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

For The

US Alaska Pacific Halibut Commercial Fishery

(200 mile EEZ)

Applicant Group

US Alaska Pacific Halibut Commercial Fishery

Facilitated By:

Alaska Seafood Marketing Institute (ASMI)

June 2011

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I. Summary and Recommendations

Summary

The Alaska Seafood Marketing Institute (ASMI), on behalf of the Alaska commercial Pacific halibut fishery, has requested assessment of the US Alaska commercial Pacific halibut 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 28th April 2011.

Pacific halibut (*Hippoglossus stenolepis*) is the species of focus in this Assessment and Certification Report. The Pacific halibut commercial fishery employs benthic longline gear within the International IPHC's Regulatory Areas 2C, 3A, 3B, 4A, 4B, and 4CDE, within Alaska jurisdiction (200 nautical miles EEZ), under international (IPHC), federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG)] management.

The FAO Code was 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 FAO CCRF and the Audit Checklist 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 Code contains sections with differing focuses, only the sections and clauses relevant to Responsible Fisheries Management 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 Alaska Pacific halibut commercial fishery has a structured and legally mandated international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management regime. The management system is based upon and respects international and national fishery laws. Amendments in the IPHC Treaties of 1930 and 1937 authorized the division of the coast into areas and the limitation of the halibut catch in each of US and Canada's Regulatory Areas. The IPHC performs stock assessment and halibut biology research as well as apportioning catch limits among Regulatory Areas.

The NPFMC's Amendment 15 and 20 to the Groundfish Fishery Management Plan (FMP) established Individual Fishing Quotas (IFQ) and Community Development Quotas (CDQ) system for the Alaska halibut and sablefish fishery. The NPFMC recommends and implements regulations (i.e. IFQ, CDQ) to govern the directed Alaska halibut fisheries and makes allocation decisions among commercial (and incidental), sport, and subsistence halibut users and user groups fishing off Alaska. NMFS performs scientific research (groundfish trawl surveys, marine mammals and habitat conservation) and is responsible for developing, implementing and enforcing regulations in US waters. ADFG licenses sport fishing, and monitors and reports on sport and subsistence halibut harvests.

The Alaska Coastal Management Plan (ACMP) and National Environmental Protection Act (NEPA) process includes all activities, developments and stakeholders which exist and utilize the coastal resources of Alaska. All NPFMC fisheries-related packages go through full NEPA review. Conflict avoidance and resolution is dealt through NPFMC, IPHC and Board of Fisheries meetings. The IFQ System and the NMFS' Restricted Access Management entry program control commercial capacity. Monitoring of the Alaska coastal environment from a social, economic and environmental perspective is carried out by a large number of state, federal and international bodies.

B. Science and Stock Assessment Activities

The IPHC and related managing organization collect and analyze effective fishery data (dependent and independent) systems for Pacific halibut stock management purposes. The annual IPHC Pacific halibut stock assessment uses data from commercial landing reports (fish tickets), commercial logbooks, port sampling (size and age) of commercial landings, IPHC setline surveys (halibut surveys with juvenile/adult and non-halibut bycatch estimation as well as birds monitoring), and fishery agencies in both countries that report estimates of halibut (i.e. NMFS' Observer Program Groundfish Fisheries) and non-halibut bycatch (i.e. NMFS Trawl Surveys, IPHC stock assessment surveys), sport catch (i.e. NMFS logbooks & ADFG Surveys), and subsistence catch (i.e. NMFS SHARC permits).

Data on commercial catches, and on size-at-age, are the foundation of the IPHC coastwide age-structured stock assessment model. The IPHC Constant Harvest Rate policy since the 1980's is set to "harvest 20% of coastwide exploitable biomass (adult males and females) when spawning biomass (adult females) are estimated above 30% of the unfished level. The harvest rate is linearly decreased towards zero as the spawning biomass approaches 20% of the unfished level.

IPHC is aware of the decreasing trend in size at age of the Pacific halibut stock. Nonetheless, halibut total biomass is increasing. Interspecific competition with other flatfish is thought as the most likely cause for the decrease in size at age.

The 2011 IPHC standardized setline stock assessment survey will cover 28 regions, from southern Oregon to the Bering Sea, Aleutian Islands and Puget Sound. IPHC also participates in the NMFS annual Bering Sea shelf trawl survey since 1998. IPHC has a Seattle staff of 27 including a fisheries statistics program manager, quantitative scientists, data transcribers, biologists, port & sea samplers, survey managers and operators etc… that carry out stock assessment surveys and halibut biology studies, yearly producing stock assessments reports and related documents.

The halibut fleet has currently no directed observer coverage. Nonetheless, NMFS and NPFMC are in the process of restructuring the Groundfish Observer Program to include the halibut fleet and improve halibut and non halibut bycatch estimates. The new observer program may employ Electronic Monitoring (EM) technology in halibut vessels shorter than 60 feet. The program is estimated to be up and running by 2013.

C. The Precautionary Approach

The lowest spawning biomasses (able to produce strong year classes) for the three IPHC core areas all occurred in mid 1970s at approximately 9 million pounds in Area 2B, 13 million pounds in Area 2C and 42 million pounds in Area 3A. By definition, these become the spawning biomass limits reference points. The combination of harvest rate and precautionary levels of biomass protection have, in simulation model studies, provided a large fraction of maximum available yield minimizing risk to the spawning biomass, while allowing for the quickest stock recovery to at least, threshold levels (female spawning biomass at 30% of unfished levels).

A newly adopted (January 2011) Slow Up-Full Down (SUFullD) policy allows for 33% increase and 100% decrease in Catch Limit difference from one year to the following, depending on biomass projections, ultimately aiming at increasing Pacific halibut biomass. The 2011 female spawning biomass value of 350 million pounds established their current biomass as 43% of unfished levels, up from a 2010 beginning of year 38% estimate. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas.

The halibut fleet is highly regulated and subjected to defined fishery data collection systems, operating under an IFQ system, with conservatively defined catch quotas, gear restrictions, size limits, and closed seasons and areas. In addition, if halibut bycatch limits (Prohibited Species Catch) are reached in the groundfish fisheries, or if areas with if high concentrations of halibut juveniles are recorded, fishery and area closure measures are adopted respectively.

D. Management Measures

The IPHC recognizes that US agencies wish to adhere to domestic allocation limits but effective controls remain to be implemented through a Catch Sharing Plan in 2012 for the sport and commercial Pacific halibut fishery. For the sport fishery IPHC recommends continuation of a one-fish daily bag limit with an additional restriction that the retained fish must be no smaller than 37 inches. IPHC strives for improving annual stock assessment and quota recommendations, developing information on current management issues, and adding to knowledge of the biology and life history of halibut. Management actions are in place to increase knowledge of bycatch dynamics in the directed halibut longline fishery (i.e. restructuring the groundfish observer program, implementation of EM technology and related bycatch implications).

In terms of technical gear measures, scarelines, night setting, lineshooters and lining tubes are used to avoid diving birds, and circle hooks are compulsory for safe release of bycatch or juvenile halibut. Also, the Alaska Longline Fishermen's Association has secured funding to develop a real-time rockfish bycatch reporting network for the Eastern GOA, to decrease the bycatch of this valuable fish.

Furthermore, to address non-halibut bycatch issues in the halibut fishery, a working group composed of scientists from NMFS' Alaska Fishery Science Center (AFSC), NMFS' Alaska Regional Office (AKRO), ADFG, IPHC, and NPFMC was formed in January of 2010. The goal of this group is to investigate quantitative methods to estimate incidental catches in the unobserved halibut IFQ fishery and report its findings to the Plan Teams and NPFMC. In addition to this, the restructuring of the observer program, to provide coverage in the unobserved halibut IFQ fishery, has important implications for direct and sufficient collection of bycatch data.

The NPFMC has established Marine Protected Areas that benefit juvenile fish and adult spawners. The Halibut Longline Closure Area is 36,300 square miles in size. Additional trawl closures for areas in the waters of Bristol Bay provide some degree of refuge for juvenile halibut.
Any aspirant halibut fisherman must have 150 days of proved halibut fishing experience before being able to purchase halibut IFQs. A range of courses are available for fishermen who want to improve their fishing related skills.

E. Implementation, Monitoring and Control

Within the American EEZ off Alaska, the NMFS Office of Law Enforcement (OLE), and the U.S. Coast Guard (USCG) enforce Alaska fisheries laws and regulations, especially 50CFR679. All landings of halibut must be reported to NMFS via its mandatory "e-landings" reporting system. Commercial harvests of pollock, halibut and sablefish are the primary enforcement responsibilities of OLE. The IFQ, Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities. There is no legal harvesting of halibut in North Pacific waters outside the national jurisdiction of the USA or Canada. Similarly, there is no halibut harvesting by American vessels in Canadian waters, or by Canadian vessels in American waters.

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 boarding and patrols. Working with federally-deputized state marine enforcement agents and the U.S. Coast Guard, the OLE is able to garner even more patrol hours. The Alaska Wildlife Troopers (AWT) have increased undercover fisheries operations for sport and commercial fisheries over last 3 years. Monitoring of all logbook information and fish tickets is carried out by NMFS' OLE. In addition, they inspect and cross check at landings and processors records for reconciliation, and closely monitor Prohibited Species Catch in non-halibut fisheries for halibut bycatch.

The Magnuson-Stevens Act provides four basic enforcement remedies for violations (50CFR600.740 enforcement policy; CFR means "Code of Federal Regulations"). Withdrawal or suspension of fishing authorization is among the enforcement options available. NOAA's Office of General Counsel for Enforcement and Litigation can then assess a civil penalty, or they can refer the case to the U.S. Attorney's office for criminal proceedings. For repeat violators or those whose actions have severe impacts upon the resource, criminal charges may range from severe monetary fines, boat seizures and/or imprisonment. An essential element of the enforcement effort is the public perception of a high level of patrol and enforcement, which creates the view that "It doesn't pay to cheat".

F. Serious Impacts of the Fishery on the Ecosystem

Once every five years, the North Pacific Fishery Management Council conducts a complete review of its Essential Fish Habitat (EFH) program and, on an annual basis there is a Stock Assessment and Fisheries Evaluation (SAFE) process that looks at a broad set of Ecosystem Considerations prior to the Council setting annual harvest rates and limits.

In the directed Pacific halibut longline fisheries, non-halibut bycatch is not well documented. Management actions are in place in respect to increasing knowledge on the bycatch dynamics of the IFQ halibut fleet via a restructuring of the NMFS-managed groundfish observer program.

Longline vessels are required by regulation to use seabird avoidance devices. Birds avoidance measure now include the use of streamer (tory) lines, night setting, lineshooters and lining tubes, which have been shown to reduce seabird interactions when setting or retrieving gear.

The short-tailed albatross is protected in Alaska waters by the Endangered Species Act (ESA). The limit is 4 birds during each 2-year period for the BSAI and GOA hook-and-line (i.e. halibut fishery) groundfish fisheries. Since 2002 IPHC has collected seabird occurrence data on IPHC stock assessment surveys.

Yelloweye rockfish (*Sebastes ruberrimus*) are taken in the GOA halibut fishery as bycatch. The Alaska Longline Fishermen's Association has secured funding to develop a real-time rockfish bycatch reporting network for the Eastern GOA.

Although marine mammals are known to interact with halibut longline gear, bycatch is virtually non-existent.

Whales and otariids (sea lions and fur seals) may selectively eat hooked groundfish species such as Pacific halibut and sablefish directly from the longline gear as the line is retrieved by the vessel. A recent NMFS report on marine mammals interaction in the groundfish fisheries recounts that no Steller sea lion or other otariids were by-caught between 2000 and 2004. Also, non-harmful interactions with killer and sperm whales have been documented between 1998 and 2004 in the BSAI and GOA halibut fishery.

Through 2010, sharks were by-caught and managed as part of the "other species complex" in NPFMC's Groundfish Fishery Management Plan (FMP). Starting in 2011, sharks will be treated under a distinct "sharks complex". Spiny dogfish are by-caught in the halibut fishery and are Vulnerable to Extinction under the International Union for Conservation of Nature (IUCN) Red List. Nonetheless, the Alaska population appears to be stable. Also, preliminary study results indicate dogfish status in the GOA at 80%-90% the theoretical population carrying capacity. Improvement for calculating rockfish, skates and sharks bycatch and discards estimates are being addressed through a multi-agency plan.

Benthic longline gear effect on bottom habitats is generally mild to none. In addition, halibut bait species are well managed by either the State of Alaska or NMFS, and none are classified as endangered or threatened to extinction. Several projects to obtain information about environmental changes, ecosystem status and management of the Pacific halibut fishery are being conducted.

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

Outcome summaries of the Full Assessment and Certification Report can be found in Section 6.

Recommendation of the Assessment Team

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

Peer Reviewers summaries and recommendations

The Pacific halibut fishery Assessment Report was reviewed by two external Peer Reviewers. Their reports can be found in Section 8 of this report.

Peer Reviewer A's main summary and recommendation states:

The IPHC is recognized worldwide as a model institution for international collaboration and cooperation in providing scientific and technical advice for managing a transboundary resource. In combination with the NPFMC, NMFS, and ADFG (and other associated management agencies) the Alaska Pacific halibut commercial fishery is extremely well managed and a testament to what can be done when effective research, policies and procedures are put in place. The evidence presented in this assessment is supportive of a favourable assessment relative to the FAO standard.

Peer Reviewer B's main summary and recommendation states:

I have completed a thorough review of the document that assesses the US Alaska Pacific Halibut Commercial Fishery within the 200 mile EEZ for an FAO-based analysis of responsible fisheries management leading to certification. In my previous position I had spent nearly 20 years participating in direct US management at the level of the North Pacific Fisheries Management Council or oversight of the international management (IPHC) of the halibut fishery. This includes knowledge of commercial, sport and subsistence fisheries and the groundfish fisheries which bycatch halibut. The document of certification presented a true and clear assessment of the fishery, its management, the research and the implications of management on the stakeholders. The drafting team adequately addressed the FAO criteria and provided sufficient evidence that supported "High Adequacy Ratings" for the vast majority of the sub-clauses supporting the 14 FAO main criteria. While I have included a fairly extensive set of section by section, item by item set of comments; my comments are meant to bolster the analysis rather than detract from the quality of the document. Without my comments, the essence of the report still leads to a conclusion that the Pacific Halibut Fishery is clearly one of the best managed fisheries in the world, and clearly merits certification.

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 28th of April 2011. After detailed discussion, the Committee determined that the applicant fishery, the US Alaska Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management, fished with benthic longline (within Alaska's 200 nm EEZ) is 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	October 2010
Appointment of Full Assessment Team	September- October 2010
On-site Witnessed Assessment and Consultation Meetings	Nov and Dec 2010
Draft Assessment Report	February - mid April 2011
External Peer Review	10th-25th April 2011
Final Assessment Report	27th April 2011
Certification Review/Decision	28th April 2011

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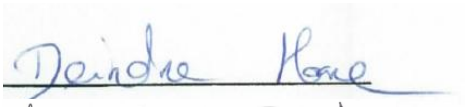
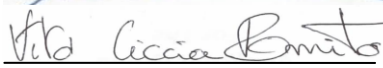
Signature: 

Signature: 

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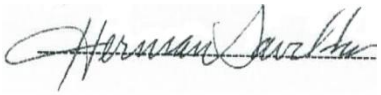
Signature: 

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IV. Acronyms

ACMP	Alaska Coastal Management Plan
ADFG	Alaska Department of Fish and Game
ASMI	Alaska Seafood Marketing Institute
BoF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CCRF	Code of Conduct for Responsible Fisheries
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
IPHC	International Pacific Halibut Commission
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
OLE	Office for Law Enforcement
PNP	Private Non-Profit
PSC	Pacific Salmon Commission
PWS	Prince William Sound
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation
TAC	Total Allowable Catch

1. Introduction

The US Alaska commercial Pacific halibut (*Hippoglossus stenolepis*) fishery, employing benthic longline gear in IPHC's Regulatory Areas 2C, 3A, 3B, 4A, 4B, and 4CDE, within Alaska jurisdiction (200 nautical miles EEZ), under international (IPHC), federal (NMFS)/(NPFMC) and state (ADFG) management, was assessed against the requirements of the FAO-Based RFM Certification Program. The application was made by the ASMI on behalf of the Alaska commercial Pacific halibut 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 halibut 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 Pacific halibut 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 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/halibut-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 external 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 28th April 2011, according to the requirements of ISO/IEC Guide 65 accredited certification.

1.1 Recommendations of the Assessment Team

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

2. Fishery Applicant Details

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3. Background to the Fishery

3.1. Species Biology

Pacific halibut, or *Hippoglossus stenolepis* [from the Greek *hippos* (horse), *glossa* (tongue), *steno* (narrow), *lepis* (scale)], is one of the largest species of fish in the world, with some individuals growing to over eight feet in length and over 500 pounds. Large specimens are routinely caught in the commercial and sport fishery. Its scientific name was first proposed in 1904 by P.J. Schmidt, a Russian scientist who noted anatomical differences such as scale shape, pectoral fin length, and body shape that distinguished it from the Atlantic halibut (*Hippoglossus hippoglossus*).

The range of Pacific halibut that the International Pacific Halibut Commission (IPHC) manages covers the continental shelf from northern California to the Aleutian Islands and throughout the Bering Sea (Figure 1). While not managed by the IPHC, Pacific halibut are also found along the western North Pacific continental shelf of Russia, Japan, and Korea.

The eastern north Pacific halibut resource is presently managed under the assumption that a single, fully-mixed population exists from California through the eastern Bering Sea. This theory rests largely upon studies that indicate there is northwest larval drift balanced by migration of juveniles and adults to the southeast, over broad geographic expanses, together with tag recovery data showing extensive movement of fish.

A new IPHC genetic microsatellite study, with samples collected in Russia and on the American/Canadian coast, will confirm in 2011 if there are significant genetic differences between the two stocks.

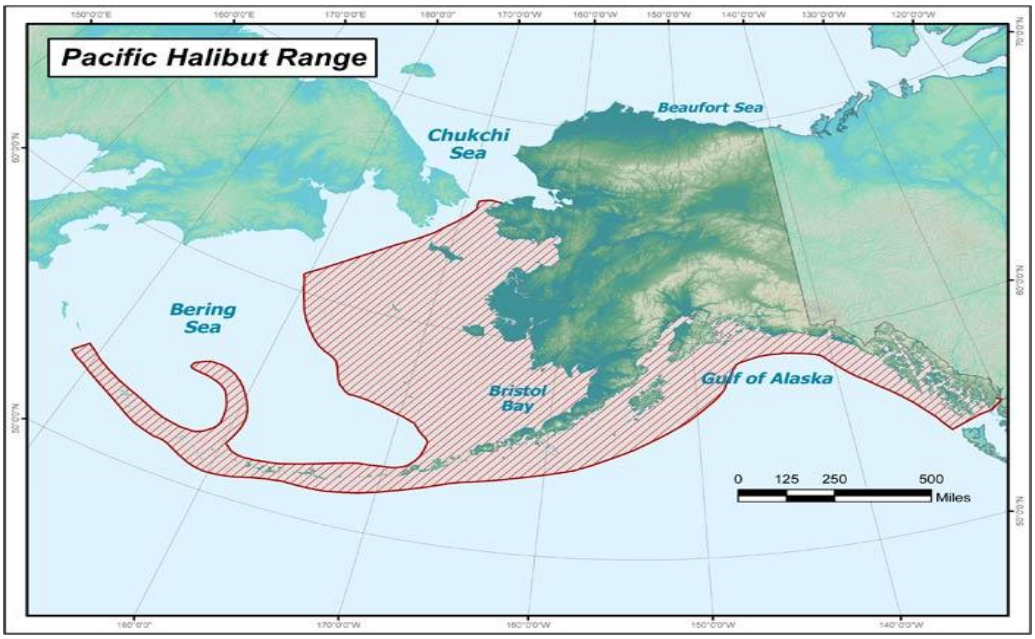

Figure 1. Pacific halibut (*Hippoglossus hippoglossus)* range within Alaska's 200 mile EEZ (http://www.adfg.alaska.gov/index.cfm?adfg=halibut.rangemap).

Halibut spawn between November and March. Though it is believed they spawn annually, there is evidence to suggest they may reproduce every other year. Halibut have been reported from as deep as 1100 m and the IPHC presently uses a depth of ~550 m to define the summertime limit of halibut habitat based on survey catch rates. However, detailed reports of depth-specific distribution are lacking, especially during winter.

Pop-up Archival Transmitting tag data have recorded periods where halibut swim up off the bottom and drift back down to the sea floor, repeating this several times. While this behavior is not fully understood, it seems to conform with "spawning rises" witnessed in other flatfish, where females move up into the water column to release eggs while accompanying males fertilize them. This mechanism would allow for better egg dispersal. Numbers of eggs vary with female size: a 50-pound (23 kg) fish produces around 500,000 eggs while a 250 lb (113 kg) one may produce over 4 million.

After about 15 days, the drifting eggs hatch. It is now that interspecific competition for resources (i.e. food, living space) with other flatfish species (arrowtooth flounder) starts. The larvae are neutrally buoyant and are transported by ocean currents, sustained by their large yolk until the early post-larva stage. During development, a post-larva can travel hundreds of miles in the Alaska Stream, which runs counter-clockwise in the Gulf of Alaska (GOA). Six months after hatching, young halibut have developed the characteristics of the adult form and are ready to settle in the shallows of inshore areas.

Using the ear-bone, or otolith, IPHC researcher can tell fish age by counting the growth rings. While the oldest fish can be over 50 years old, Pacific halibut are generally pre-teens (8 to 12 years old) when they are large enough to meet the minimum size limit for the commercial fishery of 32 inches.

Pacific halibut (Figure 2) are carnivorous. Larvae feed on zooplankton, while halibut from 1 to 3 years old feed on small shrimp-like organisms and small fish. Larger Pacific halibut feed on fish, with the percent of the diet occupied by fish increasing with size and age. They consume other abundant or commercially important species such as walleye pollock (*Theragra chalcogramma*), Pacific cod (*Gadus macrocephalus*), saffron cod (*Eleginus gracilis*), Pacific herring (*Clupea pallasi*), Japanese sardine (*Sardinops melanostictus*), capelin (*Mallotus villosus*), Pacific sandlance (*Ammodytes hexapterus*), Atka mackerel (*Pleurogrammus monopterygius*), sandfish (*Trichodon trichodon*), arrowtooth flounder (*Atheresthes stomias*), yellowfin sole, (*Limanda aspera*), sculpins (Cottidae), salmon (*Oncorhynchus* spp.), eelpouts (*Lycodes* spp.), snailfishes (*Liparis* spp.), crabs, shrimps, squids, and octopi. In addition, halibut have been found to occasionally leave the bottom to feed on other species of fish.

Figure 2. Pacific halibut (http://www.iphc.washington.edu/research/biology.html).

Key references:

- http://www.iphc.washington.edu/research/biology/development.html
- http://www.iphc.washington.edu/publications/rara/2010/2010.315.ExaminationofgeneticpopulationstructureinPacifichalibut.pdf
- http://www.iphc.washington.edu/publications/scirep/SciReport0082.pdf
- http://www.iphc.washington.edu/sport/114-sport-faqs.html
- http://www.iphc.washington.edu/papers/sa10.pdf
- http://hmsc.oregonstate.edu/projects/msap/PS/masterlist/fish/pacifichalibut.html

3.2. Fishery Location and Method

Fishery Location

During the mid 1920s, the IPHC partitioned the commercial fishing grounds into a number of geographical regions called statistical areas. These areas were used as convenient analytical units for tabulating and analysing catch data, biological and biometric data, and the migration data from tagging experiments. Several factors have made it necessary to add, delete, or revise the statistical area boundaries: the expansion of the fishing grounds along the Aleutian Islands and into the Bering Sea, an improved understanding of halibut distribution and habitat, and the need to aggregate data into smaller management units. From the originally defined 35 areas, the Commission now recognises over 100 statistical areas extending from California, north-westward along the North American coastline, to the United States-Russia boundary, including the Bering Sea.

In addition to the statistical areas, the IPHC uses a set of larger regional units called regulatory areas. The regulatory areas are the reported management units used by IPHC. Most data are aggregated at the statistical area level and are then combined to compute statistics at the regulatory area level. Management and regulatory decisions, such as catch limits, seasons, and restrictions, are implemented at the regulatory area level. There are currently ten regulatory areas.

Within the IPHC Regulatory Areas, Areas 2C, 3A, 3B, 4A, 4B, and 4CDE are off the coast of Alaska. Area 2A entails Washington and Oregon, and Area 2B is off the coast of Canada (British Columbia). Only the areas relevant to Alaska are dealt in detail within this assessment (Figure 3). These are Areas 2C, 3A-B and 4A-E.

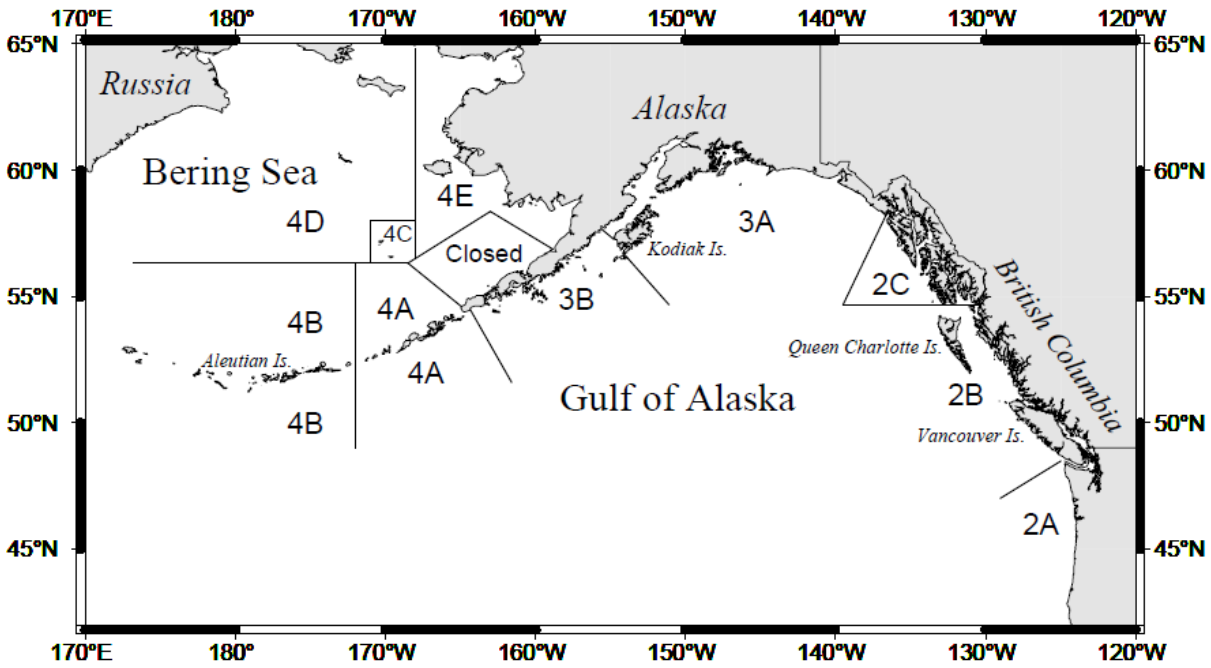

Figure 3. IPHC regulatory areas for Pacific halibut in the North Pacific Ocean (http://www.iphc.washington.edu/publications/techrep/tech0049.pdf).

Fishery Method

The only legal commercial fishing gear in the Alaska halibut fishery is benthic longline gear. Longliners catch bottomfish, primarily halibut, black-cod, lingcod, and rockfish, via a long line ("groundline") that is laid on the bottom (Figure 4).

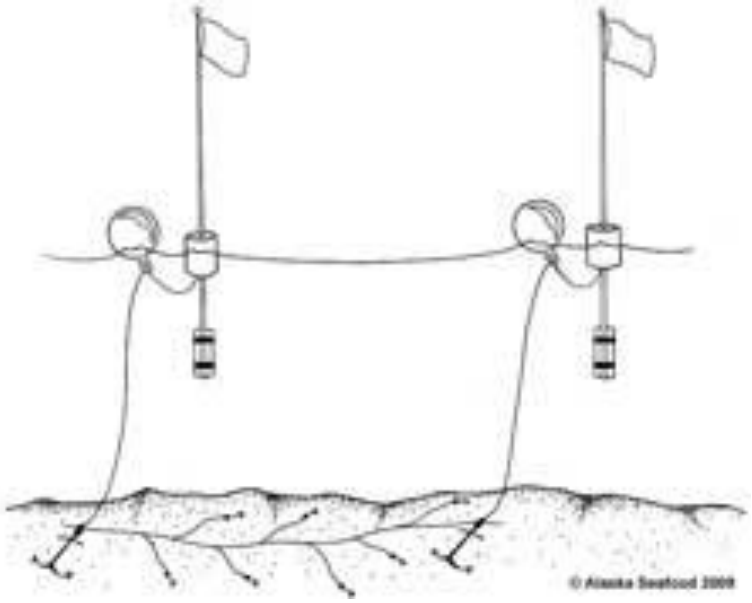

Figure 4. Longline laid on sea bottom.
(http://www.alaskaseafood.org/industry/qc/pages/harvest/index3.html)

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. 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. The longlines are coiled and stacked on deck or on the winch, when not in use. 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 (blackcod and lingcod) for subsequent sale to fresh and frozen markets.

3.3. Fishery Management History and Organization

Aboriginal peoples in North America have fished halibut for thousands of years. Commercial longline fisheries based in Seattle and Vancouver developed shortly after the completion of the first transcontinental railroads to those cities. Late in the nineteenth century the early years of the twentieth century the fishery went through the classic boom-and-bust cycle. From a small beginning off Cape Flattery and the southern end of Vancouver Island, the Pacific halibut fishery expanded rapidly in sheltered waters and by 1910 extended some seven hundred miles northward to Cape Spencer in Southeastern Alaska.

Subsequent expansion took the fishery both South and North and into offshore waters. By the late 1920s, fishing was being conducted throughout the known range of the halibut on the North American coast from northern California to the Bering Sea, a distance of more than two thousand miles. Effort in developing an extensive institutional framework necessary to studying and managing this resource began with the adoption of the halibut Convention between the Governments of the United States and Canada in 1923.

On March 2, 1923, the Marine and Fisheries Canadian Minister, Ernest LaPointe (1876–1941) and US Secretary of State Charles Evans Hughes (1862-1948) signed the "Convention for the Preservation of the Halibut Fishery of the Northern Pacific Ocean." The treaty established an international commission to regulate the north Pacific halibut fishery, where fish stocks have declined rapidly since large-scale commercial fishing began in 1888. The International Pacific Halibut Commission (IPHC) was born. The Pacific Halibut Convention marks two significant firsts: It is both the first treaty signed by the Dominion of Canada on its own and the first international agreement anywhere aimed at conservation of an ocean fish stock.

The pioneering conservation effort has proved highly successful as regulations imposed by what became the IPHC, which allowed the depleted Pacific halibut population to rebound significantly. IPHC's mandate is research on and management of the stocks of Pacific halibut (Hippoglossus stenolepis) within the Convention waters of both nations. Specifically the IPHC main objective is to set annual catch limits between the two countries and between the regulatory areas and conduct research on the halibut stocks in order to conserve the biological viability of the stock, while allowing for maximum sustainable yield harvests from commercial, sport and subsistence users.

The IPHC consists of three government-appointed commissioners for each country who serve their terms at the pleasure of the President of the United States and the Canadian government respectively. IPHC sets total allowable catch levels for halibut that will be caught by recreational and commercial harvesters in the U.S. and Canadian EEZs.

The IPHC receives money from both the U.S. and Canadian governments to support a Director and staff. Annually, the IPHC meets to conduct the business of the Commission. At every annual meeting the budgets, research plans, biomass estimates, catch recommendations, as well as regulatory proposals are discussed and approved then forwarded to the respective governments for implementation. IPHC staff currently consists of 27 permanent employees, including fishery biologists, administrative personnel and support staff, located in Seattle.

The IPHC is considered a public international organization and is entitled to the privileges, exemptions, and immunities conferred by the International Organizations Immunities Act, except those pursuant to Sections 4(b), 4(e), and 5 (a) of that Act (U.S. Presidential Executive Order 11059). In the 1960s, the IPHC was granted 503(c) status as a not-for-profit organization and is considered part of the U.S. Federal government for purchasing and travel.

At the beginning of IPHC, log books from commercial fisheries formed an important component of data for managing the fishery. The IPHC now conducts numerous projects annually to support stock assessment and basic halibut biology. Current projects include standardized stock assessment fishing surveys from northern California to the end of the Aleutian Islands and into the Bering Sea, as well as field sampling in major fishing ports to collect scientific information from the halibut fleet. In conjunction with these ongoing programs, the IPHC conducts numerous biological and scientific experiments to further the understanding and information about Pacific halibut.

The Commission encourages public participation in the management of the resource and regularly seeks advice from the Conference Board, the Processor Advisory Group (PAG), and various State and Federal agencies.

The Conference Board

The Conference Board is a panel representing Canadian and American commercial, sport halibut and First Nation/native Americans fishers and stakeholders. Created in 1931 by the Commission, the Board gives the IPHC the fishers' perspective on Commission proposals presented at Annual Meetings in January. Members are designated by crewmember union and vessel owner organizations from both nations. The Processor Advisory Group (PAG), as the name suggests, represents halibut processors. Like the Conference Board, PAG lends its opinion regarding Commission proposals and offers recommendations at IPHC Annual Meetings. The group was formed in 1996. The Research Advisory Board (RAB), which formed in 1999, consists of both fishers and processors who offer suggestions to the Director and staff on where Commission research should focus. RAB generally meets in November, prior to the IPHC Interim Meeting.

IPHC Commissioners

The Governor General of Canada and the President of the United States of America each appoint three commissioners who serve without remuneration. For each country, one commissioner has been an employee of the federal fisheries agency, one a fisher, and one either a buyer or a processor. The chairmanship of the Commission alternates between the Government official of the two countries. The commissioners appoint the Director who supervises the scientific staff, which collects and analyzes statistical and biological data needed to manage the halibut fishery. The commissioners annually review the regulatory proposals made by the scientific staff and consider proposals from the industry, the Conference Board, and the Processors Advisory Group.

IPHC Port Samplers

The primary duties of the Port Samplers are to collect detailed and accurate fishing records from commercial fishers; obtain biological data from commercial deliveries (collect random samples of halibut otoliths and corresponding fork length measurements); conduct supplementary assignments associated with the gathering of biological or statistical data; and serve as the Commission's liaison to the public.

IPHC Sea Samplers

Sea samplers collect data which are independent of commercial catch records. IPHC's quantitative scientists use these independent data in concert with data collected from commercial halibut fishing logbooks to determine total allowable catch for the upcoming season. The roughly 25 sea samplers hired each year work aboard a fleet of twelve to fifteen IPHC charter commercial longline vessels, and conduct the standardized setline stock assessment survey, which ranges from the southern Oregon border, north through British Columbia to the Bering Sea, and west to Attu island in the Aleutian Islands. The sea samplers primary directive is to collect catch per unit effort (CPUE) data; however, because the chartered vessels present a rare and valuable scientific research platform, samplers are also involved in mark and recapture experiments, sea bird studies, genetic sampling, oceanographic sampling as well other studies. The IPHC collaborates with other agencies to take full advantage of the research opportunities made possible by the fleet of research vessels.

Key References:

- http://www.iphc.washington.edu/about-iphc.html
- http://www.iphc.washington.edu/about-iphc/27.html
- http://www.iphc.washington.edu/about-iphc/115.html
- http://www.iphc.washington.edu/about-iphc/116.html
- http://www.iphc.washington.edu/papers/sr83.pdf
- http://www.historylink.org/index.cfm?DisplayPage=output.cfm&file_id=9152

3.3.1. IPHC Collaborating Organizations

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 (which has been renamed the Magnuson-Stevens Fishery Conservation and Management Act) to oversee management of the nation's fisheries. NPFMC recommends regulations to govern the directed halibut fisheries in waters off Alaska (provided its actions do not conflict with regulations recommended by the IPHC); and makes allocation decisions among halibut users and user groups fishing off Alaska: non-treaty commercial (incidental salmon troll, directed longline halibut, and incidental longline sablefish fisheries), sport, and treaty Native commercial, subsistence, ceremonial and educational.

In 1995, NPFMC and NOAA Fisheries Service Alaska Regional Office implemented an individual fishing quota (IFQ) system for the Alaska halibut industry, similar to Canada's program implemented in 1991. As a result, the commercial fishing season was extended from only days to 8 months or more. This ended the derby fishery with its incredible loss in gear, halibut resource (through wastage and spoilage), economic returns and human life. The new IFQ system increased the value of the fishery while reducing over 32 inches (above legal size) halibut wastage.

The National Marine Fishery Service. The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) is responsible for the management, conservation, and protection of living marine resources within the US EEZ. 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.

For the Alaska halibut fishery, NMFS works closely with the NPFMC and the IPHC, performing scientific research (groundfish trawl surveys, conservation of wildlife such as marine mammals and habitat conservation) and being responsible for developing, implementing, and enforcing regulations pertaining to management of halibut fisheries in US waters. In addition, the NMFS has implemented in February 1, 2011, a Charter Halibut Limited Access Program for Areas 2C (SE Alaska) and 3A (Central GOA). NMFS is also developing regulations to implement a catch sharing plan to allocate halibut between the commercial and charter fisheries in Alaska. NMFS also manages the halibut subsistence fishery for Native, rural, ceremonial and educational purposes.

Alaska Department of Fish and Game. The state of Alaska participates in management through the Alaska Department of Fish and Game (ADFG) Commissioner's seat on the NPFMC. ADFG licenses halibut anglers and sport fishing businesses and guides, monitors and reports on sport and subsistence halibut harvests, and assists federal agencies with preparation of regulatory analyses.

Key References:

- http://alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/halibut.htm
- http://www.adfg.alaska.gov/index.cfm?adfg=halibut.management
- http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm
- http://www.fakr.noaa.gov/sustainablefisheries/halibut/sport.htm

Pacific halibut management organizational chart

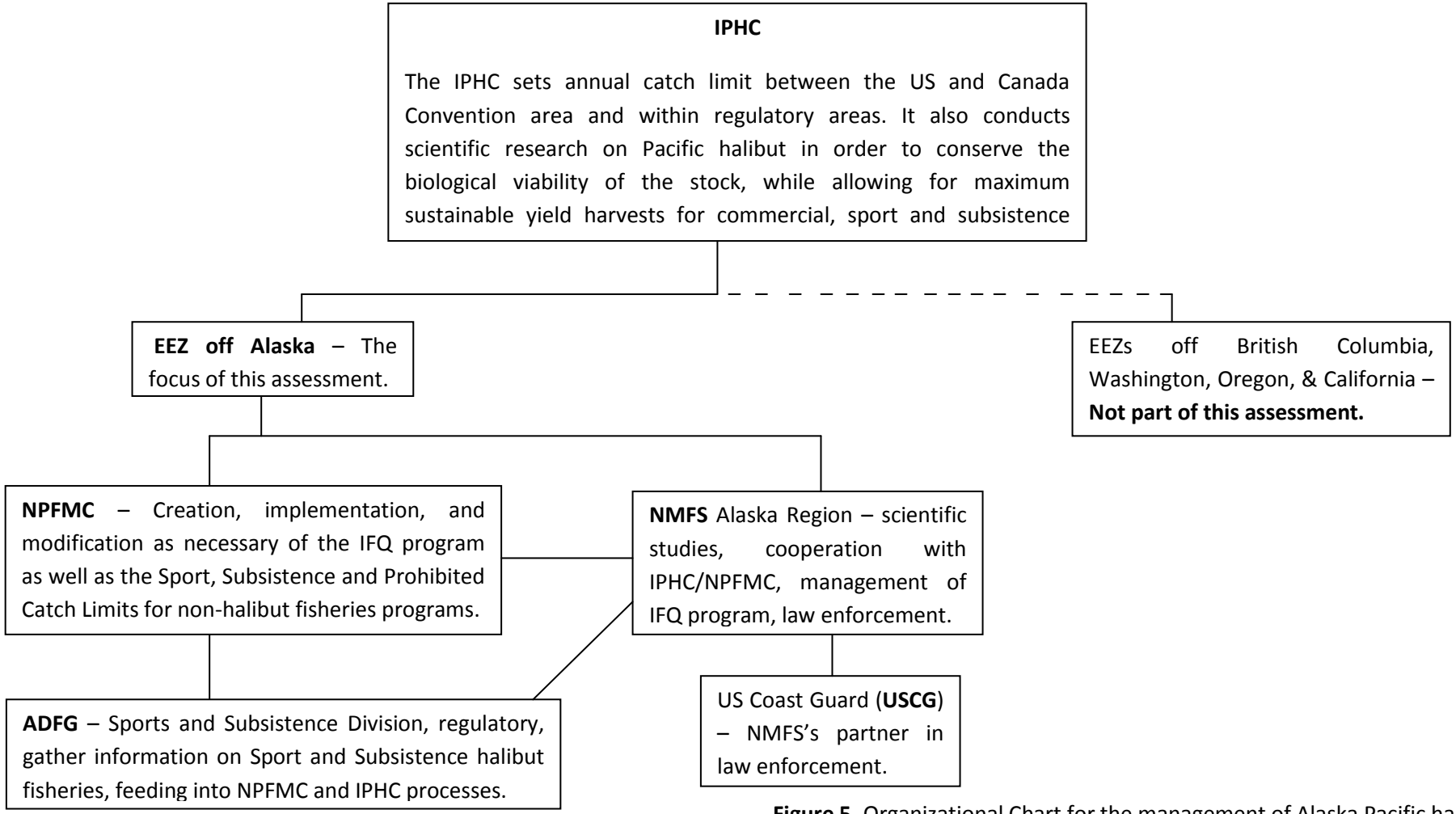

Figure 5. Organizational Chart for the management of Alaska Pacific halibut.

3.4. Stock Assessment Activities

Harvest policy, status relative to reference points and biomass projections

The IPHC has developed, refined, and utilized a constant harvest rate policy since the 1980's. The policy was fully described in Clark and Hare (2006) and further modified as described in Hare and Clark (2008). Stated succinctly, the policy is to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% of the unfished level. The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% of the unfished level. This combination of harvest rate and precautionary levels of biomass protection have, in simulation studies, provided a large fraction of maximum available yield while minimizing risk to the spawning biomass.

Since the early 2000s, the harvest policy has additionally incorporated a measure designed to avoid rapid increases or decreases in catch limits. Without this feature, the harvest rate could quickly change because of either actual changes in stock level or because of changes in the assessment model due to other factors. The protection from rapid changes is similar to what many fisheries management agencies have done. The dampening adjustment is termed *slow up fast down* (and sometimes denoted SUFD). This *slow up fast down* approach is somewhat different from similar phased-change policies of other agencies.

This Commission's policy in theory allowed the catch limit to respond more strongly to estimated decreases in biomass than to estimated increases. Specifically, if a reduction in available catch was recommended, 50% of the reduction was implemented whereas if an increase was recommended, only 33% of the increase was implemented (http://www.iphc.washington.edu/papers/sa10.pdf). Nonetheless, staff and the Commission have recently been concerned that the Commission's SUFD harvest policy adjustments have not achieved target harvest rate goals in the face of continued stock declines, in halibut growth rate, and the history of high exploitation rates for some areas in recent years.

The staff therefore recommended in 2010 that the SUFD policy be modified to a Slow Up - Full Down (SUFullD) policy, to achieve the necessary reductions in harvest rate and promote increases in exploitable biomass. That is, staff recommendations would incorporate the existing policy of a 33% increase from previous year's catch limits when stock yields are projected to increase but use a 100% decrease in recommended catch, when stock yields are projected to decrease. The SUFullD was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it (http://www.iphc.washington.edu/news-releases/news-releases-2010.html).

Evolution of IPHC assessment methods, 1982-2007

From 1982 through 1994, the halibut stock assessment relied on CAGEAN, a simple age structured model fitted to commercial catch-at-age and catch-per-effort data. The constant age-specific commercial selectivities used in the model were fundamental model parameters, estimated directly. Beginning in the late 1980s, halibut growth rates in Alaska declined dramatically. As a result, age-specific selectivity decreased. CAGEAN did not allow for that, and by the mid-1990s was seriously underestimating abundance. In effect, it interpreted lower catches as an indication of lower abundance, whereas the real cause was lower selectivity.

Incoming year classes were initially estimated to be small, but in subsequent years' assessments those estimates would increase when unexpectedly large numbers of fish from those year classes appeared in the catches. The year-to-year changes in the stock trajectory shown by the assessment therefore developed a strong retrospective pattern. The staff sought to remedy that problem by making selectivity a function of length in a successor model developed in 1995. It accounted not only for the age structure of the population, but also for the size distribution of each age group and the variations in growth schedule that had been observed. The age-specific selectivity of an entire age group was calculated by integrating length-specific selectivity over the estimated length distribution of the age group, and that age-specific selectivity was used to calculate predicted catches.

The new model was fitted to both commercial data and IPHC setline survey data, with separate length-specific selectivity functions. Commercial catchability and selectivity were allowed to drift slowly over time, while survey catchability and selectivity were held constant. When this model was fitted to data from Area 2B and Area 3A, quite different length specific selectivities were estimated, which suggested that fishery selectivity was not wholly determined by the properties of the gear and the size of the fish but also depended on fish behaviour (e.g., migration). These behavioral elements are likely to be more related to age than size. The age of sexual maturity, for example, remained virtually the same in Alaska despite the tremendous decrease in growth, so the size at maturity is now much smaller than it was. While size must affect selectivity, it was thought that age was also influential.

To allow for that, the model was fitted in two ways; the original form was called the "length-specific" fit, because a single set of estimates of the two parameters of the length-based survey selectivity function was used in all years. In a second form, called the "age-specific" fit, the parameters were allowed to drift over time (like the commercial selectivity parameters), but they were required (by a heavy penalty) to vary in such a way that the integrated age-specific selectivities calculated in each year remained constant over time.

The retrospective behavior of both fits was dramatically better than that of CAGEAN and quite satisfactory in all cases, although the length-specific fit was more consistent from year to year in 3A and the age-specific fit was more consistent in 2B. The two fits produced very similar estimates of abundance in Areas 2B and 2C, but in 3A the length-specific estimates were substantially higher, so out of caution the staff catch limit recommendations were based on the age-specific fit through 1999.
The assessment model was simplified and recoded as a purely age-structured model in 2000 to eliminate some problems associated with the modeling of growth and the distribution of length at age. It retained the option of modeling survey selectivity as a function of mean length at age (observed), but the production fits continued to be based on constant age-specific survey selectivity, estimated directly as a vector of age-specific values rather than as a parametric function of age.

The fit of this model to Area 3A data in 2002 showed a dramatic retrospective pattern, similar to the pattern of successive CAGEAN fits in the mid-1990s. Treating setline survey selectivity as length-specific rather than age-specific largely eliminated the pattern. Accumulated data showing very similar trends in catch at length in IHPC setline surveys and NMFS trawl surveys provided further evidence that setline selectivity is, after all, determined mainly by size rather than by age.

Another anomaly of the 3A model fit in 2002 was the unexpectedly large number of old fish (age 20+) in the last few years' catches. This was found to be the result of an increase in the proportion of otoliths read by the break-and-burn rather than surface method. Surface readings tend to understate the age of older fish, and IPHC age readers had been gradually doing more and more break-and-burn readings as the number of older fish in the catches increased. The poor model fit at these ages indicated a need to deal explicitly with the bias and variance of both kinds of age readings.

An entirely new model was written for the 2003 assessment. Both commercial and survey selectivity were parameterized as piecewise linear functions of mean length at age in survey catches. Because females are larger than males, all of the population accounting and predictions were done separately for each sex. (The age/sex/size composition of the commercial landings was estimated external to the assessment for this purpose). The observed age compositions (surface or break-and-burn) were predicted by applying estimated misclassification matrices to the age distributions.

Even in its most parsimonious form—with just one survey and one commercial selectivity schedule for both sexes in all years—this model achieved very good fits to the sex-specific observations and good retrospective performance. It also produced somewhat higher estimates of average recruitment and recruitment variability. With this simple model it was feasible to do standalone analytical assessments of abundance in Areas 3B, 4A, and 4B for the first time, using data from 1996-2003.

Only two minor changes were made for the 2004 assessment, and neither had a significant effect on the estimates of abundance. Apart from a few minor and inconsequential corrections and alterations, the 2005 analytical assessment was the same as the 2004 assessment. The only important change in procedure was the use of the NMFS trawl survey to estimate biomass in Area 4CDE where an analytical assessment was not done.

In 2006, growing concerns about migration of legal-sized fish from western to eastern areas led the staff to doubt the validity of the closed-area assessments that had been done for many years. The staff therefore estimated coastwide abundance by fitting the model to a coastwide dataset, and estimated biomass in each area in accordance with survey estimates of relative abundance.

The 2007 assessment followed the same procedure. Sublegal discard mortality in the halibut fishery was added to the removals included in the assessment; with the effect of decreasing biomass estimates by less than 1% (http://www.iphc.washington.edu/papers/sa07.pdf).

For 2008, as has been done since 2006, the IPHC stock assessment was done by fitting the assessment model to a coastwide dataset to estimate total exploitable biomass. The coastwide exploitable biomass was then apportioned among regulatory areas in accordance with survey estimates of relative abundance, corrected for regional hook competition. Coastwide exploitable biomass in 2009 was estimated to be 325 million pounds, down from the 361 million estimated in 2007. Virtually all of the decrease was due to lower survey and commercial catch rates of legal-sized

halibut. Projections based on the 2008 estimated age compositions suggested that the exploitable and female spawning biomasses would increase over the next several years as a sequence of strong year classes recruiting to the legal-sized component of the population (http://www.iphc.washington.edu/papers/sa08.pdf).

The 2009 IPHC stock assessment followed the same procedure as 2008. Coastwide exploitable biomass at the beginning of 2010 was estimated at 334 million pounds, revising 2008's estimate of 325 million pounds at the start of 2009 downwards to 291 million pounds and projecting an increase of 14% over that value to arrive at a 2010 value of 334 million pounds. The downward revision was part of a still present, but relatively modest, retrospective behavior shown in the model. At least part, if not most, of the downward revision for 2009 was believed to be caused by the ongoing decline in size at age, which continued for all ages in all areas.

Figure 6 shows how the average weights of halibut in survey and commercial catches have changed over the past 13 years. Average weight has declined by 25% in the survey catches and 33% in the commercial catches. While the decline could be due to a decline in average age of the fish in the catches (since younger fish are smaller), Figure 6 below shows this has not been the case, as average ages in both the survey and commercial catch have not declined at nearly the same rate. Trawl estimates of abundance were assembled in 2009 and were comparable to the assessment estimates (http://www.iphc.washington.edu/papers/sa09.pdf).

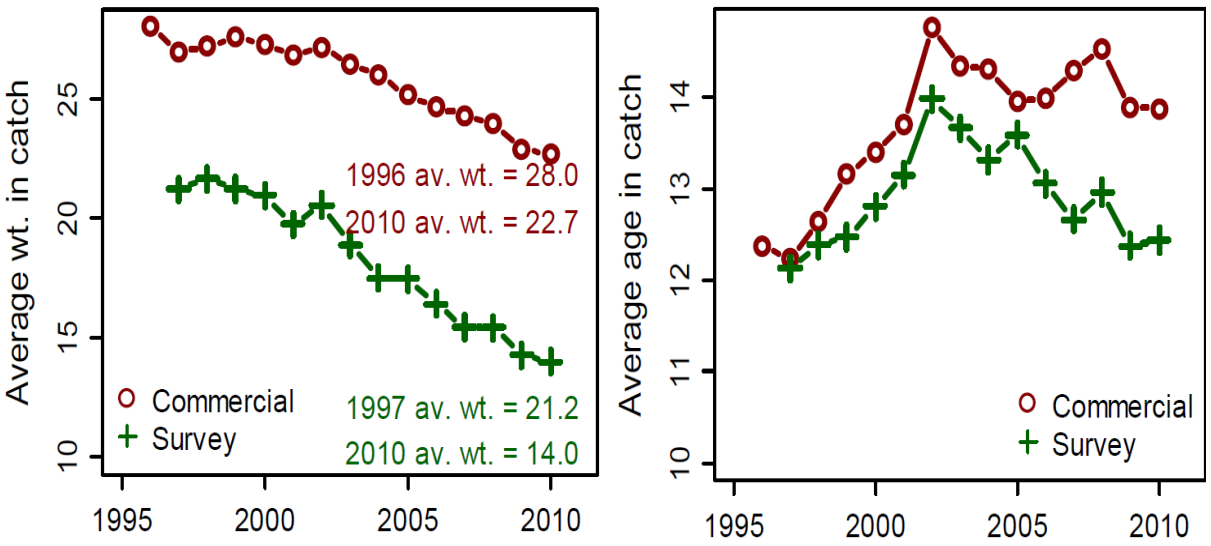

Figure 6. Average weight (left) and age (right) trends of the coastwide halibut stock from 1996 to 2009 (http://www.iphc.washington.edu/papers/sa10.pdf).

As for 2010, the North American coastwide exploitable biomass at the beginning of 2011 was estimated at 318 million pounds. The assessment revised 2009's estimate of 334 million pounds at the start of 2010 downwards to 275 million pounds, and projected an increase of 16% over that value to arrive at a 2011 value of 318 million pounds.

Female spawning biomass was estimated at 350 million pounds at the start of 2011, an increase of nearly 6% over the beginning of 2010 estimate of 331 million pounds. The female spawning biomass showed little evidence of retrospective behavior, lending credence that ongoing declines in size at age, which strongly affect selectivity-at-age, were the root cause of the retrospective behavior.

Projections based on the 2010 estimated age compositions suggested that both exploitable and spawning biomass would increase over the next several years as several strong year classes recruit to the fishable and spawning components of the population. Projected increases were tempered both by potential ongoing decreases in size-at-age, as well as realized harvest rates which continued to be above target in several regulatory areas. Trawl estimates of abundance were similar to assessment estimates in most areas, and also provided evidence of very large numbers of small halibut. Options were also been provided to allow for direct deduction of bycatch and wastage mortality under 32 inches in calculation of fishery constant exploitation yield (http://www.iphc.washington.edu/papers/sa10.pdf).

