Alaska Responsible Fishery Management Certification

1st Surveillance Report

For The

Alaska Pacific Halibut fishery

Client

'Eat on the Wild Side' (FVOA)

Assessors: **Ivan Mateo, Lead Assessor**
Rohan Smith, Assessor
Vito Romito, Assessment Team Support

Report Code: **AK/HAL/002.1/2017**
Published Date: **3rd August 2017**

SAI Global
3rd Floor, Block 3,
Quayside Business Park,
Mill Street, Dundalk,
Co. Louth, Ireland.
T + 353 42 932 0912
F + 353 42 938 6864
www.saiglobal.com

Foreword

The Alaska Responsible Fisheries Management (RFM) Standard Version 1.3 is composed of Conformance Criteria based on the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009.

The Standard also includes full reference to the 2011 FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Fisheries which in turn are now supported by a suite of guidelines and support documents published by the UN FAO. Further information on the Alaska RFM program may be found here: http://www.alaskaseafood.org/rfm-certification/certified-fisheries-companies/certified-fisheries/

This report is the 1st Surveillance Report (2017) for the Alaska Pacific Halibut, federal and state commercial fisheries following initial certification award against this FAO-Based RFM Program, awarded on April 23rd 2011, and recertification on 9th January 2017.

The objective of the Surveillance Assessment and Report is to monitor for any changes/updates in the management regime, regulations and their implementation since the previous assessment; in this case, the Final Report of Full Assessment (re-certification) completed in January 2017. The report determines whether these changes and current practices remain consistent with the overall scorings of the fishery allocated during re-certification.

High conformance was demonstrated by the fishery with regards to the Fundamental Clause. Two minor non-conformances (NC) identified during the re-assessment persist, with an appropriate client action plan as well as fair levels of progress on the NC.

The certification covers the Pacific Halibut (*Hippoglossus stenolepis*) commercial fishery employing benthic longline gear within the IPHC's Regulatory Areas 2C, 3A, 3B, 4B and 4CDE, within Alaska jurisdiction (200 nautical miles EEZ), under international [International Pacific Halibut Commission (IPHC)], federal [National Marine Fisheries Services (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG)] management, underwent their 4th surveillance assessment against the requirements of the FAO-Based RFM Conformance Criteria Version 1.3 Fundamental clauses.

The surveillance assessment was conducted according to the Global Trust Certification ISO 65 accredited procedures for FAO – Based Responsible Fisheries Management Certification using the Alaska FAO – Based RFM Conformance Criteria Version 1.3 fundamental clauses as the assessment framework.

Table of contents

Glossary

ABC	Allowable Biological Catch
ADFG	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
ASMI	Alaska Seafood Marketing Institute
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CCRF	Code of Conduct for Responsible Fisheries
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
CPUE	Catch per Unit Effort
EIS	Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FAO	Food and Agriculture Organization of the United Nations
FMP	Fishery Management Plan
GOA	Gulf of Alaska
GHL	Guideline Harvest Level
IFQ	Individual Fishing Quota
IRFA	Initial Regulatory Flexibility Analysis
IRIU	Improved Retention/Improved Utilization
LLP	License Limitation Program
MSFCMA	Magnuson-Stevens Fisheries Management and Conservation Act
mt	Metric tons
MSY	Maximum Sustainable Yield
NEPA	National Environmental Policy Act
nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
OFL	Overfishing Level
OLE	Office for Law Enforcement
OY	Optimum Yield
PSC	Prohibited Species Catch
RACE	Resource Assessment and Conservation Engineering
REFM	Resource Ecology and Fisheries Management
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation (Report)
SSC	Scientific and Statistical Committee
SSL	Steller Sea Lion
TAC	Total Allowable Catch
USCG	U.S. Coast Guard

Summary and Recommendations

This report is the 1st Surveillance Report (AK/HAL/002.1/2017) for the Alaska Pacific Halibut (*Hippoglossus stenolepis*) Commercial Fishery produced on behalf of the "Eat on the Wild Side (Fishing Vessel Owners' Association (FVOA))" according to the Alaska Based Responsible Fisheries Management (RFM) Certification Program. The fisheries were originally certified on 23rd April 2011, and recertified in 26th January 2017.

