative to the value of potential biological removal (PBR) for each stock of marine mammal. In determining a Category II classification for the BSAI sablefish pot fishery, NOAA pointed to: "the total annual mortality and serious injury to humpback whales (Central North Pacific and Western North Pacific stocks) in this fishery is greater than 1% and less than 50% of each stock's Potential Biological Removal (PBR) level," to classify the fishery. See:
http://www.nmfs.noaa.gov/pr/interactions/lof/final2011.htm#table1_cat2
http://www.nmfs.noaa.gov/pr/pdfs/fisheries/2011final/ak_beringsea_sablefish_pot_final.pdf

As a result, owners of vessels or gear engaging in Category II fisheries are required to register with NMFS PRD to obtain a marine mammal authorization in order to lawfully take a marine mammal incidentally in their fishing operation (50 CFR 229.4).

It is interesting to note the classification of this fishery compared to decline from 226 in 1996 to only six participants in 2005. In 1996 the fishery received a Category III ranking (remote likelihood of known interactions). It was listed as Category III based on the total known serious injury and mortality level for harbour seal in the GOA was less than 10% of the stock's PBR. However, observer coverage levels were low and available data suggested that the level of serious injury and mortality might be more than 10% of the stock's PBR if observer information were available." Also, since 1995 NOAA has divided Alaska into GOA and BSAI management sectors.

Although it is worthy of note, the Category II listing for the Alaska sablefish pot fishery does not change its High rating for criteria 13.1.2.

References:

A Population Monitoring Plan for Sea Otters in Alaska. Prepared by the United States Fish and Wildlife Service, Marine Mammals Management Office, Anchorage, AK, The Alaska SeaLife Center, Seward, AK and The United States Geological Survey, Alaska Science Center, Anchorage, AK 99503. July 1, 2005. Page 4. See: http://alaska.fws.gov/fisheries/mmm/seaotters/pdf/Final%20Alaska%20Sea%20Otter%20Population%20Monitoring%20Plan%2001JUL2005.pdf

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Reviewer A:

"Section 13.1.1 says "The state fishery is found to have had an adverse effect on the spatial/temporal distribution of the sablefish stock due to the spatial/temporal concentration of the catch. However, there are no observable lingering negative effects on the sablefish population."" From my knowledge of the state water fishery and how conservative it is managed, this seems like a mischaracterization. I wonder if this is a quote from a minor document (gray literature) without peer review?

Assessor Response:

The reviewer makes a good point. The ADFG website provides a more recent overview of the spatial and temporal distribution of fishing effort and its most probable impacts on the environment. This should provide more relevant evidence related to the criteria. ADFG states:

"Although at a low level relative to the peak abundances of the late 1980s and early 1990s, the sablefish population in the GOA and BSAI is relatively stable. The population is neither overfished nor approaching an overfished condition. There are currently small, open access fisheries for sablefish in state waters in the North Gulf District of Cook Inlet and the Aleutian Island District. Although not currently problematic, such open access fisheries for high valued sablefish could result in fishing pressure sufficient to overtax management capabilities and/or result in localized depletion. Due to funding constraints and assessment complexity, there is currently an adequate stock assessment program for only one of five discrete sablefish fisheries within state waters."
See: http://www.cf.adfg.state.ak.us/geninfo/finfish/grndfish/grndhome.php

ADFG manages the five sablefish fisheries under several approaches. Fisheries in Prince William Sound, Chatham, and Clarence Strait have limited access restrictions. The Prince William Sound sablefish fishery is managed using a Guideline Harvest Level (GHL) derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population. Chatham Strait researchers conduct an annual stock assessment which includes a mark-recapture estimate of the population abundance.

Open access management applies to fisheries in Cook Inlet and the Aleutian Islands. ADFG established these two minor fisheries to provide open-access to fishermen that were not allowed to participate in the IFQ program. These fisheries are managed using a GHL, which is determined based on harvest history, fishery performance, and the federal survey for the area. See:
http://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management

In managing federal stocks, NOAA uses the number of longline sets as a proxy for habitat effects. Based on years of observer data and surveys they concluded: "The sablefish fishery since 1995 is an IFQ fishery, and as such, is largely dispersed in space and time" (2001 SAFE, Sigler *et al.* 2002). The 2009 SAFE also concluded that "the sablefish fishery largely is dispersed in space and time."

In contrast, the open-access state fisheries in state waters may lead to localized areas of heavy fishing and subsequent adverse impacts to habitats. Moreover, without a comprehensive IFQ system, state policy may shift fishing effort among districts. There are few data to support these conclusions. However we should recognize as evidence the ADFG statement that "open access fisheries for high valued sablefish could result in fishing pressure sufficient to overtax management capabilities and/or result in localized depletion."

While this is an important consideration these appear to be relatively small local effects without significant or observable impacts. As a result, this information does not change the High rating given to criteria 13.1.1.

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Peer Reviewer B review

Summary and Recommendation

The Alaska Sablefish fishery is managed in a way consistent with the FAO standard of sustainable fisheries. The MSA provides a strong legislative basis for sustainable fisheries management in the US. There is a high level of cooperation and coordination among management agencies and the Council in Alaska and this has operationalized the fisheries management objectives. Biological reference points have been defined for the species and these are continually used to determine annual total allowable catches. The data collection systems in place provide a strong scientific basis for stock assessment, research, and management. The analytical techniques used are "state of the art". Fisheries are well monitored, wastage through discarding is minimized, deleterious effects of fishing on the marine ecosystem are mitigated, and fishermen are actively engaged in management activities. Overall, this is a fine example of well managed fisheries.

Summary of review from Peer Reviewer B for each of the fundamental clauses 1-13

SECTION	
A	**Fisheries Management System**
1. There must be a structured and legally mandated management system based upon and respecting International, National and local fishery laws and considering other coastal resource users, for the responsible utilization of the stock under consideration and conservation of the marine environment.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
2. Management organizations must participate in coastal area management related institutional frameworks, decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and the avoidance of conflict among users.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
3. Management objectives must be implemented through management rules and actions formulated in a plan or other framework.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
B	**Science and Stock Assessment Activities**
4. There must be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.	

The assigned rating is consistent with the evidence presented here and in other sections of the report.

5. There must be regular stock assessment activities appropriate for the fishery resource, its range, the species biology and the ecosystem and undertaken in accordance with acknowledged scientific standards to support optimum utilization of fishery resources.

The assigned rating is consistent with the evidence presented here and in other sections of the report.

C	**The Precautionary Approach**

6. The current state of the stock must be defined in relation to reference points or relevant proxies or verifiable substitutes allowing for effective management objectives and target. Remedial actions must be available and taken where reference point or other suitable proxies are approached or exceeded.