Halibut Bycatch and Wastage

Annual removals in the directed commercial Pacific halibut fishery have ranged from about 20 million pounds to about 75 million pounds during the last 60 years, whereas bycatch mortality of halibut in non-directed fisheries has averaged about 14 million pounds per year. Estimates of the bycatch mortality of Pacific halibut (*Hippoglossus stenolepis*) in 2010 totalled 10.5 million pounds (net weight), a decrease of 7% from 2009 and the lowest seen since 1986. Bycatch refers to the mortality of halibut occurring in fisheries targeting other species, wastage refers to halibut killed but not landed in the halibut fishery (due to lost gear, capture of sublegal-sized fish, etc).

Treatment of bycatch mortality in IPHC management has changed over time from different forms of explicit area-specific quota deductions to the implementation of the current method, which is based on a harvest rate adjustment. The current method deducts over-32 inch (O32) bycatch (and wastage) mortality from area-specific quotas and incorporates under-32 inch (U32) bycatch (and wastage) mortality in the determination of the target harvest rate. As of 2010, additional breakdowns of U32 bycatch and U32 wastage, into U26 and U32/O26 components, are provided in the stock assessment report to allow for alternative fishery CEY computations (http://www.iphc.washington.edu/publications/rara/2010/2010.281.IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf ; http://www.iphc.washington.edu/papers/ly09.pdf ; http://www.iphc.washington.edu/papers/sa10.pdf).

At present there is a two-part process for dealing with bycatch in calculating fishery Constant Exploitation Yield (CEY). The bycatch of fish above the commercial minimum size limit (81 cm), which have presumably completed their juvenile migration, is deducted from the total CEY in the regulatory area where they are caught. The coastwide recruitment loss resulting from sublegal bycatch—estimated to be about 10%—is included in the simulations that are conducted to choose a target harvest rate. It therefore depresses the target harvest rate slightly in all areas, but the choice of an optimum harvest rate is not at all sensitive to this factor. This method of accounting for juvenile bycatch therefore finesses the uncertainty about unequal and unknown area-specific impacts of juvenile bycatch.

In 2009, a methodology was developed to estimate yield loss from bycatch in the non directed fisheries (Hare 2010). Bycatch, which is unsexed but for which length samples are available, was partitioned into age and sex components and a life history simulation model then allowed an estimate of how much yield was lost to the directed commercial fishery, in units of pound of lost yield per pound of U32 bycatch. The yield loss ratio in general is around one pound per pound but

varies by regulatory area, depending both on the size of the bycatch when taken as well as the size at age of halibut when taken in the commercial fishery. Neither these, nor the previous calculations in Hare (2010) factored migration into the estimates, which has the effect of "spreading" the lost yield downstream from the area of capture. Work on evaluating the effect of migration on downstream distribution of lost yield is reported in Valero and Hare (2010 and 2011). (http://www.iphc.washington.edu/papers/sa10.pdf).

In the late 1990s when this method was implemented, migration modelling indicated that the impact of U32 bycatch mortality was largely confined to the area where the bycatch mortality occurred. However, this approach assumed that halibut migration over their development and lifespan largely ceased by the time halibut became available to commercial gear, an assumption that has been refuted by a recent, extensive IPHC tagging program.

A 2009 study from Valero and Hare highlighted the impact of U32 bycatch and U32 wastage on lost yield (L_Y), lost spawning biomass (LS_{Bio}), and lost egg production (L_E) of pacific halibut in light of the improved understanding of halibut migration. Preliminary results suggested that coastwide impacts on L_Y, LS_{Bio} and L_E are similar with or without accounting for migration of U32 bycatch and U32 wastage. However, area specific impacts on L_Y, LS_{Bio}, and L_E varied by area when accounting for migration. The effect of migration is to decrease impacts of U32 bycatch and U32 wastage on Area 4 and to increase impacts on other areas, particularly Area 2. Much of the impact of U32 bycatch is determined to be on areas outside of where the bycatch was taken. In contrast, most of the impacts of U32 wastage are determined to be from local wastage (http://www.iphc.washington.edu/papers/ly09.pdf).

3.5. Historic Biomass and Removals in the Alaska Pacific Halibut fishery

Biomass

Pacific halibut are widely distributed in coastal waters of the northeast Pacific from central California around the GOA out the Aleutian Island chain and into the Bering Sea, with a centre of abundance around Kodiak Island. About 2% of the biomass is off Oregon and Washington, about 15% off British Columbia, and the remainder off Alaska (http://www.iphc.washington.edu/papers/sr83.pdf).
For the Commercial Halibut fishery of Alaska, catch limits were drastically reduced in the 1970s and remained low for a decade due to decrease in the halibut stock. In the 1980s, the stock was considered rebuilt and managers established a constant harvest rate policy. In the early and mid 1990s, both the Department of Fisheries and Oceans in Canada and the NPFMC in Alaska adopted Individual Quota systems. As a result, the commercial fishing season was extended from only days to 8 months or more. This ended the derby fishery with its incredible loss in gear, halibut resource through wastage and spoilage (fish was left to spoil as processors could not deal with it), economic returns and human life. The new IFQ system increased the value of the fishery while reducing over 32 inches (above legal size) halibut wastage.

In general, coastwide exploitable biomass of Pacific halibut is estimated to have declined by about 35% during 2000-2010. The extent of and reasons behind the declines vary by area. Biomass from the central GOA is shown in Figure 7 as about 37% of the stock is found in this area, providing a good snapshot of the whole stock.

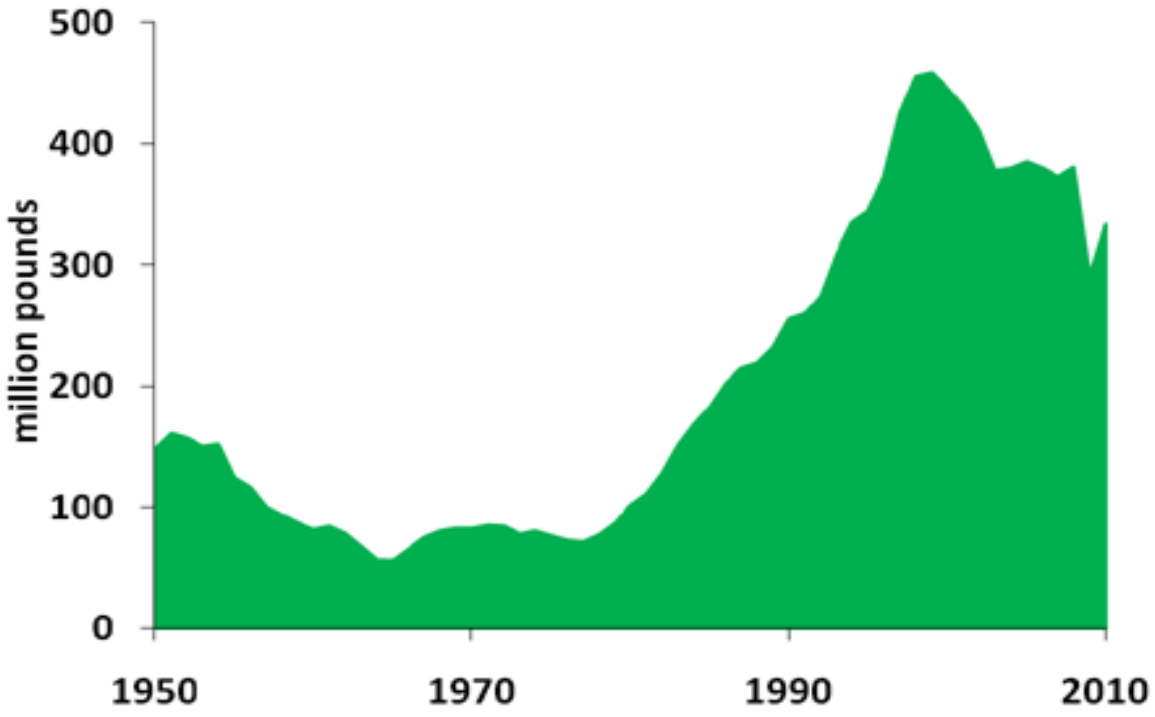

Figure 7. Pacific halibut biomass from 1950 to 2010 in the Central Gulf of Alaska. (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm).

Commercial Fishery Removals

At the 2010 Annual Meeting, the Commission continued its discussions on season length and received recommendations to open the fishery on a Saturday to facilitate marketing. The Canadian Individual Vessel Quota (IVQ) fishery in Area 2B and the United States Individual Fishing Quota (IFQ) given to commercial halibut fishermen and Community Development Quota (CDQ) fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E commenced on March 6th and closed on November 15th 2010. Ten percent of the total quota was given to the economically disadvantaged (~80) communities within 50 nm of the BSAI coastline.

The IFQ halibut and sablefish fisheries have been in effect in Alaska since 1995. NOAA Restricted Access Management (RAM) program allocated halibut Quota Share (QS) to recipients by IPHC Regulatory Area. Quota share transfers were permitted with restrictions on the amount of QS a person could hold and the amount that could be fished per vessel. As of the end of the 2010 fishery, RAM reported that 2,780 persons held quota shares, down from the initial 4,830 persons at the start of the program.

The total 2010 catch from the IFQ/CDQ halibut fishery for the waters off Alaska was 41,730,000 pounds, 1% under the catch limit. For Area 2C, the commercial QS catch was within 1%. For Areas 3A and 3B, the commercial QS catches were actually over the catch limits by less than one percent. However the catches in these areas were still within the adjusted catch limits. For Areas 4A, 4CDE, and 4B, the catches were within 3%, 7%, and 21% of the catch limit respectively.

The NPFMC Catch Sharing Plan (CSP) allowed Area 4D CDQ to be harvested in Area 4E and Area 4C IFQ and CDQ to be fished in either Areas 4C or 4D. These two regulations were the reason the catches in Areas 4D and 4E exceeded the catch limits. The total commercial catch of 3,359,000 pounds was under the combined Area 4CDE catch limit (3,580,000 pounds).

Table 1 provides commercial catch (including IPHC research catch) and catch limits of Pacific halibut by regulatory area (in thousands of pounds, net weight) between 2001 – 2010 while **Figure 8** provides coastwide Pacific halibut commercial, sport, subsistence, wastage and bycatch halibut removals for the period 1935-2010.

Commercial landing patterns and highlights

In 2010 Homer received over 10,644,000 pounds of halibut, or about 26% of the commercial Alaskan catch. Kodiak (15%) and Seward (11%) received the second and third largest landing volumes of the Alaskan commercial catch. In southeast Alaska, Sitka received 1,986,000 pounds, Juneau 1,752,000 pounds, and Petersburg 1,530,000 pounds. The Alaskan QS catch that was landed outside of Alaska was 1.9%.

The 2010 QS fishery landings were spread over nine months of the year. On a month-to-month comparison, May regained the title as the busiest month for Alaska landings, a title held by the month of August for the previous two years (2008 and 2009).
(http://www.iphc.washington.edu/publications/rara/2010/2010.31.2010commercialfisheryandregulationchanges.pdf).

Table 1. Commercial catch (including research catch) and catch limits of Pacific halibut by regulatory area (thousands of pounds, net weight), 2001-2010 (http://www.iphc.washington.edu/publications/rara/2010/2010.31.2010commercialfisheryandregulationchanges.pdf).

Regulatory Area	Commercial Catch[1]									
	2001	2002	2003	2004	2005	2006	2007	2008	2009[2]	2010[3]
2A[4]	680	851	819	884	803	829	789	682	490	423
2B	10,288	12,074	11,789	12,162	12,331	12,005	9,772	7,756	6,637	6,745
2C	8,403	8,602	8,410	10,233	10,625	10,492	8,473	6,206	4,955	4,484
3A	21,541	23,131	22,748	25,168	26,033	25,714	26,493	24,521	21,755	20,408
3B	16,336	17,313	17,231	15,460	13,171	10,792	9,249	10,748	10,781	10,094
4A	5,015	5,091	5,024	3,562	3,404	3,332	2,828	3,015	2,528	2,319
4B	4,466	4,080	3,863	2,719	1,975	1,590	1,416	1,763	1,593	1,739
4C[5]	1,647	1,210	886	954	534	493	551	724	645	819
4D[5,6]	1,844	1,753	1,956	1,655	2,578	2,368	2,720	2,552	2,210	2,154
4E[6]	479	555	415	314	369	366[7]	579	600	455	412
Total	70,699	74,660	73,141	73,111	71,823	67,981	62,870	58,567	52,049	49,597
Regulatory Area	Commercial Catch Limits[8]									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
2A[4]	681.4	817.9	817.9	890.4	788.6	818.5	799.2	718.4	511.2	420.0
2B	10,510	11,750	11,750	12,141	11,658	11,631	10,089.4	7,918	6,711.6	6,598.6
2C	8,780	8,500	8,500	10,500	10,930	10,630	8,510.0	6,210.0	5,020.0	4,400
3A	21,890	22,630	22,630	25,060	25,470	25,200	26,200.0	24,220.0	21,700.0	19,990
3B	16,530	17,130	17,130	15,600	13,150	10,860	9,220.0	10,900.0	10,900.0	9,900
4A	4,970	4,970	4,970	3,470	3,440	3,350	2,890.0	3,100.0	2,550.0	2,330
4B	4,910	4,180	4,180	2,810	2,260	1,670	1,440.0	1,860.0	1,870.0	2,160
4C	2,030	2,030	2,030	1,720	1,815	1,610	1,866.5	1,769.0	1,569.0	1,625
4D	2,030	2,030	2,030	1,720	1,815	1,610	1,866.5	1,769.0	1,569.0	1,625
4E	390	390	390	345	359	330	367.0	352.0	322.0	330
Total	72,721.4	74,427.9	74,427.9	74, 256.4	71,685.6	67,709.5	63,248.6	58,816.4	52,722.8	49,378.6

[1] Commercial catch includes IPHC research catch and in Area 2C, the Metlakatla fishery catch.
[2] Poundage figures have been updated from previous publications.
[3] Preliminary.
[4] Does not include treaty Indian ceremonial and subsistence fish.
[5] Area 4C IFQ and CDQ could be fished in Area 4D (since 2005).
[6] Area 4D CDQ could be fished in Area 4E by NOAA enforcement waiver (2001) and IFQ regulation (since 2002).
[7] Area 4E includes research catch in Closed Area.
[8] Additional carryover from the underage/overage plans is not included.

Sport Fishery Removals

For the Alaska sport fishery, estimates are provided by ADFG. Preliminary estimates of the current year's harvest by the guided and unguided sectors were made using sector-specific approaches because of the bag limit restrictions which differ between sectors. Changes in guided fishery bag limit regulations in the past two years led ADFG to project the 2010 harvest from the 2009 charter logbook data, whereas the projections for the unguided fishery continue to be made from the Statewide Harvest Survey (SWHS) time series. For both sectors, ADFG projects the number of fish caught and applies an average weight from current year dockside sampling.

Table 2. Harvest of halibut by sport fishers (millions of pounds, net weight) by regulatory area, 1977-2010. Estimates for 2010 are preliminary.

Year	Area 2A	Area 2B	Area 2C	Area 3A	Area 3B	Area 4	Total
1977	0.013	0.008	0.072	0.196	-	-	0.289
1978	0.010	0.004	0.082	0.282	-	-	0.378
1979	0.015	0.009	0.174	0.365	-	-	0.563
1980	0.019	0.006	0.332	0.488	-	-	0.845
1981	0.019	0.012	0.318	0.751	-	0.012	1.112
1982	0.050	0.033	0.489	0.716	-	0.011	1.299
1983	0.063	0.052	0.553	0.945	-	0.003	1.616
1984	0.118	0.062	0.621	1.026	-	0.013	1.840
1985	0.193	0.262	0.682	1.210	-	0.008	2.355
1986	0.333	0.186	0.730	1.908	-	0.020	3.177
1987	0.446	0.264	0.780	1.989	-	0.030	3.509
1988	0.249	0.252	1.076	3.264	-	0.036	4.877
1989	0.327	0.318	1.559	3.005	-	0.024	5.233
1990	0.197	0.381	1.330	3.638	-	0.040	5.586
1991	0.158	0.292	1.654	4.264	0.014	0.127	6.509
1992	0.250	0.290	1.668	3.899	0.029	0.043	6.179
1993	0.246	0.328	1.811	5.265	0.018	0.057	7.725
1994	0.186	0.328	2.001	4.487	0.021	0.042	7.065
1995	0.236	0.887	1.759	4.511	0.022	0.055	7.470
1996	0.229	0.887	2.129	4.740	0.021	0.077	8.084
1997	0.355	0.887	2.172	5.514	0.028	0.069	9.025
1998	0.383	0.887	2.501	4.702	0.017	0.096	8.585
1999	0.338	0.859	1.843	4.228	0.017	0.094	7.379
2000	0.344	1.021	2.258	5.305	0.015	0.073	9.017
2001	0.446	1.015	1.925	4.675	0.016	0.029	8.106
2002	0.399	1.260	2.090	4.202	0.013	0.048	8.011
2003	0.404	1.218	2.258	5.427	0.009	0.031	9.348
2004	0.487	1.613	2.937	5.606	0.007	0.053	10.703
2005	0.484	1.841	2.798	5.672	0.014	0.050	10.860
2006	0.516	1.752	2.526	5.337	0.014	0.046	10.191
2007	0.504	1.556	3.049	6.283	0.025	0.044	11.461
2008	0.481	1.536	3.264	5.320	0.026	0.040	10.667
2009	0.458	1.098	2.368	4.758	0.030	0.024	8.736
2010	0.351	1.092	2.548	5.068	0.040	0.042	9.141
2009-2010 change							
Pounds	-0.107	-0.006	0.180	0.310	0.010	0.018	0.405
Percent	(23.4%)	(<0.1%)	7.6%	6.5%	33.3%	75.0%	4.6%

Preliminary coast-wide sport harvest estimates for 2010 indicate a slight 4.6% increase in the sport harvest from 2009, to 9.1 million pounds. Coastwide harvest remains below the levels seen during 2004-2008 (10-11 million pounds) but still remains high. Harvests increased slightly in Alaskan areas. Sport bag and possession limit regulations were either unchanged or reduced from 2009 for all areas. Season length was unchanged for the Alaskan areas but shortened for the Canadian areas. (http://www.iphc.washington.edu/publications/rara/2010/2010.43.2010Halibutsportfisheryreview.pdf).

Subsistence Harvest Removals

The removals of Pacific halibut which are accounted for in the stock assessment include commercial and sport catch, bycatch, wastage, and personal use. Personal use includes removals from several fisheries, including a couple for which there are little documented data. Personal use harvests are taken in (1) the federal subsistence fishery in Alaska, (2) the sanctioned First Nations Food, Social and Ceremonial (FSC) fishery conducted in British Columbia, (3) ceremonial and subsistence removals in the Area 2A treaty Indian fishery, and (4) U32 halibut retained in Areas 4D and 4E under IPHC regulations. Educational catch is also allowed in several IPHC regulatory areas. These removals are summarized here for 2009 (**Table 3**), the most recent year for which full information is available. In addition, incomplete data for 2010 are also provided (http://www.iphc.washington.edu/publications/rara/2010/2010.59.ThepersonaluseharvestofPacifichalibutthrough2010.pdf).

Table 3. Summary of personal use harvest of Pacific halibut by region. Estimates for the most recent year are preliminary. Estimates are in thousands of pounds, net weight.

Year	West Coast	B.C	Alaska	Total	Year	West Coast	B.C	Alaska	Total
1991	10.0	50.0	1,950.0	2,010.0	**2003**	27.0	300.0	1,055.4	1,382.4
1992	14.2	100.0	1,000.0	1,114.2	**2004**	19.4	300.0	1,209.3	1,528.7
1993	15.8	300.0	616.0	931.8	**2005**	36.0	300.0	1,201.3	1,537.3
1994	10.9	300.0	616.0	926.9	**2006**	33.0	300.0	1,147.6	1,480.6
1995	14.2	300.0	228.0	542.2	**2007**	33.0	405.0	1,051.0	1,489.0
1996	15.0	300.0	228.0	543.0	**2008**	30.0	405.0	908.8	1,343.8
1997	14.8	300.0	228.0	542.8	**2009**	29.0	405.0	871.6	1,305.6
1998	10.5	300.0	430.0	740.5	**2010**	30.4	405.0	n/a	n/a
1999	10.5	300.0	434.0	744.5					
2000	17.5	300.0	439.0	756.5					
2001	16.0	300.0	456.0	772.0					
2002	16.0	300.0	444.0	760.0					

Total Fishery Removals

Annual removals in the directed commercial Pacific halibut fishery have ranged from about 20 million pounds to about 75 million pounds during the last 60 years. Total removals from the halibut populations come from seven categories: commercial catch (IPHC survey catch is included in this category), sport catch, O32 bycatch (from a variety of fisheries targeting species other than halibut), personal use, O32 wastage from the commercial halibut fishery, sublegal-sized bycatch from non-target fisheries, and sublegal-sized wastage from the commercial halibut fishery. For 2010, additional breakdowns of U32 bycatch and U32 wastage, into U26 and U32/O26 components, are provided to allow for alternative fishery CEY computations. Detailed descriptions of each category are contained in the Fishery Removals section of the annual Report of Assessment and Research Activities (Gilroy et al. 2011). On a coastwide basis, total removals are at their lowest level since 1996 and third lowest total over the past 23 years. During the last 60 years, bycatch mortality of halibut in non-directed fisheries has averaged about 14 million pounds per year. Bycatch refers to the mortality of halibut occurring in fisheries targeting other species, wastage refers to halibut killed but not landed in the halibut fishery (due to lost gear, capture of sublegal-sized fish, etc). The coastwide combined removals of the commercial, sport, subsistence pacific halibut fishery, plus wastage and bycatch for the period 1935-2010 are shown below in Figure 8. (http://www.iphc.washington.edu/publications/rara/2010/2010.281.IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf ; http://www.iphc.washington.edu/papers/sa10.pdf).

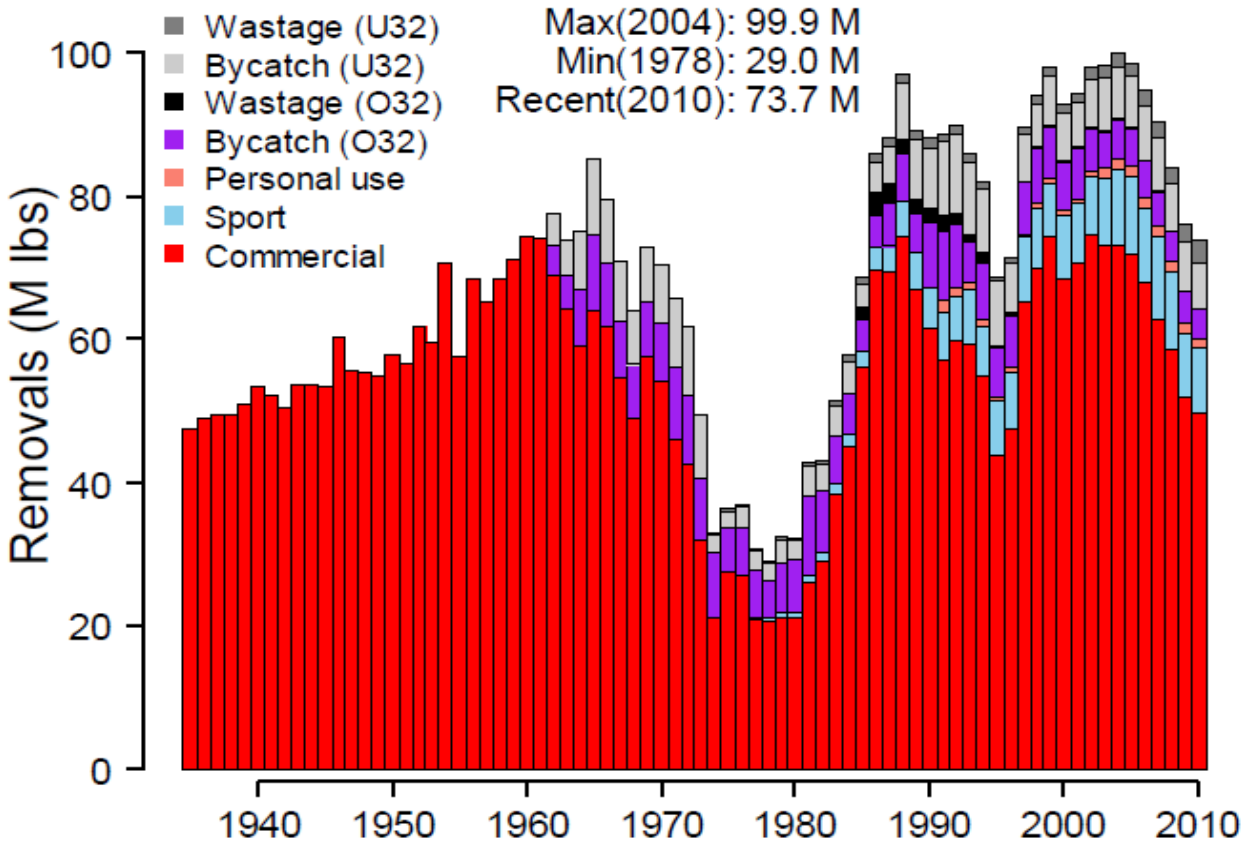

Figure 8: Total Pacific halibut removals coastwide (all of North America) for the period 1935-2010. Year and amount of minimum, maximum, and most recent removals are also listed (http://www.iphc.washington.edu/papers/sa10.pdf).

3.6. Economic Value of the Alaska Pacific Halibut Fishery

The total value of the Pacific halibut fishery in Alaska in 2008 amounted to $209 million with the value fluctuating around $200 million per year since 2003. Between 1997 and 2002 the annual catch fluctuated around $150 million. **Table 4** below shows the annual ex-vessel economic value of the Alaska Pacific halibut commercial fishery from 1984 to 2008.

Table 4. Real ex-vessel value of the catch in the domestic commercial fisheries off Alaska by species group including halibut between 1984 and 2008 $ millions (USD). (http://www.afsc.noaa.gov/refm/docs/2009/economic.pdf).

	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
1984	187.2	621.1	36.9	35.5	50.5	931.3
1985	188.4	686.5	65.0	66.1	76.5	1,082.4
1986	315.3	696.2	66.2	120.8	114.7	1,313.2
1987	360.7	792.7	69.9	127.9	229.8	1,580.9
1988	380.8	1,203.9	90.5	106.8	391.4	2,173.4
1989	435.6	790.5	29.2	131.7	527.8	1,914.7
1990	532.7	820.1	36.0	130.4	674.3	2,193.5
1991	437.1	435.7	41.5	133.0	678.0	1,725.3
1992	476.3	773.9	38.4	68.2	871.8	2,228.6
1993	456.4	543.4	19.6	74.5	566.4	1,660.3
1994	436.6	576.9	29.4	115.1	676.2	1,834.2
1995	377.2	661.2	52.1	79.3	772.4	1,942.3
1996	229.5	453.8	58.7	97.2	662.2	1,501.4
1997	221.7	319.2	20.5	137.2	754.4	1,453.0
1998	278.6	309.2	13.8	119.9	492.2	1,213.6
1999	340.5	434.0	17.8	146.8	581.6	1,520.7
2000	175.0	302.7	11.8	165.5	738.6	1,393.6
2001	148.0	225.9	12.5	143.0	701.1	1,230.5
2002	175.5	153.2	10.7	152.0	730.4	1,221.9
2003	202.5	194.0	10.3	191.5	707.4	1,305.7
2004	186.7	285.8	15.7	189.1	704.6	1,381.9
2005	172.9	318.4	14.5	184.5	807.7	1,498.0
2006	130.8	290.5	7.9	202.8	862.4	1,494.4
2007	185.5	356.5	15.2	222.9	820.9	1,601.0
2008	251.6	368.2	22.9	209.0	879.9	1,731.6

Note: The value added by at-sea processing is not included in these estimates of ex-vessel value. These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2008 dollars by applying the GDP implicit price deflators presented in Table 57.

Source: Blend and Catch-Accounting System estimates, CFEC fishtickets, Commercial Operators Annual Reports (COAR), weekly processor reports. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

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			
US ALASKA PACIFIC HALIBUT COMMERCIAL FISHERIES			
Fish Species (Common & Scientific Name)	Geographical Location of Fishery	Gear Type	Principal Management Authority
Pacific halibut (*Hippoglossus stenolepis*)	**Gulf of Alaska, Bering Sea & Aleutian Islands**	**Benthic longline**	**International (IPHC), federal (NMFS/NPFMC) and state (ADFG) management.**

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 Alaska state Pacific halibut fishery resources. Further investigation into the approach that a full assessment might undertake with respect to the current definition of the Unit of Certification and the Assessment Units that are proposed 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 Pacific halibut 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.

A summary of items included in the standard approach to each meeting were as follows:

- 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 and Units of Assessment.
    - 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 Manager, 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 'ASMI'.

Overview of Meeting Plan:

Meetings were held between the 21st June to 2nd July 2010, in Anchorage, Seward, Juneau, and Seattle, WA.

Key Outcome of the Consultation Meetings:

Each meeting served as the primary purpose to introduce the Certification Body, Global Trust and provide an overview of the FAO assessment approach and process. Key timelines for assessments and the specifics of the proposed assessment and certification units were presented. Immediate questions and concerns expressed by management and participatory organizations were addressed and some key areas which will form part of the full assessment were also addressed. 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. Summary of 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 (halibut, 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 Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands (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 Individual Fishing Quota decisions for halibut and interacts closely with the U.S. - Canada IPHC, which is responsible for conservation of halibut fisheries. Established by the Magnuson Fishery Conservation and Management Act in 1976 (now renamed the Magnuson-Stevens Fishery Conservation and Management Act) 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 halibut fishing, members may operate across a range of species and fisheries, including halibut processing, 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 National Marine Fisheries Service (NMFS, also called NOAA Fisheries) 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 Pacific halibut of Alaska 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 approach and outline the various steps in the assessment process.
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. This involves setting seasons, catch limits, management methods and means for the state's subsistence, commercial, sport, guided sport, and personal use fisheries, and it also involves setting policy and direction for the management of the state's fishery resources. 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 Pacific halibut 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 managem**e**nt 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 halibut fisheries.
1st July 2010	**International Pacific Halibut Commission** 1503 NE Boat St. Room 250 Oceanography Teaching Building University of	Bruce Leaman, Executive Director; Gregg Williams, Program Manager; Dr. Steven Hare,	The IPHC, originally called the International Fisheries Commission, was established in 1923 by a Convention between the governments of Canada and the United States of America. Its mandate is research on and management of the stocks of Pacific halibut (*Hippoglossus stenolepis*) within the Convention waters of both nations. The IPHC consists of three government-appointed commissioners for each country who serve their terms at the pleasure of the President of the United States and the Canadian government respectively. The IPHC conducts numerous projects annually to support both major mandates stock assessment and basic halibut biology. Current projects include standardized stock

	Washington Seattle, WA 98195-7951	Quantitative Scientist.	assessment fishing surveys from northern California to the end of the Aleutian Islands, as well as field sampling in major fishing ports to collect scientific information from the halibut fleet. In conjunction with these ongoing programs, the IPHC conducts numerous biological and scientific experiments to further the understanding and information about Pacific halibut. The Commission encourages public participation in the management of the resource and regularly seeks advice from the Conference Board, the Processor Advisory Group (PAG), and various State and Federal agencies. Among items surrounding the assessment process, stock assessment and catch limits and allocations were discussed as well as work programs for halibut bycatch monitoring and observer program restructuring.
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 Alaska Fisheries Science Center 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 Alaska Fisheries Science Center 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, North Pacific Fishery Management Council, 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 other items, fishery stock surveys and assessments, observer programs, Guidelines for Fishery Management Plans and Stock Assessment and Fishery Evaluation (SAFE) reports.

2nd July 2010	**Halibut Association of North America (HANA)** PO Box 872 Deming, WA 98224	Peggy Parker, Executive Director	The Halibut Association of North America (HANA), is a bilateral trade association for promoting and protecting the interests of the Pacific halibut processing industry. Formed in 1961, HANA has represented its U.S. and Canadian members in the regulatory, marketing, and scientific arenas. Pacific halibut has been managed by an Individual Fishing Quota (IFQ) system in the United States since 1995 and under an Individual Vessel Quota (IVQ) system in Canada since 1991. Within HANA's membership area, about 80% of the halibut caught is hauled in by commercial vessels. Between 12-15% is landed by sportsmen or recreational fishers. The remaining is split between personal use (subsistence) and IPHC landings done in the course of research surveys. Among the points of discussion, was the approach to the FAO based assessment and the role of HANA in providing a communication platform for industry with respect to management outputs and regulations.
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 issues of concern to member seafood companies including both at sea processors and shore based processors. Current Corporate members include: Alaska General Seafoods, Alyeska Seafoods, Inc., Golden Alaska Seafoods, LLC, North Pacific Seafoods, Inc., Peter Pan Seafoods, Inc., Phoenix Processor Limited Partnership, Trident Seafoods, Inc**.** and UniSea Inc., Westward Seafoods, Inc. PSPA members produce and market products from salmon, crab, halibut, cod, pollock 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 Dec 1st-3rd and 6th-9th 2010 and January 27-28th 2011. These were additional visits to the initial consultation meetings reported in section 5.2. 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.

The schedule of on-site activities is provided in **Table 5.1** 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 and also gave an opportunity to organizations to contribute with information they felt important to support the assessment.

A feature of the FAO-Based RFM assessment approach is to witness the management activities and procedures *in situ*. In this regard, members of the Assessment Team attended part of the NPFMC December 6th -14th 2010 cycle of meetings held in Anchorage (a summary of key proceedings that were witnessed is provided in summary in **Table 5.1**) and the January 24-28th 2011 IPHC meetings held in Victoria, BC. 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 that defines Alaska Pacific halibut fisheries management.

In addition, a considerable number of fishery representatives were met and consulted with during an ASMI annual stakeholder meeting held Dec 1st to 3rd 2010, in Seattle, Washington. These meetings included an up-date on the Alaska Pacific halibut fisheries assessment to the Technical Committee and ASMI Board. The two-way exchange allowed an opportunity for fishery participants to ask questions and contribute information with respect to the assessment process.

Table 5.1. Site Visit Schedule and Summary Outcomes for US Alaska Pacific Halibut.

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 Pacific halibut fishery assessment. Discussion with respect to the various stages in the assessment process.
Thurs 2nd Dec 2010	**International Pacific Halibut Council (IPHC).** Bruce Leaman Gregg Williams Global Trust: Dave Garforth Stephen Grabacki	Items for discussion included: a general description of stock survey techniques, the inclusion of the NMFS Trawl survey, the current observer program and in particular, developments for increased observer coverage in the GOA groundfish trawl fisheries. Fishery ecosystems interactions were discussed including: Non target and bycatch species in halibut long-line fisheries, interactions with sea birds and the continuing trend of declining weight at age in halibut stocks. How IPHC stock assessment and related activities are reviewed, such as independent internal review, external journal publication of stock assessment model and developments (involving peer review processes) and the connected activities through the Council SSC and related team plan team and committee processes were also discussed.
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 Gulf of Alaska groundfish survey and the targeted line survey carried out by IPHC for stock assessment purposes, the groundfish observer program and the declining weight at age in the halibut fishery. The halibut stock assessment prepared by the IPHC based on survey data collected from a multiple of sources including the NMFS standard ground fish trawl surveys which provide index of abundance and size composition data. The observer coverage on the GOA groundfish fleet was discussed with respect to the current level of understanding of the Prohibited Species Catch limits for halibut. 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 halibut bycatch of this current program is reported as unknown. Observers estimate total catch for a portion of hauls or sets, and sample hauls or sets for species composition, including halibut Prohibited Species Catch (PSC). These data are extrapolated by Alaska Region Catch Accounting System (CAS) to make estimates of total PSC halibut catch on both observed and unobserved vessels (Described in detail in Cahalan *et al*., 2010). 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 Dec 2010	**NPFMC, Anchorage, Alaska** Chris Oliver, David Witherell Global Trust: Dave Garforth, Stephen Grabacki	A short meeting was held prior to the NPFMC December meetings. The North Pacific Fishery Management Council, created by Section 302(a)(7) of the Magnuson-Stevens Fishery. A guide to the NPFMC organization and decision making processes is available at http://www.fakr.noaa.gov/npfmc/misc_pub/Navigating_NPFMC.pdf. Organization, practices and procedures of the Council are also documented. http://www.fakr.noaa.gov/npfmc/misc_pub/sopp608.pdf

Mon 6th-8th Dec 2010	**Witnessed Council Meeting:** **NPFMC Meeting** 201st Plenary Session North Pacific Fishery Management Council December 8-14, 2010. Hilton Hotel, Anchorage, Alaska. Meeting included SSC, AP, and Council plenary sessions. Global Trust: Dave Garforth, Stephen Grabacki	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 Scientific and Statistical Committee (SSC) and the Advisory Panel (AP) provide recommendations to the Council. The SSC is made up of scientists and 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 Allowable Biological Catch (ABC/s), Total Allowable Catch (TAC/s) 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 are 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 Pacific halibut fisheries on the December round of meetings included:** C-4 Halibut/Sablefish IFQ Program (a) Initial review of CQE Area 3A purchase of D category halibut quota. (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. D-1 Groundfish Management (b) Review discussion paper on GOA halibut PSC*. ***Groundfish management and GOA Halibut Prohibited Species Catch (PSC) Limits:** At the Dec 2009 meeting the Council had requested a discussion paper on the process for changing the halibut PSC limits in the GOA and the BSAI. In February 2010, the Council reviewed a NMFS discussion paper and set a priority to review the GOA area PSC limit. Possible actions included; simple measures to reduce halibut bycatch in the near term and; actions list of industry approaches to reduce halibut bycatch in the longterm. Potential actions that the Council could take included; taking no action, initiating an amendment (EA) to the GOA Groundfish FMP to revise PSC setting process to mirror the regulatory process as in the BSAI and include alternatives to the status quo halibut PSC limits in the analysis, initiate a separate analysis of halibut PSC to support the harvest specifications EA for 2012/2013 or include an analysis of halibut PSC limits in the next harvest specifications EA, allowing GOA halibut PSC limits in 2012 fishing year. A discussion paper noted that even with no action, the opinion of the Council that even with no action more widespread (mandatory or voluntary) use of halibut excluder devices could result in fewer halibut taken as bycatch in groundfish fisheries, thus leading to 1) potential increases in halibut abundance if not reallocated and commercial longline fishery catch limits and/or increased GOA groundfish target harvests. The amendment to the discussion paper provided a step by step options plan for revision to the PSC limits for halibut. The discussion paper noted that the overriding factor before any revision is undertaken would be to decide if there is a problem in the management of groundfish or halibut fisheries regarding halibut PSC limits.

27-28 January	**Witnessed Commission Meeting:** International Pacific Halibut Commission, annual meeting Victoria, British Columbia, Canada Global Trust: Stephen Grabacki * IPHC: International Pacific Halibut Commission * CB: Conference Board The Conference Board is a panel representing Canadian and American commercial and sport halibut fishers. Created in 1931 by the Commission, the Board gives the IPHC the fishers' perspective on Commission proposals presented at Annual Meetings in January. Members are designated by union and vessel owner organizations from both nations. * PAG: Processor Advisory Group The Processor Advisory Group (PAG), as the name suggests, represents halibut processors. Like the Conference Board,	The schedule of the Commission's 2011 annual meeting was – Monday - January 24 5:00 – 8:30 United States Delegation Meeting 5:00 – 8:30 Canadian Delegation Meeting Tuesday - January 25 8:00 - 9:00 IPHC Executive Session I 9:00 - 1:00 Public Session I 2:30 - 5:00 IPHC Administrative Session I 2:30 - 5:00 Conference Board (CB) Session I 2:30 - 5:00 Processor Advisory Group (PAG) I Wednesday - January 26 8:30 - 5:00 IPHC Administrative Session II 8:30 - 5:00 Conference Board (CB) Session II 8:30 - 5:00 Processor Advisory Group (PAG) II Thursday - January 27 8:30 - 9:30 IPHC, CB, and PAG Joint Session 9:30 - 12:00 IPHC Administrative Session III 1:30 - 5:00 IPHC Administrative Session IV Friday - January 28 7:30 - 8:30 IPHC Executive Session II 9:00 - 11:00 IPHC Meeting A member of the assessment team attended – * IPHC, CB, and PAG joint session on Thursday morning * IPHC meeting on Friday morning (Administrative and executive sessions are not open to the public.)

	PAG lends its opinion regarding Commission proposals and offers recommendations at IPHC Annual Meetings. The group was formed in 1996.	At the joint session of the IPHC, CB, and PAG, the Commissioners heard the opinions of the CB and PAG, regarding the recommendations made by IPHC staff regarding catch limits and regulatory changes. At the IPHC meeting, the Commission announced – * 2011 catch limits for each statistical area, which included significant reductions in catches for most areas. This confirmed earlier discussions with IPHC staff and with the commentary that was witnessed during the Council meetings the previous December. * 2011 fishing season starting and ending dates; for Alaska 12 March – 18 November * 2011 regulatory changes. * The first-ever IPHC Performance Review, to be undertaken over the next two years

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 Pacific halibut 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.

The IPHC is a bilateral, international treaty based organization, composed of representatives from the USA and Canada. Its mandate is research on (stock assessment and halibut biology) and management (allocation between regulatory areas in US and Canada) of the stocks of Pacific halibut (*Hippoglossus stenolepis*) within the convention waters of both nations. Specifically the IPHC main objective is to set annual catch limit between the two countries and within the regulatory areas and conduct research on the halibut stocks in order to conserve the biological viability of the stock, while allowing for maximum sustainable yield harvests from commercial, sport and subsistence users. The Northern Pacific Halibut Act of 1982 (Halibut Act) at 16 U.S.C 773-773k provides the Secretary of State of the US, with the concurrence of the Secretary of Commerce, the authority and general responsibility to carry out the requirements of the Convention and the Halibut Act. Following IPHC apportionments, the halibut fisheries in the American EEZ off Alaska are managed by the North Pacific Fishery Management Council, the National Marine Fisheries Service, and the Alaska Department for Fish and Game.

The NPFMC recommends regulations to govern the directed halibut fisheries in waters off Alaska and makes allocation decisions among halibut users and user groups fishing off Alaska. The NMFS works closely with the NPFMC and the IPHC, performing scientific research and being responsible for developing, implementing, and enforcing regulations pertaining to management of halibut fisheries

in US waters. NMFS also manages the halibut subsistence entry program for Native, rural, ceremonial and educational purposes. Additionally, ADFG licenses halibut anglers, sport anglers, fishing businesses and guides, monitors and reports on sport and subsistence halibut harvests, and assists federal agencies with preparation of regulatory analyses.

These agencies, and all of their activities and decisions regarding halibut, are subject to the Magnuson-Stevens Fishery Conservation and Management Act (known as the Magnuson-Stevens Act, or MSA).

The primary purpose of IPHC is to conduct research on the halibut stock for the biological conservation of the halibut resource for fishery use in the area through which the species migrates during its life cycle, by taking into account the whole stock unit over its entire area of distribution (from California to the Bering Sea). The halibut within the IPHC convention area are considered to be one stock, which is studied, managed and enforced by IPHC, NPFMC, NMFS, ADFG and the USCG. NMFS Alaska Region and NPFMC gather data on all sources of halibut removals and mortality: fishing (directed and incidental) and natural. All IFQ share holders must report their catches. Reporting is done via an electronic filing ("e-file") method, in which IFQ share holders report their catches.

Sport charters keep and submit catch logs, which are reviewed by NMFS. ADFG collects data from halibut sport fishermen (both guided/charter and un-guided), through an annual survey. Subsistence halibut data are gathered by NMFS under its Subsistence Halibut Registration Certificate (SHARC) program. Those data are reported to IPHC which also collects its own data through employment of port samplers and at-sea sampling agents.

The IPHC receives a great deal of input and guidance from stakeholders and researchers. The NPFMC and the NMFS provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The NPFMC actively encourages stakeholder participation, and all Council deliberations are conducted in open, public sessions.

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.

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 halibut resources. The Division of Coastal and Ocean Management (DCOM) within the state of Alaska's Department of Natural Resources is the lead agency for the Alaska Coastal Management Program (ACMP). ACMP mission is "*to provide stewardship for Alaska's rich and diverse coastal resources to ensure a healthy and vibrant Alaskan coast that efficiently sustains long term economic and environmental productivity*".

The ACMP process includes all activities and developments which utilize the coastal resources of Alaska. The NMFS and the NPFMC, cooperates with IPHC in Alaska to effectively manage halibut stocks within state jurisdiction (supported by ADFG). In all cases, management participates in coastal area management-related institutional frameworks through the ACMP and 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.

Alaska uses a multiple agency coordinated system for reviewing and processing all resource-related permits required for proposed projects in or affecting coastal areas of Alaska. The state's review process includes participation by: the project applicant; State resource agencies including DEC, ADFG (for example, Habitats Division), and DNR; the affected local coastal district office; and other interested members of the public, including fishermen's organizations and private individuals.

Examples of interactions include oceanographic survey work, oil and gas exploration, dams and weirs etc… The ACMP and NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. 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 Board of Fisheries meetings in the case of ADFG.

With regards to conflict avoidance and resolution between different fisheries, the NPFMC and the Alaska Board of Fisheries have created a joint protocol for development of "local area management plans," or LAMPs, for halibut fisheries at ports where allocation or gear conflicts are present.

Also, the IPHC annual meeting, and regular meetings of the NPFMC provide forums for resolution of potential international and national fisheries conflicts. The IPHC accepts regulatory proposals in the fall of each year, and users can testify in person or in writing at IPHC and NPFMC meetings. In addition, stakeholders may review and submit written comments to the NMFS on proposed rules published in the Federal Register.

The NPFMC approved a motion in April 2001 to incorporate the Southcentral and Southeast Alaska sport charter fleet (where the vast majority of the coastwide sport harvest is taken) into the existing IFQ program and to address overcapitalization of the sport charter fleet and reduce future allocation conflicts between charter and commercial users.

In its first few years, the Alaska Commercial Fisheries Entry Commission (CFEC) monitored and evaluated the effects of the IFQ program. Since 1998, 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.

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. The IPHC annual meetings, or regular meetings of the NPFMC provide a forum for participation of the public into the fisheries regulation's decision making process.

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

The initial Treaty signed in 1923 for the shared (US and Canada) management of Pacific halibut, points to the first basic regulations for closure of the fishery in determinate periods, research in halibut life history, regulations about halibut bycatch in other fisheries and the need for reporting such removals, enabling prosecutions for violation of the provisions. Amendments in the IPHC Treaties of 1930 and 1937 authorized the division of the coast into areas and the limitation of the halibut catch in each of US and Canada's Regulatory Areas. In 1953, a further Agreement of the Commission expanded on previous objectives of the IPHC.

In November 1993, the NMFS issued a final rule to implement Amendment 15 to the Fishery Management Plan (FMP) for the Groundfish Fishery of the BSAI Area, Amendment 20 to the FMP for Groundfish of the GOA Area, and a regulatory amendment affecting the fishery for Pacific halibut in and off Alaska. These regulations established an individual fishing quota (IFQ) limited access system in fixed gear fisheries for Pacific halibut and sablefish in and off Alaska. In addition, this action implemented a Western Alaska Community Development Quota (CDQ) program for halibut and sablefish fixed gear fisheries. These actions were intended by the NMFS to promote the conservation and management of halibut and sablefish resources, and to further the objectives of the Northern Pacific Halibut Act of 1982 (Halibut Act) and the Magnuson Fishery Conservation and Management Act (Magnuson Act) that provided authority for regulating these fisheries. Amendments 15 and 20 effectively provide a framework for the management of halibut resources within the Groundfish FMP of Alaska.

The NPFMC has developed Pacific halibut regulations to address domestic allocation concerns (e.g., catch sharing between sectors, subsistence, local area management planning). The Council develops its Pacific halibut fishery regulations pursuant to the authority in section 5(c) of the Northern Pacific Halibut Act of 1982 (Halibut Act). The Council's Halibut Act regulations are implemented only after review and rulemaking conducted by the NMFS. In a practical sense, the Council's Halibut Act regulations constitute a framework for the management of the Pacific halibut resources in the waters off Alaska. Furthermore, the federal MSA legislation contains many long-term management objectives for sustainable harvest, habitat protection, social economic objectives and strategies to develop rationalized fisheries.

The Alaska Coastal Management Plan (ACMP) and National Environmental Protection Act (NEPA) process includes all activities, developments and stakeholders which exist and utilize the coastal resources of Alaska. All NPFMC fisheries-related packages go through full NEPA review. Conflict avoidance and resolution is dealt through NPFMC, IPHC and Board of Fisheries meetings. The IFQ System and the NMFS' Restricted Access Management entry program control commercial capacity. Monitoring of the Alaska coastal environment from a social, economic and environmental perspective is carried out by a large number of state, federal and international bodies. Since 1998, NMFS has performed economic analysis evaluation to ensure that the IFQ program continues to achieve its goals. The results of these analyses are communicated through reports, including NMFS's Annual Report to the Fleet.

The interests of all fishers are explicitly, thoroughly, and routinely taken into account. NPFMC and NMFS devote a great deal of effort, with continuous stakeholder participation, in managing the commercial, sport, and subsistence fisheries.

Conservation of aquatic habitats and biodiversity are integral parts of NPFMC's management process and is statutory required under the Magnuson-Stevens Act. These concerns and decisions are summarized in the Ecosystems Considerations chapter of the Council's annual Stock Assessment and Fishery Evaluation (SAFE) report. The Council and NMFS have a long history of restricting fishing operations in order to protect endangered and threatened species of marine mammals and birds.

IPHC's harvest policy is to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% (threshold level) of a level defined as *the unfished level*. The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% (limit level) of this estimated *unfished* level.

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 IPHC requires effective data to produce the annual Constant Exploitation Yield (CEY) calculation and set the accompanying regulatory harvest levels. Clearly, the Pacific halibut stock assessment (discussed next under item 5) is critical in that assessment, as is the uses of data from commercial landing reports, commercial logbooks, port sampling of commercial landings, and fishery agencies in both countries that report estimates of bycatch, sport catch, and subsistence catch.

The weight of every commercial landing is recorded on a sales report (fish ticket), a copy of which is sent to the IPHC. The total catch in weight in every regulatory area in every year is known from this reporting system. IPHC port samplers collect additional information on commercial fishing trips and catch composition. These records are combined with fish ticket data to calculate commercial catch per unit effort (CPUE) in each area. Port samplers also obtain a carefully chosen random sample of (presently) about 1500 fish from each regulatory area, from which the length and age composition of the commercial landings can be estimated.

The IPHC relies upon information supplied by observer programs run by domestic agencies for bycatch estimates in most fisheries. On vessels with federal observer coverage, halibut bycatch in Alaskan groundfish fisheries is well documented. Strict limits exist that can trigger time and area closures when Prohibited Species Catch (i.e. halibut) caps are reached. Currently, 86%-88% of the Bering Sea fisheries are observed. In contrast, between 2004-2007 the GOA observed catch ranged mainly from 28 to 38% because of the overall smaller vessel sizes, which have lower observer coverage requirements.

In December 2009, the NPFMC's Statistical Scientific Committee (SSC) requested improvements to estimation methods of discard and continued monitoring of estimated bycatch in the Halibut IFQ fishery. Specifically the SSC recommended monitoring of at-sea discards of rockfish species, skates and sharks.

Recognizing this shortcoming, a new working group of scientists from the Alaska Fishery Science Center (AFSC), Alaska Regional Office (AKRO), ADFG, IPHC and NPFMC was formed in January 2010 to address the issue. They plan to improve bycatch estimation methods in the halibut IFQ fishery and deliver them to IPHC's stock assessment authors by August 2011.

Recent and on-going proposals for restructuring of the NMFS observer program will place control of observer deployment under the authority of the NMFS in an effort to improve to bycatch estimation in the directed halibut and other groundfish fisheries. The restructured observer program is planned to be up and running by 2013.

An Integrated Electronic Monitoring (EM) technology (cameras) component could provide viable catch monitoring capability for the smaller-boat share of the commercial halibut fleet, a large portion of which may be unsuitable for observer coverage. The NPFMC's Observer Advisory Committee – Meeting Agenda March 22, 2011, was focused on the restructuring of the observer program and the development of an EM program/design for the small boat fleet.

Research survey information is also used to generate estimates of bycatch. Also, the U.S. NMFS operates observer programs covering the groundfish fisheries off Alaska and the U.S. west coast, and provides IPHC with estimates of bycatch. Information on lost gear is collected through logbook interviews and fishing logs received by mail. The ratio of U32 to O32 halibut is determined from IPHC stock assessment survey.

Sport charters keep and submit catch logs, which are reviewed by NMFS. ADFG collects data from halibut sport fishermen (both guided/charter and un-guided), through an annual survey. Subsistence halibut data are gathered by NMFS under its Subsistence Halibut Registration Certificate (SHARC) program.

The IPHC subjects a large majority of its statistical analysis to external scientific review through the publication of fishery stock assessment models, treatment of data and conclusions drawn from these analyses. Scientific reviews of the stock assessment approaches also form a regular feature of IPHC policy. The NPFMC and Pacific Fisheries Management Council (PFMC), through their Scientific Statistical Committees also undertake on-going review of the Commission's scientific output.

IPHC has a Seattle staff of 27 including a fisheries statistics program manager, several quantitative scientists, data transcribers, biologists, port and sea samplers, survey managers and operators. This staff collectively and yearly produces timely and reliable catch and fishing effort statistics for Pacific halibut stock assessment and management purposes. The reports produced from these data follow scientifically acknowledged standards, surveys, analysis and reporting methodologies.

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

IPHC is the main body responsible for the scientific analysis for sustainable use and conservation of the Pacific halibut stock (Eastern Pacific) and its habitat. The main objective of the IPHC data collection and analysis is to develop biologically based and statistically credible management tools and models in support of this. The policy for the control of fishery removals is based on a Constant Exploitation Yield (CEY) derived from annual assessment to determine available yield. Research, data collection and generation is directed for these purposes, and to determine the wider environmental influences on the fishery.