The objective of this Surveillance Report is to monitor for, and evaluate the impacts of, any changes to the management regime, regulations and their implementation since the previous assessment. Having assessed these changes to the fishery (if any) the Assessment Team determines if these changes materially affect the fisheries' conformance to the AKRFM Standard and whether current practices remain consistent with the overall confidence ratings assigned during either initial certification or subsequent surveillance audits where the original confidence rating(s) have been changed.

In addition to this, any areas reported as "items for surveillance" or corrective action plans in the previous assessment are reassessed and a new conclusion on consistency of these items with the Conformance Criteria is given accordingly.

High conformance was demonstrated by the fishery with regards to the Fundamental Clause. Two minor non-conformances (NC) identified during the re-assessment persist, with an appropriate client action plan as well as fair levels of progress on the NC.

The certification covers the Alaska Pacific Halibut (*Hippoglossus stenolepis*) Commercial Fishery legally employing benthic longline gear within the IPHC's Regulatory Areas 2C, 3A, 3B, 4B and 4CDE, within Alaska jurisdiction (200 nautical miles EEZ), under international [International Pacific Halibut Commission (IPHC)], federal [National Marine Fisheries Services (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG)] management, underwent their 4th surveillance assessment against the requirements of the FAO-Based RFM Conformance Criteria Version 1.3 Fundamental clauses.

The surveillance assessment was conducted according to the Global Trust Certification procedures for Alaska Responsible Fisheries Management Certification using the FAO – Based RFM Conformance Criteria (v1.3) fundamental clauses as the assessment framework.

The assessment was conducted by a team of Global Trust appointed assessors. Details of the assessment team are provided in Appendix 1.

The main Key outcomes have been summarized in Section 5 "Assessment Outcome Summary".

Assessment Team Details

Dr. Ivan Mateo, Lead Assessor
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth, Ireland.
Email: ivan.mateo@saiglobal.com

Rohan Smith, Assessor
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth, Ireland.
Email: rohan.smith@saiglobal.com

Vito Romito, Assessment Team Support
Independent Fishery Expert
Portlaoise, Co. Laois, Ireland

Ruth O'Connell, Program Administrator
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth, Ireland.
Email: ruth.o'connell@saiglobal.com

1. Introduction

This Surveillance Report documents the 1st Surveillance Assessment of the Alaska Pacific Halibut (*Hippoglossus stenolepis*) Commercial Fishery originally certified on April 23rd 2011, and re-certified on 26th January 2017, and presents the recommendation of the Assessment Team for continued FAO-Based RFM Certification.

Unit of Certification
The US Alaska Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management and fished with benthic longline (within Alaska's 200 nm EEZ).

This Surveillance Report documents the assessment results for the continued certification of commercially exploited halibut fisheries to the Alaska RFM Certification Program. This is a voluntary program that has been supported by ASMI who wish to provide an independent, third-party certification that can be used to verify that these fisheries are responsibly managed.

The assessment was conducted according to the Global Trust procedures for Alaska RFM Certification using the fundamental clauses of the Alaska RFM Conformance Criteria Version (V1.3) in accordance with ISO 17065 accredited certification procedures.

The assessment is based on 6 major components of responsible management derived from the FAO Code of Conduct for Responsible Fisheries (1995) and Guidelines for the Eco-labelling of products from marine capture fisheries (2009); including:

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 12 fundamental clauses (+ 1 in case of enhanced fisheries) that guide the FAO-Based RFM Certification Program surveillance assessment.

A summary of the site meetings is presented in Section 5. Assessors included both externally contracted fishery experts and Global Trust internal staff (Appendix 1).

1.1. Recommendation of the Assessment Team

Following this 1st Surveillance Assessment, the assessment team recommends that continued Certification under the Alaska Responsible Fisheries Management Certification Program is maintained for the management system of the applicant fisheries, the US Alaska Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management, and fished with benthic longline (within Alaska's 200 nm EEZ).