The assigned rating is generally consistent with the evidence presented here and in other sections of the report. However, the complete harvest control rule is not fully described, or perhaps it hasn't been fully constructed yet. It is clear that the target biomass is B40% and the limit harvest rate is F35%. What is not clear in the documentation is how the harvest rate is reduced when the biomass falls below B40% and if there is a limit biomass below which fishing is ceased. B17.5% is mentioned, but at this level a rebuilding plan is required. However, there is no mention of a specific pre-determined process to be undertaken in this circumstance.

Assessment response

The sablefish stock complex in the BSAI and GOA is currently classified in Tier 3b of the ABC/OFL control rules. As such, $maxF_{abc} = F_{40\%} * (B/B_{40\%} - \alpha) / (1- \alpha)$, and harvest rates are reduced when the stock falls below B40 (in other words, there is an implicit accelerated rebuilding program built into the control rules because F is reduced as the stock fall below F_{msy}). Since $\alpha = 0.05$ as explained in the Goodman *et al.* review of 2003, we can see that if biomass was, for example, at $B_{40\%}$ level, then $(B/B_{40\%} - \alpha)$ would equal 0.95 (1 - 0.05). This would be divided by the second parenthesis which again would equal 0.95 (1 - 0.05). The ration between the two parenthesis would be 1 and the final result would be $F_{40\%} * 1$. If the estimated biomass was anywhere lower than $B_{40\%}$, then the result would be $F_{40\%}$ * "something less than 1", a mortality rate lower than $F_{40\%}$, allowing for stock rebuilding.
Further, the National Standard Guidelines require the Council to develop a rebuilding plan if a stock falls below MSST (1/2 MSY). A rebuilding plan would examine all sources of mortality from all fisheries, and provide additional reductions needed to bring the stock to fully rebuilt level (MSY) within 10 years.

The FMPs for GOA and the BSAI provide under section 3 determinations of "Overfishing" and "Overfished" status and that is important to understand how these determinations are made and the subsequent rebuilding actions are taken. This is provided below to explain the dynamics of fisheries approaching MSST and to answer the second question of the Peer Reviewer.

Overfishing and Overfished Status Determinations

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

Determination of "Overfishing" Status

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

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

Determination of "Overfished" Status

A stock or stock complex is determined to be —overfished if it falls below the MSST. According to the National Standard Guidelines definition, the MSST equals whichever of the following is greater: One-half the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years, if the stock or stock complex were exploited at the MFMT.

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

1) Direct estimates of *BMSY* (i.e., —the MSY level) are available for Tiers 1 and 2. For Tier 3, no direct estimate of *BMSY* is available, but *B35%* is used as a proxy for *BMSY*. For Tiers 4-6, neither direct estimates of *BMSY* nor reliable estimates of *BMSY* proxies are available. Therefore, the —overfished status of stocks and stock complexes managed under Tiers 4-6 is *undefined*.

2) For a stock assessed with an age-structured model (as is typically the case for stocks and stock complexes managed under Tiers 1-3), there is more than one stock size or numbers-at-age vector at which rebuilding to the MSY level would be expected to occur in exactly 10 years. Generally, there is no limit to the range of numbers-at-age vectors that satisfy this constraint, and each of these vectors corresponds to a stock size. Therefore, stock status in Tiers 1-3 is determined annually as follows: The determination of —overfished status begins with an estimate of the stock's —current spawning biomass, which is defined as the estimated spawning biomass for the —current year, which in turn is defined as the most recent year from which data are used in the assessment. Given these definitions, and with the understanding that *B35%* is used as a proxy for *BMSY* in Tier 3, the determination proceeds as follows:

a. If current spawning biomass is estimated to be below ½ *BMSY*, the stock is below its MSST.

b. If current spawning biomass is estimated to be above *BMSY* the stock is above its MSST.

c. If current spawning biomass is estimated to be above ½ *BMSY* but below *BMSY*, then conduct a large number of stochastic simulations by projecting the numbers-at-age vector from the current year forward under the assumption that it will be fished at the MFMT in every year, and determine status as follows:

1) If the mean spawning biomass in the 10th year beyond the current year is below *BMSY*, the stock is below its MSST.
2) Otherwise, the stock is above its MSST.

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

The MSA also requires identification of any fisheries that are —approaching a condition of being overfished, which is defined as a determination that the fishery —will become overfished within two years. The —approaching overfished determination is made by projecting the numbers-at-age vector from the current year forward two years under the assumption that the stock will be fished at *maxFABC* in each of those years, then determining whether the stock would be considered —overfished at that time. In more detail, the determination proceeds as follows:
a. If the mean spawning biomass for two years beyond the current year is below ½ *BMSY*, the stock is approaching an overfished condition.

b. If the mean spawning biomass for two years beyond the current year is above *BMSY*, the stock is not approaching an overfished condition.

c. If the mean spawning biomass for two years beyond the current year is above ½ *BMSY* but below *BMSY*, then conduct a large number of stochastic simulations by projecting the numbers-at-age vector from the current year forward under the assumption that it will be fished at *maxFABC* for two years, then at the MFMT for ten years, and determine status as follows:

1. If the mean spawning biomass in the 12th year beyond the current year is below *BMSY*, the stock is approaching an overfished condition.

2. Otherwise, the stock is not approaching an overfished condition.

In the event that a stock or stock complex is determined to be approaching a condition of being overfished, an in season action, an FMP amendment, a regulatory amendment or a combination of these actions will be implemented to prevent overfishing from occurring. In other words, fishing will be decreased or stopped accordingly.

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BSAI and GOA Fishery Management Plans.

7. Management actions and measures for the conservation of stock and the aquatic environment must be based on the Precautionary Approach. Where information is deficient, a suitable method using risk assessment must be adopted to take into account uncertainty.

The assigned rating is generally consistent with the evidence presented here and in other sections of the report.

D	**Management Measures**
8. Management must adopt and implement effective measures including; harvest control rules and technical measures applicable to sustainable utilization of the fishery, and based upon verifiable evidence and advice from available scientific and objective, traditional sources.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
9. There must be defined management measures, designed to maintain stocks at levels capable of producing maximum sustainable levels.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
10. Fishing operations must be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
E	**Implementation, Monitoring and Control**
11. An effective legal and administrative framework must be established and compliance ensured, through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
12. There must be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	
F	**Serious Impacts of the Fishery on the Ecosystem**
13. Considerations of fishery interactions and effects on the ecosystem must be based on best available science, local knowledge where it can be objectively verified and using a risk based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem must be appropriately assessed and effectively addressed.	
The assigned rating is consistent with the evidence presented here and in other sections of the report.	

9. Non-Conformances and Corrective Actions

Non conformances are categorized as minor, major and critical non conformances. Where the Assessment Team concludes that the available evidence does not meet the 'high' confidence rating for a specific clause of the Conformance Criteria, and on further clarification with fishery management organizations, the outcome remains unchanged; a non conformance may be raised against that particular clause.

Based on the high quality of information and reports available and through the course of consultation and witnessing the various management processes, the assessment team was highly confident of the responsible management that is demonstrated by the Alaska sablefish commercial fishery in accordance with the FAO-Based RFM conformance criteria. Only clause 4.2, the observer program, was scored with a medium confidence rating, all others with high confidence ratings. In conclusion, the assessment team has provided direction for items that should be specifically included in future surveillance activities to assess that the measures proposed by management are effectively carried out.