The IPHC's annual stock assessment starts with the setline survey. Roughly 25 sea samplers hired each year work aboard a fleet of twelve to fifteen IPHC charter commercial longline vessel and conduct a standardized setline stock assessment survey (collecting CPUE data), which ranges from the southern Oregon border, north through British Columbia to the Bering Sea, and west to Attu island in the Aleutian Islands. The 2011 setline survey will cover 28 regions, from the southern Oregon border to the northern Bering Sea including the Aleutian Islands and Puget Sound.

The IPHC has also participated in the NMFS annual Bering Sea shelf trawl survey since 1998. In addition to the standard stations, in 2010, the NMFS conducted an expanded survey which included 142 new stations north of the standard sampling area around St. Lawrence Island and Norton Sound. In 2010, the NMFS also operated their triennial Aleutian Islands survey, used as a comparison of NMFS trawl and IPHC assessment biomass estimates. In its current configuration, stations are placed on a 10-nautical mile grid between depths of 20 and 275 fm, resulting in a total of approximately 1280 stations.

The US collaborates with the government of Canada at the technical and research level via the IPHC on stock assessment research, biology, environmental factors and influence, the development of fishery regulations and fishery management for the Pacific halibut resources in the North Pacific Ocean. Data on commercial catches, and on size-at-age, are the foundation of the age-structured stock assessments that have been the main scientific basis of the IPHC staff's management advice for long-term resource sustainability since the late 1970s. Annual reports document the significant and comprehensive effort of the scientific staff of the IPHC. Assessment model refinements for the harvest policy occur when necessary, recently dealing with bycatch and wastage mortality.

The institutional framework for fisheries management includes supervisory, administrative, technical, economic, biometric, samplers, age readers, data entry personnel, and other IPHC staff who are responsible for collecting and quality control checking the data upon which the halibut assessment depends so strongly. All programs are guided by commission policies, standards, and/or nationally recognized scientific standards. Scientists with the IPHC routinely interact with state, federal, academic, and international researchers.

Scientists with the NMFS have conducted numerous studies and continue research on the impacts of acidification in the North Pacific. A research plan has been developed by the Alaska Fisheries Science Center focusing on forecasting fish, shellfish and coral population responses to ocean acidification in the North Pacific Ocean and Bering Sea. IPHC compared long-term changes in Pacific halibut recruitment and growth with long-term changes in climate and stock size. Since 2009 the IPHC has deployed water column profilers at each of its survey stations, from the western Aleutian Islands to

southern Oregon to assess environmental change in the ecosystem and effects on migration and recruitment of Pacific halibut. The IPHC staff has also participated in International symposia looking at the climate impacts of density-dependence and fishing on long-term and large-scale changes in recruitment, growth, maturity and distribution of Pacific halibut.

All the reported fishery research data is done in accordance with Alaska's legal requirements to protect confidential data. The state specifically protects confidentiality through statute (AS 16.05.815 Confidential nature of certain reports and records).The IPHC subjects a large majority of its statistical analysis to external scientific review through the publication of fishery stock assessment models, treatment of data and conclusions drawn from these analyses. Scientific reviews of the stock assessment approaches also form a regular feature of IPHC policy. The NPFMC and Pacific Fisheries Management Council (PFMC), through their Scientific Statistical Committees also undertake on-going review of the Commission's scientific output.

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.

Since 1985, the IPHC has followed a constant harvest rate (CHR) policy to determine annual available yield, termed the Constant Exploitation Yield (CEY). A biological target level for total removals from each regulatory area is calculated yearly by applying a fixed harvest rate to the estimate of exploitable biomass in each IPHC regulatory area. IPHC's harvest policy is to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% (threshold level) of a level defined as *the unfished level*. The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% (limit level) of this estimated *unfished* level. That is, fishing ceases completely if the stock is below 20% of the unfished biomass.

This combination of harvest rate and precautionary levels of biomass protection have, in simulation model studies, provided a large fraction of maximum available yield minimizing risk to the spawning biomass, while allowing for the quickest stock recovery to at least, threshold levels. The minimum observed spawning biomasses for the three IPHC core areas all occurred in the mid 1970s, approximately 9 million pounds in 2B, 13 million pounds in 2C and 42 million pounds in 3A. By definition, these become the spawning biomass limits.

IPHC monitors yearly the status of the female spawning biomass relative to reference points. For example in terms of biomass (B) in 2010, the halibut unfished biomass ($B_{unfished}$) was estimated at 811 million pounds, a B20 (20% of $B_{unfished}$) of 162 million, a B30 (30% of $B_{unfished}$) of 243 million pounds, and the 2011 female spawning biomass value of 350 million pounds established the current biomass ($B_{current}$) as 43% of $B_{unfished}$, up from the 2010 beginning of year estimate of $B_{current}$ of 38%.

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 IPHC completed its Eighty-seventh Annual Meeting in Victoria in 2010. The decline of the stock due to both natural declines in recruitment, lower growth rates, and higher than target harvest rates in most areas has motivated a change in the harvest recommendations. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas.

Since the early 2000s, and similar to many fisheries management agencies, the Pacific halibut harvest policy adopted by IPHC has incorporated a measure designed to avoid rapid increases or decreases in catch limits, which can arise from a variety of factors including true changes in stock level as well as perceived changes resulting from changes in the assessment model. The adjustment, termed “Slow Up Fast Down (SUFD)” was based on a target harvest rate of 20% but with a realized rate usually slightly different. Specifically, if a reduction in available catch was recommended, 50% of the reduction was implemented whereas if an increase was recommended, only 33% of the increase was implemented.

Nonetheless, recently IPHC staff have been concerned that the Commission's SUFD harvest policy adjustments have not achieved target harvest rate and recommended in 2010 that the SUFD policy be modified to a Slow Up - Full Down (SUFullD) policy. That is a 33% increase from previous year's catch limits when stock yields are projected to increase and a 100% decrease in recommended catch, when stock yields are projected to decrease. The SUFullD policy was adopted in January 2011.

The Pacific halibut fishery is an industrialized fishery with a long term management system in place, pursued by a highly regulated fleet that is subjected to well defined fishery data collection systems, operating under an IFQ system, with conservatively defined catch quotas, gear restrictions, size limits, and closed seasons and areas.

The professional staff of the IPHC has repeatedly taken a responsible approach to managing halibut resources in light of the absence or paucity of available scientific information. For example, in establishing the 2011 Catch Limit, the staff conducted several analyses in 2010 that have been incorporated into the staff’s catch limit recommendations. These included the addition of new Bering Sea survey data into estimation of exploitable biomass, and a statistical analysis resulting in an improved averaging procedure for the survey Weight Per Unit of Effort (WPUE) data used in apportioning the coastwide biomass estimate into regulatory area biomass estimates.

The Pacific halibut fishery in Alaska developed gradually, during which information on the status of the stock and harvest was obtained, in order to assess impacts on the resource. Effort in developing an extensive institutional framework necessary to studying and managing this resource began with the adoption of the halibut convention between the Governments of the United States and Canada in 1923. In fulfilment of its duty, the Commission engaged a staff (now of 27 people) and began practical scientific investigations of the life of the halibut, of the supply of halibut and of the fishery. Control of the rate of removal, or the, amount of fishing on each stock, was made possible by amendments to the Treaties of 1930 and 1937, which authorized the division of the coast into areas and the limitation of the catch in each area.

With the adoption of regulations in 1930, the Commission developed contingency plans to address changes to the health of the resource. Regulations allowed specific area closures when catch limits were reached, or to preserve areas with populations of small fish, where no fishing was allowed, in addition to the standard winter fishery closure in all areas. Beginning in 1937, halibut bycatch provisions were adopted for the North Pacific groundfish fisheries. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas.

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.

Nearly all of the research done by the staff is directed toward one of three continuing objectives of the Commission. These are improving the annual stock assessment and quota recommendations, developing information on current management issues, and adding to knowledge of the biology and life history of halibut. Management of the fishery is based upon this, and other research. The fishery continues to harvest only those fish surplus to sustaining reproductive capacity. The Commission encourages public participation in the management of the resource and regularly seeks advice from the Conference Board, the Processor Advisory Group, and various State and Federal agencies. IPHC annual meetings allow these parties to consult and collaborate on regulatory and catch limit proposals for commercial, recreational, and subsistence purposes. These meetings are publicly noticed, and held in Seattle, WA and Vancouver, BC Canada to allow increased accessibility.

Regulations in place address waste, discard, bycatch, and endangered species interactions in the halibut fisheries. The IPHC, the NMFS, and ADFG promulgate these regulations through the Commission, the NPFMC, and the Alaska Board of Fisheries. In the directed longline fisheries for Pacific halibut, bycatch of other fish species is not well documented. However, management actions are in place in respect to increasing knowledge on the bycatch dynamics of the directed halibut longline fishery (i.e. restructuring the observer program and related bycatch implications).

Bycatch of seabirds were addressed by specific regulations put in place to reduce the incidental mortality of the short-tailed albatross, a listed species under the Endangered Species Act (ESA), and other seabird species in 1998, then revised in 2008. These measures now include the use of streamer (tory) lines, night setting, lineshooters and lining tubes, have been shown to reduce seabird interactions when setting or retrieving gear.

In the early 1980s the IPHC conducted research on capture efficiency of circle vs J hooks and determined that using circle hooks lowered the mortality of undersized halibut caught and released during fishing. In 1983, industry made the operational switch from J-hooks to circle hooks in the commercial fishery.

Yelloweye rockfish (*Sebastes ruberrimus*) are also taken in the GOA halibut fishery as bycatch. The Alaska Longline Fishermen's Association has secured funding to develop a real-time rockfish bycatch reporting network for the Eastern GOA.

In terms of marine mammals, although they are known to interact with halibut longline gear, bycatch in halibut fisheries is virtually non-existent. Halibut bycatch and discards are accounted for directly and indirectly by the IPHC in setting yearly Catch Limits for the different regulatory areas.

The commercial halibut fishery is limited to retention of fish 32 inches or greater in length. Biologically, and for continued sustainability, this is the preferred portion of the spawning population available for harvest. Fishing gear is regulated to longline gear only. Longline gear and the manner of fishing have been developed over a long period of time to be selective of target species. Seasons are established in regulation by the IPHC. Open and closed periods, as well as fishing period limits are set in regulation. Regulations are in placed to address discards. General spawning areas have been mapped in Alaska. The halibut fishery is closed during peak spawning times, by regulation.

The NPFMC has established Marine Protected Areas that benefit juvenile fish and adult spawners. The Halibut Longline Closure Area is 36,300 square miles in size. Additional trawl closures for areas in the waters of Bristol Bay provide some degree of refuge for juvenile halibut.

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

The IPHC and NPFMC objectives for management are based on maintenance of maximum sustainable yield (MSY). The policy for achieving this is based on setting biological reference points that determine the annual CEY for the Pacific halibut stock. In season management measures are then used to maintain the stock at or near target reference points and above limit reference points.

Under the individual fishing quota share system in place for the Pacific halibut fishery, fishing capacity (vessels and gear) has been reduced. Through a public process at the NPFMC, extensive staff analysis was presented, analyzed, and data confirmed 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 qualifications for a fishing fleet with less capacity and with ownership in the resource. With carefully established Catch Limits, and extended seasons, market conditions greatly improved, as more fresh fish was made available.

With the implementation of IFQs in the fishery in Alaska, extended seasons reduced the derby type fishery and therefore reduced wastage of halibut in the fishery. In 1983, industry made the operational switch from J-hooks to circle hooks in the commercial fishery, lowering the mortality of undersized halibut caught and released during commercial fishing. Discards of Pacific halibut, considered a Prohibited Species Catch (PSC) by the groundfish fisheries in Alaska, is regulated. When PSC limits are reached, groundfish target species closures result. The NMFS has been researching the value in using Electronic Monitoring (EM) to quantify discards at sea.

Research has shown that the groundfish trawl industry in Alaska can deploy halibut excluders in their gear with success. The bycatch reduction device was formally tested by an industry trade association in conjunction with a NMFS fishing gear researcher under an Experimental Fishing Permit in 1998. Results from the experiment showed the device excluded 94% of the halibut while only releasing 38% of the target flatfish when deployed in the Bering Sea.

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 and net gears.

The IPHC makes available all regulatory notices, developments, and requirements through electronic and paper sources. Regulations specifically define legal gear. These have not been circumvented with regard to technical devices in the IFQ Pacific halibut fishery.

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

Any halibut aspirant fisherman must have 150 days of halibut fishing experience before being able to purchase halibut IFQs. Obtaining halibut IFQ share most often will require the purchaser (aspirant halibut 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.

There are a myriad of educational and training programs available to Alaska Pacific halibut fishermen, ranging from maritime topics like Bridge Resource Management and Radar Observer, to seafood topics like HACCP and direct marketing.
While there is not much education and training which explicitly deals with the FAO 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. Anyone who seeks to understand Alaska's fisheries management process unavoidably ends up becoming very familiar with the Code.

Only one gear type may be used to harvest halibut in the GOA and BSAI – benthic longline (a passive gear type). All longline fishing gear must be marked and operated in accordance with federal fisheries regulations – 50 CFR Part 679: Fisheries of the Exclusive Economic Zone off Alaska. 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 fish) and the Individual Fishing Quota (IFQ) program, which, among other benefits, have reduced unwanted catch and discards.

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 landings of halibut must be reported to NMFS via its mandatory "e-landings" reporting system. Commercial harvests of pollock, halibut and sablefish are the primary enforcement responsibilities of OLE. The Individual Fishing Quota (IFQ), Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities.

There is no legal harvesting of halibut in North Pacific waters outside the national jurisdiction of the USA or Canada. Similarly, there is no halibut harvesting by American vessels in Canadian waters, or by Canadian vessels in American waters. Within the American EEZ off Alaska, halibut 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) boardings, 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 inspect and cross check at landings and processors records for reconciliation, and closely monitor Prohibited Species Catch in non halibut 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. Fines issued in the sport fishery are in the order of several thousand dollars, and the revocation of sport fishing license as well as sport guide licence for several years (3 years) is an occurring penalty.

Endangered Species Act and Marine Mammal Protection Act priorities include the Steller sea lion and Cook Inlet beluga populations in addition to many other protected resources. 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 Magnuson-Stevens Act 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.

The impacts of environmental factors on halibut and other fish or non-fish species associated or dependent upon them have been and are being appropriately assessed.

In the directed longline fisheries for Pacific halibut, bycatch of other fish species is not well documented. Halibut long-line fisheries can be highly selective depending on the area they are fishing in. Management actions are in place in respect to increasing knowledge on the bycatch dynamics of the directed halibut longline. This is explained below in this section summary (see restructuring observer program discussion).

Bycatch of seabirds were addressed by specific regulations put in place to reduce the incidental mortality of the short-tailed albatross, a listed species under the Endangered Species Act (ESA), and other seabird species in 1998, then revised in 2008. These measures now include the use of streamer (tory) lines, night setting, lineshooters and lining tubes. These measures have been shown to reduce seabird interactions when setting or retrieving gear.

The short-tailed albatross is protected in Alaska waters by the Endangered Species Act (ESA). As a result of consultation with the US Fish and Wildlife Service (USFWS) under the ESA, USFWS issued an incidental take statement of 4 birds during each 2-year period for the BSAI and GOA hook-and-line (i.e. halibut fishery) groundfish fisheries. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending re-initiation of consultation with the USFWS. NMFS may choose to reinitiate consultation if/when the level of authorized incidental take is met but not exceeded, in order to avoid potential delays in operations.

In 2002 the IPHC, in collaboration with Washington Sea Grant, developed a sampling protocol for collecting seabird occurrence data on the IPHC stock assessment surveys. This was initially a collaborative project between the IPHC, ADFG and the NMFS sablefish (*Anoplopoma fimbria*) survey. The IPHC permanently incorporated the seabird data collection protocols into its survey program. Sampling seabird occurrence after the haul addresses the question of where and when certain seabird species occur, and aids in the assessment of individual species at risk by providing information that may reflect population trends over time.

In terms of marine mammals, although they are known to interact with halibut longline gear, bycatch in halibut fisheries is virtually non-existent. Sea mammals interaction with the halibut fishery consist of whales and otariids (sea lions and fur seals) selectively eating hooked groundfish species such as Greenland turbot, Pacific halibut, sablefish, or Pacific cod directly from the longline gear before the line is retrieved by the vessel.

Yelloweye rockfish are also taken in the GOA halibut fishery as bycatch. The Alaska Longline Fishermen's Association has secured funding to develop a real-time rockfish bycatch reporting network for the Eastern GOA.

Halibut bycatch and discards in the halibut and non halibut fisheries are accounted for directly and indirectly by the IPHC in setting yearly Catch Limit for the different regulatory areas.

The recent and on-going proposals for restructuring of the NMFS observer program which will place control of observer deployment under the authority of the NMFS could provide potential improvements to bycatch estimation. In the GOA, (estimates of) the ratio of halibut mortality to groundfish catch is more than twice as high as that in the BSAI fisheries and renders improvements in these estimates of halibut bycatch mortality of greater importance.

In terms of implementation, the plan is for a restructured observer program up and running by 2013, possibly, with an integrated Electronic Monitoring (EM) technology (cameras) component. EM technology could provide viable catch monitoring capability for the smaller-boat component of the commercial halibut fleet, a large portion of which may be unsuitable for observer coverage. This program has significant implications in understanding the full effect of the IFQ Pacific halibut fishery on bycatch of non-target species.

Benthic longline gear effect on bottom habitats are generally mild to none and are deemed to have no permanent negative effects. Bycatch by ghost gear has greatly diminished, especially after the adoption of IFQs, allowing for a longer and more careful fishing season. Since 1996, scientists at the Alaska Fisheries Science Center's Auke Bay Lab have been conducting research on the effects of fishing gear on benthic habitat.

Several projects to obtain information about environmental changes, ecosystem status and management of the Pacific halibut fishery are being conducted.
Halibut remain near the top of the ocean food chain. References indicated that halibut contribute to the diet of several species of fish and marine mammals. In all instances, halibut represented only a minute proportion of any animal's diet. Halibut bait species are well managed by either the State of Alaska or the NMFS, and none are classified as endangered or threatened.

Halibut size-at-age has been declining since the mid-1980s. The most generally accepted cause of the decline in size-at-age has been a density-dependent decline in growth rate resulting from the greatly increased numbers, and biomass, of flatfish. It is worth noting here that, although the exploitable biomass of halibut has declined by 50% since the late 1990s, the total biomass of halibut has continued to increase. Additionally, the biomass of arrowtooth flounder estimated to be several times greater than the halibut biomass, has remained very high. The management response to the declining size at age continues to be considered (IPHC meetings). Catch reduction have been implemented, noticeably in the current 2011 season Catch Limit.

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 Pacific halibut fishery principally managed by the IPHC.

6.1. Conformity statement

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

For the Alaska Pacific halibut commercial fishery management system, only one medium confidence rating was assigned against clause 4.2. Currently there is no observer coverage for the directed IFQ Pacific halibut fishery. The Assessment Team reviewed the available information and established that management actions to improve the observer program in the Pacific halibut commercial fishery are underway (see clause 4.2 section 7) and a comprehensive assessment of these will be carried out in 2012 during the first surveillance assessment of this fishery. 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).

Determination: The appointed members of the Global Trust Certification Committee met on the 28th of April 2011. After detailed discussion, the Committee determined that the applicant fishery, the US Alaska Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management, fished with benthic longline (within Alaska's 200 nm EEZ) is awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

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 Pacific halibut commercial fishery are listed below. These items are highlighted to survey in detail the management actions implemented to overcome the shortcomings of the Alaska Pacific halibut fishery, 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
4.1	**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.**	Current methods for estimating bycatch of non-target species in the halibut fishery are currently under review. To address these non-halibut bycatch issues in the halibut fishery, a working group composed of scientists from the AFSC, AKRO, ADFG, IPHC, and NPFMC was formed in January of 2010, to provide Plan Team and SSC members with an overview of the analytical methods and associated estimates for several example species: Pacific cod, spiny dogfish, Pacific sleeper shark and salmon shark within the GOA. The Group plans for August 2011 to have estimation of catches for non-target species prepared and provided to stock assessment authors. The output from this meeting will be monitored and appropriately assessed during the surveillance of the Pacific halibut fishery in the event of certification. Further action will be taken accordingly after surveillance.
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 with its related implications in improving bycatch and discards estimation in the groundfish and halibut fisheries off Alaska will be monitored and appropriately assessed during the surveillance assessment of the Pacific halibut fishery. A complete re-evaluation of the Observer Program will then take place between years 4 and 5 should certification be granted.
13.1.1	**The most probable adverse impacts (of the fishery on the ecosystem) shall be considered, taking into account available scientific information, and local knowledge.**	The discarded catch of non-target species in the halibut IFQ fishery is largely unobserved, undocumented and has not previously been incorporated into most of the BSAI and GOA stock assessments. New development such as the restructuring of the observer program and the new AFSC, AKRO, ADF&G, IPHC and NPFMC working group, to improve bycatch estimation in the halibut fishery have great implications to assess the impacts of the directed Pacific halibut fishery on the ecosystem. Both of these developments will be monitored and appropriately assessed during the surveillance assessment of the Pacific halibut fishery.

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 Criteria 7.7.1

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause	Evidence
1.1	The IPHC or "Commission" is a bilateral, international treaty based organization. The Commission is composed of representatives of the USA and Canada. Its mandate is research on and management of the stocks of Pacific halibut (*Hippoglossus stenolepis*) within the convention waters of both nations. The IPHC consists of three government-appointed commissioners for each country, who serve their terms at the pleasure of the President of the United States, and the Canadian government, respectively. The commission sets annual catch limits for halibut in waters along the west coast of North America, including Alaska, and apportions those limits among its regulatory areas. The Northern Pacific Halibut Act of 1982 (Halibut Act) at 16 U.S.C 773-773k provides the Secretary of State of the US, with the concurrence of the Secretary of Commerce, the authority and general responsibility to carry out the requirements of the Convention and the Halibut Act. Following IPHC apportionments, the halibut fisheries in the American EEZ off Alaska are managed by the NPFMC (or "Council") and the NMFS (or "NOAA Fisheries"). The NPFMC recommends regulations to govern the directed halibut fisheries in waters off Alaska (provided its actions do not conflict with regulations recommended by the IPHC); and makes allocation decisions among halibut users and user groups fishing off Alaska: non-treaty commercial (incidental salmon troll fishery, directed longline halibut fishery, and incidental longline sablefish fishery), sport, and treaty Native commercial and ceremonial, and subsistence.

	The NMFS works closely with the NPFMC and the IPHC, performing scientific research (conservation of wildlife such as marine mammals and habitat conservation) and being responsible for developing, implementing, and enforcing regulations pertaining to management of halibut fisheries in U.S. waters. The NMFS is implementing a limited entry system for halibut charter boats, and developing regulations to implement a catch sharing plan to allocate halibut between the commercial and charter fisheries in Alaska. NMFS also manages the halibut subsistence entry program for Native, rural, ceremonial and educational purposes. Also, the state of Alaska participates in Pacific halibut fisheries management through the Alaska Department of Fish and Game (ADFG) Commissioner's seat on the NPFMC. Moreover, ADFG licenses halibut anglers and sport fishing businesses and guides, monitors and reports on sport and subsistence halibut harvests, and assists federal agencies with preparation of regulatory analyses. These agencies, and all of their activities and decisions, are subject to the Magnuson-Stevens Fishery Conservation and Management Act (known as the Magnuson-Stevens Act, or MSA). ***sources of evidence –*** - www.iphc.washington.edu/home.html - http://www.fakr.noaa.gov/frules/76fr14300.pdf - www.iphc.washington.edu/publications/annual/ar2009.pdf - www.fakr.noaa.gov/regs/summary.htm - http://www.fakr.noaa.gov/sustainablefisheries/default.htm - http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm - http://alaskafisheries.noaa.gov/sustainablefisheries/msa/amended07.pdf - www.fakr.noaa.gov/npfmc/default.htm - http://alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/halibut.htm - http://www.adfg.alaska.gov/index.cfm?adfg=halibut.management

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 primary purpose of IPHC is to take into account the whole stock unit over its entire area of distribution which extends from California to the Bering Sea. ***sources of evidence –*** www.iphc.washington.edu/home.html
1.2.1	IPHC conducts extensive research on Pacific halibut throughout the entire area through which the species migrates during its life cycle. Further, the Commission apportions catch limits to each regulatory area within that range, with clear consideration of halibut life cycle and migration. Within the American EEZ off Alaska, NPFMC and NMFS also consider the entire range through which halibut migrate during its life cycle. ***sources of evidence –*** - www.iphc.washington.edu/research/stock-assessment.html - www.iphc.washington.edu/research/biology.html - www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/halibut.htm
1.2.2	The Pacific halibut within the IPHC convention area is considered to be one stock, which is studied and managed by IPHC, NPFMC, and NMFS. The Pacific halibut stock is apportioned yearly between the various regulatory areas according to biomass abundance in each of these. The eastern North Pacific halibut resource is presently managed under the assumption that a single, fully-mixed population exists from California through the eastern Bering Sea. This theory rests largely upon studies that indicate there is northwest larval drift balanced by migration of juveniles and adults to the southeast, over broad geographic expanses, together with tag recovery data showing extensive movement of fish. In 2002, a project was initiated to investigate genetic population structure in the northeast Pacific, including spawning groups from British Columbia, the central GOA, southeast Bering Sea, and

	eastern Aleutian Ridge. In the course of these investigations, a suite of microsatellite alleles was also discovered to show significant linkage to sex, providing a potential method for identifying gender of sampled individuals. Results of preliminary population analysis based on 16 microsatellite loci screened from samples collected in the eastern Pacific Ocean was presented in 2009, showed that, based on 9702 genotypes derived from analysis of 16 microsatellite loci from six collections showed little genetic differentiation among populations. A new IPHC genetic microsatellite study, with samples collected in Russia and on the American/Canadian coast, will confirm in 2011 if there are significant genetic differences between the two stocks. Exploitable biomass (E_{BiO}) in each regulatory area is estimated by partitioning, or apportioning, the total E_{BiO} in proportion to an estimate of stock distribution derived from the IPHC setline survey catch rates [Weight Per Unit Effort (WPE)] and by taking into account migrations of halibut from one regulatory area to other as specified by recent tagging studies results. Specifically, an index of abundance in each area is calculated by multiplying weighted survey WPUE by total bottom area between 0 and 400 fm. The logic of this apportionment is that survey WPUE can be regarded as an index of density, so multiplying it by bottom area gives a quantity proportional to total abundance. ***sources of evidence –*** - http://www.iphc.washington.edu/publications/rara/2009/449.pdf - http://www.iphc.washington.edu/papers/sa10.pdf. - http://www.iphc.washington.edu/publications/rara/2010/2010.315.ExaminationofgeneticpopulationstructureinPacifichalibut.pdf - Also see evidence cited in section 1.1
1.2.3	NMFS and NPFMC gather data on all sources of halibut removals and mortality: fishing directed and incidental, and natural. All IFQ share holders must report their catches. Reporting is done via an electronic filing (“e-file”) method, in which IFQ share holders report their catches. Natural mortality is estimated scientifically by IPHC scientists, and reported in the Commission’s annual Report of Assessment and Research Activities (RARA). Sport charters are required to keep and submit catch logs, which are reviewed by NMFS. The Alaska Department of Fish & Game (ADFG) collects data from halibut sport fishermen (both guided/charter and un-guided), through an annual survey. Although the survey lags the season by several months, ADFG provides an estimate to IPHC at the Commission’s annual meeting in January. Subsistence halibut data are gathered by NMFS under its Subsistence Halibut Registration Certificate (SHARC) program. Special permits for community harvest, ceremonial, and educational purposes also are available to qualified Alaska communities and Alaska Native Tribes. Permit holders must comply with SHARC registration and reporting processes.

	In terms of halibut bycatch in other groundfish fisheries, the NMFS operated observer program currently observes 86%-88% of the Bering Sea fisheries. 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. Halibut data are entered into IPHC's annual total removals calculations. All these data are reported to IPHC which also collects its own data through its employment of port samplers (all halibut are required to be landed at a port, rather than processed at sea) and at-sea sampling agents. Setline surveys operated by IPHC also collect information on bycatch of non halibut species, which are used as proxy to calculate bycatch in the halibut fleet, distinctively for each regulatory area. The Commission then considers all removals and mortality in its setting of annual catch limits. ***sources of evidence –*** - www.iphc.washington.edu/library/raras/149-rara-2010.html - www.iphc.washington.edu/library/annual-reports.html - www.fakr.noaa.gov/ram/subsistence/halibut.htm#reports - www.fakr.noaa.gov/sustainablefisheries/halibut/sport.htm - www.fakr.noaa.gov/ram/ifq.htm - www.fakr.noaa.gov/rr/report.htm#ifqforms - www.fakr.noaa.gov/npfmc/fmp/bsai/bsai.htm - www.fakr.noaa.gov/npfmc/fmp/goa/goa.htm - http://www.fakr.noaa.gov/npfmc/current_issues/observer/observer.htm
1.2.4	Both the Commission and the Council annually review their previous, current, and possible future management measures. The Council sets its agenda for each meeting in response to current and expected future changes and events in the fishery. By reviewing the Council's newsletters (which report past actions) and the Three Meeting Outlook (which forecast future discussions), it is apparent that the same (or similar) topics come up for discussion and decision as often as the Council deems appropriate. The Commission follows a similar process, in which the agenda for its annual meetings include any topic which the Commission deems appropriate, whether it is "new business" or "old business". ***sources of evidence –*** - www.fakr.noaa.gov/npfmc/default.htm -- see Three Meeting Outlook - www.iphc.washington.edu/library/annual-reports.html

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 Criteria 7.1.3 /7.1.4/7.3.2

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause	Evidence
1.3	The primary purpose of IPHC is exactly that – collaborative international research on, and management (through apportionment of allowable catch in each regulatory area of the US and Canada) of Pacific halibut – a trans-boundary, straddling and highly migratory species. The IPHC forum leads to a cooperative structure between the states (US/Canada) to provide a joint management and conservation system resulting in sustainable fisheries. ***sources of evidence –*** - www.iphc.washington.edu/home.html
1.3.1	Please see response to 1.3, above.
1.3.2	Please see response to 1.3, above.

Clause:

1.4 Organizations within the Management System must cooperate with neighboring coastal states with respect to common and shared fishery resources for their conservation and for the conservation of the environment.

FAO Criteria 10.3.1

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause	Evidence
1.4	The primary purpose of IPHC is exactly that – collaborative international research on, and management of, Pacific halibut – a trans-boundary, straddling and highly migratory species. The NPFMC, the Pacific Fisheries Management Council, NMFS, ADFG and the Canadian Department of Fisheries and Oceans (DFO) all share in the responsible management of the

	IPHC, and with the public, bring the local coastal interests and perspectives to the AP, the PAG and then to the Commission. ***sources of evidence –*** - www.iphc.washington.edu/home.html - http://alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/halibut.htm - http://www.adfg.alaska.gov/index.cfm?adfg=halibut.management - http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm - http://www.fakr.noaa.gov/sustainablefisheries/halibut/sport.htm - http://www.pac.dfo-mpo.gc.ca/fm-gp/commercial/ground-fond/halibut-fletan/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 Criteria *7.3.4*

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

Clause	Evidence
1.5	**RESEARCH** – From its website: "The IPHC conducts numerous projects annually to support both major mandates: stock assessment and basic halibut biology. Current projects include standardized stock assessment fishing surveys from northern California to the end of the Aleutian Islands, as well as field sampling in major fishing ports to collect scientific information from the halibut fleet. In conjunction with these ongoing programs, the IPHC conducts numerous biological and scientific experiments to further the understanding and information about Pacific halibut." The North Pacific Research Board is also known to have funded some research work, namely, "Thermal habitat preferences of Pacific halibut and the potential influence of hydrographic variability on a local coastal fishery" (around the Pribilof Islands in the southeast Bering Sea); and "Safety evaluation of fisheries management" systematically assessing whether safety improvements had occurred after quota-based management systems were established in the Alaskan halibut/sablefish and pollock fisheries. ***sources of evidence –*** www.iphc.washington.edu/about-iphc.html http://project.nprb.org/filter.do

	* Grabacki, S.T. 2008 Sustainable Management of Alaska's Fisheries: A Primer; available for download at – http://sustainability.alaskaseafood.org/tools click "Sustainability White Paper" **MANAGEMENT** – IPHC's management decisions are made by its six Commissioners, three of whom are Canadian, and three of whom are American. ***sources of evidence –*** www.iphc.washington.edu/about-iphc/27.html * Grabacki, S.T. 2008 Sustainable Management of Alaska's Fisheries: A Primer; available for download at – http://sustainability.alaskaseafood.org/tools click "Sustainability White Paper" **DEVELOPMENT** – There is very little fisheries development in the Alaska halibut fishery. Halibut are harvested by only one well-established gear type: benthic long-line. Also, there are no "un-developed" halibut fisheries in the USA EEZ off Alaska. ***sources of evidence –*** 50CFR679.24: www.fakr.noaa.gov/regs/default.htm

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 Criteria 7.6.8

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause	Evidence
1.6.	Both the Commission and the Council annually review their previous, current, and possible future management measures. The Council sets its agenda for each meeting in response to current and expected future changes and events in the fishery. By reviewing the Council's newsletters (which report past actions) and the Three Meeting Outlook (which forecast future discussions), it is apparent that the same (or similar) topics come up for discussion and decision as often as the Council deems appropriate. The Commission follows a similar process, in which the agenda for its annual meetings include any topic which the Commission deems appropriate, whether it is "new business" or "old business". The public (stakeholders, environmentalists, and communities) may submit proposals to address conservation and management issues. When this is done, IPHC's staff provides an analysis that evaluates the implications of the proposed change. ***sources of evidence –*** - www.fakr.noaa.gov/npfmc/default.htm -- see Three Meeting Outlook - www.iphc.washington.edu/library/annual-reports.html

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 Criteria 7.1.9

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
1.7	IPHC's management arrangements and decision making processes for the halibut fishery are somewhat less transparent than those of the NPFMC. The Commission receives a great deal of input and guidance from stakeholders and researchers. From its website – "The Commission encourages public participation in the management of the resource, and regularly seeks advice from the Conference Board, the Processor Advisory Group (PAG), and various State and Federal agencies (primarily NMFS and ADFG, as well as the Canadian Department of Fisheries and Oceans)." Also, IPHC's Research Advisory Board (RAB), composed of both fishers and processors, offers suggestions on where Commission research should focus. But most of the Commission's decision-making is conducted through Administrative Sessions, to which only Commission members and staff are admitted. At the end of its week-long annual meetings, the Commission conducts a public meeting, at which it announces its decisions. The actual decisions are the result of transparent scientific information and the AP & PAG's advice that has been vetted through public sessions and presented to the Commissioners. During 2011, the Commission will conduct a review of its performance against the goals set out in its Treaty. NPFMC's management arrangements and decision making processes for the fishery are organized in a very transparent manner. The Council (and NMFS) provide 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. ***sources of evidence –*** - www.iphc.washington.edu/meetings-and-events/annual-meeting/schedule.html - www.fakr.noaa.gov/npfmc/default.htm - www.fakr.noaa.gov/

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 Criteria 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 Criteria 10.1.1

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
2.1	**Alaska Coastal Management Program (ACMP).** The Division of Coastal and Ocean Management (DCOM) within the state of Alaska's Department of Natural Resources is the lead agency for the Alaska Coastal Management Program (ACMP). Through this program, DCOM oversees the responsible development of coastal uses and resources, federal activities within the coastal zone, and activities on the Outer Continental Shelf (OCS). The ACMP mission is "*to provides stewardship for Alaska's rich and diverse coastal resources to ensure a healthy and vibrant Alaskan coast that efficiently sustains long term economic and environmental productivity*." (http://alaskacoast.state.ak.us/Current_News/ACMP_Fact_Sheet_2011.pdf) NMFS and NPFMC, cooperating with IPHC in Alaska to effectively manage halibut stocks within state jurisdiction, participate in coastal area management-related institutional frameworks through the ACMP and the federal National Environmental Policy Act (NEPA) processes. These include 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 avoidance of conflict among users. (http://alaskafisheries.noaa.gov/protectedresources/whales/beluga/development/granitepoint/GranitePt_ACMPreview011907.pdf ; http://alaskacoast.state.ak.us/309/ACMP_2011_309_Assessment_and_Strategy_final.pdf) The ACMP is implemented through federal and state agencies and through local governments. State agencies involved include three divisions of ADFG, four divisions of the Department of Environmental Conservation, and nine divisions of the Department of Natural Resources. Federal agencies include the NMFS, the U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the Environmental Protection Agency. This networked implementation structure is designed to manage coastal uses and resources comprehensively. (http://alaskacoast.state.ak.us/Clawhome/MOUS/moushome.htm).

The ACMP is a voluntary program, authorized by the Coastal Zone Management Act of 1972 (CZMA). It includes a state coastal plan, coastal district (local government) plans, standards for evaluating and managing uses and activities in the coastal zone, and a process to coordinate state resource agency permitting and approval of uses and activities in the coastal zone. The program requires management of habitats in the coastal area that are subject to the ACMP "so as to maintain or enhance the biological, physical, and chemical characteristics of the habitat which contribute to its capacity to support living resources."

Alaska participates 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 NOAA 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 ACMP was reapproved by the federal Office of Ocean and Coastal Resource Management (OCRM) in December 2005.
(http://alaskacoast.state.ak.us/Clawhome/handbook/pdf/OCRM_Approval.pdf)

All construction activities in the coastal zone (e.g., work on docks, breakwaters, harbors and other infrastructure) are subject to the ACMP review process as well as in many cases the NEPA process. These processes deliberately take into account all resources and users of those resources. Conflict resolution mechanisms include both administrative (through governmental agencies) and legal (through courts of law) procedures.

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.

A coastal project questionnaire must be completed for each project proposed in the coastal zone. Alaska uses a multiple agency coordinated system for reviewing and processing all resource-related permits required for proposed projects in or affecting coastal areas of Alaska. This process, called "project consistency review," is based on the ACMP and is designed to improve management practices for use of Alaska's coastal land and water. Project proposals are reviewed to determine the project's consistency with the written standards of the ACMP and the enforceable policies of approved district coastal management districts. The state's review process includes participation by: the project applicant; state resource agencies including DEC, ADFG, and DNR; the affected local coastal district office; and other interested members of the public, including fishermen's organizations and private individuals. (http://alaskacoast.state.ak.us/Projects/pcpq.html)

NMFS oversees sustainable fisheries that produce about half the fish caught in US waters, with responsibilities covering 842,000 square nautical miles off Alaska. The Alaska Region of NMFS also works to protect and enhance Alaska's marine habitat (http://www.fakr.noaa.gov/).

	The ACMP and 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 is 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. http://alaskacoast.state.ak.us/ReferenceMaterial/ACMP_Fact_Sheet_2010.pdf http://www.epa.gov/aboutepa/states/ak.html http://www.alaskacoast.state.ak.us/District/DistrictPlans_Final/Pelican/Pelican_FPA_March_2006.pdf

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 Criteria 10.1.2

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
2.2	The ACMP and 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. 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. http://alaskacoast.state.ak.us/ReferenceMaterial/ACMP_Fact_Sheet_2010.pdf http://www.epa.gov/aboutepa/states/ak.html http://www.alaskacoast.state.ak.us/District/DistrictPlans_Final/Pelican/Pelican_FPA_March_2006.pdf http://notes4.state.ak.us/pn/pubnotic.nsf/PNByCatActive?OpenView

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 Criteria 10.1.4/10.1.5

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
2.3	The NPFMC is responsible for allocation of the halibut resource among user groups in Alaska waters. The Council approved a motion in April 2001 to incorporate the Southcentral and Southeast Alaska sport charter fleet (where the vast majority of the coastwide sport harvest is taken) into the existing IFQ program. This action was taken to address overcapitalization of the sport charter fleet and reduce future allocation conflicts between charter and commercial users. Many aspects of the program still need to be worked out before the program can be approved by the US Secretary of Commerce. The NPFMC and the Alaska Board of Fisheries have also created a joint protocol for development of "local area management plans," or LAMPs, for halibut fisheries at ports where allocation or gear conflicts are present. The Board of Fisheries solicits LAMP proposals and evaluates them for adherence to the protocol before forwarding them to the Council for action. A variety of measures, including moratoriums, harvest caps, and/or exclusion zones for all fisheries, can possibly be implemented as part of a LAMP to address near shore depletion or resolve other user conflicts (LAMP Guidelines). (http://146.63.158.37/region2/groundfish/gfhalibut.cfm). In addition to this, both the Board of Fisheries and the NPFMC allow for various users to participate in the decision making for halibut use through their normal cycle of meetings, proposals and comments. (http://www.adfg.alaska.gov/index.cfm?adfg=halibut.getinvolved). The ACMP review process, as well as in many cases 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://alaskacoast.state.ak.us/ReferenceMaterial/ACMP_Fact_Sheet_2010.pdf http://www.epa.gov/aboutepa/states/ak.html http://www.alaskacoast.state.ak.us/District/DistrictPlans_Final/Pelican/Pelican_FPA_March_2006.pdf
2.3.1	The IPHC annual meeting, and regular meetings of the NPFMC provide forums for resolution of potential international and national fisheries conflicts. The IPHC accepts regulatory proposals in the fall of each year, and users can testify in person or in writing at IPHC and NPFMC meetings. In addition, 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/index.cfm?adfg=halibut.getinvolved). The enabling legislation for the NPFMC process was the 1976 Fishery Conservation and Management Act (aka Magnuson-Stevens Act, or MSA) which was intended to: *-prevent overfishing; base fishery decisions on the best science; manage individual stocks throughout their range; allocate fairly between residents of different states; promote efficiency, minimize costs and avoid duplication; take into account the importance of fishery resources to communities and minimize adverse impacts to them; and minimize bycatch of non-target species and the fishing mortality associated with it*. The MSA has been amended and strengthened several times since its original enactment. As for conflicts between fisherman and other coastal stakeholders, the ACMP review process, as well as in many cases 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://alaskacoast.state.ak.us/ReferenceMaterial/ACMP_Fact_Sheet_2010.pdf http://www.epa.gov/aboutepa/states/ak.html http://www.alaskacoast.state.ak.us/District/DistrictPlans_Final/Pelican/Pelican_FPA_March_2006.pdf

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 Criteria 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.
(http://www.nmfs.noaa.gov/pr/pdfs/education/strategic_plan.pdf).

Participation in management is an integral part of the BoF, IPHC and the NPFMC.

The IPHC annual meeting, or regular meetings of the NPFMC provide a forum for participation of the public into fisheries regulation's decision making process. Also The IPHC accepts regulatory proposals in the fall of each year, and users can testify in person or in writing at IPHC and NPFMC meetings. All the planned meetings are advertised on the IPHC and NFMC website. In addition, stakeholders may review and submit written comments to the NMFS on proposed rules published in the Federal Register. Furthermore, the Board of Fisheries allows for public input in decision making through cycle meetings, proposals and comments. (http://www.adfg.alaska.gov/index.cfm?adfg=halibut.getinvolved).

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 Criteria 10.2.

Clause:	Evidence
2.5	The value of coastal halibut resources from economic, institutional and social perspectives are regularly assessed in order to assist decision makers with allocation and use decisions. In 2005, the Alaska Fisheries Science Center (AFSC) compiled baseline socioeconomic information about 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 Bering Sea/Aleutian Islands area can be found at http://www.afsc.noaa.gov/ REFM/docs/2010/economic.pdf. The Alaska Coastal Management Plan (ACMP) and National Environmental Policy Act (NEPA) processes provide the public with information and opportunity for public involvement that is 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 is 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. (http://www.epa.gov/aboutepa/states/ak.html ; http://alaskacoast.state.ak.us/ReferenceMaterial/ACMP_Fact_Sheet_2010.pdf). *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.* The value of coastal halibut resources from economic, cultural and social perspectives is regularly assessed in order to assist decision makers with allocation and use decisions. The Limited Entry Act was passed in 1973 in order to provide resource conservation and prevent economic distress among Alaskan fishers. Some of the key features included issuance of permits to natural persons only, prohibition on permit leasing, prohibition on use of permits as collateral for loans and allowance for free transferability of permits between persons. Thus, permit holders are free to transfer their permits through gift, inheritance or sale. 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 responsibilities include: providing program information to the public, determining eligibility and issuing permits, processing transfers, collecting landing fees and related activities. RAM also prepares and distributes reports on landings in the Pacific halibut and sablefish Individual Fishing Quota (IFQ) program and halibut landings in the Community Development Quota (CDQ) program; and on the BSAI Crab Rationalization Program (http://www.fakr.noaa.gov/ram/). The economic value of the commercial halibut fishery is tracked by NMFS and NPFMC through the IFQ Halibut/Sablefish reports and CDQ Halibut program harvest and landing reports available at http://www.fakr.noaa.gov/ram/ ifqreports.htm. Subsistence fishing in Alaska is critical to the cultural and economic well being of more than 100,000 Alaska Natives and non-Natives living in rural Alaska.

The average rural subsistence harvest of fish and wildlife in Alaska is about 375 pounds of food per person per year. (http://seagrant.uaf.edu/map/fisheries/index.html).

NOAA Fisheries has published new regulations, effective December 4, 2009, allowing more residents in remote areas to participate in the subsistence fishery for Pacific halibut in waters in and off Alaska. New participants in the subsistence halibut fishery have to qualify for a subsistence halibut registration certificate (SHARC) (www.alaskafisheries.noaa.gov/ram/subsistence/halibut.htm).

A typical SHARC application from a rural resident takes into account the location of the rural or tribal applicant. The applicant has to be resident for at least 12 months in a designated subsistence area. Subsistence areas are defined based on whether customary and traditional use is a principal part of the economy of the area. Subsistence areas are not based on population size or remoteness (http://alaskafisheries.noaa.gov/frules/74fr57105.pdf).

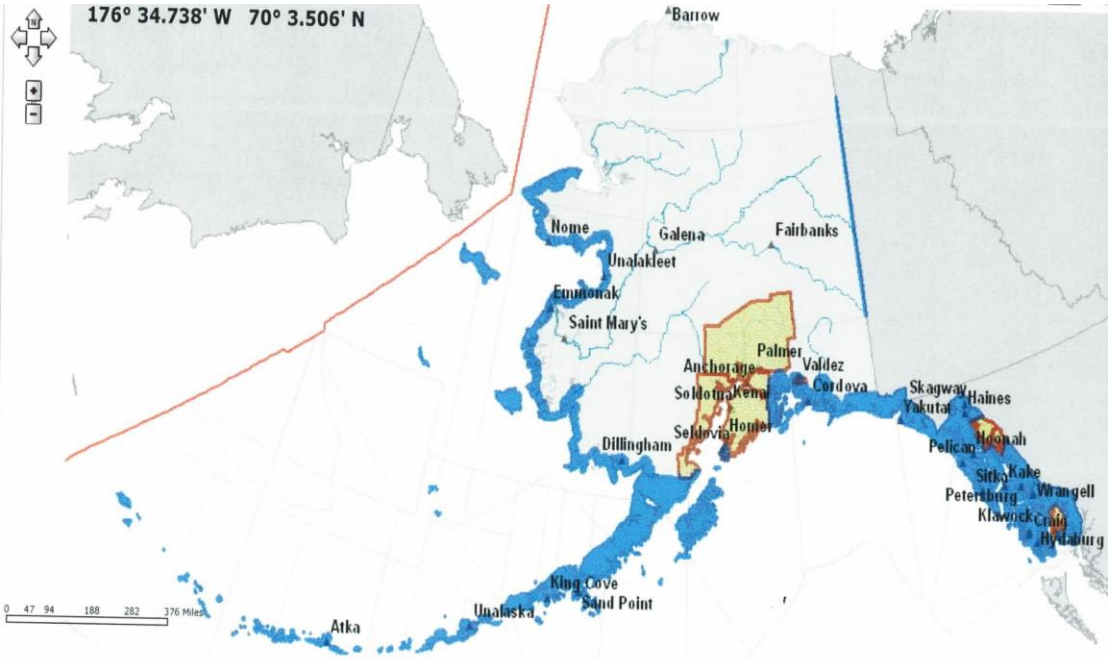

Figure 9. Halibut subsistence areas (in blue) and non rural areas (in brown) in Alaska (http://akr-mapping.fakr.noaa.gov/Halibut_Subsistence/).

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 Criteria 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 NPRB has funded 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 halibut 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 waterbody 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).

IPHC Surveys

Oceanography

Since the expansion of its survey operations in 1997, the IPHC has annually conducted fishing operations at more than 1,000 stations ranging from Oregon to the Bering Sea. These stations are located on the continental shelf in depths between 35 and 500 meters, on an equidistant 10-nautical mile grid. As such, the IPHC operates the largest consistent sampling program of any research agency in the north Pacific. In the late 1990s, the IPHC sought proposals on how this sampling program could be used for other scientific investigations without affecting the core survey activities. One obvious project was the collection of oceanographic data.

The IPHC already recorded bottom temperature at one-quarter to one-half of the survey stations; however, the potential existed to sample the entire water column.
Primary and secondary productivity are directly driven by variations in water temperature, salinity, dissolved oxygen, and other factors. Most of this productivity occurs in the mixed layer, between 20 and 100 meters depth. Acidification of the oceans and upwelling-induced hypoxia are just two of the phenomena linked to global climate change in recent years.

Coupling oceanographic observations with estimates of production from the IPHC setline survey is an obvious next step to increasing the understanding of what drives the abundance and distribution of marine natural resources. In 2000, a Seabird™ Seacat SBE-19 water column profiler was purchased by the IPHC and deployed aboard a commercial halibut longliner chartered for the annual stock assessment survey.

In 2007, the IPHC received a grant from the Oregon Department of Fish and Wildlife Restoration and Enhancement Program to purchase a second Seabird™ Seacat SBE-19*plus* (an updated version of the SBE-19) dedicated to the IPHC survey stations off the Oregon coast. This new profiler was equipped with sensors to measure depth, temperature, salinity, dissolved oxygen (SBE-43), pH (SBE-18), and chlorophyll *a* concentration (WetLabs ECO-FLRTD).

To that end, the IPHC received a grant from the National Oceanic and Atmospheric Administration (NOAA) in late 2008 to purchase 14 Seabird™ Seacat SBE19*plus* V2 water column profilers to be deployed on all survey vessels. 2009 was the second consecutive year of coastwide profiler deployment on the IPHC setline survey.
(http://www.iphc.washington.edu/publications/rara/2010/2010.309.OceanographicmonitoringontheIPHCsetlinesurveyin2010.pdf).

Seabirds monitoring

In 2002 the IPHC, in collaboration with Washington Sea Grant, developed a sampling protocol for collecting seabird occurrence data on the IPHC stock assessment surveys. This was initially a collaborative project between the IPHC, Alaska Department of Fish and Game (ADFG), and the NMFS sablefish (*Anoplopoma fimbria*) survey. The purpose of the project was to populate a seabird database for Alaska that could be analyzed for population purposes but also to make recommendations for regulatory changes to the seabird avoidance requirements for commercial fishing vessels. Several reports that evaluated

seabird occurrence using these data were published between 2002 and 2004. Although the collaboration ended in 2004, the IPHC permanently incorporated the seabird data collection protocols into its survey program. Observations were conducted between the end of May and the beginning of September, on setline stations from the west coast of Washington, Oregon, British Columbia (B.C.), southeast Alaska (inside and outside waters), the central and western GOA, Aleutian Islands, and the southeast Bering Sea continental shelf edge. Samplers aboard research vessels counted the number of seabirds in the vicinity of the vessel's stern immediately following gear retrieval (i.e., haul). Sampling seabird occurrence after the haul addresses the question of where and when certain seabird species occur. It also aids in the assessment of individual species at risk by providing information that may reflect population trends over time.
(http://www.iphc.washington.edu/publications/rara/2010/2010.403.Trendsinseabirdoccurrenceonstockassessmentsurveys.pdf)

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, nearshore, in estuaries, and in freshwater areas (http://www.fakr.noaa.gov/habitat/default.htm).

Also, the NMFS manages the halibut subsistence program whereby the social aspect of halibut resources exploitation by rural and tribal coastal communities of Alaska is constantly assessed, monitored and managed accordingly (http://alaskafisheries.noaa.gov/ram/subsistence/halibut.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).

CFEC

The value of coastal halibut resources from economic, cultural and social perspectives is regularly assessed in order to assist decision makers with allocation and use decisions. The Alaska Commercial Fisheries Entry Commission (CFEC) helps conserve and maintain the economic health of Alaska's commercial fisheries by limiting the number of participating fishers. Through continuing research on economic conditions for each limited-entry fishery, CFEC maintains publicly accessible data bases showing current and historic information on numbers of permits issued/renewed, number of permits actually fished, total weight of fish harvested, average gross earnings per permit for Alaska residents and non-residents, and average selling price of permits in each fishery (http://www.cfec.state.ak.us/). NMFS' RAM program has now superseded CFEC for federally managed fisheries.