2. Fishery Applicant Details

Table 1. Fishery Applicant Details.

Applicant Contact Information			
Organization/Company Name:	Eat on the Wild Side (Fishing Vessel Owners' Association (FVOA))		
Correspondence Address:			
Street:	4005 - 20th Ave. West, Room 232		
City:	Seattle		
State:	Washington	**Zip code**	98199
Country:	USA		
Phone:	+1 (206) 283-7735	**E-mail Address:**	robertalverson@msn.com
Key Management Contact Information			
Full Name:	**(Last)** *Alverson*	**(First)** *Robert*	
Position:	Manager		
Correspondence Address:			
Street:	4005 - 20th Ave. West, Room 232		
City:	Seattle	**Zip code**	98199
State:	Washington		
Country:	USA		
Phone:	+1 (206) 283-7735	**E-mail Address:**	robertalverson@msn.com

3. Unit of Certification

Table 2. Proposed units of assessment and certification for the U.S. Alaska Pacific Halibut Commercial Fishery.

Unit of Certification			
U.S. 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 (GOA) and Bering Sea & Aleutian Islands (BSAI)	Benthic longline	International Pacific Halibut Commission (IPHC) National Marine Fisheries Service (NMFS) North Pacific Fishery Management Council (NPFMC) Alaska Department of Fish and Game (ADFG)

4. Surveillance Meetings

Meetings have not been held, this was a desktop review of public available information on the fishery. The documents used to compile the report are referenced in section 13.

5. Assessment Outcome Summary

5.1. Fundamental Clauses Summaries

Fundamental Clause 1: Structured and legally mandated management system

Evidence adequacy rating: High

No significant change has occurred in the management of the Alaska Pacific Halibut fishery since the full assessment final report in January 2017. Fisheries resources conservation and economic viability, through research and management are important principles of the bilateral administrative framework used by Canada and USA to manage the fishery. The International Pacific Halibut Commission (IPHC) and National Marine Fisheries Service (NMFS) manage fishing for Pacific halibut through regulations established under authority of the Northern Pacific Halibut Act of 1982 (Halibut Act). The IPHC promulgates regulations governing the Pacific halibut fishery under the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea (Convention). The Halibut Act provides the North Pacific Fishery Management Council (Council) with authority to develop regulations, including limited access regulations. Council–developed regulations are implemented by NMFS after approval by the Secretary. The Council has exercised this authority during development of its IFQ Program. Congressional action is not required to modify the IFQ Program. However, CDQ allocations are specified in the MSA and changes to the CDQ allocations would require Congressional action. Following IPHC catch share allocations; halibut fisheries in the American EEZ off Alaska are managed by the North Pacific Fishery Management Council (NPFMC), the National Marine Fisheries Service (NMFS) and the Alaska Department for Fish and Game (ADFG). The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Pacific halibut fisheries laws, regulations, violations and sanctions in federal waters. The Alaska Wildlife Troopers (AWT) take part in enforcement activities in state waters.

Fundamental Clause 2: Coastal area management frameworks

Evidence adequacy rating: High

No significant changes have occurred since the re-assessment in January 2017. An appropriate policy, legal and institutional framework is adopted in order to achieve sustainable and integrated use of living marine resources, taking into account the fragility of coastal ecosystems, the finite nature of their natural resources and the needs of coastal communities. The state of Alaska is a cooperating agency in the NEPA process for federal actions, giving it a seat at the table for federal actions. Collectivity cooperation among NEPA and existing agencies (such as, ADFG, DEC, DNR, USFWS, ANILCA, OPMP and BOEM), facilitates appropriate processes for managing Alaska's coastal resources in a transparent, organized and sustainable way. In addition, these planning and management framework 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. Both the NPFMC and the IPHC decision making processes are open to public input and consultation and the information produced through these fora, for the management of the halibut resources in Alaska, are publically available. As for 2017, the IPHC is also going through a second performance review to improve its internal processes and expand the transparency of its decision making process.