Future Fishery Surveillance

Items which were categorized as important by the Assessment Team for future surveillance activities include the developments on the Observer Restructuring Program with its related implications in improving bycatch and discards estimation in the sablefish fishery of Alaska. A table of important items for future surveillance audits has been included in section 6.2.

10. Recommendation and Determination

Conclusion

The Assessment Team recommend that the management system of the applicant fishery, the US Alaska sablefish commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ) is awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

Determination

The appointed members of the Global Trust Certification Committee met on 11th of October 2011 and decided that the applicant fishery, the US Alaska sablefish commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ) shall be awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

11. References

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Appendix 1

Alaska sablefish Assessors

Based on the technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd. confirmed the Assessment Team members for this fishery as follows.

Stephen Grabacki (Assessor)

Stephen Grabacki, FP-C, holds a Master of Science degree in Fisheries Biology from University of Alaska Fairbanks. He is a Certified Fisheries Professional, in the American Fisheries Society. Steve has 32 years of experience in Alaska's fisheries. He is President of GRAYSTAR Pacific Seafood, Ltd., a consulting company which provides technical services in fisheries biology, fishery management, and seafood quality. As Adjunct Professor at University of Alaska Anchorage, Steve has taught courses in Fisheries Management and Seafood Logistics. He serves on the Board of Directors of the Alaska SeaLife Center, and is a member of the Export Council of Alaska.

Herman Savikko (Assessor)

Herman Savikko holds a degree in Biological Sciences and began his career in fisheries in 1975, working seasonally each year for ADFG in remote locations, including four Bristol Bay river systems and the Karluk River on Kodiak Island. He worked for the NMFS at their Auke Bay Biological Laboratory and then returned to ADFG, working for the Divisions of Sport Fish, Fisheries Rehabilitation, Enhancement and Development, and the Division of Commercial Fisheries where he completed a 30-year state career. Responsibilities were in freshwater and marine species management, research, and policy development. Fisheries were those comprised under a Federal Fisheries Management Plan (FMP) including Bering Sea/Aleutian Island crab, federal groundfish in the Bering Sea and GOA, state-wide scallops, and Southeast Alaska troll salmon. State regulatory procedure was handled through participation in the BOF process for groundfish (e.g., parallel and state managed Pacific cod issues, sablefish limited entry issues, rockfish bycatch concerns), federal FMP species removals, season and gear determinations, and shellfish issues (e.g., category 2 and 3 management measures as identified under the BSAI Crab FMP). Activities included: changes to the fishery observer programs, both in review of electronic and onboard biological staff attributes; establishing protected waters under a provision to describe and identify essential fish habitat (EFH) for FMP fisheries, for the purpose of minimizing the extent of practicable adverse habitat effects caused by fishing; and identifying other actions to encourage the conservation and enhancement of fish habitat. He attended all NPFMC meetings, as well as the BOF meetings on crab and groundfish. Prepared and delivered the state's report (oral and written) at each Council meeting (Agenda "B" reports) and answered questions from Council members, NPFMC staff, NMFS staff, the Alaska Board of Fisheries and the public on the department's position and policies with regard to crab, scallops, Pacific cod and other species. During his career he worked for eight governors, seven commissioners, and twelve different directors.

Steve Nelson (Assessor)

Steve Nelson has over 20 years experience in marine resource management and fisheries. He holds a M.Sc. in Estuarine Ecology from George Mason University and a B.A. in Economics from the University of Virginia. He began his career at the EPA Chesapeake Bay Program where he served as scientific program manager for 7 years at the University of Maryland. Later, he worked as Director of the Tillamook Bay National Estuary Project for 4 years while serving as extension faculty at Oregon State University. Up to 1999 he led a program as Executive Director to develop a *Comprehensive Conservation and Management Plan (CCMP)* for Tillamook Bay, Oregon with Oregon State University/EPA with focus on salmon conservation, habitat restoration, and water quality improvements. From 1999 for 4 years he participated in a multi-disciplinary team to develop an eco-region conservation strategy for the Russian Far East, served as the aquatic resource specialist with focus on management of salmon and sturgeon species with the Wildlife Conservation society (WCS) and managed US Agency for International Development (USAID) projects to strengthen nature reserves and protected areas. In recent years he has conducted biodiversity assessments on Black Sea marine resources for the USAID and managed international coastal and fishery development projects (design and review projects related to marine protected areas, fisheries, and economic development). He has strong technical, management, and communication skills and a record of publications. He is also a researcher and PhD candidate at George Mason University with a focus on coastal management and fisheries.

Vito Ciccia Romito (Information Management, Technical Support)

Vito holds a BSc in Ecology and an MSc in Tropical Coastal Management (Newcastle University, United Kingdom). His BSc studies focused on bycatch, discards, benthic impact of commercial fishing gear and technical solutions, after which he spent a year in Tanzania as a Marine Research officer at Mafia Island Marine Park carrying out biodiversity assessments and monitoring studies of coral reef, mangrove and seagrass ecosystems. Subsequently, for his MSc, he focused on fisheries assessment techniques, ecological dynamics of overexploited tropical marine ecosystems, and evaluation of low-trophic species aquaculture as a support to artisanal reef fisheries. Since 2010, he has been fully involved through Global Trust with the FAO-based RFM assessment and certification program covering the Alaska salmon, halibut, sablefish and pollock fisheries; and the Icelandic haddock, saithe and redfish fisheries.

Deirdre Hoare (Assessor, Validation Report stage)
Deirdre has a BSc. and MSc. in Marine Zoology. She has worked in fisheries stock assessment as an observer on international projects in NAFO and Ireland. For the last 5 years she worked as a Fisheries Assessment Analyst and as a Scientific and Technical Officer for the Marine Institute in Ireland. This work involved fisheries research and stock assessment for ICES working groups. The work also involved coordination and management of a Fisher Self sampling program in the Irish Sea, with particular emphasis on spatial and temporal discard measurement tools.

Dave Garforth (Lead Assessor)

Dave Garforth, BSC, HDip. (Applied Science), MSC has been involved in fisheries and aquatic resources for over 20 years. Currently, managing Global Trust FAO based Fishery Certification Program, with experience in the application of ISO/IEC Guide 65 based seafood certification systems and a professional background in numerous fishery assessments. Previous professional background includes; Development Officer in the Irish Sea Fisheries Board, supply chain and trade experience at Pan European Fish Auctions, the control and enforcement of fisheries regulations as a UK Fishery Officer. Dave is also a lead, third party IRCA approved auditor.

Appendix 2

Based on the technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd. confirmed the external peer review team members for this Alaska sablefish fishery as follows.