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 Criteria 7.3.3

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	**Evidence**
3.1	The initial US and Canada Agreement for the management, conservation and sustainable utilization of Pacific halibut in the North Pacific, signed in 1923 stated that "The Commission (IPHC) shall report the results of its investigation to the two Governments and shall make recommendations as to the regulation of the halibut fishery of the North Pacific Ocean, including the Bering Sea, which may seem desirable for its preservation and development." Objectives of this agreement pointed to the first basic regulations for closure of the fishery in determinate periods, halibut bycatch in other fisheries and the need for reporting such removals, enabling prosecutions for violation of the provisions, investigation into the life history of the Pacific halibut... Control of the rate of removal, or the amount of fishing on each stock, was made possible by amendments in the Treaties of 1930 and 1937, which authorized the division of the coast into areas and the limitation of the catch in each area. In 1953, a further Agreement of the Commission expanded on previous objectives of the IPHC as follows: "The Contracting Parties agree that for the purpose of developing the stocks of halibut of the Northern Pacific Ocean and Bering Sea to levels which will permit the maximum sustained yield from that fishery and for maintaining the stocks at those levels, the IPHC, with the approval of the President of the United States of America and of the Governor General in Council of Canada, may, after investigation has indicated such action to be necessary, in respect of the nationals and inhabitants and fishing vessels and boats of the United States of America and of Canada, and in respect of halibut: (a) divide the Convention waters into areas; (b) establish one or more open or closed seasons, as to each area; (c) limit the size of the fish and the quantity of the catch to be taken from each area within any season during which fishing is allowed;

(d) during both open and closed seasons, permit, limit, regulate or prohibit, the incidental catch of halibut that may be taken, retained, possessed, or landed from each area or portion of an area, by vessels fishing for other species of fish;

(e) prohibit departure of vessels from any port or place, or from any receiving vessel or station, to any area for halibut fishing, after any date when in the judgment of the IPHC the vessels which have departed for that area prior to that date or which are known to be fishing in that area shall suffice to catch the limit which shall have been set for that area under section (c) of this paragraph;

(f) fix the size and character of halibut fishing appliances to be used in any area;

(g) make such regulations for the licensing and departure of vessels and for the collection of statistics of the catch of halibut as it shall find necessary to determine the condition and trend of the halibut fishery and to carry out the other provisions of this Convention;

(h) close to all taking of halibut such portion or portions of an area or areas as the IPHC finds to be populated by small, immature halibut and designates as nursery grounds.

The IPHC outputs (Annual Reports, Reports of Assessment and Research Activities, Scientific Reports, Technical Reports, Regulations, Information Bullettins, Annual Meeting Reports) seek to address the fishery development and conservation objectives set out in the various Agreements between US and Canada to manage the Pacific halibut stock.
The Commission's Annual Report details the performance of the fisheries (commercial, sport, and personal use), with emphasis on the biological considerations, stock assessment, management issues (e.g. bycatch), and scientific research. The Report also presents the results of the Commission's annual meeting (usually held in January), at which the catch limits for upcoming season are determined.

In November 1993, the NMFS issued a final rule to implement Amendment 15 to the Fishery Management Plan (FMP) for the Groundfish Fishery of the BSAI Area, Amendment 20 to the FMP for Groundfish of the GOA Area, and a regulatory amendment affecting the fishery for Pacific halibut in and off Alaska. These regulations established an individual fishing quota (IFQ) limited access system in fixed gear fisheries for Pacific halibut and sablefish in and off Alaska. In addition, this action implemented a Western Alaska Community Development Quota (CDQ) program for halibut and sablefish fixed gear fisheries. These actions were intended by the NMFS to promote the conservation and management of halibut and sablefish resources, and to further the objectives of the Northern Pacific Halibut Act of 1982 (Halibut Act) and the Magnuson Fishery Conservation and Management Act (Magnuson Act) that provided authority for regulating these fisheries. The IFQ program was intended to resolve various conservation and management problems that stemmed from the, at the time current, "open access" regulatory regime. The CDQ program was intended to help develop commercial fisheries in communities on the Bering Sea coast by allowing them exclusive access to specified amounts of halibut and sablefish in the BSAI. Amendments 15 and 20 effectively provide a framework for the management of halibut resources within the Groundfish FMP of Alaska.

The Alaska halibut fishery is managed cooperatively by the IPHC, NMFS and the NPFMC. NPFMC and NMFS manage the halibut fishery in the Alaska region of the American EEZ. Management decisions are made by the NPFMC, and implemented and enforced by NMFS. The NPFMC has developed Pacific halibut regulations that are in addition to, and not in conflict with, the regulations of the IPHC. These Council regulations generally address domestic allocation concerns (e.g., catch sharing between sectors, subsistence, local area management planning), with some having a profound conservation impact. For example, the IFQ program regulations developed by the Council make it much easier to maintain total commercial harvest within the catch limits specified by the IPHC while addressing domestic allocation concerns in the fishery.

The Council develops its Pacific halibut fishery regulations pursuant to the authority in section 5(c) of the Northern Pacific Halibut Act of 1982 (Halibut Act). The Council's Halibut Act regulations are implemented only after review and rulemaking conducted by the NMFS. In a practical sense, the Council's Halibut Act regulations constitute a framework for the management of the Pacific halibut resources in the waters off Alaska. The NPFMC process is extremely transparent and inclusive of all stakeholders; all stakeholders are active participants. All stakeholders have a voice in the IPHC process, either directly, or through the Commission's Conference Board and/or Processor Advisory Group.

The federal MSA legislation contains many long-term management objectives for sustainable harvest, habitat protection, social economic objectives and strategies to develop rationalized fisheries. NMFS and the NPFMC have adopted these objectives, but they are laid out in the MSA. www.nmfs.noaa.gov/sfa/mag**act**
Pacific halibut total allowable catch apportionment is an important aspect of Pacific halibut management between Canada and the US and within regulatory areas.

For many years, the staff assessed the stock in each regulatory area by fitting a model to the data from that area. This procedure relied on the assumption that the stock of fish of catchable size in each area was closed, meaning that net migration was negligible. A growing body of evidence from both the assessments and a mark-recapture experiment showed that there is a continuing and predominantly eastward migration of catchable fish from the western area (Areas 3 and 4) to the eastern side (Area 2). The effect of this unaccounted for migration on the closed-area stock assessments was to produce underestimates of abundance in the western areas and overestimates in the eastern areas. To some extent this has almost certainly been the case for some time, meaning that exploitation rates were well above the target level in Area 2 and a disproportionate share of the catches have been taken from there.

In order to obtain an unbiased estimate of the total exploitable biomass (E_{BIO}), beginning with the 2006 assessment, the staff built a coastwide data set and fitted the standard assessment model to it. Exploitable biomass in each regulatory area was estimated by partitioning, or apportioning, the total E_{BIO} in proportion to an estimate of stock distribution derived from the IPHC setline survey catch rates [Weight Per Unit Effort (WPE)]. Specifically, an index of abundance in each area was calculated by multiplying weighted survey WPUE by total bottom area between 0 and 400 fm.

	The logic of this apportionment is that survey WPUE can be regarded as an index of density, so multiplying it by bottom area gives a quantity proportional to total abundance. In 2010, two adjustments to the index for each area, one based on hook competition and the other on survey timing, were computed for use in biomass apportionment. IPHC staff's Catch Limit Recommendations are based on use of both adjustments. New in 2010 is a change to the weighting which has been used for the last several years of survey WPUE. The estimated proportion in each area is then the adjusted and weighted index value for that area divided by the sum of the adjusted and weighted index values. *Evidence:* www.iphc.washington.edu/home.html http://www.fakr.noaa.gov/frules/76fr14300.pdf http://iea.uoregon.edu/pages/view_treaty.php?t=1923-Halibut.EN.txt&par=view_treaty_html http://iea.uoregon.edu/pages/view_treaty.php?t=1953-Halibut.EN.txt&par=view_treaty_html www.iphc.washington.edu/library/annual-reports.html www.fakr.noaa.gov/npfmc/default.htm www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/halibut.htm www.nmfs.noaa.gov/sfa/mag**act** www.fakr.noaa.gov/ram/ifq.htm http://www.iphc.washington.edu/papers/sa10.pdf http://alaskafisheries.noaa.gov/frules/fr59375.pdf

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; and

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 Criteria 7.2.2 Other 7.6.10

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
3.2.1	In 1995, NMFS implemented the NPFMC's program of Individual Fishing Quotas (IFQs), which were explicitly intended to alleviate excess fishing capacity and improve the economic viability of the halibut industry. In its first few years, the Alaska Commercial Fisheries Entry Commission (CFEC) monitored and evaluated the effects of the IFQ program. Since 1998, NMFS has performed that evaluation, to ensure that the IFQ program continues to achieve its goals. 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 responsibilities include: providing program information to the public, determining eligibility and issuing permits, processing transfers, collecting landing fees and related activities. RAM also prepares and distributes reports on landings in the Pacific halibut and sablefish Individual Fishing Quota (IFQ) program and halibut landings in the Community Development Quota (CDQ) program; and on the BSAI Crab Rationalization Program.

	Evidence: www.fakr.noaa.gov/npfmc/sci_papers/ifqpaper.htm www.fakr.noaa.gov/ram/ifq.htm www.cfec.state.ak.us/RESEARCH/h98_ts/H_TITLE.HTM www.fakr.noaa.gov/ram/ifqreports.htm – scroll down to – Annual Pacific Halibut–Sablefish IFQ Report (Report to the Fleet) http://www.fakr.noaa.gov/ram/
3.2.2	This is analyzed and ensured by NMFS, which produces many reports, including its Annual Report to the Fleet. The NEPA analysis of the various amendments to halibut management in the NPFMC – halibut charter, halibut IFQ, etc., all contain discussions of the economic conditions under which responsible fisheries are promoted. *Evidence:* www.fakr.noaa.gov/ram/ifqreports.htm – scroll down to – Annual Pacific Halibut–Sablefish IFQ Report (Report to the Fleet) ** see also – www.fakr.noaa.gov/ram/ifq.htm NEPA Groundfish-Halibut http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/
3.2.3	The interests of all fishers are explicitly, thoroughly, and routinely taken into account. NPFMC and NMFS devote a great deal of effort, with continuous stakeholder participation, in managing the commercial, sport, and subsistence fisheries. As described earlier, the commercial fishery is managed by an IFQ program. The original quota share allocation was by vessel size category to protect small coastal artisanal vessels from having quota consolidate into large industrial vessels away from coastal communities. After the catch limits are set (which ensures biological sustainability), subsistence users get first priority in allocation. The interests of Alaska Natives are taken into account through subsistence harvest and through the Community Development Quota (CDQ) and Community Quota Enterprise (CQE) programs. The CDQ program allocates a share of the Bering Sea halibut resource (as well as the resources of several other fishes) among six groups of small economically disadvantaged Alaska Native communities along the Bering Sea coast. The intent of the CDQ program is to provide an economic base for that region. The CQE program allows those villages to purchase additional harvest rights (in the form of IFQs), to further enhance their economies. Individual sport fishermen (recreationists) and sport charter operators/guides (businesses) participate actively in the Council process. The Council manages those fisheries as part of its routine business.

	The subdivision of IPHC stat area 4 into five subareas, and NPFMC's development and refinement of a catch sharing plan (for different halibut users) for those areas is an example of different stakeholder accountancy. Another example is the Sitka Sound Local Area Management Plan. *Evidence:* www.fakr.noaa.gov/ram/ifq.htm – scroll down to – ** Catch Sharing Plan for Areas 4C, 4D, and 4E ** Sitka Sound Local Area Management Plan (LAMP) www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/halibut.htm http://alaskafisheries.noaa.gov/ram/applications.htm#Link_7 – scroll to down Subsistence http://alaskafisheries.noaa.gov/ram/cqp.htm http://alaskafisheries.noaa.gov/sustainablefisheries/halibut/sport.htm
3.2.4	Conservation of aquatic habitats and biodiversity are integral parts of NPFMC's management process. This is in fact required under the MSA-EHF. These concerns and decisions are summarized in the Ecosystems Considerations chapter of the Council's annual Stock Assessment and Fishery Evaluation (SAFE) report. The Council and NMFS have a long history of restricting fishing operations in order to protect endangered and threatened species of marine mammals and birds. *Evidence:* http://access.afsc.noaa.gov/reem/ecoweb/index.cfm (see Current Report) http://www.fakr.noaa.gov/npfmc/current_issues/ssl/ssl.htm http://www.nmfs.noaa.gov/sfa/magact/
3.2.5	IPHC routinely raises and lowers its area-specific catch limits in response to the abundance of catchable halibut in those areas, which is determined in the Commission's research programs. The Commission reports its research in its annual Report of Assessment and Research Activities (RARA), and its Annual Report explains the reasons for changes in catch limits. Control of the rate of removal, or the amount of fishing on each stock, was made possible by amendments in the Treaties of 1930 and 1937, which authorized the division of the coast into areas and the limitation of the catch in each area. From IPHC's 2009 Annual Report – The Commission's policy is to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% of a level defined as *the unfished level*. The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% of this estimated *unfished* level. That is, no fishing is allowed if the stock is below 20% of the unfished biomass. This combination of harvest rate and precautionary levels of biomass protection have, in simulation studies, provided a large fraction of maximum available yield while minimizing risk to the spawning biomass. Since the early 2000s, the harvest policy has additionally incorporated a measure designed to avoid rapid increases or decreases in catch limits.

	Without this feature, the harvest rate could quickly change because of either actual changes in stock level or because of changes in the assessment model due to other factors. The protection from rapid changes is similar to what many fisheries management agencies have done. The dampening adjustment is termed *slow up fast down* (and sometimes denoted SUFD). This *slow up fast down* approach is somewhat different from similar phased-change policies of other agencies. This Commission's policy in theory allowed the catch limit to respond more strongly to estimated decreases in biomass than to estimated increases. Specifically, if a reduction in available catch was recommended, 50% of the reduction was implemented whereas if an increase was recommended, only 33% of the increase was implemented. Nonetheless, staff and the Commission have recently been concerned that the Commission's SUFD harvest policy adjustments have not achieved target harvest rate goals in the face of continued stock declines, in halibut growth rate, and the history of high exploitation rates for some areas in recent years. The staff therefore recommended in 2010 that the SUFD policy be modified to a Slow Up - Full Down (SUFullD) policy, to achieve the necessary reductions in harvest rate and promote increases in exploitable biomass. That is, staff recommendations would incorporate the existing policy of a 33% increase from previous year's catch limits when stock yields are projected to increase but use a 100% decrease in recommended catch, when stock yields are projected to decrease." The SUFullD was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it. *Evidence*: www.iphc.washington.edu/library/raras.html www.iphc.washington.edu/library/annual-reports.html http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm http://www.iphc.washington.edu/news-releases/news-releases-2010.html
3.2.6	Environmental impacts are closely monitored and corrected by several agencies of both the federal and state governments, most notably – * U.S. Environmental Protection Agency (EPA) * NMFS Habitat Conservation Division * Alaska Department of Environmental Conservation (ADEC) – divisions of: Water, Environmental Health, Spill Prevention & Response * Alaska Department of Fish & Game (ADFG) – Habitat Division (Alaska Statute Title 16 protects fisheries habitat) Please see also section 2.6 for further evidence. *Evidence:* http://www.epa.gov/aboutepa/states/ak.html http://www.epa.gov/region10/enforcement/2010results.html http://www.fakr.noaa.gov/habitat/default.htm

	http://dec.alaska.gov/water/index.htm http://dec.alaska.gov/eh/index.htm http://dec.alaska.gov/spar/index.htm http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.prohibited
3.2.7	Pollution from fishing and other vessels is monitored and corrected by USCG, District 17, along with ADEC. 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), and the Individual Fishing Quota (IFQ) program, which, among other benefits, has reduced unwanted catch and discards. Only one gear type may be used to harvest halibut in the GOA and BSAI – benthic longline (a passive gear type), which is generally considered to have minimal impacts on benthos. All longline fishing gear must be marked and operated in accordance with federal fisheries regulations – 50 CFR Part 679: Fisheries of the Exclusive Economic Zone Off Alaska (CFR = Code of Federal Regulations). NPFMC and NMFS have a proven history of working to minimize impacts of all fishing operations (not just those for halibut) on other fish and non-fish species, including birds and mammals. Both the Council and NMFS explicitly and actively protect Essential Fish Habitat. *Evidence –* http://www.uscg.mil/d17/D17%20Divisions/drm/default.asp http://www.uscg.mil/d17/D17%20Divisions/drm/DRAT/DRATpage.asp http://dec.alaska.gov/water/index.htm http://dec.alaska.gov/eh/index.htm http://dec.alaska.gov/spar/index.htm http://www.fakr.noaa.gov/npfmc/current_issues/bycatch/bycatch.htm http://www.fakr.noaa.gov/npfmc/current_issues/ssl/ssl.htm http://www.fakr.noaa.gov/npfmc/current_issues/non_target/non_target.htm http://www.fakr.noaa.gov/npfmc/current_issues/efh/efh.htm IFQs: www.fakr.noaa.gov/ram/ifq.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

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 Criteria 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 Criteria 7.4.4

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
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.** **Assessment data** The annual IPHC pacific halibut stock assessment uses data from commercial landing reports, commercial logbooks, port sampling of commercial landings, IPHC setline surveys, and fishery agencies in both countries that report estimates of bycatch, sport catch, and subsistence catch. This section describes each data type. **Commercial (fishery dependent) data** All halibut caught in waters off Alaska must be landed on shore, rather than at a floating processor. The weight of every commercial landing is recorded on a sales report (fish ticket), a copy of which is sent to the IPHC. The total catch in weight in every regulatory area in every year is known from this reporting system. The weight reported is net weight, meaning headed and gutted weight which is about 75% of round weight. This measure of weight is used throughout in halibut assessment and management, so for example estimates of biomass in the sea are stated in net weight. In 2010 commercial landings totaled almost 49.5 million (net) pounds.

IPHC port samplers collect additional information on commercial fishing trips and catch composition. They are stationed in about a dozen ports in Washington, British Columbia, and Alaska that collectively account for the majority of landings from every regulatory area. For as many trips as possible, port samplers record the areas fished, amount of gear set and hauled, and catch by copying the skipper's logbook or interviewing the skipper. These records are combined with fish ticket data to calculate commercial catch per unit effort (CPUE) in each area. Port samplers also obtain a carefully chosen random sample of (presently) about 1500 fish from each regulatory area, from which the length and age composition of the commercial landings can be estimated. From 1963 through 1990, in order to save money, the lengths of fish in the sample were not actually measured but predicted from a regression of body length on otolith size. Since 1991 samplers have measured the lengths. (http://www.iphc.washington.edu/papers/sr83.pdf ; http://www.iphc.washington.edu/publications/rara/2010/2010.31.2010commercialfisheryandregulationchanges.pdf).

Setline survey (fishery independent data) data

Except for a hiatus in the years 1987-1992, IPHC has conducted systematic setline surveys since 1977, with both the frequency and coverage of surveys increasing over the years. Before 1996, no surveys were done in Areas 3B and 4. Since 1997, most areas have been surveyed in their entirety nearly every year. The roughly 25 sea samplers hired each year work aboard a fleet of twelve to fifteen IPHC charter commercial longline vessel and conduct the standardized setline stock assessment survey, which ranges from the southern Oregon border, north through British Columbia to the Bering Sea, and west to Attu island in the Aleutian Islands. The 2011 setline survey will cover 28 regions, from the southern Oregon border to the northern Bering Sea including the Aleutian Islands and Puget Sound.

Most regions require 14 - 23 fishing days plus additional days for running, loading and offloading gear and fish, foul weather days, etc.. Depending on the region, total charter duration can be expected to be 20 - 36 days. In recent years survey stations have been placed on a square 10 nautical mile (nmi) grid covering the entire continental shelf between 20 and 275 fathoms (fm). Between four and eight standard skates (100 baited hooks each) have been set at each station. All halibut in the catch are measured, and a random sample (of target size 2000 per area) is collected for age, sex, and maturity determination. Sea samplers primary directive is to collect catch per unit effort (CPUE) data; however, because the chartered vessels present a rare and valuable scientific research platform, samplers are also involved in mark and recapture experiments, sea bird studies, genetic sampling, oceanographic sampling as well other scientific studies. The IPHC collaborates with other agencies (i.e. NMFS) to take full advantage of the research opportunities made possible by the fleet of research vessels.

http://www.iphc.washington.edu/papers/sr83.pdf
http://www.iphc.washington.edu/about-iphc/116.html
http://www.iphc.washington.edu/research/surveys.html
http://www.iphc.washington.edu/research/surveys/2011-charter.html

NMFS Trawl Surveys

The IPHC has participated in the NMFS annual Bering Sea shelf trawl survey since 1998. The 2010 standard survey took place from June 3 to August 4 and included two vessels. One vessel carried a sampler who assessed Pacific halibut for length, otoliths, gender, maturity, and prior hooking injuries, resulting in 1,855 samples. In addition to the standard stations, in 2010 the NMFS conducted an expanded survey which included 142 new stations north of the standard sampling area around St. Lawrence Island and Norton Sound. NMFS personnel collected 231 halibut samples in the expanded survey area (http://www.iphc.washington.edu/publications/rara/2010/2010.445.Cruisereportforthe2010NMFSBeringSeatrawlsurvey.pdf).

Bycatch estimates

Halibut taken as bycatch in other groundfish fisheries must be returned to the sea, and a proportion of them die in the process. Bycatch of Pacific halibut in the groundfish fisheries off Alaska has been managed with Prohibited Species Catch (PSC) limits. In 2010, the limits totaled 2,300 t (3.80 Mlbs) in the GOA and 4,575 t (7.58 Mlbs) in the Bering Sea, unchanged from 2008. The limits are established by the NPFMC, and are subdivided by gear type, target fishery, time period, and within several other management programs. In contrast to other bycatch species, the halibut limits are set as estimated mortality rather than total catch. Information collected by at-sea observers has indicated the incidental catch, or bycatch, is substantial. Regulations require that halibut be returned to the sea with no additional injury. However, some fish die from being caught and handled. The preliminary estimate of bycatch mortality in 2010 is 10.5 million pounds. This is a 7.3% decrease from 2009 and the lowest seen since 1986.
(http://www.iphc.washington.edu/publications/rara/2010/2010.281.IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf http://www.iphc.washington.edu/papers/sr83.pdf).

The IPHC relies upon information supplied by observer programs run by domestic agencies for bycatch estimates in most fisheries. Research survey information is used to generate estimates of bycatch where fishery observations are unavailable. The U.S. NMFS operates observer programs covering the groundfish fisheries off Alaska and the U.S. west coast, and provides IPHC with estimates of bycatch. Estimates of bycatch off Alaska for 2010 were based on bycatch reported from fishing conducted through late November and projections by IPHC staff for the remainder of the year. The observer coverage leading to these bycatch mortality estimates varies by fishery and area. Coverage is based on vessel length and fishing days by calendar quarter, so the resulting coverage can range from 100% of a vessel's fishing days in many Bering Sea/Aleutian Islands (BSAI) fisheries, to as low as 30% or even lower for most GOA fisheries. Estimates of bycatch mortality in crab pot and shrimp trawl fisheries off Alaska have been made by IPHC staff from previous studies of these fisheries and are based on bycatch rates observed on research surveys because there are no direct fishery observations.

Wastage in the commercial fishery includes legal-sized halibut (32 inches and over or O32 halibut) killed by lost or abandoned longline gear and a proportion of the U32 halibut that are discarded and die. Information on lost gear is collected through logbook interviews and fishing logs received by mail. The ratio of U32 to O32 halibut is determined from IPHC

stock assessment survey. (http://www.iphc.washington.edu/publications/rara/2010/2010.281.IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf ; http://www.iphc.washington.edu/publications/rara/2010/2010.51.Wastageofhalibutinthecommercialhalibutfishery.pdf).

Table 6 below provides estimates (thousands of pounds, *net weight*) of bycatch mortality of Pacific halibut from all sources by geographic region of the coast for 1980 through 2010. Estimates for 2010 are preliminary and may change with new information (http://www.iphc.washington.edu/publications/rara/2010/2010.281.IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf)

	Thousands of Pounds, net weight				
Year	Wash.,Oreg., Calif.	B.C.	Gulf of Alaska	Bering Sea & Aleut.	Total
1980	476	1,372	7,619	9,235	18,702
1981	475	1,188	6,789	6,408	14,859
1982	475	867	6,274	4,756	12,373
1983	476	943	5,196	4,269	10,883
1984	475	1,074	3,949	4,692	10,189
1985	475	1,139	1,879	4,207	7,700
1986	476	1,161	1,549	5,576	8,762
1987	476	1,649	3,416	5,738	11,279
1988	477	1,609	3,718	8,858	14,662
1989	477	1,498	4,388	7,282	13,646
1990	408	1,679	7,015	8,580	17,682
1991	408	1,992	7,247	10,022	19,669
1992	444	1,745	7,386	10,718	20,293
1993	444	1,661	6,095	7,764	15,964
1994	444	1,219	5,822	9,466	16,951
1995	614	1,522	5,071	8,726	15,933
1996	614	299	5,045	8,507	14,465
1997	614	215	4,805	7,880	13,514
1998	1,082	213	4,412	7,725	13,432
1999	987	193	4,980	7,684	13,844
2000	822	230	4,797	7,441	13,290
2001	837	177	5,025	7,120	13,159
2002	635	244	4,458	7,273	12,610
2003	260	244	5,255	6,822	12,581
2004	286	251	5,307	6,735	12,579
2005	537	346	4,686	7,692	13,261
2006	578	294	4,716	7,491	13,079
2007	387	320	4,300	7,262	12,269
2008	422	143	4,765	6,555	11,885
2009	509	213	4,359	6,297	11,378
2010	509	213	4,230	5,591	10,543

Discards

Observer data are used to produce halibut discard mortality rates (DMRs) (calculated from data collected on the release viability or injury of halibut) in fisheries in three major areas. NMFS manages the groundfish fisheries off Alaska according to a schedule of DMRs recommended by the IPHC used to determine the fraction of the estimated bycatch that dies, vary by fishery and area. For areas without observers, assumed DMRs are used, which are based on the similarity of fisheries to those in other areas where data are available.

In Area 2A, NMFS observers have been collecting release condition data for halibut on bottom trawlers for several years. These data were used by Heery et al. (2010) to estimate mortality in 2009. In Area 2B, observers deployed on the Canadian bottom trawl vessels examine each halibut to determine release viability. The bycatch mortality reported to IPHC incorporates those release mortality observations.
Data to determine DMRs for other fisheries are not available, so assumptions are made on likely DMRs based on similar fisheries where DMRs are known. For the sablefish hook-&-line fishery off the US west coast, NMFS uses a DMR of 16%, based on an analysis of the observer data from the sablefish fishery off Alaska prior to the implementation of individual fishing quotas in 1995. Bycatch mortality in the catcher/processor mid-water fishery for whiting is based on a 75% DMR, based on the large catches of whiting typical of this type of fishery (http://www.iphc.washington.edu/publications/rara/2010/ 2010.281. IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf).

Non-halibut bycatch in halibut fishery

IPHC provides ADFG and NMFS staff detailed halibut and other-species catch data from the IPHC stock assessment survey and summarized commercial halibut catch and effort data by depth strata to assist them in estimating bycatch in the halibut fishery, particularly for bycatch of rockfish species, skates, and sharks. In 2008, ADFG and IPHC had a joint project on the IPHC stock assessment survey vessels in SE Alaska to record species on 100% of the hooks and collect biological data on some rockfish species (http://www.iphc.washington.edu/publications/rara/2008/2k8rara10a_ssa.pdf).

Previous methods of estimating bycatch of non-target species in the halibut fishery are currently under review as NOAA is working toward incorporating all removals into their BSAI and GOA stock assessments. To address these non-halibut bycatch issues in the halibut fishery, a working group composed of scientists from the Alaska Fishery Science Center (AFSC), Alaska Regional Office (AKRO), ADFG, IPHC, and NPFMC was formed in January of 2010. The goal of this group is to investigate quantitative methods to estimate incidental catches in the unobserved halibut IFQ fishery and report its findings to the Plan Teams and NPFMC.

The purpose of their study is to provide Plan Team and SSC members with an overview of the analytical methods and associated estimates for several example species: Pacific cod, spiny dogfish, Pacific sleeper shark and salmon shark within the GOA.

The working group has focused on three areas:
1) estimation of variance for extrapolated survey catch and CPUE;
2) investigation of methods to better represent commercial fishing behavior by using annual IPHC survey data; and
3) extrapolate survey catch to commercial effort using ratio estimators.

Timeline

- January-August 2010: Working group meetings and method developments.
- September 2010: Presentation of methods to joint Plan Teams, discussion and feedback, selection of best method.
- November 2010: Presentation of best method with catch estimates of example species to joint Plan Teams.
- February 2011: Presentation of best method to SSC for approval.
- March 2011: Make necessary changes requested by SSC.
- August 2011: Estimation of catches for non-target species prepared and provided to stock assessment authors.

http://alaskafisheries.noaa.gov/npfmc/membership/plan_teams/Minutes/1110IFQbycatch.pdf

In addition, a recent (2010) joint project (with IPHC, NMFS North Pacific Observer Program, the Pacific States Marine Fisheries Commission, and the Fishing Vessel Owners' Association), through a North Pacific Research Board grant, placed Electronic Monitoring (EM) equipment on several Alaskan commercial halibut fishing vessels. The project was to provide baseline observations and a proof-of-concept for use of this technology for estimating bycatch in the Alaskan halibut fishery, similar to what is used in the Canadian IVQ fishery. This paper is now been reviewed by the NPFMC for potential integration of EM equipment in the new restructuring of the groundfish observer program. The Restructuring of the Observer Program (now under NPFMC Review, planned to be implemented in 2013) holds great potential in respect to increasing knowledge on the bycatch dynamics of the directed halibut longline fishery. (http://alaskafisheries.noaa.gov/npfmc/current_issues/observer/OACagenda311.pdf).

Sport catch estimates

The Canadian Department of Fisheries and Oceans (DFO) estimates the British Columbia sport catch. Length frequency data are available for most but not all jurisdictions; age samples only from Alaska. The length frequencies of sport catches are very similar to the length frequencies of IPHC setline survey catches.
For the Alaska sport fishery, estimates are provided by ADFG. Preliminary estimates of 2010's harvest by the guided and unguided sectors were made using sector-specific approaches because of the bag limit restrictions which differ between sectors. Changes in guided fishery bag limit regulations in the past two years led ADFG to project the 2010 harvest from the 2009 charter logbook data, whereas the projections for the unguided fishery continue to be made from the Statewide Harvest Survey (SWHS) time series.

	For both sectors, ADFG projects the number of fish caught and applies an average weight from current year dockside sampling. Preliminary 2010 coastwide sport harvest estimates indicate a 4.6% increase in the sport harvest from 2009, to 9.1 million pounds (http://www.iphc.washington.edu/publications/rara/2010/2010.43.2010Halibutsportfisheryreview.pdf). **Subsistence catch estimates** Both Canada and the United States authorize fishing for subsistence or personal use apart from sport fishing. The catches in weight are reported but no length or age data are collected. Because these are all hook-and-line fisheries, they are assumed to have length frequencies similar to IPHC setline survey catches, like the sport catches. Personal use includes removals from several fisheries, including a couple for which there are little documented data. Personal use harvests are taken in (1) the federal subsistence fishery in Alaska, (2) the sanctioned First Nations Food, Social and Ceremonial (FSC) fishery conducted in British Columbia, (3) ceremonial and subsistence removals in the Area 2A treaty Indian fishery, and (4) U32 halibut retained in Areas 4D and 4E under IPHC regulations. The 2009 Alaska harvest of subsistence halibut was 871.6 thousand pounds (net weight). Subsistence halibut users information are gathered by NMFS under its Subsistence Halibut Registration Certificate (SHARC) program. Subsistence removals are documented through ADFG's Division of Subsistence surveys of Subsistence Halibut Registration Certificate (SHARC) holders and distributed to NMFS and IPHC (http://www.iphc.washington.edu/publications/rara/2010/2010.59.ThepersonaluseharvestofPacifichalibutthrough2010.pdf).
4.1.1	**IPHC Publications** The IPHC publishes three serial publications (Annual Reports, Scientific Reports, and Technical Reports) and also prepares and distributes regulation pamphlets and information bulletins. Electronic copies of all these publications are also available through the links below. • Annual Reports • Report of Assessment and Research Activities • Scientific Reports • Technical Reports • Regulations • Information Bulletins **Annual Meetings** Documents are also produced for IPHC Annual Meetings in January. These include the Bluebook, which contains the Meeting agenda and staff presentations, and the Staff Regulatory Proposals which list catch limit and regulation change recommendations for the coming year. Only the 1998-Present documents are currently available.

	Some examples of published material are available below for 2008-2010 **2010** Assessment of the Pacific halibut stock at the end of 2010 (.pdf) The full account of the most recent assessment. Potential modifications to the IPHC harvest policy. Two changes to the current IPHC harvest policy are analyzed. Evaluation of the impact of migration on lost yield, lost spawning biomass, and lost egg production due to U32 bycatch and wastage mortalities of Pacific halibut. Discussion paper on IPHC setline survey expansion. Issues associated with an expansion of the survey to deeper and shallower waters. Adjusting IPHC setline survey WPUE for survey timing and hook competition. A review of hook competition and timing adjustments to the survey WPUE index. Discussion of potential modifications to the Area 2A survey to improve the WPUE index. Notes on the IPHC setline survey design, alternatives for estimating biomass distribution, and the hook competition adjustment. Discussion of several apportionment issues. Weighted averaging of recent survey indices. A statistical approach to weighting recent survey index values for apportionment. **2009** Assessment of the Pacific halibut stock at the end of 2009 (.pdf) The full account of the 2009 assessment. Estimates of halibut total annual surplus production, and yield and egg production losses due to under-32 inch bycatch and waste (.pdf) Effect of migration on lost yield, lost spawning biomass, and lost egg production due to U32 bycatch and U32 wastage of Pacific halibut (.pdf) How migration affects distribution of impacts Adjusting IPHC setline survey WPUE for survey timing, hook competition and station depth (.pdf) Various factors can affect survey catch rates Options for modifying the Area 2A setline survey (.pdf) Updated and expanded estimates of bottom area in IPHC regulatory areas (.pdf) Apportionment requires precise estimates of bottom area (habitat). Analysis of PIT tag recoveries through 2009 (.pdf)

	2008 Assessment of the Pacific halibut stock at the end of 2008 (.pdf) The full account of the 2008 assessment. Variability and precision in the aging of halibut otoliths (.pdf) An analysis of the tradeoff between a larger number of first reads and a smaller number of verified age readings. Exploring effects of fishing and migration on the distribution of Pacific halibut (.pdf) Details about the widget model used to consider how fishing and migration alter the equilibrium distribution of halibut. Compilation of coincident setline and trawl survey catch rates in the eastern Bering Sea (.pdf) Comparison of NMFS EBS trawl and IPHC setline catch rates. Comparison of stock assessment and trawl survey estimates of total halibut abundance at length (.pdf) Paper showing good agreement between the stock assessment and swept-area estimates of abundance from the NMFS trawl survey in Areas 3A and 3B. Questions and Significant Comments Arising at Apportionment Workshop September 2008 (.pdf) A Biomass Apportionment workshop was held September 4th at Bellevue, WA. A summary of significant questions and responses was prepared. The Legacy Data sets on the IPHC webpage go back to 1929 In addition to the IPHC, the NPFMC and the NMFS, collaborating with the IPHC produce and publish on their websites a wealth of information (in their respective areas of responsibility) relating to commercial, sport, and subsistence halibut fishery. Overall, these three organizations, at appropriate times and scales of aggregation, produce the vast majority of documents necessary for the responsible management of the Pacific halibut fishery. See their website for more information at: http://www.iphc.int/library.html http://alaskafisheries.noaa.gov/npfmc/ http://www.alaskafisheries.noaa.gov/
4.1.2	IPHC has a Seattle staff of 27 including a fisheries statistics program manager, several quantitative scientists, data transcribers, biologists, port and sea samplers, survey managers and operators etc. (http://www.iphc.washington.edu/contacts.html). IPHC stock assessments contain a multitude of scientifically collected and analyzed, appropriately aggregated data including alternative coastwide model fits; shares of exploitable biomass by area according to various apportionment methods; yearly total removals by type and regulatory area; catch rates for IPHC setline survey (J and Circle hooks) and NMFS trawl surveys; comparison of NMFS trawl survey and IPHC length frequency compositions; survey weight per unit effort (weight of O32 halibut per standardized skate of gear) by regulatory area; regulatory area sex and age compositions from halibut taken in the IPHC stock assessment survey; age-specific survey catch rate of

	halibut (both sexes combined), and catch at age (both sexes combined) in the commercial fishery; trends in average age and average weight in survey catches and commercial catches; realized harvest rates from the coastwide assessment using adjusted and weighted survey weight per unit effort to partition biomass among areas; summary of removals, abundance indices, age structures, surplus production, and commercial effort per regulatory area etc.. (http://www.iphc.washington.edu/papers/sa10.pdf). Timely and reliable catch and fishing effort statistics for stock assessment purposes necessary for Pacific halibut management are produced yearly by the IPHC. The reports produced from these data follow scientifically acknowledged standards, surveys, analysis and reporting methodologies. See section 4.1.1 for report details and references.

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 Criteria** 8.4.3*

Evidence adequacy rating:

☐ **High** ☑ **Medium** ☐ **Low**

Clause:	Evidence
4.2	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". Under the current plan, groundfish vessels under 60' length overall (LOA) are not required to carry observers, groundfish vessels longer than 60' and shorter than 125' are required to carry observers 30% of their fishing time, and groundfish vessels 125' and longer are required to carry observers 100% of their fishing time. Shoreside processors that process between 500 mt and 1000 mt of groundfish in a calendar month are required to have observers 30% of the days that they receive or process groundfish. Shoreside processors that process 1,000 mt or more of groundfish in a calendar month are required to have observers 100% of the days that they receive or process groundfish. The original coverage requirements were changed to reduce coverage from 100% to 30% for vessels ≥125' using pot gear. 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 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). Based on a recent (2010) NMFS-AFSC Technical Memorandum series of the Alaska Fisheries Science Center report, Electroning 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 the smaller-boat component of the commercial halibut fleet, 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).

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 Criteria 7.4.5***	
Evidence adequacy rating **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
4.3	The value of coastal halibut resources from economic, institutional and social perspectives is regularly assessed in order to assist decision makers with allocation and use decisions. 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. Each NPFMC decision package includes the NEPA evaluation that describes the social and economic impacts of the proposed action on the resource and evaluates social, economic and institutional factors relevant to the fishery (http://www.nwr. noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/)

In 2005, the Alaska Fisheries Science Center (AFSC) compiled baseline socioeconomic information about 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'RAM 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 Bering Sea/Aleutian Islands area can be found at http://www.afsc.noaa.gov/ REFM/docs/2010/economic.pdf.

RAM

The NMFS Alaska Regional Office's RAM is responsible for managing Alaska Region permit programs, including those that limit access to the Federally-managed fisheries of the North Pacific, helping maintaining the economic health of the Alaska Pacific halibut fishery by limiting the number of participant fishers. RAM responsibilities include: providing program information to the public, determining eligibility and issuing permits, processing transfers, collecting landing fees and related activities. RAM also prepares and distributes reports on landings in the Pacific halibut and sablefish Individual Fishing Quota (IFQ) program and halibut landings in the Community Development Quota (CDQ) program; and on the BSAI Crab Rationalization Program (http://www.fakr.noaa.gov/ram/).

Subsistence halibut

The NMFS collects subsistence halibut registration information by managing the Subsistence Halibut Registration Certificate (SHARC) program. Special permits for community harvest, ceremonial, and educational purposes also are available to qualified Alaska communities and Alaska Native Tribes. Permit holders must comply with SHARC registration and reporting processes. Through this process, the NMFS collects socio-economic information on the halibut subsistence harvesters in Alaska necessary to establish their fitness for license (http://www.alaskafisheries.noaa.gov/ram/subsistence/halibut.htm). Details of all the SHARCs and Special Permits issued by NMFS can be found at http://www.alaskafisheries.noaa.gov/ram/subsistence/halibut.htm#reports.

	Sport halibut The NMFS collects the following socio-institutional information for issuing Charter Halibut Permits (CHP). (a) documentation of participation in the charter vessel fishery during the qualifying and recent participation periods in ADF&G Saltwater Charter Logbooks; and (b) ownership of a business that was licensed by the State of Alaska to conduct the guided sport fishing reported in the logbooks; and (c) minimum participation standards in both a qualifying period (2004 and 2005) and a recent participation period (2008). Each CHP is issued with one area endorsement (either 2C or 3A), an angler endorsement, and a status of "transferable" or "non-transferable" (http://www.fakr.noaa.gov/ram/charter/qualifications2010.pdf).

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 for fishery management purposes.
FAO Main Criteria 12.2 Others 12.5

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

Clause:	Evidence
5.1	The halibut convention between the governments of the United States and Canada was adopted in 1923. The convention created the IPHC. Control of the rate of removal, or the amount of fishing on each stock, was made possible by amendments in the Treaties of 1930 and 1937, which authorized the division of the coast into areas and the limitation of the catch in each area. Collection of data on landings and production was mandated (http://www.iphc.washington.edu/publications/scirep/Report0013.pdf). As part of the annual IPHC staff activities they conduct (1) funded research (2) contract research and (3) un-funded research. These research projects directly support halibut fishery management. Statistically valid study designs developed by the IPHC began with the collection of commercial catch data in 1929. Age and size data research began in 1935. Data on commercial catches, and on age-and-size, are the foundation of the age-structured stock assessments that have been the main scientific basis of the IPHC staff's management advice for long-term resource sustainability since the late 1970s (http://www.iphc.washington.edu/publications/techrep/tech0042.pdf). IPHC now has a long series of biological sampling data from the commercial fishery. Annual reports document the significant and comprehensive effort of the scientific staff of the IPHC. Assessment model refinements for the harvest policy occur when necessary, recently dealing with bycatch and wastage mortality. Current projects include: standardized stock assessment fishing surveys from northern California to the end of the Aleutian Islands, and field sampling in major fishing ports to collect scientific information from the halibut fleet, and many other biological and scientific work to further the understanding and information about Pacific halibut. Every year, the IPHC places a sampler aboard the NMFS Eastern Bering Sea (EBS) groundfish/crab trawl survey. The sampler collects biological data on the halibut catches, taking lengths of almost all halibut caught and selecting a subsample for ageing (http://www.iphc.washington.edu/publications/rara/2010/2010.445.Cruisereportforthe2010NMFSBeringSeatrawlsurvey.pdf). Additionally, this year, the NMFS also operated their triennial Aleutian Islands survey. While the Aleutian Islands survey is not used as part of the IPHC assessment, it is used in a

	comparison of NMFS trawl and IPHC assessment biomass estimates. In its current configuration, stations are placed on a 10-nautical mile grid between depths of 20 and 275 fm, resulting in a total of approximately 1280 stations. Approximately 1500 otoliths are collected and aged from each regulatory area (smaller samples in Areas 2A and 4B)(http://www.iphc.washington.edu/papers/sa10.pdf). The institutional framework for fisheries management includes supervisory, administrative, technical, economic, biometric, samplers, age readers, data entry personnel, and other IPHC staff who are responsible for collecting and quality control checking the data upon which the halibut assessment depends so strongly. All programs are guided by commission policies, standards, and/or nationally recognized scientific standards. Scientists with the IPHC routinely interact with state, federal, academic, and international researchers. At each Commission's meeting, the budgets, research plans, biomass estimates, catch recommendations, and regulatory proposals are discussed and approved, then forwarded to the respective governments for implementation. (http://www.iphc.washington.edu/meetings-and-events/20/29-annual-meeting.html).

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 Criteria 12.5

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
5.2	Long-established fishery monitoring and stock assessment programs obtain the extensive scientific information necessary to establish changes in management strategies to achieve exploitation strategies and allocations among halibut resource users. IPHC staff uses information from ADFG's commercial fish tickets (landing reports) and sport charter log books to document resource removals. Subsistence removals are documented through ADFG's Division of Subsistence surveys of Subsistence Halibut Registration Certificate (SHARC) holders. IPHC's staff and NMFS scientists have researched the impacts of climate change, competition with other flatfish stocks and considerations of the impacts of ocean acidification. Evidence: http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:'Title5Chap39!2C+a!2E+1']/doc/{@1}?firsthit 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!2E130']/doc/{@1}?firsthit http://www.adfg.alaska.gov/sf/sportfishingsurvey/

http://www.fakr.noaa.gov/ram/subsistence/adfg_subhalibut_2007_prev_draft.pdf
http://www.adfg.alaska.gov/index.cfm?adfg=prolicenses.sportfishguides

On vessels with federal observer coverage, halibut bycatch in Alaskan groundfish fisheries is well documented. Strict limits exist that can trigger time and area closures when prohibited species bycatch limits are reached (http://alaskafisheries.noaa.gov/ npfmc/ analyses/GOAHalibutPSCmod210.pdf).

At-sea observers in other groundfish fisheries monitor the bycatch of halibut. Current observer coverage in the Alaska groundfish fisheries is described in http://www.fakr.noaa. gov/regs/679e50.pdf.

Additionally, the NPFMC is undertaking a thorough review of the observer program, with a possible change in observer requirements for smaller commercial vessels 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 ; http://iphc.ipower.com/meetings/bycatchworkshop/Minutes BycatWkshp.pdf).

IPHC staff participated for a second year in a study conducted by the North Pacific Fisheries Foundation (NPFF) to collect data from trawl-caught halibut for evaluating the effects of fishing practices on estimated discard mortality. (http://www.iphc.washington. edu/publications/rara/2010/2010.7.Reviewof2010ProjectsandProposalsfor2011.pdf).

The IPHC has conducted comprehensive Passive Integrated Transponder (PIT) tag investigations for several years. PIT tags are used to track migratory habits of halibut. Data are used when establishing Catch Limits to conservatively establish resource removals by all sectors. The IPHC is currently looking at different tag technologies to answer specific migratory questions. (http://iphc.ipower.com/meetings/ bycatchworkshop/MinutesBycat Wkshp.pdf).

Alaskan waters are relatively free of industrial pollutants, which are aggressively monitored by the ADEC. 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).

The 2010 Integrated Report produced by ADEC is a statewide water quality assessment. It describes whether the existing condition of each Alaska waterbody is sufficient to maintain multiple designated uses of that waterbody. Sources of information used by ADEC 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. ADEC actively solicits all existing and readily available water quality data and information in accordance with guidance from the federal Environmental Protection Agency (EPA). Data sources include: university researchers, U.S. Department of Agriculture, NOAA, U.S. Geological Survey (USGS), and the U.S. Fish and Wildlife Service (USFWS). (http://dec.alaska.gov/water/index.htm).
5.2.1	IPHC scientists conduct their own research, and they participate in research projects conducted by other agencies, most notably NMFS. IPHC compared long-term changes in Pacific halibut recruitment and growth with long-term changes in climate and stock size. They determined that environmental variability—both interdecadal and interannual—is responsible for most of the observed variation in Pacific halibut recruitment. However, the dramatic decline in size at age, resulting in the large changes in growth rates that occurred during the twentieth century, appear to have been density-dependent responses to changes in stock size and competition with expanding flatfish stocks in general, with virtually no environmental influence. (http://afsjournals.org/doi/abs/10.1577/1548-8675(2002)022%3C0852%3AEOCASS%3E2.0.CO%3B2). Since 2009 the IPHC has deployed water column profilers at each of its survey stations, from the western Aleutian Islands to southern Oregon to assess environmental change in the ecosystem and effects on migration and recruitment of Pacific halibut (http://www.iphc.washington.edu/publications/scirep/SciReport0082.pdf). IPHC staff has also participated in International symposia (North Pacific Marine Science Organization) looking at the climate impacts of density-dependence and fishing on long-term and large-scale changes in recruitment, growth, maturity & distribution of Pacific halibut. (http://www.pices.int/publications/presentations/2010-Climate-Change/A2/A2.aspx). Scientists with the NMFS have conducted numerous studies and continue research on the impacts of acidification in the North Pacific (http://www.pices.int/publications/presentations/2010-Climate-Change/A2/A2.aspx). A research plan has been developed by the Alaska Fisheries Science Center focusing on forecasting fish, shellfish and coral population responses to ocean acidification in the north Pacific Ocean and Bering Sea. (http://www.afsc. noaa.gov/ABL/ MESA/ mesa_ me_ cor .php). On the international level, collaborative technical and research programs study the processes generating variability in abundance, distribution, and dynamics of fish species at daily, decadal, and centennial scales (http://www.spc.int/sppu/images/stories/preliminary%20assessment.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 Criteria 12.7

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
5.3	IPHC, NPFMC and ADFG work to minimize at-sea discards, and to improve utilization of halibut harvests. Under the IFQ fishery, the fishery proceeds at a slower pace than under the olympic race for fish seen prior to IFQ implementation. This program results in less waste and greater economic output given the value of fresh fish markets [See Grafton, R. Quentin, Dale Squires, and Kevin J. Fox. 2000. Private Property and Economic Efficiency: A Study of A Common-Pool Resource. *Journal of Law & Economics* 43(October): 679–713.; or Casey et al (1995); Branch and Hilborn in several of their papers; and Dr. Matulich (WSU) in several presentations to the NPFMC (http://ageconsearch.umn.edu/bitstream/28221/1/ 18020149.pdf)]. See also http://www.fakr.noaa.gov/ram/ifq.htm ; http://www.perc.org/ articles/ article412.php. The IPHC encouraged the NPFMC to adopt economic management incentives; it later adopted the IFQ program after the NEPA analysis described the gains in optimum utilization. In the early 1980s the IPHC conducted research on capture efficiency of circle vs J hooks. They determined that using circle hooks lowered the mortality of undersized halibut caught and released during fishing. In 1983, industry made the operational switch from J-hooks to circle hooks in the commercial fishery. (http://www.iphc.washington.edu/ publications/annual/ar1983.pdf). Discards of Pacific halibut, considered a Prohibited Species Catch by the groundfish fisheries in Alaska, is regulated. When PSC limits are reached, closures result. Bycatches of all prohibited species are managed by fleet-wide caps that are allocated between fishing targets and often apportioned seasonally. Seasonal allocations are based on industry recommendations which are designed to ensure that fishing effort is spread out over the year and to take advantage of seasonal opportunities for fishing with reduced halibut and crab bycatch (Witherell and Pautzke 1997). The NMFS has been researching the value in using electronic monitoring (cameras) to quantify discards at sea. This technology is now under review for implementation in the small boat (<60 feet) portion of the halibut commercial fleet. http://www.fakr.noaa.gov/ sustainablefisheries/efp/efp08-01_halibutdiscards_rpt.pdf ; http://alaskafisheries.noaa.gov/npfmc/current_issues/observer/OACagenda311.pdf.

	The retention of halibut bycatch in the BSAI trawl fisheries for assessment purposes is encouraged. (http://www.fakr.noaa.gov/npfmc/current_issues/bycatch/bycatch.htm) (scroll down to Amendment 80). Also, regulations are in place to address discards. They state: "All halibut that are caught and are not retained shall be immediately released outboard of the roller and returned to the sea with a minimum of injury by (a) hook straightening; (b) cutting the gangion near the hook; or (c) carefully removing the hook by twisting it from the halibut with a gaff. (2) Except that paragraph (1) shall not prohibit the possession of halibut on board a vessel that has been brought aboard to be measured to determine if the minimum size limit of the halibut is met and, if sublegal-sized, is promptly returned to the sea with a minimum of injury" (http://www.iphc.washington.edu/publications/regs/2010iphcregs.pdf).
5.3.1	State and national policies regarding seafood are guided and driven by the Alaska Department of Environmental Conservation (ADEC), 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 the state agency 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 (FITC) as a component of the University of Alaska (http://www.sfos.uaf/fitc/). FITC 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).

Clause:

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

FAO Criteria 12.17

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
5.4	The annual IPHC research projects are voted on and adopted by the six Commissioners. These projects are all directed toward improving the knowledge of halibut stocks and their biology. (http://www.iphc.washington.edu/research.html). The United States collaborates with the government of Canada at the technical and research level via the IPHC on stock assessment research, biology, environmental factors and influence, the development of fishery regulations and fishery management for the Pacific halibut resources in the North Pacific Ocean. While the fishery is managed within specific management areas, migration and life history periods; halibut are studied throughout its range. For example, recent archival tagging has identified winter spawning migrations as long as 1,200 km as well as some degree of site fidelity to summer areas (http://www.iphc.washington.edu/meetings/2011am/iphc2011bluebook.pdf. Other studies indicate that juvenile halibut undertake an ontogenetic eastward-southward migration that counters the drift of eggs and larvae (http://www.iphc.washington.edu/publications/rara/2010/2010.325.Detectinginterpretingandmeasuringbothtrueandfalseannuli.pdf).

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 Criteria 12.3 Others 7.4.2

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
5.5	Landings, buying and production data for Pacific halibut are recorded on Alaska Department of Fish and Game fish tickets or through the e-Landings system, and the Commercial Operators Annual report, as required by Alaska Statute (Section 16.05.690 Record of Purchases), and the Alaska Administrative Code (5 AAC 39.130 Reports required of processors, buyers, fishermen, and operators of certain commercial fishing vessels; transporting requirements). Scientific staff analyzes data. Reporting of their findings is

	done in accordance with the State of Alaska's legal requirements to protect confidential data. The State 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 CFEC except as set out in this subsection. To ensure confidentiality, fishery data are routinely redacted from ADFG 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, Alaska Department of Fish and Game, 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. The IPHC, ADFG and NMFS produce volumes of research reports, annual management reports, and technical publications that are made available to the public in printed form. Data which are made available to the public are always summarized and aggregated to protect confidentiality. 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
5.5.1	ADFG Game has a thorough, electronic fishery harvest and production database that is available for the creation of ad hoc reports of non-confidential fisheries data. Databases are updated annually http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.requests. The NMFS Alaska Fisheries Science Center has a searchable database at http://access.afsc.noaa.gov/pubs/search.cfm. The IPHC routinely publishes and distributes reports on preseason forecasts, stock status reports, research reports, data reports, and technical reports. A comprehensive list of Annual Reports, Report of Assessment and Research Activities (RARAs), Scientific Reports, and Technical Reports is available on the web at: http://www.iphc.washington.edu/library/raras/149-rara-2010.html. All publications and data runs assist in the analysis of the fisheries for conservation concerns, fishery management, and fishery development by interested parties, including international scientific staff, industry representatives, university staff, and the general public, etc.
5.5.2	Evidence of the initiation of timely research in the lack of scientific information has been well documented. In past years, the lack of sufficient data on halibut removals by the charter fleet in Alaska prompted the development of a department logbook, with timely reporting requirements. Any local representative of ADFG, State of Alaska Peace Officer or Federal Enforcement Officer must be shown a logbook upon request. Historical logbook information is available only to the owner of the business. Similarly, halibut bycatch by the less than 60 foot unobserved groundfish fleet off Alaska was lacking. Realizing the need for adequate scientific information in order to secure harvest data in that sector of the fleet, the NPFMC produced an initial draft review in June 2010 titled "Restructuring the Program for Observer Procurement and Deployment in the North Pacific". Analyses continue through the Council process. (http://www.fakr.noaa.gov/npfmc/current_issues/observer/ObserverRest510.pdf).