Fundamental Clause 3: Management objectives and plan

Evidence adequacy rating: High

No significant changes have occurred since the re-assessment in January 2017. USA and Canada agreement and long term objectives for management, conservation, and sustainable utilization of Pacific halibut in the North Pacific has been in use since 1923. Relevant fisheries management plans are developed from these management objectives and included: seasonal fishery closures, halibut bycatch restrictions in other fisheries, IFQ and CDQ, as well as systems for mandatory reporting catch (removals), fishery monitoring, and persecutions where violations are identified. The IPHC promulgates regulations governing the Pacific halibut fishery under the Convention

between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea (Convention) (signed on March 2, 1953) as amended by a Protocol Amending the Convention (signed on March 29, 1979). Regulations developed by the IPHC are subject to approval by the Secretary of State with concurrence from the Secretary of Commerce (Secretary). After approval by the Secretary of State and the Secretary, the IPHC regulations are published in the Federal Register as annual management measures. Overall management objectives of NMFS includes promoting 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 Stevens Act or MSA) that provided authority for regulating these fisheries.

Fundamental Clause 4: Fishery data
Evidence adequacy rating: Medium
No significant changes have occurred since the re-assessment in January 2017.
A minor non-conformance identified during the re-assessment in January 2017, related to limited observer coverage on vessel <40ft. Evidence of progress included the recommendation and implementation of Electronic Monitoring (starting 2017) among smaller vessels (<40f) that currently do not participate in the observer program. Demonstration of this evidence is expected in the 2017 fishing season. A Client corrective action plan was provided and accepted for the non-conformance on sub-clause 4.2. This NC will remain open throughout the period of certificate (5 years) until the medium confidences move to high as the corrective actions take effect.

Full stock assessment consistent with contemporary methods was completed at the end of 2016. In addition data sources are updated with new available information, and refined to provide accurate representation of the fishery. All 1,366 survey stations planned for the 2016 survey season were either scouted or completed (Stewart and Hicks, 2016). All fishery removals, wastage, and mortality of Pacific halibut are considered in the assessment and management of the stock. Reliable and accurate data are provided annually to IPHC scientist to assess the status of Pacific halibut fisheries and ecosystems. These data include information on retained catch in the commercial and sport fisheries, the subsistence fisheries, as well as estimates of bycatch, and discards in other fisheries. Several data reporting systems are in place for the various fishery components to ensure timely and accurate collection and reporting of catch data. Fishery-independent surveys produce important, high-quality abundance and trend information for assessment and management of the Pacific halibut stock. The IPHC has conducted fishery-independent setline surveys in selected areas during most years since 1963, and has carried out a coast-wide survey with a consistent sampling design since 1998. The IPHC has also taken part in the NMFS Bering Sea groundfish trawl survey since 1998 and the NMFS Aleutian Islands trawl survey since 2012. These two NMFS surveys contribute Pacific halibut data from areas either poorly covered or not covered by the Commission's own fishery-independent survey.

Fundamental Clause 5: Stock assessment
Evidence adequacy rating: High
No significant changes have occurred since the re-assessment in January 2017. Full stock assessment consistent with contemporary methods was completed at the end of 2016 (Stewart and Hicks, 2016).
The SB at the beginning of 2017 is estimated to be 212 million pounds (~96,200 t), with an approximate 95% confidence interval ranging from 153 to 286 million pounds (~69,400-129,700 t). Recruitment estimates are strongest among the 199 and 2002 cohorts. The stock is currently at 41% of equilibrium unfished level. Fishing mortality is estimated in the stock assessment from data collected during fishing surveys, catch sampling in main ports, and tagging studies. The Research project to monitor environmental contaminants in Alaskan fish are coordinated by the Alaska Department of Environmental Conservation (ADEC) with inputs from the IPHC, with regards to fisheries management and conservation. Results from analysis of persistent organic pollutants (POP's -