Alan Sinclair

Alan Sinclair recently retired from a fisheries research career with Fisheries and Oceans Canada. His research included stock assessment methods and application with a recent emphasis on management strategy evaluation through feedback loop simulation and the application of the Precautionary Approach in achieving sustainable fisheries. He studied changes in fish population demographic characteristics including growth, juvenile survival, and adult natural mortality and the implications of these changes on productivity and management reference points. He investigated geologic and oceanographic factors influencing the spatial distribution of fish species, and the influence of environmental factors on recruitment. He worked with a number of national and international fisheries organizations including the Pacific Scientific Advice Review Committee (PSARC) chair of Groundfish Subcommittee; Canadian Atlantic Fisheries Advisory Committee (CAFSAC) chaired the Groundfish Subcommittee, the Statistics Sampling and Surveys Subcommittee; NAFO stock assessments and symposia; ICES annual science conferences, symposia and working groups; PICES annual science conference. He participated in fishery stock assessment meetings as reviewer and presenter in PSARC, CAFSAC, NAFO, ICES, and US National Marine Fisheries Service (NMFS) Stock Assessment Review (STAR) Panels. Alan Sinclair is currently a member of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) where he is the co-chair of the Marine Fishes Species Specialist Subcommittee.

Earl Krygier

Earl E. Krygier gained a BSc in Science, an MSc from the Department of Fisheries and Wildlife, and completed a Ph.D Doctoral Thesis (on the role of nursery areas for juvenile English sole off Oregon) at the Oregon State University. From 1989 to 2008 he worked for ADFG's Commercial Fisheries Division as Extended Jurisdiction Program Manager with primary responsibility on state policy coordination of state, national and international marine fishery matters (research, conservation and management, and policy development), provided support for ADFG's Commissioner in carrying out his NPFMC's responsibilities and acting as the Commisssioner's alternate (1989-1997).

Earl represented ADFG at the IPHC for 19 years, and he was state representative at the Donut Hole and the U.S./Russian ICC meetings. He sat as alternate for the Commissioner on the North Pacific Research Board (NPRB); represented ADFG on Alaska's CDQ Allocation Team; advised department staff, the Alaska BOF members, the Alaska Legislature and other state officials on NPFMC activities; and proposed management plans, long-range policies and regulatory implications, or inter-jurisdictional issues arising from Council actions. He coordinated ADFG's staff activities at the NPFMC and recommended policies and strategies to the director, commissioner and other state officials in regards to extended jurisdictional fisheries.

Earl coordinated the State's conservation and management policy for halibut at the NPFMC, the PFMC and the IPHC, that resulted in proper halibut bycatch management; stock utilization; equitable

Alaska subsistence, sport and commercial harvests; helping ensure that development of CDQs and IFQ was done in accordance with conservation & management objectives, fairly and equitably for user groups. From 2008 to present times he is the Owner/Manager of KEE Biological Consultants and served as the Marine Conservation Alliance Foundation's (MCAF) Cooperative Research Coordinator, implementing MCAF's marine research activities in Alaska in cooperation with state or federal agencies, academia, the seafood industry and other interested parties.

Appendix 3

Certification summary

Alaska Sablefish (Black-cod) Commercial Fishery Certification

Certification Recommendation

A positive Certification determination has been awarded for the U.S. *Alaska Sablefish (commonly known as black cod) Commercial Fishery,* against the United Nations, Food and Agriculture Organization (FAO) based Responsible Fisheries Management (RFM) Conformance Criteria, by a Global Trust Certification Committee on October 11th 2011, after independent assessment of the Alaska sablefish commercial fishery. The assessment was performed at the request of Alaska Seafood Marketing Institute (ASMI).

The Certification covers the Alaska sablefish *(Anoplopoma fimbria)* commercial fishery employing demersal longline, pot and trawl gear within Alaska jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

A Global Trust Certification Committee, composed of fishery, certification and accreditation experts, was tasked with a qualitative review of the formal processes, assessment reports and recommendations provided by the fishery Assessment Team and Peer Reviewers appointed to assess this fishery. The Certification Committee unanimously agreed with the Assessment Team's findings that the applicant Alaska sablefish commercial fishery is responsibly managed by effective management organizations, using robust fishery management plans and practices based on objective science and information.

The resulting certification communication for the Alaska sablefish commercial fishery is: *'Certified Responsible Fisheries Management'*.

This Certification delivers high confidence that reliable management systems are in place to properly assess and respond to any current and evolving issues and allow the fishery to continue on the path of sustainable and responsible management. These management systems are certified as being in line with those recommended by the FAO Code of Conduct for Responsible Fisheries (1995) and FAO Guidelines for the Eco-Labeling of Fish and Fishery Products from Marine Capture Fisheries (2005) and amended/extended in 2009.

This Certification demonstrates responsible management for the sustainable use of the fisheries and is a realistic and tangible communication for this standard and process. The Certification lasts for five years and it involves annual surveillance assessments of the fishery. This Certification means that the Alaska sablefish commercial fishery has met the criteria for certification of responsibly managed fisheries at the point in time of the assessment. This certification does not certify that the fisheries

will remain responsibly managed in the future. Thus the reason there are annual surveillance assessments and a full re-assessment every 5 years.

The Alaska sablefish commercial fishery achieved high conformity against almost all FAO RFM Conformance Criteria. Clause 4.2 however, achieved a medium rating as the sablefish commercial fishery has limited observer coverage at present. Nonetheless, there is substantial evidence available that describes the on-going activities and plans that are under way to improve observer coverage in the sablefish fishery. The consequences of observer coverage mainly relate to the accuracy of the current bycatch estimates in the sablefish fishery. These bycatch species include mainly grenadiers and spiny dogfish.

The Assessment Team findings were supported by evidence from the various management organizations (NMFS, NPFMC) and outcomes from the NPFMC Scientific and Statistical Committee and Advisory Panel discussion documents. Various options have been investigated and debated. These include the use of on vessel video cameras, a possible solution to the difficulties of accommodating observers on relatively small vessels used in the sablefish fishery. Based on this information and through direct consultation and witnessing of NPFMC meetings, the Assessment Team were confident that management entities were following a responsible course with respect to fishery improvements. The separate peer review evaluations also supported a positive decision for certification. A vast amount of information has been collated and recorded regarding the applicant fishery, all of which were considered in the assessment. The assessment findings have been documented in a 250 page Full Assessment and Certification Report.

The assessment process has layers of governance and transparency. The assessment was conducted by Global Trust Certification according to (International Standards Organization) ISO Guide 65:1996 procedures for FAO-based Responsible Fisheries Management Certification. ISO Guide 65 is the international accreditation criteria for bodies offering product and process certification. The ISO Guide 65 assessment, certification and decision process is governed by the accreditation bodies of the International Accreditation Forum (IAF). Global Trust Certification is accredited the Irish National Accreditation Board (INAB) who is a member of IAF.