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.

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 Criteria 7.5.2 Others 7.5.3

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
6.1.1	Since 1985, the IPHC has followed a constant harvest rate (CHR) policy to determine annual available yield, termed the Constant Exploitation Yield (CEY). A biological target level for total removals from each regulatory area is calculated yearly by applying a fixed harvest rate to the estimate of exploitable biomass in each IPHC regulatory area. The corresponding target level for catches in directed fisheries subject to allocation is the fishery CEY. The CHR policy was fully described in Clark and Hare (2006) and further modified as described in Hare and Clark (2008). The harvest rate, which is the fraction of the exploitable biomass allowed to be harvested annually, has changed over time. The target harvest rate over the past decade for halibut has generally been 0.20. Exceptions include a briefly increased rate to 0.225 and 0.25 between 2004 and 2006, and a lower rate of 0.15 in Areas 4B and 4CDE. On a coastwide basis, however, recent realized harvest rates have hovered around 0.25. A sizable portion of this above target harvest rate comes from the retrospective revision of exploitable biomass estimates. Thus, while the intended target rate has been around 0.20, with catch limits based on such a rate, a retrospective revision of exploitable biomass, when combined with unchanged estimates of total removals generates the higher estimated harvest rates. Stated succinctly, the policy is to harvest 20% of the coastwide exploitable biomass when

the spawning biomass is estimated to be above 30% of the unfished level. The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% of the unfished level. This combination of harvest rate and precautionary levels of biomass protection have, in simulation studies, provided a large fraction of maximum available yield while minimizing risk to the spawning biomass.

Since the early 2000s, and in common with many fisheries management agencies, the harvest policy has incorporated a measure designed to avoid rapid increases or decreases in catch limits, which can arise from a variety of factors including true changes in stock level as well as perceived changes resulting from changes in the assessment model. The adjustment, termed "Slow Up Fast Down (SUFD)" resulted in a target harvest rate of 20% but a realized rate usually a bit different. This *slow up fast down* approach is somewhat different from similar phased-change policies of other agencies. This Commission's policy in theory allowed the catch limit to respond more strongly to estimated decreases in biomass than to estimated increases. Specifically, if a reduction in available catch was recommended, 50% of the reduction was implemented whereas if an increase was recommended, only 33% of the increase was implemented.

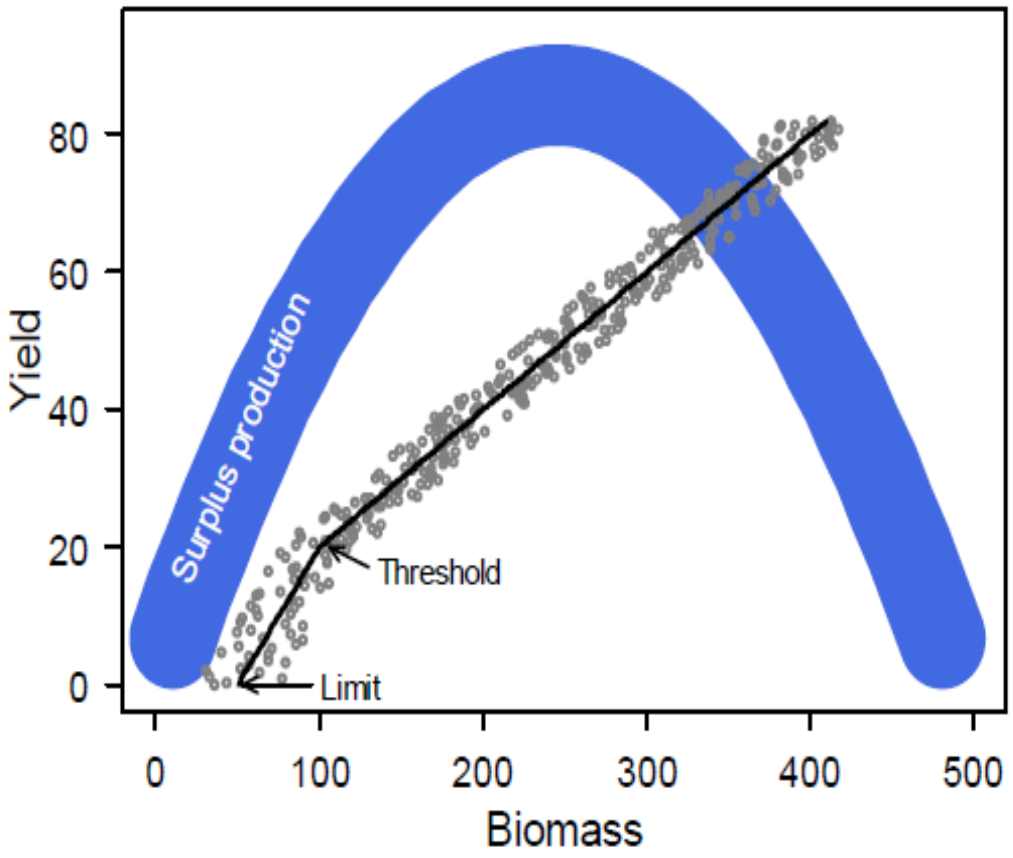

Figure 10. Representation of the IPHC harvest policy. The background curve illustrates theoretical relationship between biomass and surplus production, taken as yield. The slope of the straight line is a 20% harvest rate (Yield/Exploitable biomass), and the harvest rate decreases linearly to zero as the biomass approaches established reference points,

	termed the female spawning biomass threshold and limit. The scatter about the harvest rate indicates the effect of the "Slow Up Fast Down" adjustment to catch limits in term of realized harvest rate. (http://www.iphc.washington.edu/papers/sa10.pdf). The staff and the Commission have recently been concerned that the Commission's Slow Up - Fast Down (SUFD) harvest policy adjustments have not achieved target harvest rate goals in the face of continued stock declines, in halibut growth rate, and the history of high exploitation rates for some areas in recent years. The staff therefore recommended in 2010 that the SUFD policy be modified to a Slow Up - Full Down (SUFullD) policy, to achieve the necessary reductions in harvest rate and promote increases in exploitable biomass. That is, staff recommendations would incorporate the existing policy of a 33% increase from previous year's catch limits when stock yields are projected to increase but use a 100% decrease in recommended catch, when stock yields are projected to decrease." The SUFullD was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it. **References** http://www.iphc.washington.edu/papers/sa08.pdf http://www.iphc.washington.edu/papers/sa07.pdf http://www.iphc.washington.edu/papers/sa10.pdf http://www.iphc.washington.edu/papers/sr83.pdf http://www.iphc.washington.edu/news-releases/news-releases-2010.html
6.1.2	**Implementation of a minimum biomass threshold and limit** The IPHC considers first and foremost the impact of the harvest policy on female spawning biomass. The approach taken is one of avoidance of dropping below the minimum observed historical level. This is different from the philosophy where harvest control rules are based on a more theoretical construct: spawning biomass per recruit. Within the three areas being analyzed, halibut populations rebounded from the minimum spawning biomasses of the early 1970s to the high levels observed for the past 15-20 years. IPHC scientists have some confidence therefore of stock dynamics at those spawning biomass levels, but not at lower levels. In keeping with the global movement towards precautionary management, an additional biomass safeguard was investigated and adopted. The terms "threshold" and "limit" have come into use in fisheries management to define levels at which extra conservation measures are implemented. There is no universally accepted definition for the terms and they are often used interchangeably. For the purposes of the Pacific halibut harvest policy, threshold is defined as a level at which more conservative harvest rates begin to apply, and limit as a biomass level at which all fishing on the stock ceases.

There are at least two rationales for establishing reasonable minimum biomass safeguards.

A fairly common threshold is BMSY, i.e., the equilibrium biomass when fishing at the maximum sustainable yield (MSY) rate. A common limit associated with this threshold is 0.5 BMSY. This is somewhat problematic for halibut due to its alternating productivity regimes as well as density dependent growth.

A second rationale for selecting a limit and threshold has to do with what has historically been observed for the stock. If a stock has been monitored long enough to observe a descent to, and recovery from, a low point then that low point may be a “safe” minimum limit. IPHC followed this second rationale in establishing a minimum biomass threshold and limit for Pacific halibut.

The minimum observed spawning biomasses for the three IPHC core areas all occurred in the mid 1970s, approximately 9 million pounds in 2B, 13 million pounds in 2C and 42 million pounds in 3A. By definition, these become the spawning biomass limits. In the IPHC harvest policy, the target harvest rate is linearly scaled downwards once spawning biomass reaches the threshold, to reach the limit biomass level with a zero harvest rate.
In simulations, this was found to be very effective in returning the spawning biomass to at least the threshold in a short time without greatly affecting yield. IPHC tested several thresholds, ranging from 1.25 to 2.00 times the limit. A threshold equal to 1.5 times the limit performed well in simulations, producing lower variability in yield than higher or lower values. This is explained and shown in Figure 10 in section 6.1.1 above.

Currently female spawning biomass is well above the B20 limit at B43 as shown in Figure 11.

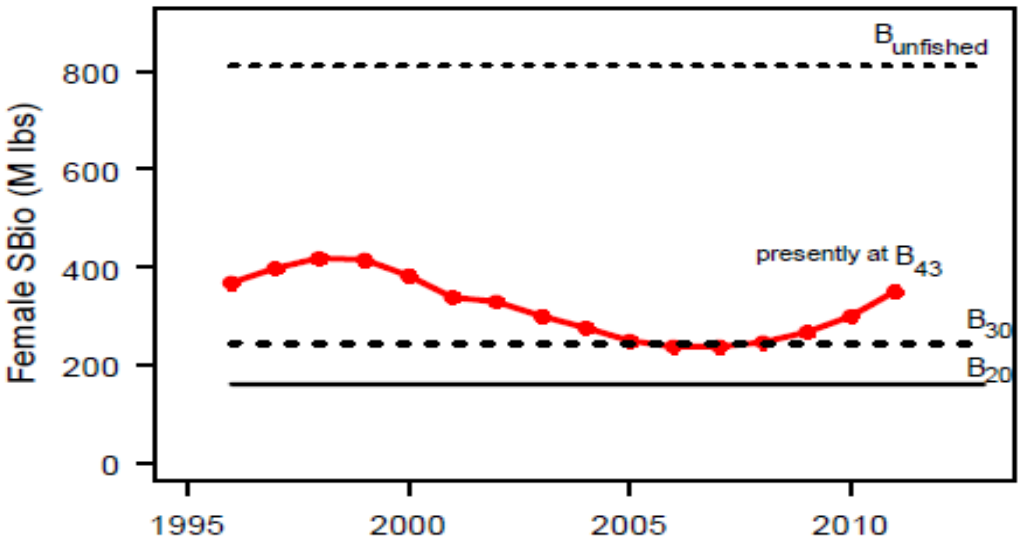

Figure 11. Female spawning biomass in relation to threshold (B30) and limit level (B20) (http://www.iphc.washington.edu/papers/sa10.pdf).

6.1.3	In terms of Biomass (B) in 2010, halibut unfished biomass ($B_{unfished}$) is estimated at 811 million pounds, a B20 (20% of $B_{unfished}$) of 162 million, a B30 (30% of $B_{unfished}$) of 243 million pounds, and the 2011 female spawning biomass value of 350 million pounds establishes current biomass ($B_{current}$) as 43% of $B_{unfished}$, up from the 2010 beginning of year estimate of $B_{current}$ of 38%. The revised trajectory of spawning biomass (S_{Bio}) suggests that the female spawning biomass did drop slightly below the B30 level which, had it been so estimated in 2009 would have triggered a reduction in the harvest rate. On an annually estimated basis, however, the stock has not been that low; it is only retrospectively that IPHC estimates the spawning 2010 Pacific halibut stock assessment biomass to have gone below to the reference point threshold. One problem with this method of establishing reference points is that the threshold and limit are dynamic, changing each year as the estimate of average recruitment changes. In 2010's calculation the very strong 2001 year class was included among the year classes used to compute average recruitment. However, due to the downward revision of several year classes in this year's assessment, the estimate of $B_{unfished}$ actually declined from the 2009 estimate. Correspondingly, B20 and B30 values also dropped slightly. The projected increase in the 2010 S_{Bio} results in the new determination that $B_{current}$ is around B43. The estimated age composition of the coastwide spawning biomass shows a broad range of ages including 7% females age 20 and older. While the age distribution is truncated due to the size-selective effects of fishing, IPHC concludes that production of eggs is not confined to a narrow range of ages and that should ensure that adequate reproductive potential remains in the ocean for the foreseeable future. On an area-by-area basis, there are some departures from this pattern, particularly in Areas 2 and 3B which show a lower percentage of older females. IPHC performs detailed age distribution studies of the Pacific halibut stock from data acquired through the assessment setline survey. The latest study from Joan E. Forsberg is for 2010 and has tables on age distribution in each regulatory area for: male, female, and unknown sex combined; only females and only males (http://www.iphc.washington.edu/publications/rara/2010/2010.79.Agedistributionofthecommercialhalibutcatchfor2010.pdf). The most generally accepted cause of the decline in size-at-age has been a density-dependent decline in growth rate resulting from the greatly increased numbers, and biomass, of flatfish. It is worth noting here that, although the exploitable biomass of halibut has declined by 50% since the late 1990s, the total biomass of halibut has continued to increase. Additionally, the biomass of arrowtooth flounder, estimated to be several times greater than the halibut biomass, has remained very high (further theories for the general size at age decline of halibut are provided at http://www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf.

In addition to monitoring the status of the female spawning biomass relative to reference points, success at achieving the harvest rate is also documented (Figure 12 below).

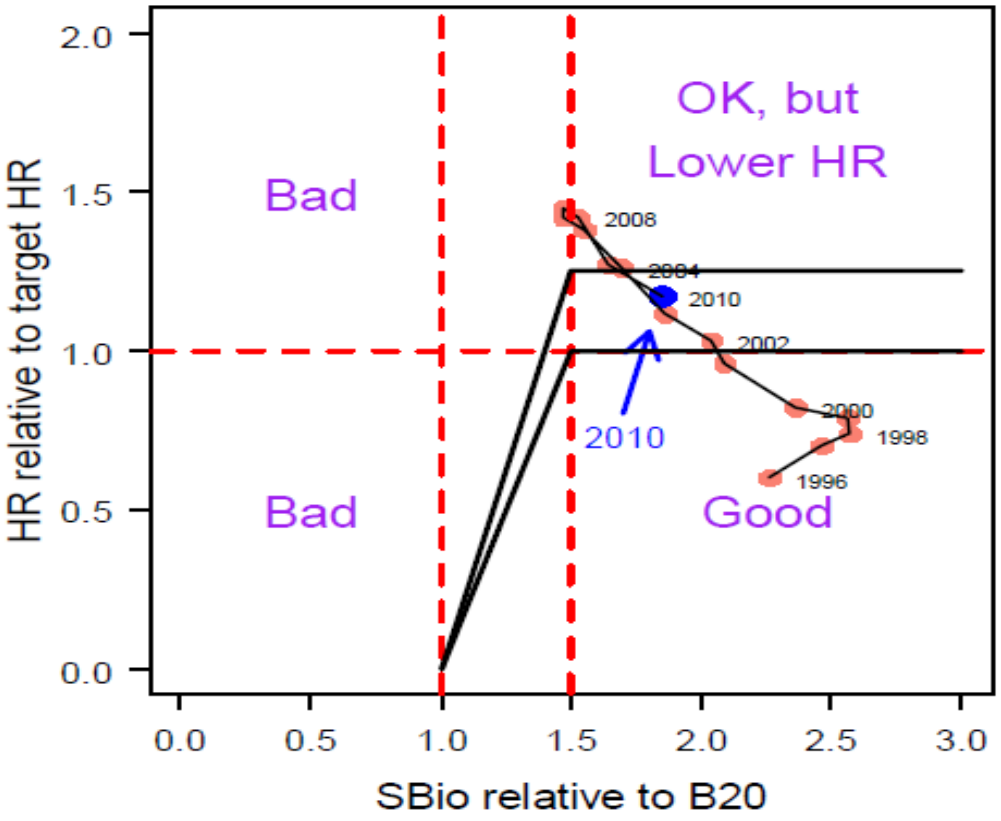

Figure 12. Trend and status of halibut management relative to reference points. Horizontal axis indicates female spawning biomass (SBio) relative to B_{20} (value of 1.0) and B_{30} (value of 1.5). Vertical axis illustrates realized harvest rate relative to a target harvest rate of 0.20 (value of 1.0) and the previous target harvest rates of 0.25 (value of 1.25). (http://www.iphc.washington.edu/papers/sa10.pdf).

The harvest rate over the past decade for halibut has generally been 0.20. Exceptions include a briefly increased rate to 0.225 and 0.25 between 2004 and 2006, and a lower rate of 0.15 in Areas 4B and 4CDE. On a coastwide basis, however, recent realized harvest rates have hovered around 0.25. A sizable portion of this above-target harvest rate comes from the retrospective revision of exploitable biomass estimates.

Thus, while the intended rate has been around 0.20, with catch limits based on such a rate, a retrospective revision of exploitable biomass, when combined with unchanged estimates of total removals generates higher realized harvest rates. Another portion of the above target performance results from the SUFD adjustment which prevents catch limits dropping fully to the target level indicated by contemporary estimates of exploitable biomass (http://www.iphc.washington.edu/papers/sa10.pdf).

6.1.4	The IPHC CHR harvest policy is to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% of the unfished level (threshold level). The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% of the unfished level (limit level). This combination of harvest rate and precautionary levels of biomass protection have, in simulation studies, provided a large fraction of maximum available yield while minimizing risk to the spawning biomass, as well as being very effective in returning the spawning biomass to at least the threshold in a short time without greatly affecting yield. With this model, a sharp decrease in harvest starts at the threshold level (B30) and harvest stops completely at the spawning biomass limit level (B20). See also references for section 6.1.1.

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.

7.1.1 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 Criteria 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 behavior have been recognized long ago (Larkin, 1972; Gulland, 1983) (http://www.fao.org/docrep/003/w1238E/W1238E03.htm). The staff and the Commission have been concerned that the Commission's Slow Up - Fast Down (SUFD) harvest policy adjustments have not achieved target harvest rate goals in the face of continued stock declines, decreases in halibut growth rate, and the history of high exploitation rates for some areas in recent years. The staff therefore recommends that the SUFD policy be modified to a Slow Up - Full Down (SUFullD) policy, to achieve the necessary reductions in harvest rate and promote increases in exploitable biomass. That is, staff recommendations would incorporate the existing policy of a 33% increase from previous year's catch limits when stock yields are projected to increase but use a 100% decrease in recommended catch, when stock yields are projected to decrease." The SUFullD was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it (http://www.iphc.washington.edu/news-releases/news-releases-2010.html). A central problem for both fishery scientists and managers is to deal with uncertainty. The IPHC completed its Eighty-seventh Annual Meeting in Victoria, B.C., with Dr. Laura J. Richards of Nanaimo B.C. presiding as Chair. The Commission staff reported on the 2010 Pacific halibut stock assessment, comprised of a coastwide estimation of biomass with apportionment to regulatory area biomass based on the data from the annual Commission standardized stock assessment survey. The Commission staff expressed concerns over continued declining catch rates in most areas and recommended aggressive action to reduce harvests. In particular, staff recommended that the

	Commission shift its harvest control rule to implement the full reductions in catch limits identified by the stock assessment, rather than the partial (50%) reductions used in previous years. The decline of the stock due to both natural declines in recruitment, lower growth rates, and higher than target harvest rates in most areas has motivated this change in the harvest recommendations. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas. By adopting conservative approaches in setting Total Allowable Catches, staff of the IPHC follows the precautionary approach in establishing sustainable harvest removals. Staff carefully works to safeguard both the fishermen's livelihood and the ecosystem's biodiversity. The Pacific halibut fishery is an industrialized fishery with a long term management system in place, pursued by a highly regulated fleet that is subjected to well defined fishery data collection systems, etc. The fishery operates under an Individual Fishing Quota (or Individual Vessel Quota) system, with conservatively defined catch quotas, gear restrictions, size limits, and closed seasons and areas. IPHC staff use biological reference points, the concepts of risk and reversibility of changes over a specific time span, and a requirement to take account of the state of available knowledge in assessing risks and reversibility. (http://www.iphc.washington.edu/papers/HPupdate.pdf ; http://www.iphc. washington.edu/).
7.1.1	The professional staff of the IPHC has repeatedly taken a responsible approach to managing halibut resources in light of the absence or paucity of available scientific information. For example, in establishing the 2011 Catch Limit, the staff conducted several analyses in 2010 that have been incorporated into the staff's catch limit recommendations. These included the addition of new Bering Sea survey data into estimation of exploitable biomass, and a statistical analysis resulting in an improved averaging procedure for the survey Weight Per Unit of Effort data used in apportioning the coastwide biomass estimate into regulatory area biomass estimates. At the request of the Commission, the staff also developed a procedure to directly deduct removals of halibut between 26-32 inches from available yield, in the area of occurrence. (http://www.iphc.washington.edu/news-releases/news-releases-2010/146-r20101202.html).

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 Criteria 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 Criteria 7.5.5

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
7.2	The commercial Pacific halibut fishery is well-established in all regards: fishing areas, fishing gear, stock assessment, fishery management, etc. Therefore, there have been no new or exploratory halibut fisheries for many years. As an example of precautionary procedures, the Pacific Halibut Fishery Regulations for 1947, the sixteenth year of regulation, were approved by the Governor General of Canada in Council on March 4, and by the President of the United States on March 17, and became effective on the latter date. They were essentially the same as in 1946, except for a redefinition of the boundary line between Halibut Management Areas 3 and 4, and the setting of a catch limit for the latter area in anticipation of a fishery for halibut developing there. In 1983 Area 4 was subdivided into Area 4 A-D. In 1984 Area 4-E was added, so that there was 4 A-E. Area 4-E was meant to be a test fishery, with short openings to discourage large vessels and provide closures to count up the catch so as to not exceed the target catch limit. The division was made to achieve a distribution of catch that more nearly corresponds to the productivity of the area, and to facilitate nearshore, small boat fisheries for local people. Each subarea was assigned individual catch limits. (http://www.iphc.washington.edu/publications/bulletins/ib0027.pdf; http://www.iphc.washington.edu/publications/annual/ar1983.pdf; http://www.iphc.washington.edu/publications/annual/ar1984.pdf). Additionally, State of Alaska participants in the Commission process are guided by State Regulation 5AAC 39.210, the Management Plan for high impact emerging fisheries requires that those fisheries be closed until an interim management plan and associated regulations are developed. (http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.u

	s/cgi-in/folioisa.dll/aac/query=[JUMP:'5+aac+39!2E210']/doc/{@1}?firsthit) .
7.2.1	From the very first Annual Report produced by the Commission (1947 Report to the International Commission, Number 13), the authors stated that past experience in the regulation of other marine fisheries provided no basis for predicting the effect of regulation upon the halibut fishery and upon the stock of halibut. Thus, it was necessary to proceed carefully, a step at a time, basing each step on previously established facts and justifying it by observation of results before taking the next one. To this end, the Commission established and maintains a system of statistical and biological observations of the changes in the fishery and in the stocks of halibut, and conducts special investigations as the need arises. Therefore, the Pacific halibut fishery in Alaska developed gradually, during which information on the status of the stock and harvest was obtained, in order to assess impacts on the resource (http://www.iphc.washington.edu/publications/scirep/Report0013.pdf).
7.2.2	The Pacific halibut fishery has been managed through a precautionary approach for over seventy years. Effort in developing an extensive institutional framework necessary to studying and managing this resource began with the adoption of the halibut convention between the Governments of the United States and Canada in 1923. In fulfilment of its duty, the Commission engaged a staff and began practical scientific investigations of the life of the halibut, of the supply of halibut and of the fishery. Control of the rate of removal, or the, amount of fishing on each stock, was made possible by amendments in the Treaties of 1930 and 1937, which authorized the division of the coast into areas and the limitation of the catch in each area (http://www.iphc.washington.edu/ publications/scirep/Report0013.pdf). In 1932 IPHC began quota management by setting annual catch limits. (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm).
7.2.3	From the earliest years of operation, for purposes directly or indirectly connected with the administration of the regulations, the Commission has required halibut boats of five net tons or over to be licensed, to keep accurate log records of their fishing operations and to make statistical returns regarding the amount and area of origin of their catches. It has made the validity of those licenses contingent upon compliance with the statistical and other provisions of the regulations. It has also required halibut dealers to keep accurate records of their purchases' of halibut and to make these available to the Commission. (http://www.iphc.washington.edu/publications/scirep/Report0013.pdf).
7.2.4	With the adoption of regulations in 1930, the Commission developed contingency plans to address changes to the health of the resource. Regulations allowed specific area closures when catch limits were reached, or to preserve areas with populations of small fish, where no fishing was allowed, in addition to the standard winter fishery closure in all areas. Beginning in 1937, halibut bycatch provisions were adopted for the North Pacific groundfish fisheries. Today, staff of the IPHC is fully aware and responsive to adverse environmental changes or other phenomena adversely affecting the resource. Actions taken by IPHC for the 2011 fishery follow staff recommendations that the

	Commission shift its harvest control rule to implement the full reductions in catch limits identified by the stock assessment, rather than the partial (50%) reductions used in previous years. The decline of the stock due to both natural declines in recruitment, lower growth rates, and higher than target harvest rates in most areas has motivated this change in the harvest recommendations. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas. (http://www.iphc.washington.edu/news-releases/159-nr20110131.html). The SUFullD policy was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it (http://www.iphc.washington.edu/news releases/news-releases-2010.html).

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 7.1.1 /7.4.1/29.2/29.4

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
8.1	The IPHC retains very qualified and experienced managers, researchers, and technicians to manage the Pacific halibut resources under their authority. Nearly all of the research done by the staff is directed toward one of three continuing objectives of the Commission: • Improving the annual stock assessment and quota recommendations based on the Harvest Control Rule – Constant Harvest Rate to determine available yield (CEY); • Developing information on current management issues; and • Adding to knowledge of the biology and life history of halibut. In each of these areas the routine work program applies the best information and methods available, and research program aims to improve the information and methods by answering the most important outstanding questions. For the commercial sector, the Pacific halibut fishery is an industrialized fishery with a long term management system in place, pursued by a highly regulated fleet that is subjected to well defined fishery data collection systems. The fishery operates under an Individual Fishing Quota (USA 1995), or Individual Vessel Quota (Canada 1991) system, with conservatively defined catch quotas, gear restrictions, size limits, and closed seasons and areas. IPHC staff utilizes biological reference points, the concepts of risk and reversibility of changes over a specific time span, and a requirement to take account of the state of available knowledge in assessing risks and reversibility. They account for the effects of harvesting on the population being harvested and conduct studies on the occurrence of seabirds and estimate on bycatch during the yearly performed setline

	surveys**.** For the recreational sector, including the charter sport fishery, the Commission recognizes that U.S. agencies wish to adhere to domestic allocation limits but effective controls remain to be implemented through a Catch Sharing Plan (CSP) in 2012. Noting that the CSP for IPHC Area 2C fisheries is not yet approved, the Commission recommends regulatory action designed to restrict charter harvest of halibut in IPHC Area 2C to the Guideline Harvest Level approved by the NPFMC. The IPHC recommends continuation of a one-fish daily bag limit with an additional restriction that the retained fish must be no larger than 37 inches (total length) and a requirement to retain the frame until landing, if halibut are legally filleted at sea. Reduced bag limits and increased legal size restrictions are evidence of measures applied to ensure sustainable utilization by the charter fleet in response to the inability to meet harvest caps imposed on that fishery, reflecting application of the precautionary principle in management. Traditional (subsistence) removals are documented through Department of Fish and Game, Division of Subsistence surveys of Subsistence Halibut Registration Certificate (SHARC) holders by a voluntary postal survey. http://www.iphc.washington.edu/news-releases/159-nr20110131.html http://www.adfg.alaska.gov/index.cfm?adfg=prolicenses.sportfishguides
8.1.1	The IPHC has continually worked to produce a fishery that promotes optimum utilization of the resource. Nearly all of the research done by the staff is directed toward one of three continuing objectives of the Commission. These are improving the annual stock assessment and quota recommendations, developing information on current management issues, and adding to knowledge of the biology and life history of halibut. Management of the fishery is based upon this, and other research. The fishery continues to harvest only those fish surplus to sustaining reproductive capacity. (http://www.iphc.washington.edu/publications/rara/2010/2010.7.Reviewof2010ProjectsandProposalsfor2011.pdf). Under the IFQ fishery, the fishery proceeds at a slower pace than under the derby fishery scenario seen prior to IFQ implementation. This program results in less waste and greater economic output given the value of fresh fish markets which increased optimum utilization [See Grafton, R. Quentin, Dale Squires, and Kevin J. Fox. 2000. Private Property and Economic Efficiency: A Study of A Common-Pool Resource. *Journal of Law & Economics* 43(October): 679–713.; or Casey et al (1995); Branch and Hilborn in several of their papers; and Dr. Matulich (WSU) in several presentations to the NPFMC (http://ageconsearch.umn.edu/bitstream/28221/1/18020149.pdf). See also http://www. perc.org/articles/article412.php. As participants in the process, state biologists are also guided by mandate in the Alaska constitution, specifically Article VIII, Section 4. It states: “Sustained Yield; Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.”

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 Criteria 7.1.2 Others 7.1.6

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
8.2	There is a solid, international (government to government) dimension to Pacific halibut resource management. The Halibut Treaty between USA and Canada has been specifically created to allow engagement between the two regions and the IPHC is an international body (not federal) which engages both US (NPFMC and PFMC) and Canadian (DFO) management systems. This allows for country to country cooperation, reflecting the public/stakeholder oriented nature of the IPHC management system. IPHC holds annual public meetings to discuss regulatory and catch limit proposals of interest to multiple user groups (traditional, sport, and commercial who have a legitimate interest in the use and management of this fishery resource). This year was the eighty-seventh such meeting. The Commission encourages public participation in the management of the resource and regularly seeks advice from the Conference Board, the Processor Advisory Group (PAG), and various State and Federal agencies. At this annual meeting the budgets, research plans, biomass estimates, catch recommendations, as well as regulatory proposals are discussed and approved, then forwarded to the respective governments for implementation. (http://www.iphc.washington.edu/about-iphc.html).
8.2.1	Annual meetings allow these parties to consult and collaborate on regulatory and catch limit proposals for commercial, recreational, and subsistence purposes. These meetings are publicly noticed, and held in Seattle, WA and Vancouver, BC Canada to allow increased accessibility. The IPHC also accepts timely written proposals and comments for those unable to attend or participate in person. IPHC final deliberations are conducted in closed sessions, in contrast to the NPFMC where everything is open to the public. (http://www.iphc.washington.edu/about-iphc.html).

Clause:

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

FAO Main Criteria 7.6.1

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
8.3	The Pacific halibut fishery operates on a form of marine tenure — where individuals or groups of fishermen are guaranteed a specific share of future catch — for users, that reconciles their economic interest with long-term conservation, eliminates the race-for-

	fish, and reduces or eliminates incentives for overcapitalization of fishing fleets. The most broadly used form of marine tenure is individual quotas in which a specific portion of the total catch is allocated to individuals or vessels. Individual Transferable Quotas (ITQs), under which individuals can catch and/or sell their right to catch a portion of the total allowable catch, have now been implemented in New Zealand, Australia, Iceland and several specific fisheries within the U.S. and Canada. Pacific halibut are fished under an ITQ system in British Columbia, Canada, and under Individual Fishery Quotas (IFQs) in US fisheries. ITQs/IFQs provide incentives to reduce fishing capacity to a level appropriate for productive capacity of the resource and to concentrate on minimizing costs and maximizing value of the catch, since the total catch is determined by a science-based public process (NRC 1999a). Hilborn, R. 2004. Ecosystem-based fisheries management: the carrot or the stick? Marine Ecology-Progress Series 274:275-278. (http://www.fish.washington.edu/people/rayh/publications.html). The IPHC raises or lowers Catch Limits based upon the current state of the fishery resource. For example, during their 2011 meeting staff recommended that the Commission shift its harvest control rule to implement the full reductions in catch limits identified by the stock assessment, rather than the partial (50%) reductions used in previous years. The decline of the stock due to both natural declines in recruitment, lower growth rates, and higher than target harvest rates in most areas has motivated this change in the harvest recommendations. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas http://www.iphc.washington.edu/news-releases.html. The SUFullD was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it. (http://www.iphc.washington.edu/news-releases/news-releases-2010.html).

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 Criteria 7.6.9 Other 30

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
8.4	Regulations in place address waste, discard, bycatch, and endangered species interactions in the halibut fisheries. The IPHC, the National Marine Fisheries Service, and the Alaska Department of Fish and Game promulgate these regulations through the Commission, NPFMC, and the Alaska Board of Fisheries. Discards are accounted for directly and indirectly by the IPHC in setting yearly Catch Limit for the different regulatory areas. (http://www.iphc.washington.edu/publications/rara/2010/ 2010.51.Wastageofhalibutinthecommercialhalibutfishery.pdf). Halibut long-line fisheries can be highly selective depending on the area they are fishing. In the directed longline fisheries for Pacific halibut, bycatch of other fish species is not very well documented. Setline surveys operated by IPHC collect information on bycatch of non halibut species, which are used as proxy to calculate bycatch in the halibut fleet, distinctively for each regulatory area. Halibut bycatch in the groundfish fisheries of Alaska is recorded by the NMFS operated observer program, which currently observes 86%-88% of the Bering Sea fisheries. 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.

Management actions are in place in respect to increasing knowledge on the bycatch dynamics of the directed halibut longline (please see section 4.2. on restructuring the observer program and related bycatch implications). Bycatch of seabirds were addressed by specific regulations that were put in place that 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 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 Board of Fisheries 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, lineshooters and lining tubes. These measures have been shown to reduce seabird interactions when setting or retrieving gear. The IPHC also conducts bird bycatch research and collects multi-agency observations on seabird distribution. (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm).

Yelloweye rockfish (*S. ruberrimus*) are also taken in the GOA halibut fishery as bycatch. The Alaska Longline Fishermen's Association has secured funding through the Oak Foundation and the Alaska Marine Conservation Council to develop a real-time rockfish bycatch reporting network for the Eastern GOA. Preliminary funding has allowed for development of charts that indicate halibut and blackcod survey stations with high rockfish bycatch rates. Future funding is being pursued to allow full implementation of bycatch reporting network resulting in real-time identification of bycatch hotspots, allowing fishermen to set in areas that are less likely to have high rockfish bycatch (http://www.alfafish.org/Rockfish-Bycatch-Reporting-Network.shtml).

Although marine mammals are known to interact with halibut longline gear, bycatch is virtually non-existent. Whales and otariids (sea lions and fur seals) may selectively eat hooked groundfish species such as Greenland turbot, Pacific halibut, sablefish, or Pacific cod directly from the longline gear before the line is retrieved by the vessel. In such instances there would be only empty hooks as the line is retrieved over the roller and into the vessel.

A recent NMFS report on marine mammals interaction in the groundfish fisheries recounts that no Steller sea lion (eastern and western stock) were accidentally by-caught by the halibut commercial longline fishery between 2000 and 2004. No other otariids species were documented in the report. In the same, were documented between 1998 and 2004: 82 fishing days where Killer whales had predatory interactions (plucking fish from hooks) with the BSAI halibut longline fishery; and 17 fishing days where Sperm whales had predatory interactions with the GOA halibut fishery. (http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-167.pdf).

	Decreasing encounters with bycatch species is knowledge-based, i.e. the harvesters must have knowledge of the distribution and/or behavior of the species in order to avoid encounters. This knowledge can be gained through both personal and collective experience. For example, in Alaska this collective experience is employed in a formalized way through a cooperative agreement among some harvesters, conducted by the industry group Groundfish Forum. In the program called Sea State, observers aboard these trawl vessels estimate catch and bycatch. These data are submitted electronically to a centralized repository, where they are checked and extrapolated to include unsampled hauls. Vessel-specific bycatch rates are faxed to participating vessels within 24 h. Similarly, the IPHC has analyzed halibut size frequency data obtained by observers on Bering Sea trawlers to identify areas of consistently high abundance of juvenile size classes of halibut. These data sources provide knowledge that allows harvesters to avoid areas of high halibut abundance, thereby minimizing the rate at which the Protected Species Catch (PSC) caps are approached and allowing greater harvest of the target species. See: http://spo.nmfs.noaa.gov/mfr662/mfr6624.pdf.
8.4.1	The commercial halibut fishery is limited to retention of fish 32 inches or greater in length. Biologically, and for continued sustainability, this is the preferred portion of the spawning population available for harvest. For 2011, the IPHC has proposed regulations for the sport charter halibut fleet in Area 2C that would limit retention to fish that were 37 inches or greater in length. This limits harvest to fall within established caps. (http://www.fakr.noaa.gov/sustainablefisheries/halibut/charter/factsheet_iphcrec.pdf). Fishing gear is regulated to longline gear only, by regulation. (http://www.iphc.washington.edu/publications/regs/2010iphcregs.pdf). Seasons are established in regulation by the IPHC to protect halibut stocks during the winter spawning migration. Open and closed periods, as well as fishing period limits are set in regulation. General spawning areas have been mapped in Alaska. Pacific halibut spawn from November to the end of March, peaking between the last week of December and the third week of January. The halibut fishery is closed during peak spawning times, by regulation. Spawning occurs all along the coast but varies in intensity with location (http://www.iphc.washington.edu/publications/scirep/SciReport0070.pdf). Regulations are in placed to address discards. They state: “All halibut that are caught and are not retained shall be immediately released outboard of the roller and returned to the sea with a minimum of injury by (a) hook straightening; (b) cutting the gangion near the hook; or (c) carefully removing the hook by twisting it from the halibut with a gaff. Except that paragraph (1) shall not prohibit the possession of halibut on board a vessel that has been brought aboard to be measured to determine if the minimum size limit of the halibut is met and, if sublegal-sized, is promptly returned to the sea with a minimum of injury by using careful release techniques”. (http://www.iphc.washington.edu/publications/regs/2010iphcregs.pdf ; http://www.iphc.washington.edu/publications/rara/2010/2010.413.Priorhookinjuriesresultsfromthe2010IPHCSSAandNMFStrawlsurvey.pdf).

	The NPFMC has established Marine Protected Areas that benefit juvenile fish and adult spawners. Beginning in 1967, the IPHC designated IPHC Regulatory Area 4E (Bristol Bay) as a halibut nursery area and prohibited all fishing for halibut year-round within the area (IPHC, 1968). The Halibut Longline Closure Area is 36,300 square miles in size. Additional trawl closures for areas in the waters of Bristol Bay provide some degree of refuge for juvenile halibut. (http://www.fakr.noaa.gov/npfmc/sci_papers/mfr_witherell_MPAs.pdf).
8.4.2	Current regulations describe and limit gear type. Longline gear and the manner of fishing have been developed over a long period of time to be selective of target species. Under the IFQ system in place in Alaska, much less gear is deployed and consequently lost than in the historical race for fish scenario. Prior to IFQs, the short season forced the fishers into the same prime areas at the same time, resulting in damaged and lost fishing gear and "ghost fishing," in which lost fishing gear continued to catch fish. From six days in 1990, the season has now been lengthened to 245 days. With the longer season, vessels no longer conflict with one another, thereby preventing substantial losses of gear and fish each season. The annual setline survey by IPHC continues to evaluate gear efficiency. **Table 7** below shows an estimates of legal-sized or O32 Pacific halibut, in thousands of pounds, killed by lost or abandoned longline gear in the commercial halibut fishery by IPHC Regulatory Area, 1985 -2010. (http://www.iphc.washington.edu/publications/rara2010/2010.51.Wastageofhalibutinthecommercialhalibutfishery.pdf).

	Regulatory Area						
Year	2A	2B	2C	3A	3B	4	Total
1985	n/a	n/a	n/a	n/a	n/a	n/a	1,600
1986	n/a	n/a	n/a	n/a	n/a	n/a	3,200
1987	3	173	368	1,580	341	257	2,722
1988	<1	49	206	1,506	122	69	1,952
1989	7	46	193	1,458	194	130	2,029
1990	15	117	327	1,110	216	238	2,023
1991	2	72	347	1,143	418	245	2,227
1992	7	53	245	643	181	126	1,255
1993	9	96	192	341	63	113	814
1994	1	69	228	845	39	107	1,289
1995	3	39	54	128	9	24	257
1996	1	29	44	177	22	74	347
1997	6	37	40	74	54	79	290
1998	1	53	41	154	56	54	359
1999	7	40	67	117	71	93	395
2000	7	28	38	59	58	69	257
2001	3	46	37	65	32	88	246
2002	5	36	26	139	34	51	290
2003	2	35	25	68	35	49	214
2004	0	36	31	76	15	40	199
2005	5	37	32	156	26	31	287
2006	2	36	21	51	11	18	139
2007	3	29	29	53	18	24	152
2008	<1	22	12	61	4	33	133
2009	1	20	10	44	21	34	131
2010[1]	1	19	9	20	10	23	82

[1]Preliminary as of Nov 10.

	Under the old system, vessel owners felt compelled to fish regardless of weather conditions, because the loss of even a day of fishing could make the difference between profit and loss for the season. The end of the short fishing seasons has greatly enhanced the safety of the fishers. Also, the longer fishing season has enabled fishers to sell higher quality and fresher fish. Prior to IFQs, only about half the catch could be sold as fresh fish, which are more valuable; now nearly all of it is sold fresh. The result has been better product for consumers and higher profits for producers. The partial transferability of the IFQs added to the benefits of the system. For example, the number of vessels has been reduced, because smaller, less efficient fishers have sold or leased their licenses to more efficient operators. This has decreased capital costs and reduced total crew in the fleet. Similarly, average vessel size has risen, increasing the safety of the crews. Perhaps most importantly, transferability gets the quotas into the hands of the "highliners," the skippers who are best at finding the fish and harvesting them in the most efficient way (http://www.perc.org/articles/article412.php). Federal gear regulation: Only one gear type may be used to harvest halibut in the GOA and BSAI – benthic longline (a passive gear type). All longline fishing gear must be marked and operated in accordance with federal fisheries regulations – 50 CFR Part 679: Fisheries of the Exclusive Economic Zone Off Alaska. In 1983, industry made the operational switch from J to circle hooks in the commercial fishery, lowering the mortality of undersized halibut caught and released during commercial fishing. (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm). (*note*: CFR = Code of Federal Regulations) 50CFR679.24: www.fakr.noaa.gov/regs/default.htm.

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 7.1.8 /7.6.3

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	**Evidence**
9.1	Under the individual fishing quota share system in place for the Pacific halibut fishery, fishing capacity (vessels and gear) has been reduced. Through a public process at the NPFMC during the early 1990s, extensive NEPA analysis was presented, analyzed, and data confirmed to ensure that the proposed level of fishing was commensurate with the sustainable use of the fishery resource. IFQs in the Alaska fishery are separated into vessel categories, which address operation type (fishing, fishing/processing) and vessel length (categories A through D) (http://alaskafisheries. noaa.gov/regs/679d40.pdf). Leasing options and owner onboard provisions were built into regulation. These provisions provide ownership and resource responsibility (http://www.fakr.noaa.gov/ram/ifq.htm). Implementation was made under Amendment 15 to the BSAI Groundfish Management Plan, and Amendment 20 to the GOA Groundfish Management Plan. (http://alaskafisheries.noaa.gov/frules/fr59375.pdf).
9.1.1	As noted in 9.1, 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 qualifications for a fishing fleet with less capacity and with ownership in the resource. With carefully established Catch Limits, 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 enforcement is in place.

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 Criteria 7.6.10 Others 7.4.3

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
9.2	Management areas in Alaska with indications of stock depletion are subject to appropriate regulatory changes in seasonal Catch Limits or trip catch limits. This has been the approach taken by IPHC staff in the past, and was utilized again at the 2011 annual meeting. The Commission staff expressed concerns over continued declining catch rates in most areas and recommended aggressive action to reduce harvests. In particular, staff recommended that the Commission shift its harvest control rule to implement the full reductions in catch limits identified by the stock assessment, rather than the partial (50%) reductions used in previous years. The decline of the stock due to both natural declines in recruitment, lower growth rates, and higher than target harvest rates in most areas has motivated this change in the harvest recommendations. Catch limits adopted for 2011 were lower in the central regions of the stock (IPHC Areas 2C and 3) but significant recent reductions in catch limits for IPHC Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas. (http://www.iphc.washington.edu/news-releases/159-nr20110131.html). The SUFullD policy was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it. (http://www.iphc.washington.edu/news-releases/news-releases-2010.html)

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 Criteria 7.6.6

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Clause:	**Evidence**
9.3	This customary and traditional use of Pacific halibut in Alaska was utilized in the development of subsistence regulations in federal law. (http://www.fakr.noaa.gov/ram/subsistence/halibut.htm). In Alaska, by Alaska statute (AS 16.05.258), subsistence takes priority over other fishery uses. The fishery is open to Alaskans who have customary and traditional uses

	of halibut, including residents of 117 rural coastal communities and members of 120 coastal tribes. The fishery allows up to 30 hooks per fisherman, and a daily bag limit of 20 halibut per fisherman. (http://subsistmgtinfo.org/hal.htm ; http://www.adfg.alaska.gov/index.cfm?adfg= subsistence. main). Participation by coastal residents in commercial fisheries was safeguarded by awarding fishing privileges to qualified individuals under the development of the IFQ fishery by the NPFMC. In 2004, 13 years after program implementation, the Council created the Community Quota Entity (CQE) program, which authorizes non-profit organizations to purchase and use annual IFQ for a council-approved list of 42 communities, including Old Harbor, Craig, and Sand Point (Smith, 2004). (http://www.edf.org/documents/11391_alaska-ifq.pdf). In 1995, initial halibut Community Development Quota CDQ was issued to communities coincident with the issuance of IFQ to commercial halibut fishermen under the NPFMC motion to adopt an IFQ program. The CDQ and IFQ allocations were done under federal regulations. In 2006, the MSFCMA was amended to establish the Western Alaska CDQ Program. The CDQ program allocates a percentage of all BSAI quotas for groundfish, prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to: (i) provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the BSAI Management Area; (ii) support economic development in western Alaska; (iii) alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska. (http://alaskafisheries.noaa.gov/cdq/cdq_msa_section305i1.pdf).

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 Criteria 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 derby fishery and therefore reduced wastage of halibut in the fishery (http://www.edf.org/documents/11391_alaska-ifq.pdf ; http://www.iser.uaa.alaska.edu/Projects/ifqsurv/discards.pdf). In 1983, industry made the operational switch from J-hooks to circle hooks in the commercial fishery, lowering the mortality of undersized halibut caught and released during commercial fishing. (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm).

Discards of Pacific halibut, considered a Prohibited Species Catch by the groundfish fisheries in Alaska, is regulated. When PSC limits are reached, closures result. By-catches of all prohibited species are managed by fleet-wide caps that are allocated between fishing targets and often apportioned seasonally. Seasonal allocations are based on industry recommendations which are designed to ensure that fishing effort is spread out over the year and to take advantage of seasonal opportunities for fishing with reduced halibut and crab bycatch (Witherell and Pautzke 1997). The NMFS has recently been experimenting the value in using electronic monitoring to quantify discards at sea. Please see http://www.fakr.noaa.gov/sustainablefisheries/efp/efp08-01_halibutdiscards_rpt.pdf.

The IPHC has conducted studies on discard mortalities. The recent introduction of fishery cooperatives in the Alaska groundfish fisheries and attendant allocation of bycatch to the cooperatives potentially provides opportunity to improve handling and therefore survival of discarded halibut (http://www.iphc.washington.edu/publications/rara/2009/413.pdf).

Research has shown that the groundfish trawl industry in Alaska can deploy halibut excluders in their gear with success. The bycatch reduction device was formally tested by an industry trade association in conjunction with a NMFS fishing gear researcher under an Experimental Fishing Permit in 1998, and the excluders have been improved over the years. Results from the experiment showed the device excluded 94% of the halibut while only releasing 38% of the target flatfish when deployed in the Bering Sea.

Linear simulations of the fishery were developed to estimate the potential benefit of the grate. Results indicated that fleet-wide use of the grate would result in a 171% increase in the duration of the fishery, a 61% increase in target flatfish catch, and a 71% reduction in overall halibut bycatch. In the GOA, the result of this collaborative effort between the NMFS and the fishing industry concluded that vessel tows with the excluder had 57% less halibut bycatch by weight on average than tows without the excluder. The Bering Sea excluder design could not be fished on GOA boats, which are generally smaller and lack the deck space necessary to accommodate the Bering Sea model (http://www.marineconservationalliance.org/wp-content/uploads/2010/07/SeaFacts-2-Halibut-Excluder.pdf ; http://www.st.nmfs.noaa.gov/st5/documents/The_effectiveness_of_a_halibut_excluder_device_and_consideration_of_tradeoffs_in_its_application.pdf).

The halibut excluder efforts by the flatfish fleet were rewarded when on June 1, 2010, all major flatfish fisheries off Alaska were certified under the Marine Stewardship Council (MSC) environmental standard for sustainable and well-managed fisheries. The certification applies to flathead sole, arrowtooth flounder, rex sole, northern rock sole; and southern rock sole trawl fisheries in designated areas in the GOA and BSAI.

The mortality due to sublegal bycatch is now incorporated into the population model that is used to evaluate alternative exploitation rates. (http://www.iphc.washington.edu/papers/bycatch.accounting.pdf).

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 Criteria 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 derby fishery mentality that had forced vessels out fishing during storms and competing on crowded fishing grounds with IFQs fisherman, as well as the amount of gear deployed and lost during the fishery. (http://www.edf.org/documents/11391_alaska-ifq.pdf and http://www.iser.uaa.alaska.edu/Projects/ifqsurv/discards.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 and net gears (http://swfsc.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFSC-154_P1216.PDF).

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 Criteria 8.5.1

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
9.6	Longline gear has been in use for the duration of the fishery, and has proven efficient. Under the highly regulated IFQ fishery, as seen in Alaska, waste, discards, and bycatch have been reduced. (http://www.iser.uaa.alaska.edu/Projects/ifqsurv/discards.pdf). The commercial halibut fishery switched from J-hooks to circle hooks in 1983, lowering the mortality of undersized halibut caught and released during commercial fishing (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm). See also 8.5.1 for additional regulatory information on seabird protections.
9.6.1	Under the guidance of the IPHC, the public may participate fully in the annual meeting process, where reports on current research and Catch Limit setting discussions occur. This can be done in person, or through electronic means. The IPHC makes available all regulatory notices, developments, and requirements through electronic and paper sources. Regulations specifically define legal gear. These have not been circumvented with regard to technical devices in the IFQ Pacific halibut fishery.

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 Criteria 8.5.4

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
9.7	The Commission operates under an international agreement between the governments of Canada and the United States. Cooperation with provincial, state and federal fisheries agencies is crucial to the mission of the IPHC. Meetings, held annually, provide ample opportunity for the sharing of gear research and technology. Cooperative research examples also continue with other long-standing projects in 2011. These include the collaborative work on contaminants in halibut with ADEC, placement of IPHC staff on the NMFS summer trawl surveys, and the undergraduate internship program. Cooperative projects continue with WDFW and ODFW to provide data on bycatch species on the setline surveys. Cooperative data collection continued on the assessment surveys in 2010. The annual IPHC setline survey from Oregon to the Aleutian Islands and into the Bering Sea has IPHC staff on board charter survey vessels where, among other things, they continue to assess catchability of the gear. On the IPHC Area 2B survey, staff worked with the Canadian Department of Fisheries and Oceans (DFO) to provide a third biologist on survey vessels to collect hook by hook occupancy information for all species, and otoliths, maturities, and lengths for rockfish (except thornyheads). Cooperative work with ADFG resulted in the collection of whole-haul catch data for yelloweye rockfish from survey vessels operating in the Fairweather survey region of IPHC Area 3A and in the Sitka, Ommaney and Ketchikan charter regions of IPHC Area 2C. (http://www.iphc.washington.edu/publications/rara/2010/2010.7. Review of2010ProjectsandProposalsfor2011.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 Criteria 8.5.3/12.10

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
9.8	See section 9.7. Cooperation occurs among states, resource agencies, universities, and governments. Cooperative data collection continued on the assessment surveys in 2010 with fisheries staff from both Washington and Oregon. Collaborative work continues on contaminants in halibut with ADEC, placement of IPHC staff on the NMFS summer trawl

	surveys, and the undergraduate internship program. Cooperative projects with WDFW and ODFW to provide data on bycatch species on the setline surveys in IPHC Area 2A will continue, as will efforts with DFO in IPHC Area 2B, and in IPHC Areas 2C/3A with ADFG.

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 Criteria 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 halibut population remains exceptionally 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 halibut in the area and are likewise unlikely to affect halibut fishing.

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 Criteria 8.1.7

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

Clause:	Evidence
10.1	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, & Watchkeeping). 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.

Any halibut aspirant fisherman must have 150 days of halibut fishing experience before being able to purchase halibut IFQs. Besides eligible community nonprofit organizations in the GOA Community Purchase Program, and except in a few uncommon circumstances, eligibility to receive catcher vessel QS by transfer is restricted to those persons who received QS by initial issuance and those individuals who can demonstrate they have served as a member of the harvesting crew in any U.S. fishery for no fewer than 150 days. Those individuals are designated as "IFQ Crewmembers" and, upon approval, receive Transfer Eligibility Certificates (TECs) from RAM. (http://www.alaskafisheries.noaa.gov/ram/rtf09.pdf).

	Also, obtaining halibut IFQ share most often will require the purchaser (aspirant halibut 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 deck hand level working their way up. The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional halibut crew members must pass. Training ranges from firefighting on a vessel, damage control, man-overboard, MARPOL, etc., - http://www.npfvoa.org/. ***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/

Clause: **10.2**	**States, with the assistance of relevant international organizations, shall endeavor to ensure through education and training that all those engaged in fishing operations be given information on the most important provisions of the 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 Criteria 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. MSFCMA), 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 become very familiar with the Code.