pesticides, selected PCB congeners, dioxins, and furans) found that in general these compounds are either undetectable in halibut or well below other marine fish species. This is a positive finding and is likely attributable to the lower fat content in halibut compared to these other species. New Five-Year Research Plan are proposed for the period 2017-21 includes extensive studies covering five major research areas: 1) Reproduction (i.e., sex identification, maturity estimates), 2) Growth (i.e., decrease in size-at-age, temperature effects), 3) Discard mortality rates (i.e., physiological condition and survival post-release of bycatch), 4) Migration (i.e., larval dispersal, adult and reproductive migrations) and 5) Genetics and Genomics (i.e., genetic population structure, genome characterization.

Fundamental Clause 6: Biological reference points and harvest control rule
Evidence adequacy rating: High
No significant changes have occurred since the re-assessment in January 2017. Full stock assessment are conducted annually, and fisheries management and conservation are based on precautionary and ecosystem based approaches. IPHC's harvest policy is to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% (B30 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% (B20 limit level) of this estimated unfished level. That is, fishing ceases completely if the stock is below 20% of the unfished biomass. Since 1985, the IPHC has followed a constant harvest rate policy to determine annual available yield, termed the Constant Exploitation Yield (CEY).

The apportionment percentages and the target harvest rates for each regulatory area (21.5% for Areas 2A-3A, and 16.125% for Areas 3B-4CDE) together result in a target distribution for the annual TCEY. The stock is currently at 41% of equilibrium unfished levels; however, the probability distribution indicates considerable uncertainty, with a 5% probability that the stock is below the SB 30% (B30 target reference point) level. The 41% biomass level is above the B30 (target) and B20 (limit) reference points, and therefore above any level where the harvest control rule would need to be applied to reduce harvest rates.

Typically, the Pacific halibut fishery is highly regulated and subjected to defined fishery data collection systems, operating under an IFQ system, with conservatively defined catch quotas, gear specifications and 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 high concentrations of juvenile halibut are recorded, fishery and area closure measures are adopted respectively.

Fundamental Clause 7: Precautionary approach
Evidence adequacy rating: High.
No significant changes have occurred since the re-assessment in January 2017. Full stock assessment are conducted annually, and fisheries management and conservation are based on precautionary and ecosystem based approaches. Target reference points for biomass and fishing mortality (harvest rate) have been developed based on sound scientific analyses. Exploitation rates for the individual management areas are established separately to ensure that localized overfishing does not occur. The apportionment percentages and the target harvest rates for each regulatory area (21.5% for Areas 2A-3A, and 16.125% for Areas 3B-4CDE). Precautionary approach-based reference points are used in the management of this stock.

A comparison of the median current ensemble SB to reference levels specified by the current harvest policy suggests that the stock is currently at 41% of equilibrium unfished levels; however, the probability distribution indicates considerable uncertainty, with a 5% probability the stock is below the SB $_{30\%}$ level. Stock projections for a range of alternative management actions were conducted using the integrated results from the stock

assessment ensemble, summaries of the 2016 fishery, and other sources of mortality, as well as the results of apportionment calculations and the target harvest rates from current IPHC harvest policy.

Fundamental Clause 8: Management measures
Evidence adequacy rating: High
No significant changes have occurred since the re-assessment in January 2017. Conservation and management of the fishery is based on harvest control rule to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% (B30 threshold level) of a level defined as the unfished level. Target harvest rates are established for each regulatory area (21.5% for Areas 2A-3A, and 16.125% for Areas 3B-4CDE) to ensure that localized overfishing does not occur.

Typically, the NPFMC determines the regulations for halibut taken as (prohibited species) by-catch in the Alaskan fisheries under its management, and requires that all halibut caught incidentally in these groundfish fisheries must be discarded, regardless of whether the fish is living or dead. Recent measures have been introduced within NPFMC to reduce the halibut bycatch in the Gulf of Alaska groundfish fisheries. There are numerous technical management measures aimed at conservation and sustainable utilization of the halibut resources. Under the individual fishing quota share system, the fishing capacity (vessels and gear) has been reduced, seasons were extended and wastage was reduced. Longline is the principal gear utilized for this fishery. Regulations are in place to address discards. General spawning areas have been mapped in Alaska, and the halibut fishery is closed during peak spawning times, by regulation. The NPFMC has established Marine Protected Areas and additional trawl closures that benefit juvenile fish and adult spawners. Bycatch of seabirds has been addressed by specific regulations now including the use of streamer (tory) lines, night setting, line shooters and lining tubes.