The established FAO Criteria for the fishery assessment were based on key standard documents. These documents included the FAO-based Responsible Fisheries Management Conformance Criteria (Version 1, July 2010), as derived from FAO Code of Conduct for Responsible Fisheries (1995), and the minimum criteria set out for marine fisheries in the FAO Guidelines for the Eco-Labeling of Fish and Fishery Products from Marine Capture Fisheries (2005/2009). Certification for the Alaska sablefish commercial fishery is for a 5-year period after which the fishery will re-enter full assessment. In the intervening years, the fisheries will be subject to annual surveillance assessments to confirm that the fishery continues to meet the requirements for certification. The Full Assessment and Certification Report will be made available for download on request at Global Trust and ASMI's websites:

www.GTCERT.com and http://sustainability.alaskaseafood.org/black-cod-certification

Summary of the Process

ASMI, on behalf of Alaska sablefish commercial fishery, submitted an application to Global Trust Certification for a formal assessment of the Alaska sablefish commercial fishery to the requirements of the FAO-Based Responsible Fisheries Management (RFM) Certification Program. The Application was received in April 2010 (Table 1).

After an initial Validation Assessment (Table 2) was completed by Global Trust in October 2010, an expert Assessment Team was formed to undertake the full assessment. The five person team was composed of independent assessors (Table 3) with expert competency in fishery science, the Alaska sablefish fishery, the Alaska management system and the FAO-based RFM assessment criteria.

The Assessment Team's report was peer-reviewed by two additional independent experts (Table 4) before being submitted to a formal Global Trust Certification Committee (Table 5) for an independent certification decision.

Key factors and issues evaluated, documented and judged by the Assessment Team included:

A. The Fisheries Management System

The Magnuson Stevens Act (MSA) is the primary domestic legislation governing management of the United States marine fisheries. In 1996, the United States Congress reauthorized the MSA to include, among other things, a new emphasis on the precautionary approach in U.S. fishery management policy. In federal waters (3-200 nm), Alaska sablefish fisheries are managed by the NPFMC and the NMFS Alaska Regional Office, subject to their Groundfish Fishery Management Plans (FMPs). NPFMC recommends regulations to govern the directed sablefish fisheries in waters off Alaska; and makes allocation decisions among sablefish users and user groups fishing off Alaska. NPFMC sablefish management measures include a TAC which is divided among gear types and an Individual Fishing Quota (IFQ) program for the majority of fixed gear. Fixed gear (longlines and pots) harvest around 85% of the sablefish quota and trawl gear about 15%.

In 1995, the NPFMC and NMFS implemented an IFQ system for the Alaska sablefish (and halibut) industry, which has significantly decreased the number of vessels in the fishery, increased season length and gross income, as well as decreasing bycatch and reducing gear losses and the related ghost fishing effects. The NMFS conducts stock surveys, stock assessment reports and a multitude of biological and environmental studies, and in connection with the United States Coast Guard (USCG) enforces regulations. These agencies, and all of their activities and decisions, are subject to the MSA. The Groundfish FMPs are written and amended subject to MSA and govern the management of the fisheries.

In state waters (0-3 nm), sablefish fisheries catch around less than 10% of the total Alaska landings and are managed and regulated by the ADFG and the BOF outside the IFQ program. State and federal management is interlinked and full cooperation between federal and state agencies allows effective and responsible management. State fisheries include two minor state fisheries in Cook Inlet and the Aleutian Islands and three major state fisheries in Prince William Sound, Chatham and Clarence Strait. These fisheries, similarly to the federal ones, are governed under state specific fishery management plans and/or regulations. These include the Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC 28.640). 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272, and

Southeast Alaska State managed sablefish (Chatham and Clarence strait) regulations are specified under 5AAC28 Groundfish Commercial Fisheries Regulations. The Alaska Wildlife Troopers enforce fisheries regulations in state waters.

The NPFMC's management arrangements and decision making processes for the fishery are organized in a very transparent manner, and actively encourages stakeholder participation, and all Council deliberations are conducted in open, public session. Similarly, the BOF process is transparent, and open to all stakeholders. Both federal and state agencies provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The GOA and BSAI sablefish stocks are both considered to be parts of the same stock, but separate from sablefish further south along the west coast of North America. They are not considered to be trans-boundary and hence there are no formal co- management arrangements with other countries.

The NMFS and the NPFMC participates in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. Additionally, under the Coastal and Marine Spatial Planning (CMSP) framework objective of the National Ocean Policy, the U.S. will be subdivided into nine regional planning areas of which Alaska/Arctic region will be one entity. Each region will have a corresponding regional planning body consisting of Federal, State, and tribal representatives to develop regional goals, objectives, and ultimately regional CMS plans. CMSP has been initiated in some states. Other states, like Alaska, are in the development phase to implement CMSP.

The NPFMC assesses economic, social and cultural value of the fishery resources in order to assist decision-making, allocation and use. Also, the coastal zone is monitored as part of the coastal management process using physical, chemical, biological, economic and social parameters. Involvement includes a multitude of federal and state agencies and programs.

B. Science and Stock Assessment Activities

The NMFS and ADFG collect fishery data and conduct fishery independent surveys to assess the sablefish fishery and ecosystems in GOA and BSAI areas. GOA and BSAI Stock Assessment and Fishery Evaluation (SAFE) reports provide complete descriptions of data types and years collected. Fishery data is collected from fixed gear (longline and pot) vessels which target sablefish in the IFQ fishery and trawl fisheries that catch sablefish as retained bycatch in other fisheries such as rockfish and sole. Records of catch and effort for these vessels are firstly recorded through the e-landing (electronic fish tickets) catch recording system, secondly collected by observers and thirdly, recorded by vessel captains in voluntary and required logbooks. The Restricted Access Management Division of NMFS tracks in-season catches and IFQ balances. Real-time accounting of individual harvests contributes significantly to accurate and timely management of each IFQ holder's IFQ accounts and supports in-season transfers.

Fishery data from the Observer Program are available since 1990. Observers report age, length, and CPUE data for selected vessels. Vessels between 60 and 125 feet carry an observer 30% of the time and vessels >125 feet carry an observer 100% of the time. Since 1999, logbooks have been required for vessels >60 feet. Vessels <60 feet are not required to carry observers or submit logbooks but many do participate in a voluntary logbook program formed in 1997. The NMFS implemented observer program is at present in restructuring phase. The new observer program aims at increasing

observer coverage in the <60 feet vessel portion of the fleet and employ the coverage more systematically to allow a scientifically sound catch recording coverage system.

The mission of the NMFS Alaska Fisheries Science Center (AFSC) is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. The AFSC operates several laboratories (including Auke Bay Biological Lab and the National Marine Mammal Lab), and extensive fisheries monitoring and analysis sections and divisions.