	The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional halibut crew members must pass. Training ranges from firefighting on a vessel, damage control, man-overboard, MARPOL, etc., - http://www.npfvoa.org/. ***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 Criteria 8.2.4

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
10.3	Only one gear type may be used to harvest halibut in the GOA and BSAI – benthic longline (a passive gear type). All longline fishing gear must be marked and operated in accordance with federal fisheries regulations – 50 CFR Part 679: Fisheries of the Exclusive Economic Zone Off Alaska. (*note*: CFR = Code of Federal Regulations) ***sources of evidence –*** - 50CFR679.24: www.fakr.noaa.gov/regs/default.htm

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 Criteria* 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 fish) and the Individual Fishing Quota (IFQ) program, which, among other benefits, has been reduced unwanted catch and discards. Bycatch of non-target fish species (rockfish, skates, & sharks) in the directed halibut fishery has been not as well reported as it could be. However, during 2010, a multi-agency working group comprising the staffs of IPHC, NMFS, NPFMC and ADFG crafted a plan to address this, and presented it to IPHC at the Commission's January 2011 meeting. The plan will be tested and adjusted in 2011-2012, at implemented fleet-wide in 2013. In IPHC Area 2C (southeast Alaska), since 2004, full retention of all “benthic shelf rockfish” (DSR, predominantly yelloweye rockfish, *Sebastes ruberrimus*) is mandatory. There is very little interaction between halibut harvesting and marine mammals. Interaction with pinnipeds is said to be virtually non-existent. Whales and otariids (sea lions and fur seals) may selectively eat hooked groundfish species such as Greenland turbot, Pacific halibut, sablefish, or Pacific cod directly from the longline gear before the line is retrieved by the vessel. In such instances there would be only empty hooks as the line is retrieved over the roller and into the vessel. A recent NMFS report on marine mammals interaction in the groundfish fisheries recounts that no Steller sea lion (eastern and western stock) were accidentally by-caught by the halibut commercial longline fishery between 2000 and 2004. No other otariids species were documented in the report. In the same document were listed between 1998 and 2004: 82 fishing days where Killer whales had predatory interactions (plucking fish from hooks) with the BSAI halibut longline fishery; and 17 fishing days where Sperm whales had predatory interactions with the GOA halibut fishery. Whale interactions are unpleasant for the fishermen, but there have been no reports of harm to the whales. NMFS and NPFMC encourage the use of fishing practices which reduce those interactions, such as avoiding distinctive engine and machinery noise that attracts them.

	Interactions with seabirds has been (and still is) the subject of regulation by NMFS, with strong collaboration with industry. The use of streamer lines (scare lines) is mandatory. There have been no recent reports of interaction between the halibut fishery and the endangered short-tailed albatross. ***sources of evidence –*** - IFQs: www.fakr.noaa.gov/ram/ifq.htm - Seabird Avoidance Gear and Methods: www.fakr.noaa.gov/protectedresources/seabirds/guide.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 - IPHC bycatch: Ms. Heather Gilroy, Mr. Greg Williams - http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-167.pdf - DSR full retention: http://www.fakr.noaa.gov/npfmc/fmp/goa/GOA.pdf (page 70)

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 Criteria7.1.7 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 Alaska fisheries laws and regulations, especially 50CFR679. All landings of halibut must be reported to NMFS via its mandatory "e-landings" reporting system. Commercial harvests of pollock, halibut and sablefish are the primary enforcement responsibilities of OLE. The Individual Fishing Quota (IFQ), Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities. Endangered Species Act and Marine Mammal Protection Act priorities include the Steller sea lion and Cook Inlet beluga populations in addition to many other protected resources. Vessel Monitoring is used extensively in Alaska to manage both commercial fishing and the potential jeopardy it may pose to Steller sea lion habitat areas. In Fiscal Year 2008 alone, NOAA Office of Law Enforcement investigated more than 4,800 incidents. In recent years, the OLE has also stepped up its presence in the international scene as more and more fish are imported and exported into and out of the United States. 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. In addition to enforcing legislation for the commercial halibut fishery, OLE has responsibility for enforcement of the crab rationalization program, subsistence halibut fishing and charter halibut fishing. In addition, OLE's officers inspect and cross check at landings and processors records for reconciliation, and closely monitor Prohibited Species

	Catch in non halibut fisheries. Furthermore, the Alaska Wildlife Troopers conduct undercover operations in the sport charter fleet. Fines are high ($10,000) and revocation of sport fishing license as well as sport guide licence for several years (3 years) are occuring penalties (see article at http://deckboss-thebrig.blogspot.com/2010_04_01_archive.html) in this program. ***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 - reporting: www.fakr.noaa.gov/ram/webapps.htm -- scroll down to IFQ Halibut/Sablefish and CDQ Halibut - e-landings: http://elandings.alaska.gov/ - http://www.fakr.noaa.gov/frules/76fr14300.pdf

Clause: **11.2 Fishing vessels shall not be allowed to operate on the resource in question without specific authorization.** ***FAO Main Criteria 7.6.2 Other 8.2.1***	
Evidence adequacy rating: **☑ High** **☐ Medium** **☐ Low**	
Clause:	**Evidence**
11.2	All vessels harvesting halibut must be authorized and permitted to fish, in accordance with federal regulations, 50CFR679. Further, all halibut 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 – Individual Fishing Quota 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 subregional 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 Criteria 8.1.4 Other 7.7.5

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Clause:	Evidence
11.3	There is no legal harvesting of halibut in the Eastern North Pacific waters outside the national jurisdiction of the USA or Canada. Similarly, there is no halibut harvesting by American vessels in Canadian waters, or by Canadian vessels in American waters. Within the American EEZ off Alaska, halibut 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) boardings, protection of National Marine Sanctuaries and various undercover operations. These patrol vessels range in size from a 17' Zodiac to the largest 39' Chris Craft. 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 our cooperation with a variety of other agencies, the U.S. Coast Guard remains the OLE's closest partner in the protection of Federal fisheries. ***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 affect authorization to fish in the event of non-compliance with conservation and management measures.

FAO Main Criteria 7.7.2

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause:	**Evidence**
12.1	50CFR600.740 Enforcement policy; states – **(a)** The Magnuson-Stevens Act 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 Magnuson-Stevens Act 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 Magnuson-Stevens Act. 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 Magnuson-Stevens Act is used in the commission of an offense prohibited by section 307 of the Magnuson-Stevens Act, 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 Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the Magnuson-

	Stevens Act 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. 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, boat seizures and/or imprisonment may be levied by the United States Attorney's Office. ***sources of evidence-*** - 50CFR600.740 Enforcement policy - http://www.nmfs.noaa.gov/ole/investigations.html
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 Criteria 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/

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 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. Steve Arlow, AWT * Capt. Steve Hall, AWT * Lt. Bernard Chastain, AWT * Capt. Michael Cerne, USCG * Special Agent-In-Charge Kevin Heck, NMFS, OLE

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. ***FAO 7.2.3/8.4.7/8.4.8/12.11*** ***ECO 29.3/31***						
Confidence Ratings	**Low**	**0 out of 7**	**Medium**	**0 out of 7**	**High**	**7 out of 7**

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 Criteria 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 Criteria 29.3 Other 31

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause:	Evidence
13.1	The impacts of environmental factors on halibut and other fish or nonfish species associated or dependent upon them have been and are being appropriately assessed by the IPHC, NMFS/NPFMC and ADFG. IPHC compared long-term changes in Pacific halibut recruitment and growth with long-term changes in climate and stock size. They determined that environmental variability—both interdecadal and interannual—is responsible for most of the observed variation in Pacific halibut recruitment. However, the dramatic decline in size at age, resulting in the large changes in growth rates that occurred during the twentieth century, appear to have been density-dependent responses to changes in stock size and competition with expanding flatfish stocks in general, with virtually no environmental influence. (http://afsjournals.org/doi/abs/10.1577/1548-8675(2002)022%3C0852%3AEOCASS%3E2.0.CO%3B2). Since 2009 the IPHC has deployed water column profilers at each of its survey stations, from the western Aleutian Islands to southern Oregon to assess environmental change in the ecosystem and effects on migration and recruitment of Pacific halibut (http://www.iphc.washington.edu/publications/scirep/SciReport0082.pdf). IPHC staff has also participated in International symposia (North Pacific Marine Science Organization) looking at the climate impacts of density-dependence and fishing on longterm

and large-scale changes in recruitment, growth, maturity and distribution of Pacific halibut. (http://www.pices.int/publications/presentations/2010-Climate-Change/A2/A2.aspx).

Scientists with the NMFS have conducted numerous studies and continue research on the impacts of acidification in the North Pacific Ocean. (http://www.pices.int/publications/presentations/2010-Climate-Change/A2/A2.aspx).

A research plan has been developed by the Alaska Fisheries Science Center focusing on forecasting fish, shellfish and coral population responses to ocean acidification in the north Pacific Ocean and Bering Sea. (http://www.afsc. noaa.gov/ABL/ MESA/ mesa_ me_cor.php).

On an annual basis there is also a Stock Assessment and Fisheries Evaluation (SAFE) process that looks at a broad set of Ecosystem Considerations prior to the Council setting annual harvest rates and limits. (http://www.marineconservationalliance.org/?p=2925).

On the international level, collaborative technical and research programs study the processes generating variability in abundance, distribution, and dynamics of fish species at daily, decadal, and centennial scales. (http://www.spc.int/sppu/images/stories/ preliminary%20assessment.pdf).

Other research bodies carry out work to obtain information about the ecosystem, status and management of Pacific halibut fisheries. Examples include:

The North Pacific Research Board (NPFB) (http://www.nprb.org/index.html) "…conducts research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean (including any lesser related bodies of water)….[with]….priority on research efforts designed to address pressing fishery management or marine ecosystem information needs."

The Bering Sea Integrated Ecosystem Research Program (http://bsierp.nprb.org/) which is a $52 million partnership between the NPRB and the National Science Foundation (NSF), that seeks to understand the impacts of climate change and dynamic sea ice cover on the eastern Bering Sea ecosystem. More than one hundred scientists are engaged in field research and ecosystem modeling to link climate, physical oceanography, plankton, fishes, seabirds, marine mammals, humans, traditional knowledge and economic outcomes to better understand the mechanisms that sustain this highly productive region.

The Gulf of Alaska Integrated Ecosystem Research Project (IERP) (http://gulfofalaska.nprb.org/) is a program of the NPRB that seeks to understand how environmental and anthropogenic processes, including climate change, affect trophic levels and dynamic linkages among trophic levels, with emphasis on fish and fisheries, marine mammals, and seabirds within the GOA. Implementation of the GOA IERP is structured around four separately completed components which will link together to form a fully integrated ecosystem study in the Gulf of Alaska. The four components of this program are: Upper Trophic Level (UTL): The overall goal of this component focuses on identifying and quantifying the major ecosystem processes that regulate recruitment strength of key groundfish species (arrowtooth flounder, Pacific cod, Pacific ocean perch, sablefish, and

	walleye pollock) in the GOA. The focus is on a functional group of five predatory fish species that are commercially important and account for most of the predatory fish biomass in the GOA. Taken together they encompass a range of life history strategies and geographic distributions that provide contrast to explore regional ecosystem processes. The remaining three components are being completed separately and integrated in a post-proposal selection process to ensure achievement of a fully vertical trophic understanding. **Forage Base**: To focus on forage base and resources which influence the productivity of the top level predator(s) chosen. The type, quality and quantity of food, and its timing and location, are critical to understanding higher trophic level responses. **Lower Trophic Level and Physical Oceanography**: To focus on biological and physical oceanographic parameters on which this portion of the ecosystem is based. This includes euphausiids, fish eggs, and larval fishes. **Ecosystem Modeling**: To describe and predict the responses (and variability therein) of this portion of the GOA ecosystem to environmental and anthropogenic processes, including climate change. The GOA IERP will include one planning year (FY2010), three field years (FY 2011, 2012 and 2013), followed by one synthesis year (2014). Also, the Pacific States Marine Fisheries Commission (http://psmfc.org/) coordinates research activities, monitors fishing activities, collects and maintains databases on marine fish occurring off the California, Oregon, Washington, Idaho, and Alaska coast.
13.1.1	**Impacts of fishing gear on the habitat** Benthic longline is a passive gear (not towed). There are no serious, irreversible concerns of halibut gear interaction on the habitat that are presented by management. Readers should also consult Section 9.5. The effects of lost/abandoned gear on legal O32 halibut have been presented in a recent IPHC paper. The numbers have decreased from 1600 thousand pounds (net weight) in 1985 to 82 thousand pounds (net weight) in 2010. (http://www.iphc.washington.edu/publications /rara/2010/2010.51.Wastageofhalibutinthecommercialhalibutfishery.pdf). In a NMFS report on a working group reviewing ghost fishing, the group determined that longline gear garnered a “Low Priority Recommendations” when compared to pot and net gears. (http://swfsc.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFSC-154 _P12 16. PDF). **Impact of fishing gear on seabirds** The short-tailed albatross is a listed species under the Endangered Species Act (ESA). As such, incidental takes in the longline fishery are regulated and limits are set. The limit set by NMFS under the current ESA biological opinion is a maximum of four birds in a two- year

cycle. If that level is exceeded, it automatically initiates an ESA Section 7 Consultation, which involves a consultation between the US Fish and Wildlife Service and the National Marine Fisheries Service. New regulations and further avoidance measures can be placed on the fishery by NMFS.

Bycatch of halibut in other fisheries (the GOA and BSAI groundfish fishery)

Current levels of by-catch of halibut (U32 and O32) in the groundfish fisheries in the GOA and BSAI are estimated in several ways including; observer coverage, fishery reporting systems, NMFS trawl surveys). 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%.

The current observer program does not include the entire GOA fleet, most vessels in the <60ft class which are currently unobserved. There have been considerable and on-going proposals for restructuring of the NMFS observer program which will place control of observer deployment under the authority of the NMFS. It is reported that this could provide potential improvements to bycatch estimation for this segment of the fleet. In the GOA, estimates of the ratio of halibut mortality to groundfish catch is more than twice as high as that in the BSAI fisheries and renders improvements in these estimates of halibut bycatch mortality of greater importance. (http://www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf).

Whilst, the outcome of these efforts is still in process, there is a considerable amount of evidence that demonstrates an active and concerted approach in developing an observer program that delivers the intended objectives of improved estimation of bycatch halibut and provides economic and operational acceptability for the parties involved. Integrated Electronic Monitoring (EM) technology (cameras) component could provide viable catch monitoring capability for the smaller-boat component of the commercial halibut fleet, a large portion of which may be unsuitable for observer coverage. 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. Observer restructuring program documents, efforts and research is reported in the various Council/NMFS meeting outputs (http://alaskafisheries.noaa.gov/npfmc/current_issues/observer/Observer_restructuring910.pdf ; http://alaskafisheries. noaa.gov/npfmc/current_issues/observer/OACagenda311.pdf ; http://project.nprb.org/view.jsp?id=4de2a205-a76c-4924-96fc-caad5b076ce3).

Sub-legal catches of halibut:

The mortality due to sublegal bycatch of halibut is now incorporated into the population model that is used to evaluate alternative exploitation rates, so an allowance for sublegal bycatch is contained in the chosen rate. There is no explicit adjustment for sublegal bycatch in the quota-setting process. (http://www.iphc.washington.edu/papers/bycatch.accounting.pdf).

TEP (Threatened, Endangered, Proposed) fish species

As described in federal regulation, there are no threatened or endangered species of fish in Alaska. (http://alaska.fws.gov/fisheries/endangered/pdf/consultation_guide/4_Species_List.pdf).

Several TEP species are managed by the NMFS. These are shown here below in **Table 8.**

SPECIES MANAGED BY NATIONAL MARINE FISHERIES SERVICE, SPECIES AND STATUS	FREQUENCY OF OCCURRENCE	RANGE IN ALASKA
Endangered Cook Inlet beluga whale (*Delphinapterus leucas)*	Regular	Cook Inlet
Steller sea lion (*Eumetopias jubatus)* **west of 144o**	Regular	Bering Sea, N. Pacific
Blue whale (*Balaenoptera musculus*)	Rare	Bering Sea, Gulf of Alaska, N. Pacific
Bowhead whale (*Balaena mysticetus)*	Regular	Chukchi Sea, Beaufort Sea
Fin whale (*Balaenoptera physalus)*	Regular	Chukchi Sea, Bering Sea, Gulf of Alaska, N. Pacific
Humpback whale (*Megaptera novaeangliae)*	Regular	Bering Sea, Gulf of Alaska, N. Pacific
North Pacific right whale (*Eubalaena japonica)*	Rare	Bering Sea, Gulf of Alaska, N. Pacific
Sperm whale (*Physeter macrocephalus)*	Regular	Bering Sea, Gulf of Alaska, N. Pacific
Sei whale *(Balaenoptera borealis)*	Rare	Gulf of Alaska, N. Pacific
Leatherback sea turtle (*Dermochelys coriacea)*	Rare	Gulf of Alaska
Threatened		
Steller sea lion (*Eumetopias jubatus)* **east of 144o**	Regular	Bering Sea, Gulf of Alaska, N. Pacific
Loggerhead sea turtle (*Caretta caretta)*	Rare	Gulf of Alaska
Green sea turtle (*Chelonia mydas)* (incl. *agassizi*)	Rare	Gulf of Alaska
Proposed		
Bearded seal (*Erignathus barbatus nauticus*) Ringed seal (*Phoca hispida hispida*)	Regular Regular	Bering, Chukchi and Beaufort Seas Bering, Chukchi and Beaufort Seas
Candidate None		
Delisted		
Gray whale (*Eschrichtius robustus)*	Regular	Chukchi Sea, Bering Sea, Gulf of Alaska, N. Pacific

Bycatch

In the directed longline fisheries for Pacific halibut, bycatch of other fish species is not well documented on any sized vessel. Halibut long-line fisheries can be highly selective depending on the area they are fishing. Management actions are in place in respect to increasing knowledge on the bycatch dynamics of the directed halibut longline (please see section 4.2. on restructuring the observer program and related bycatch implications).

Seabirds

Bycatch of seabirds were addressed by specific regulations that were put in place that 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 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 Board of Fisheries 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).

To date, reports states that bycatch mitigation measures by the freezer longline fleet in Alaska have resulted in an 80% reduction in takes of seabirds. The first reported takes in 12 years of short tailed albatross occurred in August and September 2010, when two birds were taken. (http://www.afsc.noaa.gov/quarterly/jas2010/divrptsREFM7.htm).

Measures in place to reduce seabird interactions now include the use of streamer (tory) lines, night setting, lineshooters and lining tubes, which have been shown to reduce seabird interactions when setting or retrieving gear (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm).

In 2002 the IPHC, in collaboration with Washington Sea Grant, developed a sampling protocol for collecting seabird occurrence data on the IPHC stock assessment surveys. This was initially a collaborative project between the IPHC, ADFG and the NMFS sablefish (*Anoplopoma fimbria*) survey. The IPHC permanently incorporated the seabird data collection protocols into its survey program. Sampling seabird occurrence after the haul addresses the question of where and when certain seabird species occur, and aids in the assessment of individual species at risk by providing information that may reflect population trends over time. (http://www.iphc.washington.edu/publications/rara/2010/2010.403.Trendsinseabirdoccurrenceonstockassessmentsurveys.pdf).

Rockfish

Yelloweye rockfish (*S. ruberrimus*) are also taken in the GOA halibut fishery as bycatch. The Alaska Longline Fishermen's Association has secured funding through the Oak Foundation and the Alaska Marine Conservation Council to develop a real-time rockfish bycatch reporting network for the Eastern GOA. Preliminary funding has allowed for development of charts that indicate halibut and black-cod survey stations with high rockfish bycatch rates. Future funding is being pursued to allow full implementation of bycatch reporting network resulting in real-time identification of bycatch hotspots, allowing fishermen to set in areas that are less likely to have high rockfish bycatch (http://www.alfafish.org/Rockfish-Bycatch-Reporting-Network.shtml).

Marine Mammals

Although marine mammals are known to interact with halibut longline gear, bycatch is virtually non-existent. Whales and otariids (sea lions and fur seals) may selectively eat hooked groundfish species such as Greenland turbot, Pacific halibut, sablefish, or Pacific cod directly from the longline gear before the line is retrieved by the vessel. In such instances there would be only empty hooks as the line is retrieved over the roller and into the vessel.
A recent NMFS report on marine mammals interaction in the groundfish fisheries recounts that no Steller sea lion (eastern and western stock) were accidentally by-caught by the halibut commercial longline fishery between 2000 and 2004. No other otariids species were documented in the report. In the same, similar non-harmful interaction with whales were documented between 1998 and 2004: 82 fishing days where Killer whales had predatory interactions (plucking fish from hooks) with the BSAI halibut longline fishery; and 17 fishing days where Sperm whales had predatory interactions with the GOA halibut fishery.
(http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-167.pdf).

Bycatch data from the IPHC stock assessment surveys

IPHC provides ADFG and NMFS staff detailed halibut and other-species catch data from the IPHC stock assessment survey and summarized commercial halibut catch and effort data by depth strata to assist them in estimating bycatch in the halibut fishery, particularly for bycatch of rockfish species, skates, and sharks. In 2008, ADFG and IPHC had a joint project on the IPHC stock assessment survey vessels in SE Alaska to record species on 100% of the hooks and collect biological data on some rockfish species (http://www.iphc.washington.edu/publications/rara/2008/2k8rara10a_ssa.pdf). This report highlighted significant shark bycatch in the directed halibut fishery.

Sharks

Shark abundance increases in the GOA have been apparent to fishermen throughout the 1990s. The predominant shark species in nearshore Alaska waters, spiny dogfish sharks (*Squalus acanthias*), Pacific sleeper sharks (*Somniosus pacificus*), and salmon shark (*Lamna ditropis*), have dramatically increased in abundance in the eastern GOA and Prince William Sound (PWS). Spiny dogfish are commonly taken as bycatch in commercial fishing gear in Alaska. They are well represented in the pelagic trawl Pollock fishery and in longline fisheries for sablefish, halibut, Greenland turbot, and Pacific cod. (http://www.pices.int/publications/pices_press/volume8_issue2/May00/Shark.pdf).

The spiny dogfish or spurdog (*Squalus acanthias)* is a small demersal shark of temperate continental shelf seas worldwide. Although naturally abundant, this is one of the more vulnerable species of shark to over-exploitation by fisheries because of its late maturity, low reproductive capacity, longevity, long generation time (25–40 years) and hence a very low intrinsic rate of population increase (2–7% per annum). Population segregation and an aggregating habit make mature (usually pregnant) females highly vulnerable to fisheries even when stocks are seriously depleted. This aggregating habit also means that catch per

unit effort (CPUE) is not an adequate indicator of stock status; high CPUE can be maintained even when populations are severely depleted. In the IUCN Red list, the spiny dogfish is classified as Vulnerable to extinction, but despite the population trend data indicate that the southern part of the Northeast Pacific stock has also declined through overfishing, stocks appear stable off Alaska. In fact, based on the preliminary results of the of a 2009 study funded by the North Pacific Research Board, dogfish in the GOA are estimated to be at 80%-90% the theoretical population carrying capacity, with an annual maximum sustainable yield of 20,000 – 30,000 mt. (http://doc.nprb.org/web/05_prjs/511%20Final%20 Report12.10.08.pdf).

The Pacific Sleeper Shark (*Somniosus pacificus*) is Data Deficient under the IUCN Red list. The deepwater sleeper shark, relatively common in the north Pacific Ocean. In the northern part of its distribution it ranges into shallower water, but at lower latitudes it becomes strictly deepwater, extending down to at least 2,000 m depth in the extreme southern end of its range. The species is taken as bycatch by bottom trawl fisheries in the western Bering Sea, and by longline fisheries for sablefish and Pacific halibut in the eastern north Pacific, and is generally discarded. Biomass estimates are increasing in the western Bering Sea and GOA, and have decreased in other areas in the eastern Pacific. Greater depths that are not currently fished may provide some refuge for adult Pacific sleeper sharks. (http://www.iucnredlist.org/apps/redlist/details/161403/0).

The salmon shark (*Lamna ditropis*) occurs in the eastern and western North Pacific and its population appears to be stable and at relatively high levels of abundance. For this reason it is listed as Least Concern under the IUCN Red list. Currently there is no directed fishery in the Northeast Pacific, apart from a small sport fishery for the species in Alaska. Bycatch in the Northeast and Eastern Central Pacific appears to be at low levels and is not increasing at this point-in-time. In addition, the most recent demographic analysis supports the contention that salmon shark populations in the Northeast and Northwest Pacific are stable at this time. Nevertheless, there are very little data on catch in other fisheries, discards and potential finning from the major pelagic fisheries in the North Pacific Ocean. (http://www.iucnredlist.org/apps/redlist/details/39342/0).

There are no directed fisheries for sharks in the BSAI or in the GOA, but some sharks are caught incidentally in other directed commercial fisheries. These sharks are generally not retained. They are currently included as part of the "Other Species" complex in the BSAI and GOA Groundfish Fishery Management Plans. A total allowable catch is set annually for the Other Species management category. (http://www.nmfs.noaa.gov/fishwatch/species/pac_spiny_dog.htm).

There is no evidence to suggest that overfishing is occurring for any shark species in the BSAI or GOA. In the BSAI sharks have made up from 1% to 5% of Other Species catch from 1997 – 2010. Pacific sleeper shark make up 68% of the total shark catch in the BSAI, followed by Other/unidentified sharks at 20%, salmon shark at 9% and spiny dogfish at 2%. In the GOA, sharks have made up from 11% to 64% of Other Species catch from 1997 –

2009. In 2009, spiny dogfish made up 93% of the shark catch, but on average are 53% of total shark catch. Pacific sleeper shark made up 4% of the total shark catch in 2009 and are on average 30% of the shark catch. (http://www.afsc.noaa.gov/REFM/docs/2010/GOAshark.pdf ; http://www.afsc.noaa.gov/REFM/docs/2010/BSAIshark.pdf).

Estimating bycatch

Previous methods of estimating bycatch of non-target species in the halibut fishery are currently under review as NOAA is working toward incorporating all removals into their BSAI and GOA stock assessments. To address these non-halibut bycatch issues in the halibut fishery, a working group composed of scientists from the Alaska Fishery Science Center (AFSC), Alaska Regional Office (AKRO), ADFG, IPHC, and NPFMC was formed in January of 2010. The goal of this group is to investigate quantitative methods to estimate incidental catches in the unobserved halibut IFQ fishery and report its findings to the Plan Teams and NPFMC.

The purpose of their study is to provide Plan Team and SSC members with an overview of the analytical methods and associated estimates for several example species: Pacific cod, spiny dogfish, Pacific sleeper shark and salmon shark within the GOA.

The working group has focused on three areas: 1) estimation of variance for extrapolated survey catch and CPUE; 2) investigation of methods to better represent commercial fishing behavior by using annual IPHC survey data; and 3) extrapolate survey catch to commercial effort using ratio estimators.

Timeline

- January-August 2010: Working group meetings and method developments.
- September 2010: Presentation of methods to joint Plan Teams, discussion and feedback, selection of best method.
- November 2010: Presentation of best method with catch estimates of example species to joint Plan Teams.
- February 2011: Presentation of best method to SSC for approval.
- March 2011: Make necessary changes requested by SSC.
- August 2011: Estimation of catches for non-target species prepared and provided to stock assessment authors.

http://alaskafisheries.noaa.gov/npfmc/membership/plan_teams/Minutes/1110IFQbycatch.pdf

Readers should also review the following section 4.2. on the observer restructuring program and the related bycatch monitoring implications.

	Bait fisheries During 1998, the International Pacific Halibut Commission (IPHC) conducted numerous pilot experiments investigating the effects of bait type, size, or quality, hook size, or gear type on the longline CPUE of Pacific halibut. Thirty-six different experiments were completed by a total of nine chartered commercial fishing vessels. Many of the experiments showed significant differences in the catches of either legal- or sublegal-sized halibut. In general, larger hooks or baits caught more legal-sized and fewer sublegal-sized halibut and significant differences were observed between different baits or bait qualities. Results of these pilot experiments will be useful in designing future IPHC gear experiments. Bait choice by commercial fishers is the result of personal preference, bait availability, and economics. While the IPHC has no control over the baits and hooks used by the commercial fisheries, the baits used in IPHC stock assessment grid surveys since 1993 have been standardized to 0.11 to 0.15-kg (1/4 to 1/3-pound) pieces of chum salmon (*Oncorhynchus keta*) fillet, skin-on. Most bait is purchased frozen, and thawed before using. Beside salmon, herring, cod and octopus or squid are typically purchased for bait (http://www.iphc.int/publications/techrep/tech0048.pdf). These bait species are well managed by either the State of Alaska or the NMFS, and none are classified as endangered or threatened http://www.fakr.noaa.gov/npfmc/fmp/fmp.htm and http://alaskafisheries.noaa.gov/npfmc/SAFE/SAFE.htm as well as http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.main.
13.1.2	**Ecosystem interactions** Halibut remain near the top of the ocean food chain. In research conducted by the IPHC, halibut were found to be opportunistic feeders. Juvenile halibut fed almost exclusively on small crustaceans. With increasing size, the diet shifted to larger crustaceans and fish. Pacific sand lance, walleye pollock, octopus, and Tanner crab made up a significant proportion of the halibut diet. The weight of the content of some stomachs has been recorded, but no quantitative analysis has been done. A literature search was conducted to define the role of halibut as a prey item. Little definitive information was located. References indicated that halibut contribute to the diet of several species of fish and marine mammals. In all instances, halibut represented only a small proportion of any animal's diet. (http://www.iphc.int/publications/techrep/tech0021.pdf ; http://en.wikipedia.org/wiki/Halibut). Larval halibut feed on zooplankton (tiny floating animals), while adults are carnivorous. Adult halibut prey on a wide variety of food items including; cod, pollock, sablefish, rockfish, turbot, sculpins, other flatfish, sand lance, herring, octopus, crabs, clams, and occasionally smaller halibut. Halibut are sometimes eaten by marine mammals and sharks but are rarely preyed upon by other fish (http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm). Halibut size-at-age has been declining since the mid-1980s. The cause(s) behind the ongoing decline are not well understood. The timing of the decline in size-at-age correlates very strongly with the increase in halibut numbers that began following the environmental

regime shift of the late 1970s. By the mid-1980s, several strong year classes had increased the total number of halibut in the ocean by at least a factor of two. At the same time, increased numbers of other flatfish, in particular arrowtooth flounder (*Atherestes stomias*), also occurred in the GOA and Bering Sea (Walters and Wilderbuer 2000). The most generally accepted cause of the decline in size-at-age has been a density-dependent decline in growth rate resulting from the greatly increased numbers, and biomass, of flatfish. It is worth noting here that, although the exploitable biomass of halibut has declined by 50% since the late 1990s, the total biomass of halibut has continued to increase. Additionally, the biomass of arrowtooth flounder estimated to be several times greater than the halibut biomass, has remained very high. The GOA population is 198% of its target level. The Bering Sea Aleutian Islands population is estimated at 3 times its target level. (http://www.nmfs.noaa.gov/fishwatch/species/arrowtooth_flounder.htm).

The management response to the declining size at age continues to be considered and is well documented in the management generated literature (IPHC, PFMC, NMFS). In recent years, the Commission has been forced to reduce both the harvest rate (Area 3B) and the harvest levels of GOA halibut (Areas 3A and 3B) as the stock biomass has not responded to management measures based on the harvest policy. The Commission's action to reduce harvest rates in Area 3B is based on a lack of response to these mitigative management measures.

Most recent management action in response to this can be seen in the measures implemented in 2011 fishing season; revision to the harvest rate as a consequence of the outcome of the stock assessment at the end of 2010. IPHC report that whilst projections based on the currently estimated age compositions suggest that both exploitable and spawning biomass will increase over the next several years as several strong year classes recruit to the fishable and spawning components of the population, these increases are tempered by the ongoing decreases in size-at-age as well as realized harvest rates which continue to be above target in several regulatory areas.

Environmental factors contributing to this can be multiple; (temperature, salinity), diet changes, fishery induced evolution, and size-selective fishing have been considered. To date, there is no strong environmental correlate reported by management. The possibility of fishery induced evolution, i.e., that halibut capable of producing fast growing progeny have been "fished out" of the population is both unlikely over such a short time frame and is also countered by the observation that the current halibut size-at-age is similar to that of the 1930s. In other words, a cycle of change from small to large size-at-age has already been observed, and the increase in size-at-age occurred at a time of very low halibut abundance. The change in halibut size-at-age could, theoretically, be produced by the effects of size selective fishing and not by a change in growth rate. Since larger halibut are targeted, a progressively smaller size-at-age would result in a fishery that systematically removed the larger individuals. Such an effect however, would be expected in a fishery imposed on a previously unfished stock, which has not been the case for halibut in 80+ years. Additionally, halibut size-at-age increased greatly through the 1960s and 1970s, a time when the stock was (and long had been) fully exploited. (http://www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.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 Criteria 8.4.7 Other 12.11

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause:	Evidence
13.2	The commercial halibut fishery in Alaska is a well-established one. Resources are fully allocated. In 1983 the IPHC subdivided Area 4 into subareas A-D. They further subdivided Area 4 by adding a new subarea F in 1984 to provide more near shore opportunity to coastal Alaskans. The staff recommended that Area 4 be subdivided into subareas to achieve a distribution of catch that more nearly corresponds to the productivity of the area, and to facilitate nearshore, small boat fisheries for local residents. Each subarea was assigned individual catch limits. http://www.iphc.washington.edu/publications/bulletins/ib0027.pdf http://www.iphc.washington.edu/publications/annual/ar1983.pdf http://www.iphc.washington.edu/publications/annual/ar1984.pdf Vessel clearances have been required by the IPHC since the 1960's to discourage illegal fishing and false reporting of catch harvested in IPHC Area 4. Because of the great distances involved in the Bering Sea and Aleutian fishing areas, reduced levels of enforcement presence, and marginal weather, IPHC vessel clearances continue to be a very important compliance tool to discourage illegal fishing and promote accurate catch reporting. The operator of any vessel that fishes for halibut in Areas 4A, 4B, 4C, or 4D must obtain an IPHC vessel clearance before fishing in any of these areas, and before the landing of any halibut caught in any of these areas, unless specifically exempted by regulation. There are several exemptions but the one to be discussed here is the "Vessel Monitoring System (VMS) Exemption" which is administered by the NOAA Fisheries Office for Law Enforcement (OLE). Any vessel that carries a transmitting VMS transmitter while fishing for halibut in Area 4A, 4B, 4C, or 4D, and until all halibut caught in any of these areas is landed, is exempt from the IPHC Area 4 vessel clearance requirements, provided that the vessel operator properly registers the VMS transmitter with OLE. (http://www.nmfs.noaa.gov/ole/vms_iphc.html). Assessments were completed and examined, including habitat considerations through the annual NMFS survey in the Bering Sea. The NMFS has also made determinations for Essential Fish Habitat flatfish and other species in waters of the Bering Sea listed in the FMP. (http://alaskafisheries.noaa.gov/habitat/seis/final/appd_3_1.pdf).

	The Bering Sea has also large areas closed to fishing (http://www.adfg.alaska.gov/static/lands/protectedareas/pdfs/5j02-08_p2.pdf ; http://www.fakr.noaa.gov/npfmc/current_issues/ HAPC/HAPCmaps205.pdf). With the possibility of warming oceans, there has been speculation of fish movements into Arctic waters. In December 2009, the United States closed its Arctic waters (507,000 square kilometers or 196,000 square miles) to commercial fishing until scientific research can assess the rapidly evolving marine environment. In international waters of the Bering Sea near the Arctic, Russia and the United States developed an international fisheries agreement in 1994. This halted commercial fishing in a region known as the Bering Sea "donut hole" until such activities are proved to be sustainable. (http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Fact_Sheet/InternationalArcticfactsheetFINAL012011.pdf ; http://www.fakr.noaa.gov/npfmc/current_issues/ Arctic/arctic.htm). Monitoring of fishing activity in Area 4 fisheries is done through the use of VMS or the process of tracking vessel license clearances requirements. (http://www.nmfs.noaa.gov/ole/ vms_iphc.html).
13.2.1	No new gear types have been introduced for the Pacific halibut commercial fishery off Alaska.

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 Criteria 8.4.8

Evidence adequacy rating:

☑High **☐ Medium** **☐ Low**

Clause:	**Evidence**
13.3	Research on impacts of fishing gear, and impacts to coastal communities is an integral part of the NPFMC process. Since 1996, scientists at the Alaska Fisheries Science Center's Auke Bay Lab have been conducting research on the effects of fishing gear on benthic habitat (http://www.afsc.noaa.gov/Quarterly/jas2003/featurelead.htm). In 2005, the Alaska Fisheries Science Center (AFSC) compiled baseline socioeconomic information about 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 Bering Sea/Aleutian Islands area can be found at http://www.afsc.noaa.gov/REFM/docs/ 2010/economic.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

The IPHC is recognized worldwide as a model institution for international collaboration and cooperation in providing scientific and technical advice for managing a transboundary resource. In combination with the NPFMC, NMFS, and ADFG (and other associated management agencies) the Alaska Pacific halibut commercial fishery is extremely well managed and a testament to what can be done when effective research, policies and procedures are put in place. The evidence presented in this assessment is supportive of a favourable assessment relative to the FAO standard.

Nonetheless, there are some shortcomings in the assessment that degrade this review. A few general points are summarized here and specific points are made under the relevant sections below.

The lack of references to previous publications hinders peer review. For example, statements about the effectiveness of a 20% harvest rate at achieving maximum yield are undocumented. On several occasions, when a reference is given, there is no original research or supporting citations in the cited document.

Crucial pieces of documentation do not appear until very late in the document. For example, concerns about continuing declines in exploitable biomass are not described until section 7.

The roles and responsibilities of the IPHC, NPFMC, NMFS, ADFG should described very early in the background section and then used consistently throughout the document. In my opinion, the 'management' responsibilities of the IPHC are overstated throughout the document. I believe the IPHC provides scientific and technical advice to management agencies such as the NPFMC, NMFS, and ADFG regarding management measures. But, the IPHC does not manage the fisheries directly. The latter is stated and implied several times in the document and I think it is incorrect.

The assessment has an overly positive tone that leads one to suspect that it is holding back on weaknesses in the system. For example, it isn't until very late in the report that the departure from the Slow Up Fast Down decision rule is reported. There is no discussion about the effect reductions in size at age are having on stock productivity and therefore on the effectiveness of the 20% fixed harvest rate rule. This detracts from the objectivity of the assessment.

Assessment Team Statement

The responses for each and every comment raised by the Peer Reviewer have been provided in detail by the Assessment Team in the following section. Both the Reviewer comments and the Assessment Team responses have been subject to the Certification Committee review process as per standard procedures.

Summary of review from Peer Reviewer A for each of the fundamental clauses A-F.

Clauses	
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. No return comment required.	
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. No return comment required.	
3.	Management objectives must be implemented through management rules and actions formulated in a plan or other framework.
The assigned rating to this component is generally supported by the available documentation. However, the section would benefit from some reorganization. The long term objectives should be clearly stated at the beginning of the response. These should include aspects of sustainable harvest and allocation of access. I expected there to be an explanation of how the total allowable catch is apportioned between Canada and the US, and how within the US the catch is apportioned among management regions. The Assessment Team acknowledges the comment. Long term objectives of management have been reorganized accordingly and are now stated in section 3.1. Apportionment between regulatory areas has been briefly explained from the listed references and in more detail in section 3 of the Assessment Report. For further details reviewers and interested parties can review http://www.iphc.washington.edu/papers/sr83.pdf and http://www.iphc.washington.edu/ papers/sa10.pdf. Exploitable biomass in each regulatory area is estimated by partitioning, or apportioning, the total exploitable biomass in proportion to an estimate of stock distribution derived from the IPHC setline survey catch rates [Weight Per Unit Effort (WPUE)] and by taking into account migrations of halibut from one regulatory area to other as specified by recent tagging studies results. Specifically, an index of abundance in each area is calculated by multiplying weighted survey WPUE by total bottom area between 0 and 400 fathoms. The logic of this apportionment is that survey WPUE can be regarded as an index of density, so multiplying it by bottom area gives a quantity proportional to total abundance. In 2010, two adjustments to the index for each area, one based on hook competition and the other on survey timing, were computed for use in biomass apportionment. IPHC staff's Catch Limit Recommendations are based on use of both	

adjustments. New in 2010 is a change to the weighting which has been used for the last several years of survey WPUE. The estimated proportion in each regulatory area is then the adjusted and weighted index value for that area divided by the sum of the adjusted and weighted index values http://www.iphc.washington.edu/papers/sa10.pdf.

There is a rather cryptic description of how the apportionment is done in the last paragraph of section 6.1.3. The apportionment component of the management system seems to be more relevant to management objectives and their realization discussed in section 3 than to the estimation of stock size that is covered in section 6.

The Assessment Team acknowledges the comment.
The small discussion of Apportionment in section 6.1.3. was not deemed essential and removed accordingly due to the more detailed explanation placed in Section 3.

It appears that the apportionment is based on the estimated biomass distribution among areas. This is an important component of the management system and it should be explained along with the statement in section 1.2.2 that the stock is assumed to be fully mixed over its entire range.

The Assessment Team acknowledges the request for further explanation of the relevance of biomass distribution among areas. A statement on the biological basis of apportionment of halibut quotas among regulatory areas has been added in section 1.2.2 as suggested.

If the stock is indeed fully mixed over its entire range, what difference does it make where the catch is taken? I can see the necessity to apportion the catch between Canada and the USA in order to determine national shares. I can also see the necessity to share the US catch among the widely dispersed areas in Alaska and the southern coastal states. But, it is not apparent why the sharing should be based on biomass distribution. Perhaps the decision would be more equitable if it were based on differences in productivity or on historical use. In any event, this important part of the system deserves a clearer and more explicit explanation.

The Assessment Team acknowledges the need on describing apportionment between regulatory areas. Further description is provided in the previous page of this Peer Reviewer report.

With respect to allocation based on biomass distribution, the Assessment Team would like to point out that stock size is achieved by estimating the density of halibut in different regulatory areas. For example, the density of halibut in the GOA is generally far higher than in the BSAI. After migration is taken into account, quotas are set accordingly, and the regulatory areas with higher halibut biomass densities receive higher quotas. Biomass is distributed according to local productivity (recruitment * growth – mortality) and adjusted for migration patterns of Pacific halibut.

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.
No return comment required.

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.

This section provides an inadequate description of the stock assessment conducted by IPHC and the assigned rating is not supported.

The section should evaluate the adequacy of the assessment model, its application, and the frequency of assessments relative to management needs. This should cover both the assessment of the global stock and the way the total catch is apportioned between countries and among management regions. The performance of the model should be described and evaluated.

The Assessment Team acknowledges the Reviewer comment. The assessment team undertook reviews of stock assessments and methods which are generally published in scientific reports and through discussions with IPHC. The Assessment Team included a description in the beginning of the report but acknowledges that any further detail is fragmented throughout the rest of the report and the report would be strengthened by a thorough detailed description in Fundamental 5 as follows.

Description of the assessment model

IPHC stock assessment surveys are performed yearly. The 2010 halibut assessment model has remained essentially unchanged since 2003. It has been thoroughly described in an IPHC Scientific Report (Clark and Hare 2006) and was subjected to a peer review by two external scientists from the Center for Independent Experts (Francis 2007, Medley 2007). Since the Commission's acceptance of a coastwide stock assessment model (open model allowing for halibut migration between regulatory areas as opposed to a closed area no/minimal migration model), much of the focus of the staff and the industry is now on how the coastwide estimate of exploitable biomass is apportioned among regulatory areas.

The IPHC assessment model is age-and sex-structured. Commercial and survey selectivities are both estimated as piecewise linear functions of observed mean length at age/sex in survey catches. There is a 32-inch minimum size limit in the commercial fishery. Commercial catchability (the degree of ease halibut can be caught) is typically allowed to vary from year to year with a penalty of 0.03 on log differences. Some variation in survey catchability between years has been allowed in production fits since 2006. The model is fitted to commercial and survey catch at age/sex and Catch per Unit Effort (CPUE).

Until 2006, estimates of halibut abundance were made using closed-area models for all areas except Areas 2A and 4CDE. Area 2A leveraged the Area 2B assessment and relative survey WPUE, while Area 4CDE relied upon the NMFS EBS trawl estimates of swept area abundance. The closed-area models are not considered reliable due to violation of the closed-population assumption. The coastwide model has considerable more flexibility than the closed-area models, including sex-specific catchability, selectivity, and natural mortality parameters; it is fitted to CPUE [WPUE and Number per Unit Effort (NPUE)] at age/sex (rather than just total CPUE), uses weaker selectivity smoothing and neutral data weighting. Finally, the coastwide data set is far less noisy than the closed area datasets and fits to the data providing more confidence in the results than was the case for closed-area model results. Several versions of the basic assessment model were fitted. Differences among all the models concerned how survey and commercial catchability (generally termed "q") were parameterized.

Quality of fits

The model tends to predict well survey NPUE at sex/age and commercial catch at age.

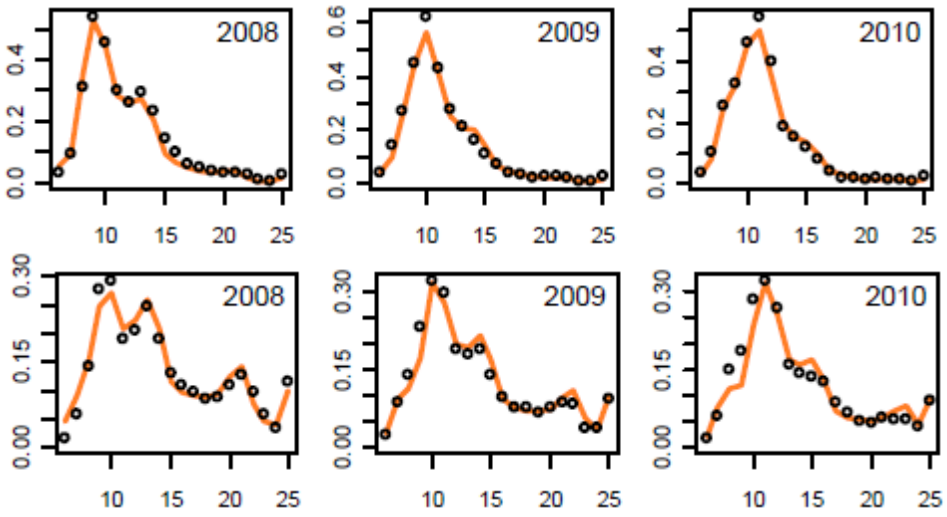

Figure 13. Observed (points) and predicted (lines) survey Number Per Unit Effort at age of females (above) and males (below) in the 2008-2010 coastwide model fit. The x axis represents age and the y axis represents number per skates.

There is no apparent pattern to the residuals from the fits, although the model initially underestimates slightly the early strength of the 1987 year class. The model is successfully predicting the increasing number of fish aged 25 and older, particularly males, which are appearing in both the survey and commercial catches. The very low growth rate for male halibut means that many are not recruiting to the fishery until they are older than 25. The series of total survey and commercial CPUE are also predicted closely. See Figure 14 below.

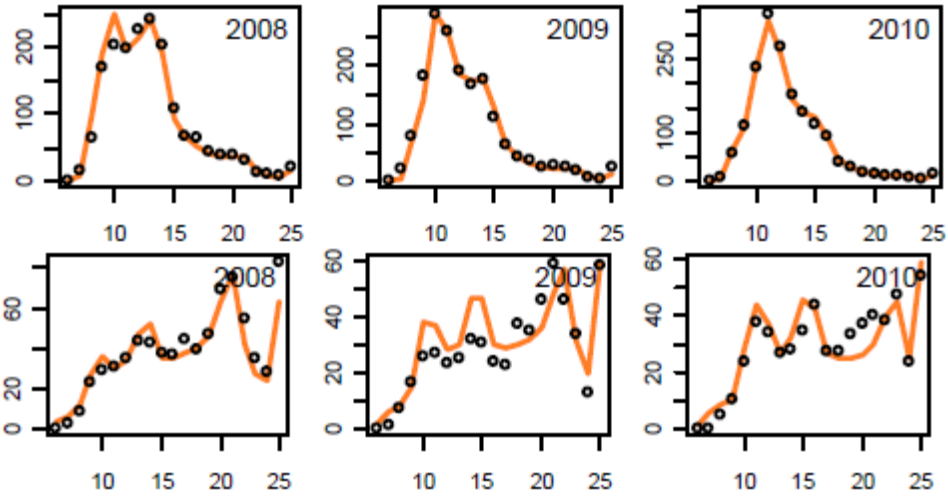

Figure 14. Observed (points) and predicted (lines) commercial catch at age of females (above) and males (below) in the 2008-2010 coastwide model fit. The x axis represents age and the y axis represents catch in thousands.

Estimates of uncertainty

There are a number of ways of estimating the uncertainty associated with a given model fit and biomass estimate. They are all unsatisfactory in that they are conditioned on the correctness of the model when in fact it is the choice of one model rather than another that is the major source of uncertainty in assessments. This is well illustrated by the difference in area-specific biomass estimates between the coastwide and closed-area fits of the IPHC model as reported in past years. One standard method of illustrating uncertainty around an estimate, for a given model, is the likelihood profile. The 95% confidence interval (C.I.) for 2011's Exploitable Biomass (E_{Bio}) is 283 to 355 million pounds, while the 95% C.I. for the Female Spawning Biomass (S_{Bio}) is 309 to 394 million pounds.

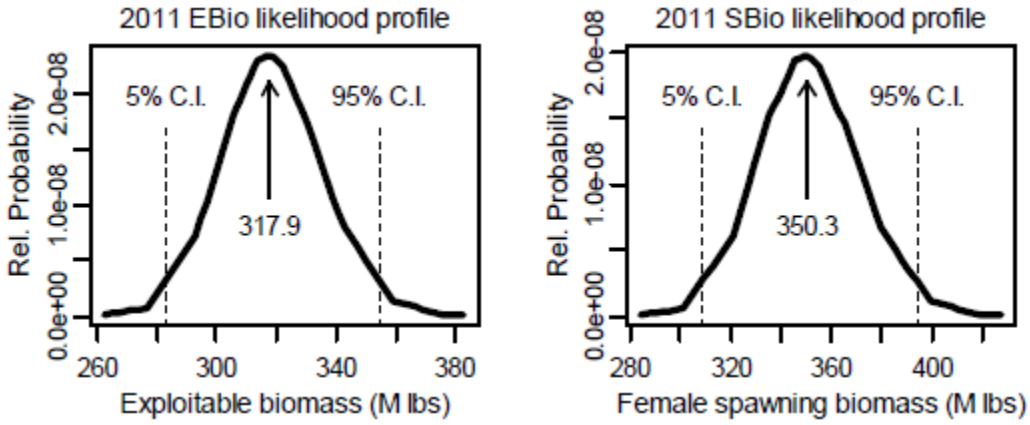

Figure 15. The 95% confidence interval (C.I.) for 2011's E_{Bio} and for S_{Bio}.

It is worth noting that the means of both E_{Bio} and S_{Bio} for all the alternative model fits (Figure 16 below), with the exception of Alternative 4, lie within the 95% C.I. of the Base (production) model estimates. Alternative 4, due to its unrestricted survey catchability parameter and non-use of commercial CPUE has very wide C.I.s, indicating relatively high uncertainty in the biomass estimates.

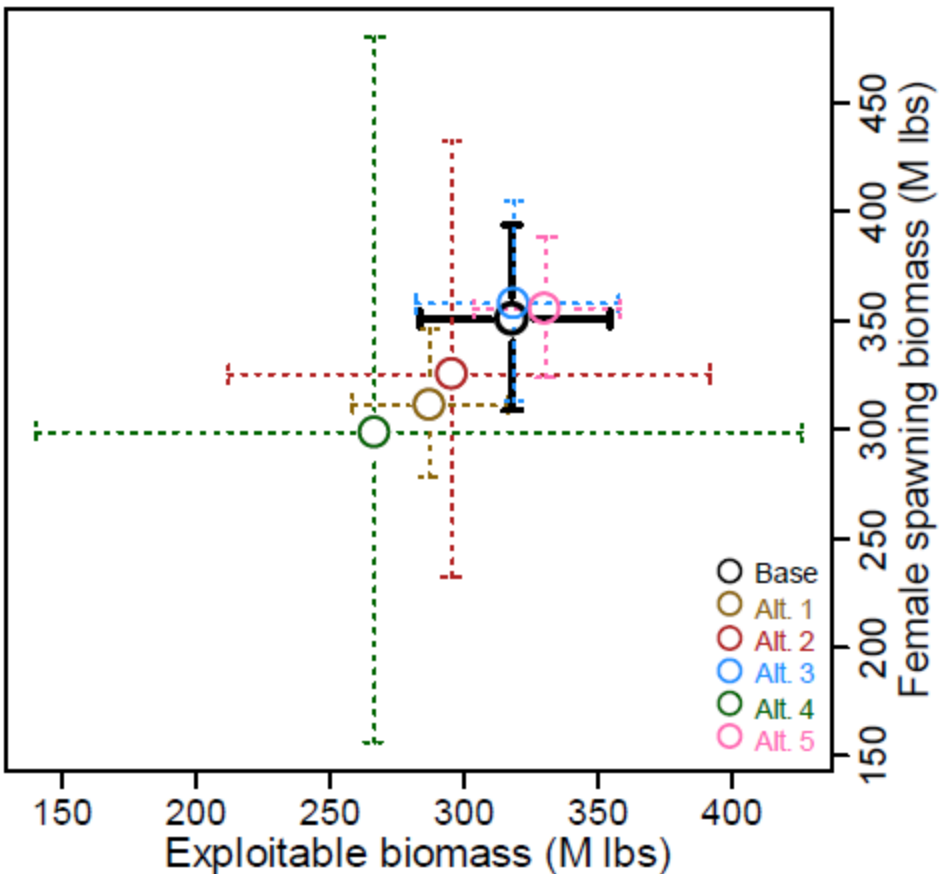

Figure 16: Illustration of maximum likelihood estimates (circles) for E_{Bio} and S_{Bio} for various model fits. The 95% asymptotic confidence intervals for the likelihood profiles are shown by the end caps of the horizontal and vertical lines extending from the circles.