The NMFS's AFSC conducts longline sablefish surveys to collect catch, effort, age, length, weight, and maturity data. These domestic longline surveys provide an accurate index of sablefish abundance. AFSC describes survey protocol on their website. From 1979-1994, the AFSC conducted cooperative annual longline surveys initially with Japan, and then independently from 1987 to present. The fixed station positions are divided among six NPFMC management areas: Bering Sea, Aleutian Islands, Western GOA, Central GOA, West Yakutat, and East Yakutat/Southeast. Stations are placed 30-50 km apart, and gear is set from 150-1000 m at each slope station. Catches are pooled by management area and an abundance index is computed for use in stock assessment and fishery evaluation reports.

Trawl surveys of the upper continental slope that adult sablefish inhabit have been conducted biennially or triennially since 1980 in the Aleutian Islands, and 1984 in the GOA. Trawl surveys of the Eastern Bering Sea slope were conducted biennially from 1979-1991 and standardized for 2002, 2004, and 2008. Trawl surveys of the Eastern Bering Sea shelf are conducted annually.

The sablefish population is represented with an age-structured model. The assessment uses a statistical, forward-projecting age structured model which estimates population numbers and mortality rates separately for male and female sablefish. The model is fitted using data on catches, length/age compositions and CPUE from the fisheries, and several series of abundance indices and associated age or length compositions from longline and trawl surveys. The 2008 model represents an incremental improvement over the one developed in the 2007 assessment, by making better use of survey age data and reducing the number of parameters describing fishery selectivity. The current model configuration follows a more complex version of the GOA Pacific ocean perch model with split sexes to attempt to more realistically represent the underlying population dynamics of sablefish.

For state-managed fisheries, ADFG also has a well-developed research capacity. The state's Policy and Planning Committee establish research priorities. For example, in 1988, the department began annual longline research surveys in both NSEI and SSEI to assess the relative abundance of sablefish over time and differing environmental conditions. This data is used to describe the age and size structure of the populations and detect recruitment events. ADFG standardized survey methods with NMFS survey. Mark-recapture studies for sablefish are also carried out in Southeast Alaska. The two minor Cook Inlet and the Aleutian Islands open-access fisheries are managed using a Guideline Harvest Level (GHL), which is determined based on harvest history, fishery performance, and the federal survey for the area. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model.

The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current

fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST).

The Economic and Social Sciences Research Program within NMFS's Resource Ecology and Fisheries Management (REFM) Division provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs. The AFSC's Economic and Social Sciences Research (ESSR) Program has been preparing the implementation of the Alaska Community Survey, an annual voluntary data collection program initially focused on Alaska communities for feasibility reasons, in order to improve the socio-economic data available for consideration in North Pacific fisheries management.

C. The Precautionary Approach

The MSA is the primary domestic legislation governing management of the nation's marine fisheries. In 1996, the United States Congress reauthorized the MSA to include, among other things, a new emphasis on the precautionary approach in U.S. fishery management policy.

For the past 25 years, the Council management approach has incorporated forward-looking conservation measures that address differing levels of uncertainty. Recognizing that potential changes in productivity may be caused by fluctuations in natural oceanographic conditions, fisheries, and other, non-fishing activities, the Council states that it intends to continue to take appropriate measures to insure the continued sustainability of the managed species. It will carry out this objective by considering reasonable, adaptive management measures, as described in the MSA and in conformance with the National Standards, the Endangered Species Act, the National Environmental Policy Act, and other applicable law.

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The first element of the precautionary approach is the Optimum Yield (OY) for the groundfish complexes in the Bering Sea / Aleutian Islands (BSAI) and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The range for BSAI is 1.4 to 2.0 million mt while the range for GOA is 116 to 800 thousand mt. These total groundfish harvest limits the total groundfish harvest that can be taken from the BSAI and GOA marine ecosystems, effectively adopting a conservative ecosystem approach to fisheries.

The second element of precautionary approach is the *Tier* system, based on knowledge and uncertainties of the stock in question. NPFMC inaugurated the Tier system in fisheries management: the harvest control rule depends on the amount of information available. The less the information about a given stock, the more conservative is the catch allowed. Currently, sablefish in Alaska is managed under tier 3, where sufficient information is available to determine a target biomass level, which would be obtained at equilibrium when fishing according to the control rule with recruitment at the average historical level.

The third element of the precautionary approach is the OFL, ABC and TAC system. Allowable Biological Catch (ABC) is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. Overfishing Level (OFL) is a limiting catch level, corresponding to fishing at MSY level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. In application, the NPFMC sets TAC ≤ ABC < OFL. Since 1981, actual groundfish harvests have averaged approximately 90% of the

cumulative TAC and 65% of the cumulative ABC because of the complex array of accountability measures governing these fisheries. By-catch from a given stock is limited by a Maximum Retainable By-catch amount (MRB), which is determined as a percentage of retained catch (not including arrowtooth flounder).

The harvest control rule is a biomass-based rule, for which fishing mortality is constant when biomass is above the target and declines linearly down to a limit value when biomass drops below the target. Model projections indicate that the sablefish stock is neither overfished nor approaching an overfished condition. Projected 2011 spawning biomass is 37% of unfished spawning biomass. Spawning biomass has increased from a low of 30% of unfished biomass in 2002 to 37% projected for 2011. NPFMC estimated the posterior probability that projected abundance will fall below thresholds of 17.5% [minimum stock size threshold (MSST) or limit reference point] of the unfished spawning biomass based on the posterior probability estimates over the next 14 years. The probability was 0. In NPFMC settings, thresholds are defined in the Council harvest rules. These are when the spawning biomass falls below MSY or *B35%* and when the spawning biomass falls below ½ MSY or *B17.5%* which calls for a rebuilding plan under the MSA. The harvest rate decreases to zero if spawning biomass reaches the MSST.

D. Management Measures

The management system for the NPFMC groundfish fisheries is a complex suite of measures comprised of harvest controls—e.g., OY, ABC, TAC, OFL—effort controls (ITQs, licenses, cooperatives), time and/or area closures (also known as habitat protection, marine reserves), by-catch controls (PSC limits, retention and utilization requirements), monitoring and enforcement (observer program, social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions and to avoid seabirds).

IFQ management of the sablefish fishery has increased fishery catch rates and decreased the harvest of immature fish. Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota from eight to five percent of landed value, a savings averaging U.S.$3.1 million annually. The shift from an open-access to an IFQ fishery has nearly doubled catching efficiency, while it has reduced the number of hooks deployed. The IFQ fishery likely has also reduced discards of other species because of the slower pace of the fishery and the incentive to maximize value from the catch. Under the major State managed sablefish fisheries, the use of an equal quota share system is very much like individual fishery quotas, and produces similar efficiencies. Spawning potential of sablefish, expressed as spawning biomass per recruit, increased nine percent for the IFQ fishery. Additional goals of the IFQ Program were to keep the historic fleet structure of the fishery, limit and discourage corporate ownership, limit windfall profits to participants granted quota, discourage speculative entry, and reward participants who invested in the fishery (long-time participants and active participants).

MSFCMA's National Standard 9 governs federal regulators. It states that 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. Regulations in place address waste, discard, bycatch, and endangered species interactions in the sablefish fisheries. The NMFS promulgates these regulations through the NPFMC. In this respect, specific regulations were put in place intended to reduce the incidental mortality of the short-tailed albatross and other seabird species with revision in 1998 and 2008. The short-tailed albatross is a listed species under the Endangered Species Act (ESA).

The BOF enacted changes to state law, mirroring regulations within state waters for groundfish fisheries. These measures now include the use of streamer (tory) lines, night setting, line shooter and lining tubes, have been shown to reduce seabird interactions when setting or retrieving gear.

The NMFS and the ADFG have well-established regulations on fishing seasons and legal gear use. Discards of sablefish in the longline fishery are small, typically less than 5% of total catch. The catch of sablefish in the longline fishery typically consists of a high proportion of sablefish, 90% or more. However at times grenadiers may be a significant catch and they are almost always discarded. The trawl fishery operates under strict maximum retainable allowances for sablefish. The discards from trawl fisheries decreased from a 1994-2003 average of 825 t to an average of 262 mt for 2004-2009, while hook and line fisheries decreased slightly from 525 t down to 462 t.

Three gear types may be used to harvest sablefish in the GOA and BSAI – demersal longline (a passive gear type), pots (= traps, another passive gear type), and trawl (an active gear type). All of these gear types must be marked and operated in accordance with federal fisheries regulations – 50 CFR Part 679: Fisheries of the Exclusive Economic Zone off Alaska. Similar requirements apply to sablefish fisheries in state waters. Longline gear is the gear that lands the vast majority of sablefish. Longline and the manner of fishing have been developed over a long period of time to be selective of target species. Pot gear use mandates the inclusion of escape devices, should the pot be lost. The Alaska Administrative Code 5 AAC 39.145, as well as federal regulations under 50 CFR 679.2 state that pot gear in Alaska crab and bottom fish fisheries is required to have an escape mechanism consisting of an opening closed by 100% cotton twine.

The IFQ fishery in Alaska is carried out by experienced and competent fisherman. Obtaining sablefish IFQ share most often will require the purchaser (aspirant fisherman) to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. This competence and professionalism is a learned experience with the culmination of entrants into the fishery starting at deck hand level working their way up through proof of competence.

Fishing specific training is available from places including the Alaska Maritime Training Center (AMTC). AMTC's goal is to promote safe marine operations by effectively preparing captains and crew members for employment in the Alaskan maritime industry. The AMTC is a United States Coast Guard (USCG) approved training facility located in Seward, Alaska, and offers USCG/STCW-compliant maritime training.

E. Implementation, Monitoring and Control

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) monitor and enforce Alaska fisheries laws and regulation. Sablefish landings must be reported to NMFS via its mandatory "e-landings" reporting system. Commercial harvests of pollock, sablefish and halibut are the primary enforcement responsibilities of OLE. The IFQ, Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities.

In any given year, OLE Agents and Officers spend an average 10,000-11,000 hours conducting patrols and investigations, and an additional 10,000-11,000 hours on outreach activities. The OLE maintains 19 patrol boats around the country to conduct a variety of patrols including Protected Resources Enforcement Team (PRET) boardings, protection of National Marine Sanctuaries and various undercover operations.

Information collection and monitoring of logbook information and fish tickets at landing is carried out by NMFS's OLE. In addition, they inspect and cross check at landings and processors records for reconciliation.

The MSA provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy). NOAA's OLE Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL). GCEL can then assess a civil penalty in the form of a Notice of Permit Sanctions (NOPs) or Notice of Violation and Assessment (NOVAs), or they can refer the case to the U.S. Attorney's Office for criminal proceedings. For perpetual violators or those whose actions have severe impacts upon the resource criminal charges may range from severe monetary fines to boat seizures and/or imprisonment may be levied by the United States Attorney's Office.

Sanctions include the possibility of temporary or permanent revocation of fishing privileges. Withdrawal or suspension of authorizations to serve as masters or officers of a fishing vessel are also among the enforcement options. Within the USA EEZ, penalties can range up through forfeiture of the catch to forfeiture of the vessel, including financial penalties and prison sentences.

For the state fisheries, the Alaska Wildlife Troopers (AWT) have increased undercover fisheries operations for sport and commercial fisheries over last 3 years. A fully staffed investigations unit dedicates time to commercial investigations. This includes cooperation, as jurisdictionally appropriate, with USCG and NMFS OLE.

F. Serious Impacts of the Fishery on the Ecosystem

NPFMC and NOAA/NMFS conduct assessments and research on environmental factors on sablefish and associated species and their habitats. Findings and conclusions are published yearly in Stock Assessment and Fishery Evaluation Report, the annual Ecosystem SAFE documents, and research reports. The SAFE reports include sections for 1) Ecosystem effects on the stock; and 2) Effects of the sablefish fishery on the ecosystem. SAFE reports also describe results of first-order trophic interactions for sablefish from the ECOPATH model, an ecosystem modeling software package. The Resource Ecology and Ecosystem Management group at the AFSC provides up-to-date ecosystem information and assessments in annual *Ecosystem Considerations* documents. These annual reports include an ecosystem assessment, contributions with updated status and trend indices, and ecosystem-based management indices and information for the Bering Sea, Aleutian Islands, and the Gulf of Alaska ecosystems. These documents accompany the groundfish stock assessment reports presented to the North Pacific Fishery Management Council each fall.

NOAA also supports the Fisheries And The Environment (FATE) program with focus on the development, evaluation, and distribution of leading ecological and performance indicators. In 2010, FATE projects included a study to integrate environmental variables into sablefish recruitment and stock assessment models. Furthermore, the *Final Programmatic Supplemental Environmental Impact Statement for the Alaska Groundfish Fisheries* (PSEIS) (NMFS 2004) provides information about the effects of the fishery on the ecosystem and effects of the ecosystem on the groundfish fishery. It evaluates the historical effects of the spatial concentration of the state fishery and regime changes on sablefish stocks.

The PSEIS document provides evidence that physical oceanographic factors, particularly climate, have a controlling influence on biological community composition in the BSAI and GOA. An important conclusion drawn from these studies is that any effects of human activities on the marine environment should be considered in the context of the powerful physical forces that appear to be driving the BSAI and GOA ecosystems. Total biomass of commercially-fished species in shelf and slope areas had increased since 1984, despite a considerable, concurrent increase in harvest effort. At the same time, the abundances of unexploited (or underexploited) species including skate, some shark species, forage species, arrowtooth flounder, and other flatfish had increased. The controlling factor for these increases appeared to be environmental, with changes in community species composition in nearshore areas linked to an increase in advection in the Alaska Coastal Current. Scientists concluded that cyclical weather patterns increased flow around the GOA and enhanced the supply of nutrients and plankton on the shelf and upper slope areas, resulting in higher productivity.

Young-of-the-year sablefish prey mostly on euphausiids and copepods while juvenile and adult sablefish are opportunistic feeders. Larval sablefish abundance has been linked to copepod abundance and young-of-the-year abundance may be similarly affected by euphausiid abundance because of their apparent dependence on a single species. The dependence of larval and young-of-the-year sablefish on a single prey species may be the cause of the observed wide variation in annual sablefish recruitment.