Retrospective performance

As of 2010, IPHC assessments shows modest retrospective behaviour (mis-matching the previous year estimates) for the last few years. Each year the assessment has revised downward the previous year's exploitable biomass estimates, meaning that biomass was overestimated then and may be overestimated now if the cause of the retrospective problem lies somewhere within the model. There is some precedent for that; the assessment models in use in the mid 1990s and the early 2000s showed strong retrospective patterns that turned out to be the result of mis-specified selectivity, age rather than length-based (incoming year-classes would at first be estimated as weak because catch rates were low, but the real reason was low selectivity rather than low abundance).

Note that the retrospective behavior of the female spawning biomass is substantially smaller than that for the E_{Bio}, indicating that the source of the behaviour may be more closely linked to estimated numbers of males, whose selectivity at age has declined along with the growth rate. Please see Figure 17 below.

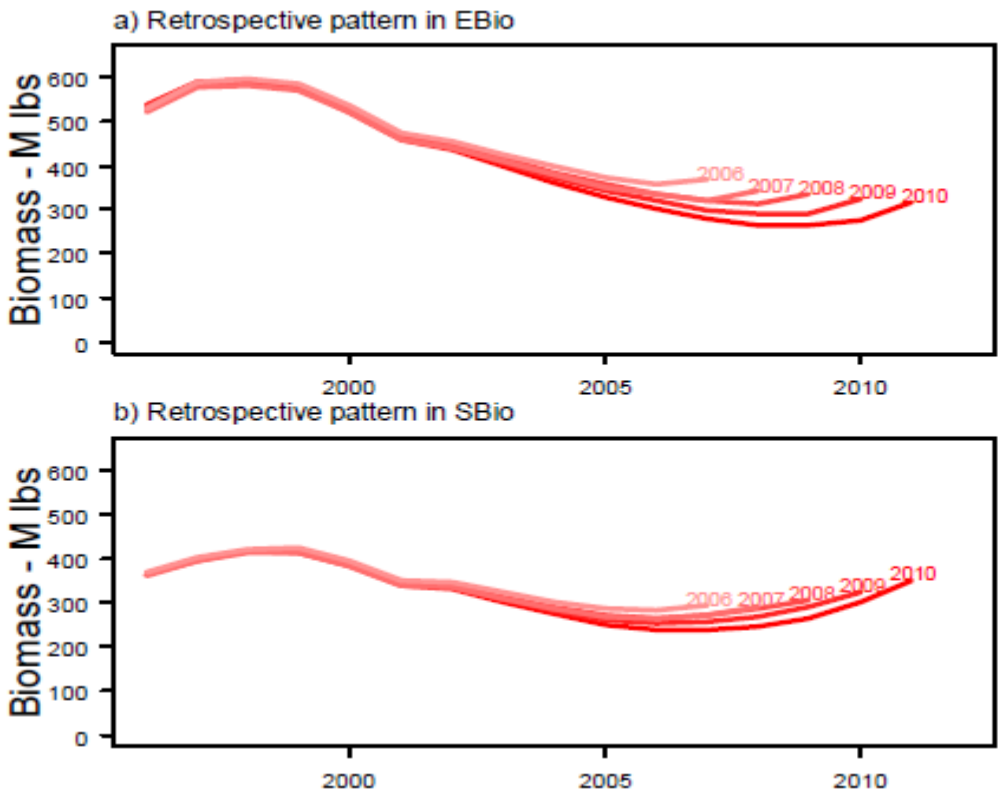

Figure 17: Retrospective pattern in the IPHC's Pacific halibut assessment model, the top panel represents the E_{Bio}, while the lower panel represents S_{Bio}.

In 2007, a check was made using a blind projection of the assessment from 2004 to 2007. Year-class strengths and other parameters from the 2004 assessment, along with just the catches from 2005-2007 which are needed to estimate fishing mortality, were used to project the 2007 age structure and then compared to the 2007 observed age structure. That projection demonstrated that the retrospective behavior appears to be caused solely by the data and not by the assessment model (Clark and Hare 2008). The magnitude of the retrospective pattern from earlier assessments has lessened considerably over the last few years. The difference between the 2010 assessment of the last few E_{Bios} and the earlier assessments of the same E_{Bios} differ generally by less than 15%.

In the case of halibut, it appears that the causes of the retrospective behaviour result from lower number per unit effort catch rates than expected, given the estimated mortality rate. This could be due, for example, to a trend in natural (or undocumented fishing) mortality, or a trend in catchability. However, catchability seems less likely, given that a model which allows catchability to have a trend produces assessment estimates that differ little from models with tightly constrained catchability. IPHC considers it most likely that the retrospective behavior continues to derive in part, if not in whole, from the still declining growth rates. Each year, a new set of size at age data is collected and used to smooth earlier estimates of size at age. The addition of smaller sizes at age results in a reduction of the earlier estimated weights at age thus lowering E_{Bio} estimates for the same number of fish. More important however is that as growth slows, fewer fish of the same age are selected to (caught by) the gear and their lack of appearance in expected numbers forces the model to revise recruitment estimates to match the observed survey and

commercial catch rates. The difference in retrospective behavior for the E_{Bio} vs. the S_{Bio} lends credence to the growth rate change as the prime factor in the retrospective behaviour. The magnitude of the behavior is modest and the trend of successively lowering all earlier E_{Bio} estimates has greatly tapered off. In Hare (2009), IPHC's scientists state that analyses of the recognized patterns in the retrospective behaviour of the stock assessment model will continue. http://www.iphc.washington.edu/papers/sa09.pdf ; http://www.iphc.washington.edu/papers/sa10.pdf.

The background refers to a retrospective pattern where exploitable biomass has been overestimated in recent years and where the fishery has produced harvest rates in excess of the target of 20%. This suggests an inadequacy in performance that has not been noted.

The Assessment Team acknowledges the Peer Reviewer comment.
A sizable portion of this above-target harvest rate comes from the retrospective revision of exploitable biomass estimates. Thus, while the intended rate has been around 0.20, with catch limits based on such a rate, a retrospective revision of exploitable biomass, when combined with unchanged estimates of total removals generates higher realized harvest rates. Another portion of the above target performance results from the Slow Up – Fast Down (SUFD) adjustment which prevents catch limits dropping fully (100%) to the target level indicated by contemporary estimates of exploitable biomass http://www.iphc.washington.edu/papers/sa10.pdf.

A Full Re-Evaluation of the harvest policy, in a Management Strategy Evaluation framework, is currently under development by the IPHC but was stated that is still a year away (from 2010) from completion. http://www.iphc.washington.edu/papers/HPupdate.pdf .

In making catch limit recommendations for 2011, IPHC reports that it has considered the results of the 2010 stock assessment, changes in the commercial and survey indices used to monitor the stock, and a harvest policy that reflects coastwide policy goals. The IPHC staff and the Commission have also been concerned that the Commission's SUFD harvest policy adjustments have not achieved target harvest rate goals in the face of continued stock declines, decreases in halibut growth rate, and the history of high exploitation rates for some areas in recent years. IPHC staff therefore recommends that the SUFD policy be modified to a Slow Up – Full Down (SUFullD) policy, to achieve the necessary reductions in harvest rate and promote increases in exploitable biomass. That is, IPHC recommendations should incorporate the existing policy of a 33% increase from previous year's catch limits when stock yields are projected to increase but use a 100% decrease in recommended catch, when stock yields are projected to decrease http://www.iphc.washington.edu/news-releases/news-releases-2010.html. The SUFullD was presented to the Commission at the November 2010 Interim Meeting, which was webcast to the public. There was a discussion at the IPHC Annual Meeting in January 2011 and the Commission adopted the new measure.

Attention should be drawn to Figures 12 and 16 of the IPHC 2010 stock assessment paper, the trends in the IPHC set line survey biomass index and trends in commercial WPUE. For the whole stock, the survey index has declined linearly by 66% between 1997 and 2010. The commercial index has declined by about 45% over the same time period. The stock assessment results indicate an increase in recent years.

This should be described and explained. It causes me a fair amount of concern given the diagnostics of the assessment model. Apparently it caused some concern among the IPHC Commissioners as well (section 7.1).

The Assessment acknowledges the Peer Reviewer comment.
IPHC have reported the issue of decline in size at age of the Pacific halibut stock and report that it has adopted measures accordingly to ensure the sustainable viability of the stock. Please refer to the previous two responses and the following response (and the ones below) for a more detailed description of this item.

The background also describes large reductions in size at age. This implies a reduction in stock productivity. While a harvest rate of 20% may have been adequate to give maximum production in the past, it could lead to overfishing if stock productivity has been impaired. Related to this, have the biomass reference points been adjusted for changes in productivity?

The Assessment Team acknowledges the Peer Reviewer comment.
Despite the large reductions in size at age in the Pacific halibut stock (attributed to interspecific competition with other flatfish species such as the arrowtooth flounder), productivity does not appear to have been impaired to date. Whilst size at age is declining, nor the Total, the Exploitable biomass or the Spawning biomass appear to be in decline which would indicate impaired productivity. Female biomass is not reported to be impaired, since the level at 2010 is 43% the unfished levels, when threshold and limit level lie respectively at 30% and 20% of the latter. Please see figure 18 below.

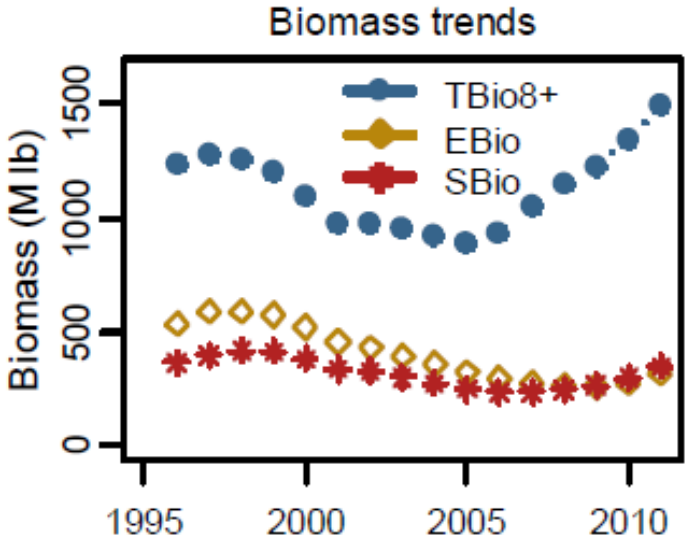

Figure 18: Coastwide Pacific halibut biomass trends (http://www.iphc.washington.edu/papers/sa10.pdf).

In addition the harvest rate of 20% is reduced when needed to 15% (i.e. in 2009, a reduced harvest rate of 0.15 was implemented in Area 3B in part based to the local, more truncated age distribution of the local halibut population; also a 0.15 decrease was implemented in Area 4BCDE) http://www.iphc.washington.edu/papers/sa10.pdf.

Productivity of halibut depends on its rates of recruitment and growth, both of which have varied greatly over the last 70 years. The pronounced change in size at age also has the potential to affect the maturity and egg production of female halibut.

Halibut recruitment has alternated between high and low "regimes" of productivity over at least the past 70 years. Transitions between regimes most recently occurred in 1947 (from high to low) and 1977 (from low to high). Recent research has linked these productivity regimes to an interdecadal mode of pan-Pacific climate variability termed the Pacific Decadal Oscillation (PDO, Mantua et al. 1997). Recruitment for halibut is clearly driven by environmental conditions. The best fit to the recruitment data uses no information on spawning stock size. The best fit for a model using spawning stock as a predictor has regime specific parameter values further verifying the importance of the PDO to halibut recruitment.

In addition, long-term changes in size at age have long been noted for halibut. Halibut of both sexes and all ages 8 and older are substantially smaller than halibut of the same sex and age 30 years ago. However, halibut of the same size at age were seen in the 1920s and 1930s. Clark and Hare (2002) estimated trends in growth using a simple linear model of growth with time varying parameters. Mean weight at age 8 and growth increments were estimated every 10 years between 1920 and 2000 and annual values were then interpolated. The resulting time series for both growth parameters were then plotted against environmental and stock indices. Both growth parameters showed the strongest linear relationship with total numbers of adult halibut (age 10+) with little evidence for an environmental influence. http://www.iphc.washington.edu/papers/sr83.pdf

The current IPHC harvest policy was developed during the 2000s and has remained essentially unchanged for the past five years. The policy is described in detail in several documents (e.g., Clark and Hare 2006, Hare and Clark 2008). The policy was developed with full knowledge of the Pacific halibut decline in size at age trend. http://www.iphc.washington.edu/papers/HPupdate.pdf

The assessment model was modified in an effort to "cure" the retrospective patters. This involved a modification to how growth and selectivity were modeled. This section of the report should address whether this "cure" was appropriate and how it was chosen relative to alternatives? (see NMFS Northeast Fisheries Science Center documents on Groundfish Assessment Review Meetings (GARM) at www.nefsc.noaa.gov/publications/crd/crd0816/pdfs/part1.pdf for alternative explanations and treatments for retrospecitve patterns). For example, an undetected increase in natural mortality could cause the same type of retrospective pattern. The implications of applying the wrong cure can be significant. What measures are there in the management plan to mitigate the wrong choice?

The Assessment Team acknowledges the Peer Reviewer comment.
Primarily, the assessment has reviewed whether the management system is capable of addressing issues in the fishery. This does require analysis of the decisions taken and of the outcomes of decisions where they are measurable and reportable.
As shown by the history and evolution of the assessment model used by IPHC stock assessment scientists, the model has been updated and improved through the years, decreasing sequentially its retrospective behaviour. A detailed description is provided in http://www.iphc.washington.edu/papers/sr83.pdf. Also the assessment team notes that the biomass estimates for the stock are in most cases revised downwards. This means that despite the fact that any given first prediction may have a degree of overestimation on it, the second

estimation of the model revises and lowers the biomass prediction for that given year and the prediction for the following year. Hence, it is felt, that there are mitigating measures available to management if wrong choices are taken.

Please see the description and evaluation of the assessment model illustrated in the first response of section 5. The current retrospective pattern is considered mild. IPHC considers it most likely that the retrospective behavior continues to derive in part, if not in whole, from the still declining growth rates. Each year, a new set of size at age data is collected and used to smooth earlier estimates of size at age. The addition of smaller sizes at age results in a reduction of the earlier estimated weights at age thus lowering E_{Bio} for the same number of fish. More important however is that as growth slows, fewer fish of the same age are selected to the gear and their lack of appearance in expected numbers forces the model to revise recruitment estimates to match the observed survey and commercial catch rates. The difference in retrospective behavior for the E_{Bio} vs. the S_{Bio} lends credence to the growth rate change as the prime factor in the retrospective behaviour. The magnitude of the behavior is modest and the trend of successively lowering all earlier E_{Bio} estimates has greatly tapered off. In Hare (2009), IPHC's scientists state that analyses of the recognized patterns in the retrospective behaviour of the stock assessment model will continue. http://www.iphc.washington.edu/papers/sa09.pdf ; http://www.iphc.washington.edu/papers/sa10.pdf.

The assessment team felt that evidence demonstrates that IPHC is very responsive to issues threatening the productive viability of the Pacific halibut stock. For example, during the IPHC Annual Meeting in January 2011 the IPHC adopted the SUFullD policy, in place to achieve the necessary reductions in harvest rate and promote increases in exploitable biomass. That is, staff recommendations should incorporate the existing policy of a 33% increase from previous year's catch limits when stock yields are projected to increase but use a 100% decrease in recommended catch, when stock yields are projected to decrease http://www.iphc.washington.edu/news-releases/news-releases-2010.html.

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.

This section is very confusing and should be clarified. As it currently stands, the assigned rating is unsupported.

It is clear from the background and text in this section that the IPHC follows a pre-determined decision rule when setting the total allowable catch for the stock. The decision rule uses biological reference points related to a target harvest rate and stock biomass. This is common practice in many fisheries and there is supporting documentation for such an approach in the literature.

However, the specific details of the biomass reference points are unclear. Up until this section, and in this section, the threshold and limit reference points are defined as 30% and 20% of the estimated unfished biomass. How is the unfished biomass determined? Reference is made to average recruitment being involved, how?

The Assessment Team acknowledges the Peer Reviewer comment.

The unfished female spawning biomass ($B_{unfished}$) is computed by multiplying Spawning Biomass per Recruit (SBR, from an unproductive regime) and average coastwide age-six recruitment (from an unproductive regime) and is reported in http://www.iphc.washington.edu/papers/sa10.pdf). SBR can be defined as the total weight of mature female halibut remaining in the ocean under different levels of fishing, at *equilibrium conditions,* divided by the average number of halibut recruits. This is typically scaled down as a percent of SBR under conditions of no fishing and no loss of recruitment.

The recruitment scaling uses the ratio of high to low recruitments based on long term recruitment estimates from Areas 2B, 2C and 3A and applied to the current coastwide average recruitment (Clark and Hare 2006) which IPHC believes, represent a productive regime. The SBR value, computed from Area 2B/2C/3A size at age data from the 1960s and 1970s (all time lows) is 118.5 lbs per age-six recruit. Average coastwide recruitment for the 1990-2001 year classes (computed at age-six) is 21.5 million, and the estimate of unproductive regime average recruitment is 6.84 million recruits. This gives a $B_{unfished}$ of 811 million pounds, a 20% Biomass (B20) of 162 million, a 30% Biomass (B30) of 243 million pounds, and the 2011 female spawning biomass value of 350 million pounds establishes the current female spawning biomass ($B_{current}$) as 43% of $B_{unfished}$, up from the 2010 beginning of year estimate of $B_{current}$ of 38% (http://www.iphc.washington.edu/papers/sa10.pdf).

For the first time in the report in section 6.1.2, reference is made to the previously observed minimum stock biomass reached in the mid-1970s as a biomass limit. What does this mean?

The Assessment Team acknowledges the Peer Reviewer comment.

The CEY policy is designed to achieve maximum sustainable yield in the long term while assuring that spawning biomass will remain above the historical minimum reached in the 1970s (when strong year-classes were produced despite relatively low spawning biomass) http://www.iphc.washington.edu/papers/uncertain.pdf . The rationale for selecting a limit and threshold has to do with what has historically been observed for the stock. If a stock has been monitored long enough to observe a descent to, and recovery from, a low point then that low point may be a "safe" minimum limit. IPHC followed this second rationale in establishing a minimum biomass threshold and limit for Pacific halibut. The minimum observed spawning biomasses for the three IPHC core areas all occurred in the mid 1970s, approximately 9 million pounds in 2B, 13 million pounds in 2C and 42 million pounds in 3A. By virtue of precautionary approach, these become the spawning biomass limits. No proof is available of exploiting the stock below this limit point and achieving sufficient recruitment to rebuild the stock to sufficient levels (http://www.iphc.washington.edu/papers/sa10.pdf).

It would be very helpful to have a graph of spawning biomass vs. time for the entire assessment period.

The Assessment Team acknowledges the Peer Reviewer comment and presents a graph of spawning biomass vs. time from 1996 to 2011 (**Figure 19**) and a prediction up to 2016 (**Figure 20)**.

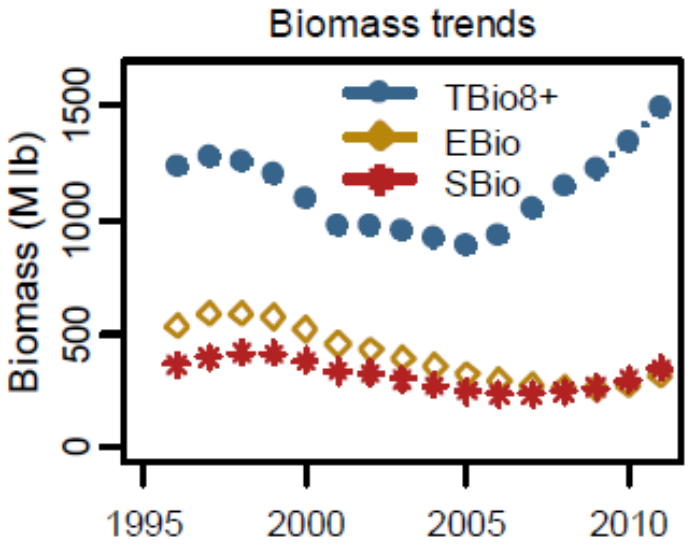

Figure 19. Coastwide Pacific halibut biomass trends. http://www.iphc.washington.edu/papers/sa10.pdf).

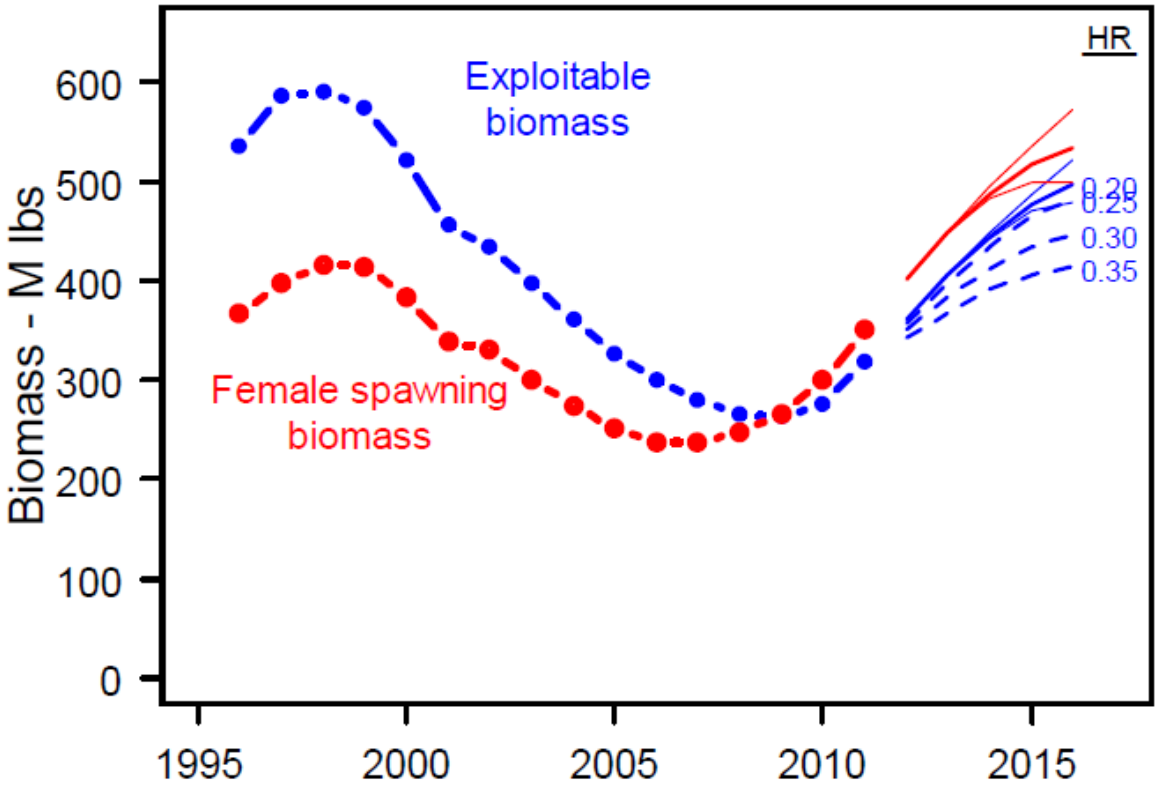

Figure 20. Projected exploitable and spawning biomasses for the coastwide population of Pacific halibut, with provision of simulation of Harvest Rates spanning from 0.2 to 0.35. The thicker solid blue and red lines represent respectively Exploitable biomass and Female Spawning biomass at 20% exploitation level. Both of these increase from current levels under a 0.2 harvest rate scenario.

The "Slow Up Fast Down" rule is mentioned but it is not described, otherwise one cannot review its performance.

The Assessment Team acknowledges the Peer Reviewer comment.
At its core, the policy has a target harvest rate on the exploitable biomass, which is defined by commercial selectivity at length. The target harvest rate was established through simulation modeling of a halibut fishery and a range of life history processes including alternating high and low recruitment regimes and density dependent growth. The choice of harvest rate represents a precautionary balance between catch and spawning biomass preservation. The current target harvest rate of 0.20 results in a reduction of SBR to 32% of that estimated for the unfished state. In areas of particular concern, the target harvest rate has been lowered to 15% representing extra caution (http://www.iphc.washington.edu/papers/sa10.pdf).

The SUFD catch quota adjustment has been utilized since 2001. Implementation of the SUFD adjustment was essentially a formalization of a process the Commission had often used at the Annual Meetings to arrive at each year's commercial Catch Limits. The rationale was that many factors could influence annual estimates of biomass and sustainable catch but, due to the relatively widespread age structure of halibut, true annual variations were likely to be not as large as the estimates. Thus, changes in available catches were generally phased in over time and a working procedure was developed such that decreases were phased in more rapidly than increases. Specifically, if a reduction in available catch was recommended, 50% of the reduction was implemented whereas if an increase was recommended, only 33% of the increase was implemented. While many agencies around the world employ a similar process of graduated changes in catch limits or realized harvest rates among years (e.g., the European Union Common Fisheries Policy has a tiered system of allowable changes in Catch Limits, based on knowledge of the stock; permissible changes range from 15-25%), the IPHC employs asymmetric control rules for changes in catch limits among years http://www.iphc.washington.edu/papers/HPupdate.pdf.

Figure 10 is poorly drawn. The axis units are not given and I presume it is a hypothetical view of the rule and not specific to Pacific halibut. The unfished biomass is about 500 biomass units, 30% of that is 150 units, and 20% is 100 units. The inflection points for yield vs. biomass are not in the right places. The maximum yield is at 250 biomass units in the graph. There is nothing in the graph to indicate how a harvest rate of 20% would get you there. In fact, the effectivness of the target harvest rate is not documented.

The Assessment Team acknowledges the Peer Reviewer comment and makes reference to the following published reports cited in the evidence.
http://www.iphc.washington.edu/papers/sa10.pdf,
http://www.iphc.washington.edu/papers/sr83.pdf,
http://www.iphc.washington.edu/papers/HPupdate.pdf.

To summarize these; IPHC presents an evaluation of the efficacy of different target rates including the 0.2 harvest rate chosen by IPHC.

In regards to Figure 10, it was taken from the latest 2010 IPHC stock assessment paper and it is meant as a representation of the IPHC harvest policy. The background curve illustrates theoretical

relationship between biomass and surplus production, taken as yield. The slope of the straight line is a 20% harvest rate (Yield/Exploitable biomass), and the harvest rate decreases linearly to zero as the biomass approaches established reference points, termed the female spawning biomass threshold and limit. The scatter about the harvest rate indicates the effect of the "Slow Up Fast Down" adjustment to catch limits in term of realized harvest rate.

The effectiveness and rate of exploitation for Pacific halibut has been modelled by IPHC scientist to produce the most precautionary balance between catch and spawning biomass preservation.

The harvest policy builds upon an understanding of the long term dynamics of the stock, and is investigated using a simulation model that incorporates time varying stock dynamics. For this reason, the harvest policy is developed based on the productivity of the IPHC "core" areas, i.e., Areas 2B, 2C and 3A.

In Clark and Hare (2004), harvest rates up to a maximum of 0.40 were investigated; values higher than 0.40 sometimes drove spawning biomass below the limit, but values equal to or less did not. Thus, a harvest rate of 0.40 functions in the same manner as the "maximum fishing mortality threshold" that is defined under National Standard 1 for NMFS' managed groundfish stocks. By that definition, harvest rates above the reference value of 0.40 would constitute "overfishing". By restricting allowable harvest rates to the range of 0.00 to 0.30, allowance is made for observation error in estimates of exploitable biomass. Analysis of retrospective pattern in halibut assessments indicates that initial stock biomass estimates have a coefficient of variation of 10-15% (Clark and Hare 2005). Thus, even with a persistent underestimate of the true stock biomass, restriction of harvest rates to a maximum of 0.30 would ensure that the maximum rate of 0.40 would not be reached.

For each harvest rate and area, simulations run forward (from currently estimated numbers and weight at age) for 150 years to establish equilibrium conditions, and performance statistics are tabulated for the next 100 years. Two hundred Monte Carlo replicates are run and results are averaged across replicates. Many population and catch indices are tracked in the simulations; for purposes of selecting a harvest rate, four sets of indicators are used: average catch, frequency of spawning biomass reaching the threshold, realized average harvest rate, and long term average spawning biomass relative to unfished level. Other indicators of interest include, e.g., female proportion in the catch, numbers of age 20+ fish remaining in the population, average weight of fish in the catch, etc...

A reference set of simulations and results are developed for the "Most Likely" scenario, i.e., one incorporating all dynamics as outlined above. In addition to reporting results for the "Most Likely" scenario, a second set of results are shown for an alternative scenario—the "Low Growth" scenario. This scenario is utilized to test the robustness of the harvest policy to what is likely the most critical of the dynamic life history traits: density dependent growth. Under this scenario, it is assumed that the current low growth rates—attributed to large numbers of fish in the population—are instead the result of some fundamental ecosystem change. Alternatively, a low growth rate might occur if the halibut population had been "culled" of fish with a genetic Disposition towards rapid growth. This alternative scenario is believed to be the most realistic alternative scenario. In previous analysis, other scenarios were examined, including redistributed recruitment among areas and continuous low recruitment levels (Hare and Clark 2003).

Under the Most Likely and Low Growth scenarios, differences between growth scenarios are greatest in Area 3A because the density dependent variation in growth is greatest there. Average annual yield increases rapidly from a harvest rate of 0.00 to 0.20 and then increases only moderately up a harvest rate of 0.30. Average spawning biomass declines sharply in response to fishing. At a harvest of 0.20, average spawning biomass declines to 24-36% of the unfished average. At a harvest rate of 0.30, average spawning biomass drops as low as 15% of the unfished value in Area 2B. The realized harvest rate begins to drop below the target harvest rate at a target harvest rate of 0.20 and accelerates rapidly thereafter. Under the Most Likely scenario, at a target harvest rate of 0.25 the minimum biomass threshold is reached 21-29% of the time in the three IPHC area 2B, 2C and 3A. At a harvest rate of 0.30, the threshold is reaches approximately twice as often as at a rate of 0.25. However, at a slightly reduced harvest rate of 0.225, the frequency of reaching the threshold is less than half the frequency at 0.25 http://www.iphc.washington.edu/papers/sr83.pdf.

In recent years, there have been several advances in IPHC understanding of halibut population dynamics. Several substantive changes have also occurred in the stock assessment model used to estimate population. Among the most important changes since the last published analysis of the harvest policy (Sullivan et al. 1997) are: a lower natural mortality rate, independent accounting of sexes, quantification of aging error, length-specific selectivity, and the new views about factors affecting growth and recruitment. A constant harvest rate policy has served the halibut population well but needs to be re-examined in light of these changes http://www.iphc.washington.edu/papers/sr83.pdf.

A Full Re-Evaluation of the harvest policy, in a Management Strategy Evaluation framework, is currently under development by the IPHC but is still a year away (from 2010) from completion. http://www.iphc.washington.edu/papers/HPupdate.pdf.

Figure 12 is quite useful for evaluating management performance. It is clear from the figure that the actual harvest rate has risen above the target rate. One needs to be cautious interpreting the recent tendency toward reduced harvest rate and increasing biomass because of the retrospective pattern in the stock assessment results.

Finally, the target harvest rate is 20% and it has not been modified since the simulation work was originally done despite reductions in size at age. It is likely that the stock is less productive now relative to when the size at age was higher. Has this been taken into account?

The Assessment Team acknowledges the comment.
Please refer to the 4th response to comments in section 5 section and the previous comment in this section. In Clark and Hare (2004), harvest rates up to a maximum of 0.40 were investigated. Reduced size at age trends and the relative implications with stock productivity have been taken into account in recent years since they are part of a long known and documented phenomenon.

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.

I agree with the rating assigned for this section. The Alaska halibut fishery is well monitored and managed. There are clearly stated objectives for the fishery, the management plan has

reference points indicating desirable outcomes, undesirable outcomes (limit reference point), and a plan to move the stock from an undesirable place to a desirable place. The plan is well supported by science, industry, and fishermen.

However, I have a few small points.

The statement in section 7.1 that the SUFD approach works well because the assessment generally has a better information base for estimating decreasing biomass compared with increasing biomass; and second, such an asymmetric policy follows the Precautionary Approach is taken verbatim from the 2010 stock assessment document (sa10.pdf) where it is unsupported by original research or citation. This is a strong statement that, at face value, gives one confidence that the rule works well and fulfils requirements under the PA. It needs to be supported.

The Assessment Team acknowledges the comment.

NPFMC and Pacific Fisheries Management Council (PFMC), through their Scientific Statistical Committees undertake on-going review of the Commissions scientific output.

The SUFD catch quota adjustment has been utilized since 2001. Implementation of the SUFD adjustment was essentially a formalization of a process the Commission had often used at the Annual Meetings to arrive at each year's commercial CL. The rationale was that many factors could influence annual estimates of biomass and sustainable catch but, due to the relatively widespread age structure of halibut, true annual variations were likely to be not as large as the estimates. Thus, changes in available catches were generally phased in over time and a working procedure was developed such that decreases were phased in more rapidly than increases. Specifically, if a reduction in available catch was recommended, 50% of the reduction was implemented whereas if an increase was recommended, only 33% of the increase was implemented. While many agencies around the world employ a similar process of graduated changes in catch limits or realized harvest rates among years (e.g., the European Union Common Fisheries Policy has a tiered system of allowable changes in Catch Limits, based on knowledge of the stock; permissible changes range from 15-25%), the IPHC employs asymmetric (i.e. Small Increase, Full Decrease) control rules for changes in catch limits among years.

The SUFD quota adjustment was not always recommended by staff but in general it was more often applied than not. Following the 2006 Center for Independent Expert review (Francis 2007, Medley 2007), the SUFD adjustment was formally investigated as part of the harvest policy and became official IPHC policy (Hare and Clark 2008). Over the past few years, however, as biomass declines have persisted, there has been a growing concern among staff bout continued use and application of the SUFD adjustment because some of the conditions the stock is currently experiencing were not included in the original evaluation of the SUFD. In the simulations that supported the SUFD quota adjustment it was found that, over the long term, SUFD was more precautionary than a harvest strategy without the adjustment. In other words, average spawning biomass was slightly higher and removals slightly lower with the adjustment (Hare and Clark 2008). This can be anticipated from the asymmetrical nature of the adjustment; more catch is "surrendered" during times of yield increases than is taken during periods of yield declines. However, this net benefit is only realized over the long term, which would include periods of both biomass and yield increase and decrease. http://www.iphc.washington.edu/papers/HPupdate.pdf.

In recent years the final Catch Limits have been within 0.5-1.0 million pounds (1-2%) of the sum

of the individual regulatory area SUFD catch limit recommendations. However, those values were already 4-5 million pounds greater than the fishing level at Constant Exploitable Yield (F_{CEY}) values. Although this overall departure could be argued to be relative small at the coastwide scale, it is crucial to point out that the SUFD adjustment is not applied coastwide but on an area by area basis, where departures between the adopted Catch Limits and the F_{CEY} have been much larger for some areas (e.g. 41%-103% in 2A, 35%-94% in 2B, 58%- 84% in 2C). Therefore, the realized harvest rates have consistently been in excess of the target harvest rate for some areas. There is an additional argument against continued present use of the SUFD adjustment. In the simulations that supported the SUFD, halibut size-at-age was held constant over time. It is an ongoing concern, however, that size at age has continued to decline). This may cause stock decline as the Growth component of the model is now contributing less to the halibut stock then previously modelled and planned for. IPHC scientists note that modifications to the SUFD policy in future years to minimize the problem of persistent periods of unidirectional trends affecting biomass. For example, a policy of Slow Up – Full Down, wherein management consistently took the full decrease recommended by the F_{CEY}, would achieve such a goal http://www.iphc.washington.edu/papers/HPupdate.pdf). This policy has been adopted by the IPHC in early 2011.

The statement in section 7.1.1 that the IPHC staff take a responsible approach to managing the resource is a little inaccurate. The IPHC does not manage the resource. The fisheries in Alaska are managed by the NPFMC, NMFS and ADFG. The IPHC assess stock status and recommend management measures, the largest of which are catch limits.

The Assessment Team acknowledges the Reviewer comment.
The Assessment Team make the comment that IPHC uses a responsible approach in managing the 'scientific assessment' of the resource and in apportioning catch limits between regulatory areas. It is recognized and acknowledged that the NMFS, the NPFMC and ADFG manage the harvesting of the resource through assignment of annual catch shares in the various regulatory areas, debits to IFQ accounts, enforcement actions, reporting requirements, etc... IPHC manages the scientific assessment of the status of the resource. The catch limits are assigned by the IPHC in the various regulatory areas, after performing stock assessment estimates and other related scientific studies. By setting catch limits, the IPHC is above and beyond providing scientific advice. Therefore IPHC is taken as part of management of the resource while other agencies manage the fisheries.

While the SDFU approach has some desirable qualities, it was abandoned in 2010 due to concerns over declining catch rates. That a rule can be abandoned when it isn't working is encouraging, this indicates a certain weakness in the rule.

The Assessment Team acknowledges this comment.
Please refer to previous responses on the newly adopted IPHC's SUFullD policy.

Section 7.2 applies to new and developing fisheries. The Alaska halibut fishery is well established. In my opinion, this section does not apply.

The Assessment Team acknowledges this comment. The rationale presented is in some respect based on existing evidence and that the existing management framework, legislative regime and policies would be conducive to ensuring a responsible approach to the development of any new

halibut fisheries.

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.

The initial sentence in 8.1 implies that the IPHC actively manages the species. This is an overstatement, in my opinion. The IPHC provides scientific advice on fisheries management. The NPFMC sets limits. The NMFS and ADFG manage fishing activities.

The Assessment Team acknowledges the comment.
However, IPHC is part of management in that they assign catch limits in different regulatory areas, after performing stock assessment estimates and other related scientific studies. By setting catch limits, the IPHC is above and beyond providing scientific advice. Please see the response in the previous section 7.

Section 8.1 states that the IPHC accounts for the effects of harvesting on species other than halibut when providing catch advice. I do not recall an example of when this is done.

The Assessment Team acknowledges the comment.
Section 8.1 precisely states that "They account (IPHC) for the effects of harvesting on both the population being harvested and on dependent and related populations." This is a mis-statement that was intended to state "They account for the effects of harvesting on the population being harvested and conduct studies on the occurrence of seabirds and estimate on bycatch during the yearly performed setline surveys.

The first paragraph of section 8.1.1. could simply restate how the TAC decision rule works to sustain the reproductive capacity of the halibut population.

The Assessment Team acknowledges the comment.

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

The assigned rating is well supported by the evidence presented here and in other sections of the report.

No comment required.

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 well supported by the evidence presented in this section of the report.

No comment required.

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 well supported by the evidence presented in this section and elsewhere in the report.

No comment required.

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 well supported by the evidence presented in this section and elsewhere in the report.

No comment required.

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 well supported by the evidence presented in this section and elsewhere in the report.

No comment required.

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

Fisheries enhancement is not used in this fishery and this section is not applicable.

No comment required.

Peer Reviewer B

Summary and Recommendation

I have completed a thorough review of the document that assesses the US Alaska Pacific Halibut Commercial Fishery within the 200 mile EEZ for an FAO-based analysis of responsible fisheries management leading to certification. In my previous position I had spent nearly 20 years participating in direct US management at the level of the North Pacific Fisheries Management Council or oversight of the international management (IPHC) of the halibut fishery. This includes knowledge of commercial, sport and subsistence fisheries and the groundfish fisheries which bycatch halibut.

The document of certification presented a true and clear assessment of the fishery, its management, the research and the implications of management on the stakeholders. The drafting team adequately addressed the FAO criteria and provided sufficient evidence that supported “High Adequacy Ratings” for the vast majority of the sub-clauses supporting the 14 FAO main criteria. While I have included a fairly extensive set of section by section, item by item set of comments; my comments are meant to bolster the analysis rather than detract from the quality of the document. Without my comments, the essence of the report still leads to a conclusion that the Pacific Halibut Fishery is clearly one of the best managed fisheries in the world, and clearly merits certification.

Summary review of Peer Reviewer B for each of the fundamental clauses A-F.

Clauses	
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.

This section is correct – additional points by item follow:

- **1.2.3** All fishery removals and mortality must be considered by the management system. More could be said about the assessment of bycatch in non-halibut target fisheries. The groundfish observer program estimation of halibut bycatch is entered into the annual total removal calculation. Added.
- **1.3** Add that the IPHC forum leads to a cooperative structure between the states (US/Canada) to provide a joint management and conservation system resulting in sustainable fisheries. Added.
- **1.4** Add that the NPFMC, PFMC, NMFS, ADFG and DFO all share in the responsible management of the IPHC, and with the public bring the local coastal interests and perspectives to the AP, the PAG and then to the Commission. Added.
- **1.5** The NPRB has funded some of this basic research (http://project.nprb.org/filter.do). Added.
- **1.6** Note that the public (stakeholders, environmentalists, and communities) may submit proposals to address conservation and management issues. When this is done, IPHC's staff provides an analysis that evaluates the implications of the proposed change. Clarified.
- **1.7** While it is true that most of the Commission's decision-making is completed in the administrative meetings, these are Bi-lateral Government to Government meetings required under a Treaty Commission. The actual decisions are the result of transparent scientific information and the AP & PAG's advice that has been vetted through public sessions and presented to the Commissioners. Clarified.

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 section is well documented with appropriate sources of evidence. It describes the framework that is the basis of evaluating the fishery management process and changes to that process and implications from such proposed changes. Additional points by item:

- **2.5** Add in the 9th paragraph – Each NPFMC decision package includes the NEPA evaluation that describes the social and economic impacts of the proposed action on the resource, the stakeholders, the communities and the public at large. Added.

- **2.6** 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. Clarified.
  For Oceanography, the NPRB has funded 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 halibut and other marine species http://www.pmel.noaa.gov . Added.

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

This section is clear and well documented – with the following additions by item:

- **3.1** Note that the federal MSA legislation contains many long-term management objectives for sustainable harvest, habitat protection, social economic objectives and strategies to develop rationalized fisheries. NMFS and the NPFMC have adopted these objectives, but they are laid out in the MSA (www.nmfs.noaa.gov/sfa/magact). Clarified.
- **3.2.2** The NEPA analysis of the various amendments to halibut management in the NPFMC – halibut charter, halibut IFQ, etc., all contain discussions of the economic conditions under which responsible fisheries are promoted. Clarified.
- **3.2.3** Note that the original quota share allocation was by vessel size category to protect small coastal artisanal vessels from having quota consolidate into large industrial vessels away from coastal communities. Clarified.
  *Note that "The interests are Alaska Natives are taken into account (add: "through subsistence harvest and through") (delete "by") the Community Development Quota (CDQ) and Community Quota Enterprise (CQE) programs. And that "among six small (add: economically disadvantaged) Alaska Native communities …" Added.
- **3.2.4** "Conservation of aquatic habitats and biodiversity are integral parts of NPFMC's management process. " In fact, this is required under the MSA – EFH. Added. (www.nmfs.noaa.gov/sfa/magact/).
- **3.2.5** Control of the rate of removal, or the amount of fishing on each stock, was made possible by amendments in the Treaties of 1930 and 1937, which authorized the division of the coast into areas and the limitation of the catch in each area (from item 5.1) (http://www.nmfs.noaa.gov/fishwatch/ species/pacific_halibut.htm). Added.

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 section on science and stock assessment is well described and has adequate evidentiary links. Would add one small note under:

- **4.3** That recognizes that the NEPA document analysis evaluates social, economic and institutional factors relevant to the fishery. Added.

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.

This section again provides adequate justification and evidence that stock assessment and biological considerations of the stock are researched and analyzed. Points I would add to each item are:

- **5.1** As part of the annual IPHC staff activities they conduct (1) funded research (2) contract research and (3) un-funded research. These research projects directly support halibut fishery management. Added.
- **5.2** Note that both staff from the IPHC and NMFS scientists have researched the impacts of climate change, competition with other flatfish stocks and considerations of the impacts of ocean acidification. Added.
- **5.2.1** Changes to 2nd paragraph: "However, (add: there has been a dramatic decline in size-at-age, resulting in) the large changes in growth rates that occurred during the twentieth century. These appear to have been density-dependent responses to changes in stock size, (add: and competition with expanding flatfish stocks in general) with virtually no environmental influence. Added.
- **5.3** Add "the IPHC encouraged the NPFMC to adopt economic management incentives; it later adopted the IFQ program after the NEPA analysis described the gains in optimum utilization." Added.
- Change the 3rd paragraph to read: 'In the early 1980s the IPHC conducted research on capture efficiency of circle vs J hooks. They determined that using circle hooks lowered the mortality of undersized halibut caught and released during fishing. In 1983, industry made the operational switch from J-hooks to circle hooks in the commercial fishery http://www.iphc.washington.edu/publications/annual/ar1983.pdf . Added.
- **5.4** Add that "The annual IPHC research projects are voted on and adopted by the six Commissioners. These projects are all directed toward improving the knowledge of halibut stocks and their biology http://www.iphc.washington.edu/research.html . Added.

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.

As all sections, well described and referenced. Small additions follow:

- The SUFD approach is correct in the document in section 6.1.1. But it needs to be expanded to encompass what occurred this year with SUFullD. They have adopted an even more precautionary approach to address the implications to stock directional changes under the current models that could not adjust for the change of size-at-age and its impact on catch limit projections. Here is what happened:

"The staff and the Commission have also been concerned that the Commission's Slow Up - Fast Down (SUFD) harvest policy adjustments have not achieved target harvest rate goals in the face of continued stock declines, decreases in halibut growth rate, and the history of high exploitation rates for some areas in recent years. The staff therefore recommends that the SUFD policy be modified to a Slow Up - Full Down (SUFullD) policy, to achieve the necessary reductions in harvest rate and promote increases in exploitable biomass. That is, staff recommendations would incorporate the existing policy of a 33% increase from previous year's catch limits when stock yields are projected to increase but use a 100% decrease in recommended catch, when stock yields are projected to decrease." The SUFullD was presented to the Commission at the November Interim Meeting, which was webcast to the public. There was a discussion at the Annual Meeting in January 2011 and the Commission adopted it. Added.

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.

As all sections, well described and referenced. Small additions follow:

- Section 7 again has a discussion regarding "SUFD". See 7.1, the revision suggested above under section 6 should be incorporated here and other places in the document where SUFD is discussed. Added.
- A number of places in the document TAC or Total Allowable Catch are used. This is an incorrect IPHC definition. IPHC uses "Catch Limit" when they talk about halibut in the same context as the NPFMC talks about groundfish TAC. Replace TAC and Total Allowable Catch with the term Catch Limit where appropriate (i.e. there may be a discussion on groundfish TAC which would be correct). Corrected.
- **7.2** In 2nd paragraph regarding Area 4 – the information is a little incorrect. In 1982 there was only one Area 4. In 1983 Area 4 was subdivided into Area 4 A-D. In 1984 Area 4-E was added, so that there was 4 A-E. I remember from being there, Area 4-E was meant to be a test fishery, with short openings to discourage large vessels and provide closures to count up the catch so as to not exceed the target catch limit http://www.iphc.washington.edu/publications/annual/ar1984.pdf. Clarified.
- **7.2.2** Add in that: in 1932 IPHC begins quota management by setting annual catch limits http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm . Added.
- **7.2.4** SUFD in context of "rather than the partial (50%) reductions...". Added.

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.

As all sections, well described and referenced. Small additions follow:

- **8.1** Fix first bullet point to read; Improving the annual stock assessment and quota

recommendations (add: based on the Harvest Control Rule – Constant Harvest Rate to determine available yield (CEY)); Added.

- **8.1.1** 2nd paragraph. 3rd sentence – change to read: economic output given the value of fresh fish markets (add: "which increased optimum utilization") Added.
- **8.2** 2nd paragraph. 2nd sentence – change to read; interest to multiple user groups (traditional, sport, and commercial) (add: "who have a legitimate interest in the use and management of this fishery resource"). Added.
- **8.3** Fix TAC and SUFD issue as before. Added.
- **8.4** Change TAC to Catch Limits; address "bycatch of other fish species is not very well documented, especially in the >60 portion of the fleet" as suggested earlier. Clarified.
- **8.4.1** Modify to read: "Seasons are established in regulation by the IPHC (add: "to protect halibut stocks during the winter spawning migration"). Open and closed periods, as well as fishing period limits are set in regulation. (Move paragraph 6 on "General spawning" up to this part)". Added.

  *Then modify next paragraph: Regulations are in placed to address discards. They state: "All halibut that are caught and are not retained shall be immediately released outboard of the roller and returned to the sea with a minimum of injury by (add: "using careful release techniques".

  http://www.iphc.washington.edu/publications/rara/2010/2010.413.Priorhookinjuriesresultsfromthe2010IPHCSSAandNMFStrawlsurvey.pdf . Added.
- **8.4.2** Modify as: ...Prior to IVQs (replace with IFQs in 3 places in this section), the short season forced the fishers into the same prime areas at the same time, resulting in damaged and lost fishing gear and "ghost fishing," in which lost fishing gear continued to catch fish. From six days in 1990, the season has (add: "now") been lengthened to 245 days. With the longer season, vessels no longer conflict with one another, thereby preventing substantial losses of gear and fish each season. Also, the annual setline survey by IPHC continues to evaluate gear efficiency.*Then – at the end of the last paragraph of 8.4.2 add: "In 1983, industry made the operational switch from J-hooks to circle hooks in the commercial fishery, lowering the mortality of undersized halibut caught and released during commercial fishing http://www.nmfs.noaa.gov/fishwatch/species/pacific_ halibut.htm". Added.

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

As all sections, well described and referenced. Small additions follow:

- **9.1** modify 1st paragraph: 3rd sentence - ...Council (add: during the early 1990s), extensive NEPA analysis was presented, analyzed, and...

  *Last Paragraph states: "Implementation (of the IFQ program) was under Amendment 15 to the BSAI Groundfish Management Plan, and Amendment 20 to the GOA Groundfish Management Plan http://alaskafisheries.noaa.gov/frules/fr59375.pdf". The IFQ program is part of a Plan Amendment, integrating the halibut management framework within the Groundfish FMP. Added.
- **9.1.1 and 9.2** – document again uses TAC instead of Catch Limits. Modified.
- **9.2** "... rather than the partial (50%) reductions used in previous years..." (This is SUFD). Modified.
- **9.3** 3rd paragraph starts out "In 2006 ..."(Change that to: In 1995, initial halibut CDQ was

issued to communities coincident with the issuance of IFQ to commercial halibut fishermen under the NPFMC motion to adopt an IFQ program. The CDQ and IFQ allocations were done under federal regulations.) In 2006, the MSFCMA was amended to establish the Western Alaska Community Development Quota (CDQ) Program (add: under federal statute (a more permanent allocation). Added.

- **9.4** In paragraph. 6 4th line reads - (NMFS) fishing gear researcher under an Experimental Fishing Permit in 1998 (add", and the excluders have been improved over the years"). Results from the experiment. Added.
  * Add a new paragraph between paragraph 6 & 7 -- (add: "The halibut excluder efforts by the flatfish fleet were rewarded when on June 1, 2010, all major flatfish fisheries off Alaska were certified under the Marine Stewardship Council (MSC) environmental standard for sustainable and well-managed fisheries. The certification applies to flathead sole, arrowtooth flounder, rex sole, northern rock sole; and southern rock sole trawl fisheries in designated areas in the GOA and BSAI." Added.

- **9.5** Change to read: "With the implementation of IFQs in the fishery in Alaska, extended seasons reduced the olympic race for fish mentality (add: "that had forced vessels out fishing during storms and competing on crowded derby grounds".) (delete "and therefore") (add: "With IFQs, fishermen") reduced the amounts of gear deployed, and lost during the fishery". Added.
- **9.6.1** Change 1st 3 lines to read: Under the guidance of the IPHC, the public may participate fully in the annual meeting process, where reports on current research and (delete:"TAC setting discussions occur" and replace with "discussions on proposed Catch Limits"). This can be done in person, or... Added.
- **9.7** Add to end of 1st paragraph – "...setline surveys. Cooperative data collection continued on the assessment surveys in 2010. (Add: The annual IPHC setline survey from Oregon to the Aleutian Islands and into the Bering Sea has IPHC staff on board charter survey vessels where, among other things, they continue to assess catchability of the gear.)" Added.
- **9.9** (remember that "although the exploitable biomass of halibut has declined by 50% since the late 1990s, the total biomass of halibut has continued to increase"). Clarified.

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

As all sections, well described and referenced. Small additions follow:

- **10.1** After the last paragraph – add (The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional halibut crew members must pass. Training ranges from firefighting on a vessel, damage control, man-overboard, MARPOL, etc., - http://www.npfvoa.org/).
- **10.2** Add same last paragraph (The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional halibut crew members must pass. Training ranges from firefighting on a vessel, damage control, man-overboard, MARPOL, etc., - http://www.npfvoa.org/).
- **10.4** "sea mammals" should be termed "marine mammals"; then paragraph 5 starts with "This is unpleasant..." – replace that with "Whale interactions are" unpleasant for the fishermen, but there have been no reports of harm to the whales.

- NMFS and NPFMC encourage the use of fishing practices which reduce those interactions, such as avoiding distinctive engine and machinery noise (add "that attracts them").

Clarifications have been provided in order to support the references in the evidence sections of fundamental 10.

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.

As all sections, well described and referenced. Small additions follow:

- **11.3** Change 1st line to read: "There is no legal harvesting of halibut in (add: "the eastern") North Pacific waters outside the national…". Added.

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

No proposed changes in 12 – looks good.
No return comment required.

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.

As all sections, well described and referenced. Small additions follow:

- **13.1** 2nd paragraph – 1st two lines should read – "These agencies utilize the best scientific information available gathered from annual stock assessment surveys, (add: "annual research projects") onboard observer coverage,…" Added.
- *Para 6 on BYCATCH should note – "…well documented, especially in the <60' portion of the fleet (halibut fleet is currently not well observed on any sized vessel). Halibut long-line fisheries can be highly selective depending on the area…" Clarified
  * on paragraph starting "Although marine mammals... at line 6 "...A recent NMFS report on (replace "sea" with "marine" mammals interaction in the groundfish fisheries recounts that no Steller sea lion (eastern and western stock) were accidentally by-caught by the halibut commercial longline fishery between 2000 and 2004. No other otariids species were documented in the report. (replace "In the same," with "Similar non-harmful interactions with whales") were documented between 1998 and 2004..." Added.
- **13.1.1** 2nd paragraph "The effects of lost/abandoned gear on legal (delete "and") O32 halibut

have been presented" Added.

- * 4th paragraph – "…which involves a consultation between the US Fish and (replace "Game Department" with "Wildlife Service") and the National Marine Fisheries Service. Modified.
- **3.2** Fix this to read -- The commercial halibut fishery in Alaska is a well-established one. Resources are fully allocated. In 1983 the IPHC (delete "further") subdivided Area 4 into subareas A-(DELETE "E" insert "D") .They further subdivided Area 4 by adding a new subarea "F" in 1984 to provide more near shore opportunity to coastal native Alaskans. http://www.iphc.washington.edu/publications/annual/ar1984.pdf. Clarified.

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

This section - - no comment
No return comments required

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 Pacific halibut commercial fishery in accordance with the FAO-Based RFM conformance criteria. Only clause 4.2 was scored with a medium confidence rating, all others with high confidence ratings. Throughout the assessment and during the peer review stage, several clarifications were sought on specific items of the assessment, in connection with bycatch in halibut fisheries, PSC for halibut in the GOA groundfish fisheries and the various aspects of fisheries management planning for halibut between IPHC and the NPFMC. 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 groundfish and halibut fisheries off 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 Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management, fished with benthic longline (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 the 28th of April 2011. After detailed discussion, the Committee determined that the applicant fishery, the US Alaska Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management, fished with benthic longline (within Alaska's 200 nm EEZ) is awarded certification to the FAO-Based Responsible Fisheries Management Certification Program.

11. References

§ 679.50 Groundfish Observer Program. Subpart E--Groundfish Observer Program.	http://www.fakr.noaa.gov/regs/679e50.pdf
1923 Convention For The Preservation Of The Halibut Fishery.	http://iea.uoregon.edu/pages/view_treaty.php?t=1923-Halibut.EN.txt&par=view_treaty_html
2011. International Pacific Halibut Commission Eighty-seventh Annual Meeting.	http://www.iphc.washington.edu/meetings/2011am/iphc2011bluebook.pdf
27th Legislature(2011-2012) Infobases.	http://www.legis.state.ak.us/basis/folio.asp
5 AAC 28.055. Seabird avoidance measures in 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
5 AAC 39.210. Management plan for high impact emerging fisheries.	http://www.iphc.washington.edu/publications/bulletins/ib0027.pdf
ADF&G. 1998. Changes under Alaska's Halibut IFQ Program, 1995 to 1998.	www.cfec.state.ak.us/RESEARCH/h98_ts/H_TITLE.HTM
ADF&G. 2006. Our Wealth Maintained: A strategy for conserving Alaska's Diverse Wildlife and Fish Resources.	http://www.adfg.alaska.gov/static/species/wildlife_action_plan/cwcs_main_text_combined.pdf
ADF&G. Commercial Fisheries Regulations Commercial and Subsistence Fishing and Private Non Profit Salmon Hatcheries.	http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial
ADF&G. Commercial Salmon Fisheries.	http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.main
ADF&G. Fish Habitat Regulations.	http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.prohibited
ADF&G. Home. Alaska Sport Fishing Survey.	http://www.adfg.alaska.gov/sf/sportfishingsurvey/
ADF&G. Requesting Information.	http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.requests
ADF&G. Sport Fishing Guides & Charter Requirements. Overview.	http://www.adfg.alaska.gov/index.cfm?adfg=prolicenses.sportfishguides
ADF&G. Alaska. Pacific Halibut. Get Involved.	http://www.adfg.alaska.gov/index.cfm?adfg=halibut.getinvolved
ADF&G. Alaska. Pacific Halibut. Management.	http://www.adfg.alaska.gov/index.cfm?adfg=halibut.management
ADF&G. Alaska. Pacific Halibut. Range Map.	http://www.adfg.alaska.gov/index.cfm?adfg=halibut.rangemap
ADF&G. Habitat Research.	http://www.adfg.alaska.gov/index.cfm?adfg=habitatresearch.main
ADFG. Preliminary listing and description of site types included in the Alaska MPA inventory database.	http://www.adfg.alaska.gov/static/lands/protectedareas/pdfs/5j02-08_p2.pdf
Alaska Coastal Management Program.2006. Pelican Coastal Management Plan.	http://www.alaskacoast.state.ak.us/District/DistrictPlans_Final/Pelican/Pelican_FPA_March_2006.pdf
Alaska Coastal Management Programme. Division of Coastal & Ocean Management. CPQ Instructions.	http://alaskacoast.state.ak.us/Projects/pcpq.html

Alaska Coastal Management Programme. Division of Coastal & Ocean Management. Current News.	http://alaskacoast.state.ak.us/Current_News/ACMP_Fact_Sheet_2011.pdf
Alaska Coastal Management Programme. Division of Coastal & Ocean Management. Memorandum of Understanding.	http://alaskacoast.state.ak.us/Clawhome/MOUS/moushome.htm
Alaska Commercial Fisheries Entry Commission.	http://www.cfec.state.ak.us/
Alaska Federal Fisheries Management - Sustainable Fisheries Division.	http://www.fakr.noaa.gov/sustainablefisheries/default.htm
Alaska Longline Fishermen's Association. Rockfish Bycatch Reporting Network.	http://www.alfafish.org/Rockfish-Bycatch-Reporting-Network.shtml
Alaska Sea Grant Marine Advisory Program. Fisheries. 6	http://seagrant.uaf.edu/map/fisheries/index.html
Alaska Seafood .FAO Checklist.	http://sustainability.alaskaseafood.org/fao
Alaska Seafood Marketing Institute. Halibut Certification.	http://sustainability.alaskaseafood.org/halibut-certification
Alaska Wildlife Action Plan. Summary.	http://www.wildlifeactionplans.org/pdfs/action_plan_summaries/alaska.pdf
ANILCA. Office of Project Management and Permitting.	http://dnr.alaska.gov/commis/opmp/anilca/anilca.htm
Avtec. Alaska Maritime Training Center.	http://www.avtec.edu/AMTC.htm
Beamish R., Myron P., Motomitsu T.,& A2 Presentations Species-specific responses: Changes in growth, reproductive success, mortality, spatial distribution, and adaptation.	http://www.pices.int/publications/presentations/2010-Climate-Change/A2/ A2. aspx
Bering Sea Project. Website.	http://bsierp.nprb.org/
Bering Select Seafoods Company. News.	http://www.beringselect.com/?p=534
Best E.A & St.Pierre G.1986. Pacific Halibut as Predator and Prey.IPHC.	http://www.iphc.int/publications/techrep/tech0021.pdf
Bonney J., Kinsolving A., & McGauley K.2009.Continued Assessment of an Electronic Monitoring System for Quantifying Atsea Halibut Discards in the Central Gulf of Alaska Rockfish Fishery.	http://www.fakr.noaa.gov/sustainablefisheries/efp/efp08-01_halibutdiscards_rpt.pdf
Bonzon, K., McIlwain, K., Strauss, C.K. and Van Leuvan, T. (2010). Catch Share Design Manual: A Guide for Managers and Fishermen. Environmental Defence Fund.	http://www.edf.org/documents/11391_alaska-ifq.pdf
Cahalan J.A, Leaman B.M, Williams G.H, Mason B.H and Karp W.A. Bycatch Characterization in the Pacific Halibut Fishery: A Field Test of Electronic Monitoring Technology. NOAA.	http://www.afsc.noaa.gov/publications/AFSC-TM/NOAA-TM-AFSC-213.pdf
CFEC. State of Alaska. Fishery Statistics. Basic Information Table.	http://www.cfec.state.ak.us/bit/MNUOFIN.htm
CFEC. State of Alaska. Permit Holdings.	http://www.cfec.state.ak.us/Publications/permit_holdings.htm
Clark W. G. & Hare S. R. Assessment and management of Pacific halibut: data, methods, and policy.	http://www.iphc.washington.edu/papers/sr83.pdf
Clark W. G. & Hare S. R. Assessment of the Pacific halibut stock at the end of 2008.	http://www.iphc.washington.edu/papers/sa08.pdf
Clark W. G. & Hare S. R. Assessment of the Pacific halibut stock at the end of 2007.	http://www.iphc.washington.edu/papers/sa07.pdf
CLARK W.G & HARE S.R. Accounting for Bycatch in Management of the Pacific Halibut Fishery North American Journal of Fisheries Management 18:809–	http://www.iphc.washington.edu/papers/bycatch.accounting.pdf

821, 1998.	
Clark W.G, Hare S.R & Leaman B.M. Sources of uncertainty in annual CEY estimates.	http://www.iphc.washington.edu/papers/uncertain.pdf
Clark W.G, Vienneau B.A, Blood C.L, and Forsberg J.E.2000.A review of IPHC catch sampling for age and size composition from 1935 through 1999, including estimates for the years 1963-1990. INTERNATIONAL PACIFIC HALIBUT COMMISSION.	http://www.iphc.washington.edu/publications/techrep/tech0042.pdf
DEC. Alaska. More About Water.	http://dec.alaska.gov/water/MoreAboutWater.htm
Description of Essential Fish Habitat for the Groundfish Resources of the BSAI Regions.	http://alaskafisheries.noaa.gov/habitat/seis/final/appd_3_1.pdf
Division of Alaska Wildlife Troopers . Core Mission.	www.dps.state.ak.us/awt/
Ecosystem Considerations Report website. Ecosystem Considerations.	http://access.afsc.noaa.gov/reem/ecoweb/index.cfm
elandings. Interagency electronic reporting system for commercial fishery landings in Alaska.	http://elandings.alaska.gov/
EPA. Alaska. About EPA.	http://www.epa.gov/aboutepa/states/ak.html
FAKR.NOAA. Federal Register / Vol. 76, No. 51/ Rules and Regulations.	http://www.fakr.noaa.gov/frules/76fr14300.pdf
Fall J.A & D. Koster. 2008. Subsistence Harvests of Pacific Halibut in Alaska, 2007.	http://www.fakr.noaa.gov/ram/subsistence/adfg_subhalibut_2007_prev_draft.pdf
FAO corporate Document Repository. THE PRECAUTIONARY APPROACH TO FISHERIES AND ITS IMPLICATIONS FOR FISHERY RESEARCH, TECHNOLOGY AND MANAGEMENT AND UPDATED REVIEW.	http://www.fao.org/docrep/003/w1238E/W1238E03.htm
Federal Register Vol. 63, No. 44 Friday, March 6, 1998 Rules and Regulations.	http://www.fakr.noaa.gov/protectedresources/seabirds/fr11161.pdf
Federal Register Vol. 72, No. 242 Tuesday, December 18, 2007 Rules and Regulations.	http://www.fakr.noaa.gov/frules/72fr71601.pdf
Fisheries and Oceans Canada. Halibut - Pacific Region.	http://www.pac.dfo-mpo.gc.ca/fm-gp/commercial/ground-fond/halibut-fletan/index-eng.htm
Fishery Industrial Technology Center. Teaching.	http://www.sfos.uaf.edu/fitc/teaching/
Forsberg J.E. 2010.Age distribution of the commercial halibut catches for 2010.	http://www.iphc.washington.edu/publications/rara/2010/2010.79.AgedistributionofthecommercialhalibutcatchfOr2010.pdf
Galindo H.M, Hauser L & Loher. T. 2009. Examination of genetic population structure in spawning adults of Pacific halibut: laboratory work conducted in 2009.	http://www.iphc.washington.edu/publications/rara/2009/449.pdf
Galindo H.M, Hauser L & Loher. T. 2010. Examination of genetic population structure in Pacific halibut: laboratory work conducted in 2010.	http://www.iphc.washington.edu/publications/rara/2010/2010.315.ExaminationofgeneticpopulationstructureinPacifichalibut.pdf
Gauvin J.R & Rose C.S. The Effectiveness Of A Halibut Excluder Device and Consideration of Tradeoffs in its Application.	http://www.st.nmfs.noaa.gov/st5/documents/The_effectiveness_of_a_halibut_excluder_device_and_consideration_of_tradeoffs_in_its_application.pdf
Geernaert T.O .Trends in seabird occurrence on stock assessment surveys. (2002-2010).	http://www.iphc.washington.edu/publications/rara/2010/2010.403.Trendsinseabirdoccurrenceonstockassessmentsurveys.pdf

Geiger H. 2009. Annual Report 2009. IPHC.	http://www.iphc.washington.edu/publications/annual/ar2009.pdf
Gilroy H.L & Hare S.R. 2010. Wastage of halibut in the commercial halibut Fishery.	http://www.iphc.washington.edu/publications/rara/2010/2010.51.Wastageofhalibutinthecommercialhalibutfishery.pdf
Gilroy H.L, Erikson L.M & MacTavish K.A 2010. Commercial fishery and regulation changes. IPHC Report of Assessment and Research Activities 2010.	http://www.iphc.washington.edu/publications/rara/2010/2010.31.2010commercialfisheryandregulationchanges.pdf
Hare S.R. Assessment of the Pacific halibut stock at the end of 2009.	http://www.iphc.washington.edu/papers/sa09.pdf
Hare S.R. Assessment of the Pacific halibut stock at the end of 2010.	http://www.iphc.washington.edu/papers/sa10.pdf
Hare S.R. Potential Modifications to the IPHC harvest policy.	http://www.iphc.washington.edu/papers/HPupdate.pdf
Hiatt T, Felthoven R, Dalton M, Garber-Yonts B, Haynie A, Lew D, Sepez J, Seung C and the staff of Northern Economics, Inc. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic Status of the Groundfish Fisheries off Alaska, NPFMC, November, 2008.	http://www.afsc.noaa.gov/refm/docs/2009/economic.pdf
Hilborn, R. 2004. Ecosystem-based fisheries management. Marine Ecology-Progress Series 274 275-278.	http://www.fish.washington.edu/people/rayh/publications.html
International Pacific Halibut Commission Bycatch Workshop Hotel Deca, Seattle, WA September 29, 2009.	http://iphc.ipower.com/meetings/bycatchworkshop/MinutesBycatWkshp.pdf
IPHC Staff. 2011. Effect of reducing bycatch limits in the Gulf of Alaska on the halibut exploitable biomass and spawning potential, including downstream effects from halibut migration.	http://www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf
IPHC. 1984. Annual Report 1983.	http://www.iphc.washington.edu/publications/annual/ar1983.pdf
IPHC. 1985. Annual Report 1984.	http://www.iphc.washington.edu/publications/annual/ar1984.pdf
IPHC. 2010. Oceanographic monitoring on the IPHC setline survey in 2010.	http://www.iphc.washington.edu/publications/rara/2010/2010.309.OceanographicmonitoringontheIPHCsetlinesurveyin2010.pdf
IPHC. 2010. Pacific Halibut Fishery Regulations 2010.	http://www.iphc.washington.edu/publications/regs/2010iphcregs.pdf
IPHC. 2011 SSA Charter.	http://www.iphc.washington.edu/research/surveys/2011-charter.html
IPHC. 2011. IPHC Staff Preliminary Catch Limit Recommendations.	http://www.iphc.washington.edu/news-releases/news-releases-2010/146-nr20101202.html
IPHC. Halibut Commission Completes 2011 Annual Meeting.	http://www.iphc.washington.edu/news-releases/159-nr20110131.html
IPHC. Information Bulletins.	http://www.iphc.washington.edu/library/bulletins.html
IPHC. IPHC Research Program: Review of 2010 Projects and Proposals for 2011.	http://www.iphc.washington.edu/publications/rara/2010/2010.7.Reviewof2010ProjectsandProposalsfor2011.pdf

IPHC. IPHC Seattle Staff.	http://www.iphc.washington.edu/contacts.html
IPHC. Pacific Halibut Fishery Regulations.	http://www.iphc.washington.edu/library/regulations.html
IPHC. Pacific Halibut. About IPHC.	http://www.iphc.washington.edu/about-iphc.html
IPHC. Pacific Halibut. Annual Meeting 2011 Schedule.	www.iphc.washington.edu/meetings-and-events/annual-meeting/schedule.html
IPHC. Pacific Halibut. Annual Reports.	www.iphc.washington.edu/library/annual-reports.html
IPHC. Pacific Halibut. Development.	http://www.iphc.washington.edu/research/biology/development.html
IPHC. Pacific Halibut. General Biology.	http://www.iphc.washington.edu/research/biology.html
IPHC. Pacific Halibut. Port Samplers.	http://www.iphc.washington.edu/about-iphc/115.html
IPHC. Pacific Halibut. Sea Samplers.	http://www.iphc.washington.edu/about-iphc/116.html
IPHC. Pacific Halibut. Sport FAQ's.	http://www.iphc.washington.edu/sport/114-sport-faqs.html
IPHC. Pacific Halibut. Commissioners.	http://www.iphc.washington.edu/about-iphc/27.html
IPHC. Pacific Halibut. International Pacific Halibut Commission.	http://www.iphc.washington.edu/home.html
IPHC. Pacific Halibut. RARA 2010.	www.iphc.washington.edu/library/raras/149-rara-2010.html
IPHC. Pacific Halibut Stock Assessment.	http://www.iphc.washington.edu/research/stock-assessment.html
IPHC. Past Annual Meeting Handouts.	http://www.iphc.washington.edu/library/156-bluebooks.html
IPHC. Research. Stock Assessment.	http://www.iphc.washington.edu/research/stock-assessment.html
IPHC. Scientific Reports.	http://www.iphc.washington.edu/library/scirep.html
IPHC. Stock Assessment Surveys	http://www.iphc.washington.edu/research/surveys.html
IPHC. Technical Reports.	http://www.iphc.washington.edu/library/techrep.html
IPHC. Report of Assessment and Research Activities.	http://www.iphc.washington.edu/library/raras.html
Kaimmer S.2004. 1998 gear and bait experiments. IPHC. Technical Report No.48.	http://www.iphc.int/publications/techrep/tech0048.pdf
Kaimmer S.M. Prior hook injuries: results from the 2010 IPHC SSA and NMFS trawl surveys.	http://www.iphc.washington.edu/publications/rara/2010/2010.413.Priorhookinjuriesresultsfromthe2010IPHCSSAandNMFStrawlsurvey.pdf
Knapp G. Unreported Discards Under IFQ Management: Survey Responses of Alaska Halibut Fishermen.	http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm
Kong T.M, Gilroy H.L and Leickly R.C.2004. Definition of IPHC statistical areas. International Pacific Halibut Commission.	http://www.iphc.washington.edu/publications/techrep/tech0049.pdf
Kong T.M, Gilroy H.L and Leickly R.C.2004. Definition of IPHC statistical areas. International Pacific Halibut Commission.	http://sustainability.alaskaseafood.org/tools
Kruse G.H, Galluchi V.F, Tribuzio C.A, Rice J. 2008.Abundance, Life History, and Population Demographics of Spiny Dogfish, Squalus acanthias, in the Gulf of Alaska.	http://doc.nprb.org/web/05_prjs/511%20Final%20Report12.10.08.pdf
Loher T. & Seitz A.C. 2006. Seasonal Seasonal migration and environmental conditions experienced by Pacific halibut in the Gulf of Alaska, elucidated from Pop-up Archival Transmitting (PAT) tags. International	http://www.iphc.washington.edu/publications/scirep/SciReport0082.pdf

Pacific Halibut Commission.	
Marine Conservation Alliance. SeaFacts Sustainable Fisheries, Science-Based Management and Marine Ecosystems.	http://www.marineconservationalliance.org/?p=2925
Marine Species with Aquaculture off the Coast of Oregen and Pacific Northwest. Pacific Halibut.	http://hmsc.oregonstate.edu/projects/msap/PS/masterlist/fish/pacifichalibut.html
Matulich S.C & Clark M.L.North Pacific Halibut and Sablefish IFQ Policy Design: Quantifying the Impacts on Processors Marine Resource Economics, Volume 18, pp. 149–166.	http://ageconsearch.umn.edu/bitstream/28221/1/18020149.pdf
Methods for the estimation of non-target species catch in the unobserved halibut IFQ fleet. 2010. November Groundfish Plan Team Document.	http://alaskafisheries.noaa.gov/npfmc/membership/plan_teams/Minutes/1110IFQbycatch.pdf
NMFS. FishWatch US Seafood Facts. Pacific Spiny Dogfish.	http://www.nmfs.noaa.gov/fishwatch/species/pac_spiny_dog.htm
NMFS. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT. National Oceanic and Atmospheric Administration. National Marine Fisheries Service.	http://alaskafisheries.noaa.gov/sustainablefisheries/msa/amended07.pdf
NMFS.NOAA. Fishwatch-U.S Seafood Facts. Pacific Halibut.	http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm
NOAA Fisheries Service Protected Resources. 2005-2006. Outreach and Education Strategic Plan.	http://www.nmfs.noaa.gov/pr/pdfs/education/strategic_plan.pdf
NOAA Fisheries. About the Program. Community Quota Program and Community Quota Entities.	http://alaskafisheries.noaa.gov/ram/cqp.htm
NOAA Fisheries. Alaska Fisheries Science Center: Mesa: Deep-sea Corals.	http://www.afsc. noaa.gov/ABL/ MESA/ mesa_me_cor .php
NOAA Fisheries. Office of Protected Resources. Education.	http://www.nmfs.noaa.gov/pr/education/
NOAA Fisheries. Online (Web) Services.	www.fakr.noaa.gov/ram/webapps.htm
NOAA Fisheries. Restricted Access Management Program Applications. Alaska Fisheries Permit Applications and Instructions.	http://alaskafisheries.noaa.gov/ram/applications.htm#Link_7
NOAA Fisheries. Sport Halibut Management. Sport Halibut Fishing in Alaska.	http://alaskafisheries.noaa.gov/sustainablefisheries/halibut/sport.htm
NOAA Fisheries.2010.Alaska Region, Restricted Access Management (RAM) Charter Halibut Permit Qualifications: General Information.	http://www.fakr.noaa.gov/ram/charter/qualifications2010.pdf
NOAA. 2010. Pacific Halibut. FishWatch- U.S. Seafood Facts.	http://www.nmfs.noaa.gov/fishwatch/species/pacific_halibut.htm
NOAA. 2011. Charter Halibut – 2011 IPHC Recommendations. Halibut Fishery Management.	http://www.fakr.noaa.gov/sustainablefisheries/halibut/charter/factsheet_iphcrec.pdf
NOAA. Alaska Division Office of Law Enforcement.	www.nmfs.noaa.gov/ole/ak_alaska.html
NOAA. Alaska Fisheries. Federal Register /Vol. 58, No. 215 Rules and Regulations.	http://alaskafisheries.noaa.gov/frules/fr59375.pdf
NOAA. Alaska Fisheries. Federal Register /Vol. 74, No. 212 Rules and Regulations.	http://alaskafisheries.noaa.gov/frules/74fr57105.pdf

NOAA. Aleutian Islands protected areas.	http://www.fakr.noaa.gov/npfmc/current_issues/HAPC/HAPCmaps205.pdf
NOAA. Coastal Programs: Partnering with States to Manage Our Coastline.	http://coastalmanagement.noaa.gov/programs/czm.html
NOAA. Endangered, Threatened, Proposed, Candidate and delisted species in Alaska.	http://alaska.fws.gov/fisheries/endangered/pdf/consultation_guide/4_Species_List.pdf
NOAA. Federal Fisheries Regulations 50 CFR Part 679: Fisheries of the Exclusive Economic Zone Off Alaska.	http://www.fakr.noaa.gov/regs/default.htm
NOAA. Fishwatch US Seafacts. Arrowtooth Flounder (Atheresthes stomias).	http://www.nmfs.noaa.gov/fishwatch/species/arrowtooth_flounder.htm
NOAA. IFQ Halibut/Sablefish Reports and CDQ Halibut Program Reports.	http://www.fakr.noaa.gov/ram/ifqreports.htm
NOAA. NMFS. Individual Fishing Quota (IFQ) Program.	www.fakr.noaa.gov/ram/ifq.htm
NOAA. NMFS. Recordkeeping and Reporting (R&R) - Report Forms.	www.fakr.noaa.gov/rr/report.htm#ifqforms
NOAA. NMFS. Subsistence Halibut Fishing in Alaska. Programme Information.	www.fakr.noaa.gov/ram/subsistence/halibut.htm#reports
NOAA. NMFS. Sport Halibut Management. Sport Halibut Fishing in Alaska.	www.fakr.noaa.gov/sustainablefisheries/halibut/sport.htm
NOAA. Northwest Regional Office. Groundfish NEPA Documents.	http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/
NOAA. Office of Law Enforcement. VMS Guidelines For IPHC Area 4 Halibut Clearance Exemption.	http://www.nmfs.noaa.gov/ole/vms_iphc.html
NOAA. Report of the Working Group on Ghost Fishing.	http://swfsc.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFSC-154_P1216.PDF
NOAA. Research at the Auke Bay Laboratory on Benthic Habitat.	http://www.afsc.noaa.gov/Quarterly/jas2003/featurelead.htm
NOAA. Resource Ecology & Fisheries Management (REFM) Division. Resource Ecology & Ecosystem Modeling Program. Short-Tailed Albatross Bycatch.	http://www.afsc.noaa.gov/quarterly/jas2010/divrptsREFM7.htm
NOAA. Federal Fisheries Regulations. Alaska Fisheries Regulations and Notices.	http://www.fakr.noaa.gov/regs/summary.htm
NOAA.NPFMC. Observer Program.	http://www.fakr.noaa.gov/npfmc/current_issues/observer/observer.htm
North Pacific Research Board. Gulf of Alaska Project. Gulf of Alaska Integrated Ecosystem Research Program.	http://gulfofalaska.nprb.org/
North pacific Research Board. Website.	http://www.nprb.org/index.html
November Groundfish Team Plan. 2010. Methods for the estimation of non-target species catch in the unobserved halibut IFQ fleet.	http://alaskafisheries.noaa.gov/npfmc/membership/plan_teams/Minutes/1110IFQbycatch.pdf
NPFMC 2010. Economic SAFE. Stock Assessment and Fishery Evaluation report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Islands Area: Economic Status of the Groundfish Fisheries off Alaska, 2009.	http://www.afsc.noaa.gov/REFM/docs/2010/economic.pdf
NPFMC. 2001. Summary of the Gulf of Alaska Groundfish Fishery Management Plan.	www.fakr.noaa.gov/npfmc/fmp/goa/goa.htm

NPFMC. 2009. NAVIGATING THE NORTH PACIFIC COUNCIL PROCESS.	http://www.fakr.noaa.gov/npfmc/misc_pub/Navigating_NPFMC.pdf
NPFMC. 2010. Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area.	BSAI
NPFMC. 2010. Restructuring the Program for Observer Procurement and Deployment in the North Pacific.	http://www.fakr.noaa.gov/npfmc/current_issues/observer/ObserverRest510.pdf
NPFMC. 2010. Restructuring the Program for Observer Procurement and Deployment in the North Pacific.	http://alaskafisheries.noaa.gov/npfmc/current_issues/observer/Observer_restructuring910.pdf
NPFMC. 2011. Fishery Management Plan for Groundfish of the Gulf of Alaska.	http://alaskafisheries.noaa.gov/npfmc/fmp/goa/GOA.pdf
NPFMC. 2011. News & Notes.	http://www.fakr.noaa.gov/npfmc/newsletters/news211.pdf
NPFMC. Arctic Fishery Management Plan Implemented	http://www.fakr.noaa.gov/npfmc/current_issues/Arctic/arctic.htm
NPFMC. Current Issues. Bycatch.	http://www.fakr.noaa.gov/npfmc/current_issues/bycatch/bycatch.htm
NPFMC. Ecosystem Considerations for 2011.	http://access.afsc.noaa.gov/reem/ecoweb/Eco2010.pdf
NPFMC. Halibut Issues. Current Issues.	http://alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/halibut.htm
NPFMC. Non-target Species Management.	http://www.fakr.noaa.gov/npfmc/current_issues/non_target/non_target.htm
NPFMC. Observer Advisory Committee Meeting Agenda.	http://alaskafisheries.noaa.gov/npfmc/current_issues/observer/OACagenda311.pdf
NPFMC. Stock Assessment and Fishery Evaluation Reports (Groundfish, Scallop and Crab).	http://alaskafisheries.noaa.gov/npfmc/SAFE/SAFE.htm
NPFMC. Summary of the Bering Sea and Aleutian Islands Groundfish Fishery Management Plan.	www.fakr.noaa.gov/npfmc/fmp/bsai/bsai.htm
NPFMC. Essential Fish Habitat.	
NPFMS. Homepage.	www.fakr.noaa.gov/npfmc/default.htm
NPRB. Bycatch characterization in the Pacific halibut fishery: A field test of electronic monitoring technology.	http://project.nprb.org/view.jsp?id=4de2a205-a76c-4924-96fc-caad5b076ce3
OCRM. Approval of the ACMP.	http://alaskacoast.state.ak.us/Clawhome/handbook/pdf/OCRM_Approval.pdf
Pacific Halibut–Sablefish IFQ Report for Fishing Year 2009 i NOAA's National Marine Fisheries Service (NMFS), Alaska Region Restricted Access Management (RAM) Fishing Year 2009 October 2010.	http://www.alaskafisheries.noaa.gov/ram/rtf09.pdf
Pacific States Marine Fisheries Commission. Website.	http://psmfc.org/
Pautzke C.G & Oliver C.W. 1997. Development of the Individual Fishing Quota Program for Sablefish and Halibut Longline Fisheries off Alaska.	http://www.fakr.noaa.gov/npfmc/sci_papers/ifqpaper.htm
PERC. 2001. Fisheries are Classic Example of the "Tragedy of the Commons".	http://www.perc.org/articles/article412.php

Perez, M. A. 2006. Analysis of marine mammal bycatch data from the trawl, longline, and pot groundfish fisheries of Alaska, 1998-2004, defined by geographic area, gear type, and catch target groundfish species. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-167, 194 p.	http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-167.pdf
REPORT OF THE INTERNATIONAL FISHERIES COMMISSION.1948.REGULATION AND INVESTIGATION OF THE PACIFIC HALIBUT FISHERY IN 1947.	http://www.iphc.washington.edu/publications/scirep/Report0013.pdf
Sadorus L.L & Lauth R. Cruise report for the 2010 NMFS Bering Sea trawl survey.	http://www.iphc.washington.edu/publications/rara/2010/2010.445.Cruisereportforthe2010NMFSBeringSeatrawlsurvey.pdf
Seafacts.THE DEVELOPMENT OF HALIBUT EXCLUDERS TO REDUCE BYCATCH IN THE GULF OF ALASKA COD FISHERIES.	http://www.marineconservationalliance.org/wp-content/uploads/2010/07/SeaFacts-2-Halibut-Excluder.pdf
SEC. 305(i)(1) of the MSA, as amended by the Coast Guard Act (July 2006) and the MSA reauthorization (December 2006).	http://alaskafisheries.noaa.gov/cdq/cdq_msa_section305i1.pdf
Sepez, J. A., B. D. Tilt, C. L. Package, H. M. Lazrus, and I. Vaccaro. 2005. Community profiles for North Pacific fisheries - Alaska. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-160, 552 p.	http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-160/NOAA-TM-AFSC-160.pdf
Soderlund E., Dykstra C.L , Geernaert T., Anderson-Chao E., and Ranta A.M.2008 Standardized stock assessment survey. IPHC.	http://www.iphc.washington.edu/publications/rara/2008/2k8rara10a_ssa.pdf
State of Alaska > DEC > Division of Spill Prevention and Response.	http://dec.alaska.gov/spar/index.htm
State of Alaska. Natural Resources. Office of Project Management.	http://dnr.alaska.gov/commis/opmp/
State of Alaska. Department of Natural Resources. Chevron/UOCC Granite Point Onshore/Offshore 3D Seismic Survey.	http://alaskafisheries.noaa.gov/protectedresources/whales/beluga/development/granitepoint/GranitePt_ACMPreview011907.pdf
State of Alaska. Online Public Notice.	http://notes4.state.ak.us/pn/pubnotic.nsf/PNByCatActive?OpenView
St-Pierre G.1984. Spawning Locations and Season for Pacific Halibut. IPHC.	http://www.iphc.washington.edu/publications/scirep/SciReport0070.pdf
STWC. Standards of Training, Certification & Watchkeeping.	http://www.stcw.org/
Subsistence Management Information. News About Alaska's Subsistence Halibut Fishery.	http://subsistmgtinfo.org/hal.htm
The IUCN Red List of Threatened Species. Lamna ditropis.	http://www.iucnredlist.org/apps/redlist/details/39342/0
The IUCN Red List of Threatened Species. Somniosus pacificus.	http://www.iucnredlist.org/apps/redlist/details/161403/0
The Pew Environment Group. Protecting Fisheries in the High Arctic.	http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Fact_Sheet/InternationalArcticfactsheetFINAL012011.pdf
Tribuzio C.A, Echave K., Rodgveller C., Heifetz J & Goldman K.J. 2010. Assessment of the Sharks in the Gulf of Alaska.	http://www.afsc.noaa.gov/REFM/docs/2010/GOAshark.pdf
Tribuzio C.A, Echave K., Rodgveller C., Heifetz J. And	http://www.afsc.noaa.gov/REFM/docs/2010/BSAIshark.pdf

Goldman K.J.2010.	
UAF. School of Fisheries & Ocean Studies. Institute of Marine Science.	http://www.ims.uaf.edu/
US EPA. Compliance and Enforcement in the Pacific Northwest and Alaska. 2010 Region 10 Compliance and Enforcement Annual Results.	http://www.epa.gov/region10/enforcement/2010results.html
USCG. 2009. Living Marine Resources.	http://www.uscg.mil/hq/cg5/cg531/LMR.asp
USCG. D17 District Response Advisory Team (DRAT).	http://www.uscg.mil/d17/D17%20Divisions/drm/DRAT/DRATpage.asp
USCG. D17 Response.	http://www.uscg.mil/d17/D17%20Divisions/drm/default.asp
Valero J.L & Hare S.R. 2009. Effect of migration on lost yield, lost spawning biomass, and lost egg production due to U32 bycatch and U32 wastage of Pacific halibut.	http://www.iphc.washington.edu/papers/ly09.pdf
Williams G.H & Leaman B.M. Collaborative Pacific Halibut, Hippoglossus stenolepis, Bycatch Control by Canada and the United States.	http://spo.nmfs.noaa.gov/mfr662/mfr6624.pdf
Williams G.H Incidental catch and mortality of Pacific halibut, 1962-2010.	http://www.iphc.washington.edu/publications/rara/2010/2010.281.IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf
Williams G.H. 2010. Halibut sport Fishery review.	http://www.iphc.washington.edu/publications/rara/2010/2010.43.2010Halibutsportfisheryreview.pdf
Williams G.H. Incidental catch and mortality of Pacific halibut, 1962-2010.	http://www.iphc.washington.edu/publications/rara/2010/2010.281.IncidentalcatchandmortalityofPacifichalibut1962-2010.pdf
Williams G.H. Pacific halibut discard mortality rates in the 2008 CDQ and non-CDQ groundfish fisheries, and recommendations for 2010-2012.	http://www.iphc.washington.edu/publications/rara/2009/413.pdf
Williams G.H.2010.The personal use harvest of Pacific halibut through 2010.	http://www.iphc.washington.edu/publications/rara/2010/2010.59.ThepersonaluseharvestofPacifichalibutthrough2010.pdf
Wischniowski S. and Loher T. 2010. Detecting, interpreting, and measuring both true and false annuli in Pacific halibut ages one to four: Project Update.	http://www.iphc.washington.edu/publications/rara/2010/2010.325.Detectinginterpretingandmeasuringbothtrueandfalseannuli.pdf
Witherall D. & Woodby D. Application of Marine Protected Areas for Sustainable Production and Marine Biodiversity off Alaska.	http://www.fakr.noaa.gov/npfmc/sci_papers/mfr_witherell_MPAs.pdf
Wright B.A & Hulbert L. Shark abundance increases in the Gulf of Alaska.	http://www.pices.int/publications/pices_press/volume8_issue2/May00/Shark.pdf
www.legis.state.ak.us. 5 AAC 39.130. Reports required of fishermen, processors, buyers, exporters, and operators of certain commercial fishing vessels; transporting requirements.	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!2E130']/doc/{@1}?firsthit

Appendix 1

Alaska halibut 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 the Alaska Department of Fish and Game in remote locations, including four Bristol Bay river systems and the Karluk River on Kodiak Island. He worked for the National Marine Fisheries Service at their Auke Bay Biological Laboratory and then returned to the Alaska Department of Fish and Game, 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 Alaska Board of Fisheries 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 North Pacific Fishery Management Council meetings, as well as the Alaska Board of Fisheries 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.

Deirdre Hoare (Assessor)

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.

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 & technical solutions, after which he spent a year in Tanzania as a Marine Research officer at Mafia Island Marine Park. 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.

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.

Dave Fluharty(Validation Report Review)

David Fluharty is an Associate Professor [WOT] School of Marine Affairs and Wakefield Professor of Ocean and Fishery Sciences, University of Washington where he has been employed since 1976. His doctoral degree is from the University of Michigan, School of Natural Resources in the interdisciplinary field of Natural Resource Conservation and Planning. His research and teaching interests are in natural resource policy and management at national and international levels, ecosystem approaches for management of marine resources, watersheds, coastal zones, fisheries, marine protected areas, and regional effects of global climate change. Significant professional activities include: Chair, NOAA Science Advisory Board 2006-2010; Chair, External Ecosystem Research Team for NOAA-wide Ecosystem Science and Research 2005-2007; Advisor of National Center for Ecosystem Analysis and Synthesis [NCEAS] study groups on Marine Protected Areas, Models for Fisheries Ecosystems 2002-2005, and Ecosystem Management Feasibility in Tropical Areas 2006-2009; Member, North Pacific Fishery Management Council 1994-2003 with specific experience in the management of Alaska sablefish fisheries.

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 halibut 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)

29th April 2011

Alaska Pacific Halibut Commercial Fishery Certification

Certification Recommendation

A positive Certification determination has been awarded for the US *Alaska Pacific Halibut Commercial Fishery* against the United Nations, Food and Agriculture Organization (FAO) based Responsible Fisheries Management (RFM) criteria, by a Global Trust Certification Committee on April 28th 2011, after a twelve months independent assessment of the Alaska Pacific halibut commercial fishery. The assessment was performed at the request of Alaska Seafood Marketing Institute (ASMI).

The Certification covers the Alaska Pacific halibut (*Hippoglossus stenolepis*) commercial fishery, fished with benthic longline within the IPHC's Regulatory Areas 2C, 3A, 3B, 4A, 4B, and 4CDE, on American jurisdiction off Alaska (200 nautical miles EEZ), under international (IPHC), federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG)] 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 Pacific halibut commercial fishery is responsibly managed by effective management institutions, using robust fishery management plans based on good science.

The resulting certification communication for the Alaska Pacific halibut 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).

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 fisheries. This Certification means that the Alaska Pacific halibut 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 Pacific halibut commercial fishery achieved high conformity against almost all FAO RFM Conformance Criteria. Clause 4.2 however, achieved a medium rating as the directed Pacific halibut commercial longline fishery does not have observer coverage at present.

There is substantial evidence available that describes the on-going activities and plans that are under way to include observer coverage in the halibut fishery. The consequences of observer coverage relate to the accuracy of the current bycatch estimates in the halibut fishery. These mainly include species such as Pacific cod, rockfish, spiny dogfish, sleeper shark, salmon shark and skates.

The Assessment Team findings were supported by evidence from the various management organizations (IPHC, NOAA NMFS, NPFMC) and outcomes of NPFMC Scientific 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 longline crafts used in the halibut 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 summarized 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 Organizations) ISO 65 procedures for FAO-based Responsible Fisheries Management Certification. ISO 65 is the international accreditation criteria for bodies offering product and process certification. The ISO 65 assessment, certification and decision process is governed by the accreditation bodies of the International Accreditation Forum (IAF). Global Trust Certification is accredited by IAF through the Irish National Accreditation Board (INAB).

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 Pacific halibut 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 (250 pages) will be available for download at Global Trust and ASMI's websites beginning June 1st, 2011.

Go to: www.GTCERT.com and/or http://sustainability.alaskaseafood.org/halibut-certification

Summary of the Process

ASMI, on behalf of Alaska Pacific halibut commercial fishery, submitted an application to Global Trust Certification for a formal assessment of the Alaska Pacific halibut commercial fishery to the requirements of the FAO-Based Responsible Fisheries Management (RFM) Certification Program. The Application was made 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 Pacific halibut fishery, the Alaska management system and the FAO RFM assessment criteria.

The Assessment Team's report was peer-reviewed by two additional independent experts (Table 4) before being submitted to a formal four-person, independent 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 Alaska Pacific halibut commercial fishery has a structured and legally mandated international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management regime. The management system is based upon and respects international and national fishery laws. Amendments in the IPHC Treaties of 1930 and 1937 authorized the division of the coast into areas and the limitation of the halibut catch in each of US and Canada's Regulatory Areas. The IPHC performs stock assessment and halibut biology research as well as apportioning catch limits among Regulatory Areas.

The NPFMC's Amendment 15 and 20 to the Groundfish Fishery Management Plan (FMP) established Individual Fishing Quotas (IFQ) and Community Development Quotas (CDQ) system for the Alaska halibut and sablefish fishery. The NPFMC recommends and implements regulations (i.e. IFQ, CDQ) to govern the directed Alaska halibut fisheries and makes allocation decisions among commercial (and incidental), sport, and subsistence halibut users and user groups fishing off Alaska. NMFS performs scientific research (groundfish trawl surveys, marine mammals and habitat conservation) and is responsible for developing, implementing and enforcing regulations in US waters. ADFG licenses sport fishing, and monitors and reports on sport and subsistence halibut harvests.

The Alaska Coastal Management Plan (ACMP) and National Environmental Protection Act (NEPA) process regulate all activities, developments and stakeholders which utilize the coastal resources of Alaska. All NPFMC fisheries-related regulatory packages go through full NEPA review. Conflict avoidance and resolution is dealt through NPFMC, IPHC and Board of Fisheries meetings. The IFQ System and the NMFS' Restricted Access Management entry program control commercial capacity. Monitoring of the Alaska coastal environment from a social, economic and environmental perspective is carried out by a large number of state, federal and international bodies.

B. Science and Stock Assessment Activities

The IPHC and related managing organization collect and analyze effective fishery data (dependent and independent) systems for Pacific halibut stock management purposes. The annual IPHC Pacific halibut stock assessment uses data from commercial landing reports (fish tickets), commercial logbooks, port sampling (size and age) of commercial landings, IPHC setline surveys (halibut surveys with juvenile/adult and non-halibut bycatch estimation as well as birds monitoring), and fishery agencies in both countries that report estimates of halibut (i.e. NMFS' Observer Program Groundfish Fisheries) and non-halibut bycatch (i.e. NMFS Trawl Surveys, IPHC stock assessment surveys), sport catch (i.e. NMFS logbooks & ADFG Surveys), and subsistence catch (i.e. NMFS SHARC permits).

Data on commercial catches, and on size-at-age, are the foundation of the IPHC coastwide age-structured stock assessment model. The IPHC Constant Harvest Rate policy since the 1980's is set to "harvest 20% of coastwide exploitable biomass (adult males and females) when spawning biomass (adult females) are estimated above 30% of the unfished level. The harvest rate is linearly decreased towards zero as the spawning biomass approaches 20% of the unfished level.
IPHC is aware of the decreasing trend in size at age of the Pacific halibut stock. Nonetheless, halibut total biomass is increasing. Interspecific competition with other flatfish is thought as the most likely cause for the decrease in size at age.

The 2011 IPHC standardized setline stock assessment survey will cover 28 regions, from southern Oregon to the Bering Sea, Aleutian Islands and Puget Sound. IPHC also participates in the NMFS annual Bering Sea shelf trawl survey since 1998. IPHC has a Seattle staff of 27 including a fisheries statistics program manager, quantitative scientists, data transcribers, biologists, port & sea samplers, survey managers and operators etc… that carry out stock assessment surveys and halibut biology studies, yearly producing stock assessments reports and related documents.

The halibut fleet has currently no directed observer coverage. Nonetheless, NMFS and NPFMC are in the process of restructuring the Groundfish Observer Program to include the halibut fleet and improve halibut and non halibut bycatch estimates. The new observer program may employ Electronic Monitoring (EM) technology in halibut vessels shorter than 60 feet. The program is estimated to be up and running by 2013.

C. The Precautionary Approach

The lowest spawning biomasses (able to produce strong year classes) for the three IPHC core areas all occurred in mid 1970s at approximately 9 million pounds in Area 2B, 13 million pounds in Area 2C and 42 million pounds in Area 3A. By definition, these become the spawning biomass limits reference points. The combination of harvest rate and precautionary levels of biomass protection have, in simulation model studies, provided a large fraction of maximum available yield minimizing risk to the spawning biomass, while allowing for the quickest stock recovery to at least, threshold levels (female spawning biomass at 30% of unfished levels).

A newly adopted (January 2011) Slow Up-Full Down (SUFullD) policy allows for 33% increase and 100% decrease in Catch Limit difference from one year to the following, depending on biomass projections, ultimately aiming at increasing Pacific halibut biomass. The 2011 female spawning biomass value of 350 million pounds established their current biomass as 43% of unfished levels, up from a 2010 beginning of year 38% estimate. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for Areas 2A and 2B appear to have resulted in improvements to stock condition in those areas.

The halibut fleet is highly regulated and subjected to defined fishery data collection systems, operating under an IFQ system, with conservatively defined catch quotas, gear restrictions, size limits, and closed seasons and areas. In addition, if halibut bycatch limits (Prohibited Species Catch) are reached in the groundfish fisheries, or if areas with if high concentrations of halibut juveniles are recorded, fishery and area closure measures are adopted respectively.

D. Management Measures

The IPHC recognizes that US agencies wish to adhere to domestic allocation limits but effective controls remain to be implemented through a Catch Sharing Plan in 2012 for the sport and commercial Pacific halibut fishery. For the sport fishery IPHC recommends continuation of a one-fish daily bag limit with an additional restriction that the retained fish must be no smaller than 37 inches. IPHC strives for improving annual stock assessment and quota recommendations, developing information on current management issues, and adding to knowledge of the biology and life history of halibut. Management actions are in place to increase knowledge of bycatch dynamics in the directed halibut longline fishery (i.e. restructuring the groundfish observer program, implementation of EM technology and related bycatch implications).

In terms of technical gear measures, scarelines, night setting, lineshooters and lining tubes are used to avoid diving birds, and circle hooks are compulsory for safe release of bycatch or juvenile halibut. Also, the Alaska Longline Fishermen's Association has secured funding to develop a real-time rockfish bycatch reporting network for the Eastern GOA, to decrease the bycatch of this valuable fish.

Furthermore, to address non-halibut bycatch issues in the halibut fishery, a working group composed of scientists from NMFS' Alaska Fishery Science Center (AFSC), NMFS' Alaska Regional Office (AKRO), ADFG, IPHC, and NPFMC was formed in January of 2010. The goal of this group is to investigate quantitative methods to estimate incidental catches in the unobserved halibut IFQ fishery and report its findings to the Plan Teams and NPFMC. In addition to this, the restructuring of the observer program, to provide coverage in the unobserved halibut IFQ fishery, has important implications for direct and sufficient collection of bycatch data.

The NPFMC has established Marine Protected Areas that benefit juvenile fish and adult spawners. The Halibut Longline Closure Area is 36,300 square miles in size. Additional trawl closures for areas in the waters of Bristol Bay provide some degree of refuge for juvenile halibut.

Any aspirant halibut fisherman must have 150 days of proved halibut fishing experience before being able to purchase halibut IFQs. A range of courses are available for fishermen who want to improve their fishing related skills.

E. Implementation, Monitoring and Control

Within the American EEZ off Alaska, the NMFS Office of Law Enforcement (OLE), and the U.S. Coast Guard (USCG) enforce Alaska fisheries laws and regulations, especially 50CFR679. All landings of halibut must be reported to NMFS via its mandatory “e-landings” reporting system. Commercial harvests of pollock, halibut and sablefish are the primary enforcement responsibilities of OLE. The IFQ, Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities. There is no legal harvesting of halibut in North Pacific waters outside the national jurisdiction of the USA or Canada. Similarly, there is no halibut harvesting by American vessels in Canadian waters, or by Canadian vessels in American waters.

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 boarding and patrols. Working with federally-deputized state marine enforcement agents and the U.S. Coast Guard, the OLE is able to garner even more patrol hours. The Alaska Wildlife Troopers (AWT) have increased undercover fisheries operations for sport and commercial fisheries over last 3 years. Information collection, monitoring of all logbook information and fish tickets at landing is carried out by NMFS’ OLE. In addition, they inspect and cross check at landings and processors records for reconciliation, and closely monitor Prohibited Species Catch in non-halibut fisheries for halibut bycatch.

The Magnuson-Stevens Act provides four basic enforcement remedies for violations (50CFR600.740 enforcement policy; CFR means “Code of Federal Regulations”). Withdrawal or suspension of fishing authorization is among the enforcement options available. NOAA's Office of General Counsel for Enforcement and Litigation can then assess a civil penalty, or they can refer the case to the U.S. Attorney's office for criminal proceedings. For repeat violators or those whose actions have severe impacts upon the resource, criminal charges may range from severe monetary fines, boat seizures and/or imprisonment. An essential element of the enforcement effort is the public perception of a high level of patrol and enforcement, which creates the view that "It doesn't pay to cheat"**.**

F. Serious Impacts of the Fishery on the Ecosystem

Once every five years, the North Pacific Fishery Management Council conducts a complete review of its Essential Fish Habitat (EFH) program and, on an annual basis there is a Stock Assessment and Fisheries Evaluation (SAFE) process that looks at a broad set of Ecosystem Considerations prior to the Council setting annual harvest rates and limits.

In the directed Pacific halibut longline fisheries, non-halibut bycatch is not well documented. Management actions are in place in respect to increasing knowledge on the bycatch dynamics of the IFQ halibut fleet via a restructuring of the NMFS-managed groundfish observer program.

Longline vessels are required by regulation to use seabird avoidance devices. Birds avoidance measure now include the use of streamer (tory) lines, night setting, lineshooters and lining tubes, which have been shown to reduce seabird interactions when setting or retrieving gear. The short-tailed albatross is protected in Alaska waters by the Endangered Species Act (ESA). The limit is 4 birds during each 2-year period for the BSAI and GOA hook-and-line (i.e. halibut fishery) groundfish fisheries. Since 2002 IPHC has collected seabird occurrence data on IPHC stock assessment surveys.

Yelloweye rockfish (*Sebastes ruberrimus*) are taken in the GOA halibut fishery as bycatch. The Alaska Longline Fishermen's Association has secured funding to develop a real-time rockfish bycatch reporting network for the Eastern GOA. Although marine mammals are known to interact with halibut longline gear, bycatch is virtually non-existent. Whales and otariids (sea lions and fur seals) may selectively eat hooked groundfish species such as Pacific halibut and sablefish directly from the longline gear as the line is retrieved by the vessel. A recent NMFS report on marine mammals interaction in the groundfish fisheries recounts that no Steller sea lion or other otariids were by-caught between 2000 and 2004. Also, non-harmful interactions with killer and sperm whales have been documented between 1998 and 2004 in the BSAI and GOA halibut fishery.

Through 2010, sharks were by-caught and managed as part of the "other species complex" in NPFMC's Groundfish Fishery Mangement Plan (FMP). Starting in 2011, sharks will be treated under a distinct "sharks complex". Spiny dogfish are by-caught in the halibut fishery and are Vulnerable to Extinction under the International Union for Conservation of Nature (IUCN) Red List. Nonetheless, the Alaska population appears to be stable. Also, preliminary study results indicate dogfish status in the GOA at 80%-90% the theoretical population carrying capacity. Improvement for calculating rockfish, skates and sharks bycatch and discards estimates are being addressed through a multi-agency plan.

Benthic longline gear effect on bottom habitats is generally mild to none. In addition, halibut bait species are well managed by either the State of Alaska or NMFS, and none are classified as endangered or threatened to extinction. Several projects to obtain information about environmental changes, ecosystem status and management of the Pacific halibut fishery are being conducted.

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 Pacific halibut commercial fishery	Date:	April 2010
Correspondence Address:	**International Marketing Office and Administration** **Suite 200**		
Street :	**311 N. Franklin Street**		
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Full Name:	***(Last)*** Rice	***(First)*** Randy	
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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**

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 Meeting	Nov -Jan 2010
Draft Assessment Report	February - mid April 2011
External Peer Review	10th-25th April 2011
Final Assessment Report	27th April 2011
Certification Review/Decision	28th April 2011

Table 3: Global Trust Assessment Team Members

Assessor	Role	Assessor	Role
Dave Garforth, Global Trust Certification Ltd. Rivercentre, Riverlane Dundalk, Co. Louth Ireland	Assessment Leader	**Deirdre Hoare,** Global Trust Certification Ltd. Rivercentre, Riverlane Dundalk, Co. Louth, Ireland	Assessor
Stephen Grabacki, Graystar P.O. Box 100506 Anchorage, Alaska, USA	Assessor	**Herman Savikko,** Douglas, Alaska USA	Assessor
Vito Ciccia Romito, Global Trust Certification Ltd. Rivercentre, Riverlane Dundalk, Co. Louth Ireland	Technical support, Information management.	**David Fluharty,** College of Ocean and Fishery Sciences, University of Washington Seattle, Washington 98105 USA.	Validation report review only

http://sustainability.alaskaseafood.org/halibut-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 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 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: Global Trust Certification Committee

Peter Marshall, Chairperson **Certification and Accreditation Expert** Global Trust Certification Ltd. Key Contact: petermarshall@gtcert.com	**Bill Paterson** **Legal / Technical / Accreditation Expert** Global Trust Certification Ltd.
Ciaran Kelly **Fishery Management Expert** Marine Institute. Ireland	**Clare Murray** **Fishery Scientist** Global Trust Certification Ltd.
Vito Ciccia Romito: Fishery Scientist / Information Management Global Trust Certification Ltd. (Fishery Presentation to Certification Committee)	