In considering the impacts of the fishery on the ecosystem, researchers have defined possible concern for benthic species in habitat areas of particular concern (HAPC), seabirds, and by-catch of grenadiers, spiny dogfish, and other shark species. The sablefish fishery catches the majority of grenadier total catch (average 66%) and the trend is stable. The trend in seabird catch is variable but appears to be decreasing, presumably due to widespread use of measures to reduce seabird catch. Sablefish fishery catches of other species is minor. In order to protect endangered short-tailed albatross in other North Pacific fisheries, NMFS required seabird avoidance measures to be used by vessels fishing for Pacific halibut and sablefish in U.S. EEZ waters off Alaska in 1998 (63 FR 11161). As of 2004, longline vessels over 26 ft LOA are required to use either single or paired streamer lines (or in some cases for smaller vessels, a buoy bag line) to reduce incidental take of seabirds.

In 1992, fisheries observers reported eight sea otters taken incidentally by the Aleutian Island sablefish pot fishery. No other sea otter takes were reported from observed fisheries in the range of the southwest stock from 1993 through 2000. Killer and sperm whales frequently take fish directly from commercial fishing gear as it is retrieved. Interactions with commercial longline fisheries are well-documented throughout the BSAI. The placing of metallic beads throughout longline gear is been experimented to repel whales from plucking sablefish off longlines.

While it is possible that longlines could move small boulders it is unlikely fishing would persist where this would often occur. Relative to the effect on living structures and relative to the effect by bottom tending mobile gear, a significant effect of longlines on bedrock, cobbles, or sand is not easily envisioned.

Further Information

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Table 1: Fishery Application Summary

Applicant Contact Information			
Organization/ Company Name:	Alaska Seafood Marketing Institute on behalf of the Alaska sablefish commercial fishery	Date:	April 2010
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Nominated Deputy:	***As Above***		
Deputy Phone:	As Above	**Deputy** **E-mail Address:**	**rrice@alaskaseafood.org**

Table 2: Schedule of Key Assessment Activities

Assessment Activities	Date (s)
Application Date	April 2010
Initial Site Visit Consultation Meetings	June –July 2010
Initial Validation Assessment Report	October 2010
Appointment of Full Assessment Team	September- October 2010
On-site Witnessed Assessment and Consultation Meetings	November and December 2010
Draft Assessment Report	August 2011
External Peer Review	September 2011
Final Assessment Report	October 2011
Certification Review/Decision	11th October 2011

Table 3: Global Trust Assessment Team Members

Assessor	Role	Assessor	Role
Dave Garforth, Global Trust Certification Ltd. Quayside Business Park Dundalk, Co. Louth Ireland	Assessment Leader	**Deirdre Hoare,** Global Trust Certification Ltd. Quayside Business Park Dundalk, Co. Louth, Ireland	Assessor (Validation report only)
Vito Ciccia Romito, Global Trust Certification Ltd. Quayside Business Park Dundalk, Co. Louth Ireland	Technical support, Information management.	**Herman Savikko,** Douglas, Alaska USA	Assessor
Stephen Grabacki, Anchorage, Alaska USA	Assessor	**Steve Nelson** Arlington, Virginia USA	Assessor

http://sustainability.alaskaseafood.org/black-cod-certification

Table 4: Peer Reviewers

Alan Sinclair	Earl Krygier
Alan Sinclair recently retired from a fisheries research career with Fisheries and Oceans Canada. His research included stock assessment methods and application with a recent emphasis on management strategy evaluation through feedback loop simulation and the application of the Precautionary Approach in achieving sustainable fisheries. He studied changes in fish population demographic characteristics including growth, juvenile survival, and adult natural mortality and the implications of these changes on productivity and management reference points. He investigated geologic and oceanographic factors influencing the spatial distribution of fish species, and the influence of environmental factors on recruitment. He worked with a number of national and international fisheries organizations including the Pacific Scientific Advice Review Committee (PSARC) chair of Groundfish Subcommittee; Canadian Atlantic Fisheries Advisory Committee (CAFSAC) chaired the Groundfish Subcommittee, the Statistics Sampling and Surveys Subcommittee; NAFO stock assessments and symposia; ICES annual science conferences, symposia and working groups; PICES annual science conference. He participated in fishery stock assessment meetings as reviewer and presenter in PSARC, CAFSAC, NAFO, ICES, and U.S. National Marine Fisheries Service (NMFS) Stock Assessment Review (STAR) Panels. Alan Sinclair is currently a member of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) where he is the co-chair of the Marine Fishes Species Specialist Subcommittee.	Earl E. Krygier: BSc in Science, MSc from the Department of Fisheries and Wildlife, and a Ph.D Doctoral Thesis (on the role of nursery areas for juvenile english sole off Oregon) from the Oregon State University. From 1989 to 2008 he worked for ADFG's Commercial Fisheries Division as Extended Jurisdiction Program Manager with primary responsibility on state policy coordination of state, national and international marine fishery matters (research, conservation and management, and policy development), provided support for the ADFG's Commissioner in carrying out his NPFMC's responsibilities/acting as his alternate (1989-1997). Earl represented ADFG at the IPHC for 19 years, and he was state representative at the Donut Hole and the U.S./Russian ICC meetings. He sat as alternate for the Commissioner on the North Pacific Research Board (NPRB), representing ADFG on Alaska's CDQ Allocation Team; advising department staff, the Alaska BOF members, the Alaska Legislature and other state officials on NPFMC activities, proposed management plans, long-range policies and regulatory implications, or inter-jurisdictional issues arising from Council actions. Earl coordinated the State's conservation and management policy for halibut at the NPFMC, the PFMC and the IPHC, that resulted in proper halibut bycatch management; stock utilization; equitable Alaska subsistence, sport and commercial harvests; helping ensure that development of CDQs and IFQ was done in accordance with conservation & management objectives. From 2008 to present times he is the Owner/Manager of KEE Biological Consultants and served as the Marine Conservation Alliance Foundation's (MCAF) Cooperative Research Coordinator.

Table 5: Certification Committee Members

<table>
<tr><td colspan="2">Bill Paterson, Chairperson
Legal / Technical /Certification and Accreditation Expert
Global Trust Certification Ltd.</td></tr>
<tr><td>Ciaran Kelly
Fishery Management Expert
Marine Institute. Ireland</td><td>Clare Murray
Fishery Scientist
Global Trust Certification Ltd.</td></tr>
<tr><td colspan="2">Vito Ciccia Romito: Fishery Scientist /Information Management
Global Trust Certification Ltd. (Fishery Presentation to Certification Committee only)</td></tr>
<tr><td colspan="2">Dave Garforth: Fisheries and Certification Expert
Global Trust Certification Ltd. (Fishery Presentation to Certification Committee only)</td></tr>
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