Fundamental Clause 9: Appropriate standards of fisher's competence
Evidence adequacy rating: High
No significant changes have occurred since the re-assessment in January 2017. Aspirant halibut 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 to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. Several training opportunities are available to train crewmembers in Alaska.

Fundamental Clause 10: Effective legal and administrative framework
Evidence adequacy rating: High
No significant changes have occurred since the re-assessment in January 2017. The administrative framework includes the Northern Pacific Halibut Act, which governs the commercial, sport, charter, and subsistence halibut fisheries in the U.S. The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska fisheries laws and regulations, especially 50CFR679. The Alaska Wildlife Troopers enforce halibut regulations in state waters. All landings of halibut must be reported to NMFS via its mandatory "e-landings" reporting system.

IFQ systems are establish with regular and annual reconciliations of catch to address any incidents of overage. The violations in this fishery are reported to and investigated by NOAA's Office of Law Enforcement's Alaska Division and prosecuted by NOAA's Office of General Counsel's Enforcement Section. OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. NOAA Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL).

Fundamental Clause 11: Framework for sanctions
Evidence adequacy rating: High
No significant changes have occurred since the re-assessment in January 2017. The sanction and violation framework are based on the Magnuson-Stevens Act (50CFR600.740 Enforcement policy) provides four basic enforcement remedies for violations: 1) Issuance of a citation (a type of warning), usually at the scene of the offense, 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. In some cases, the Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine.

The 2011 Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions issued by NOAA Office of the General Counsel – Enforcement and Litigation, provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The Northern Pacific Halibut Act governs the commercial, sport, charter, and subsistence halibut fisheries in the U.S. The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska fisheries laws and regulations, especially 50CFR679. The Alaska Wildlife Troopers enforce halibut regulations in state waters. The violations in this fishery are reported to and investigated by NOAA's Office of Law Enforcement's Alaska Division and prosecuted by NOAA's Office of General Counsel's Enforcement Section

Fundamental Clause 12: Impacts of the fishery on the ecosystem
Evidence adequacy rating: Medium
No significant changes have occurred since the re-assessment in January 2017. The IPHC, NPFMC and NOAA/NMFS conduct assessments and research related to fishery impacts on ecosystems and habitats and how environmental factors affect the fishery. Findings and conclusions are published in the Ecosystem section of the SAFE document, annual Ecosystem Considerations documents, and the various other research reports. The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS, 2005) concluded that the benthic longline fishery has minimal or temporary impacts on halibut habitat. Various studies have applied ecosystem models to the evaluation of food webs and impacts from climate change. Changes in primary production systems are driven by climate changes such as global warming and rise in sea water temperature, as well as ocean acidification; the combine effects indicated northward shift of plankton predator species and their prey species. Halibut have low discard rates, but high Post-Capture-Survival rates in other fisheries and discussions are underway between management agencies to put in place additional regulatory measures to avoid halibut by-catch and further minimize halibut bycatch mortality. The directed halibut fishery takes significant amounts of Pacific cod, sharks, skates and rockfish; but based on by-catch levels, the fishery does not pose a threat to by-catch species. Management measures limit interactions with seabirds and the fishery has minimal impact on the short-tailed albatross, the only seabird listed as endangered under the ESA. Interactions with whales remain a problem as they take fish off longline gear, but the fishery does not adversely affect whale populations.

Fundamental Clause 13: Fisheries enhancement activities (where applicable) N/A
Evidence adequacy rating: N/A

6. Conformity Statement

The assessment team recommends that continued Certification under the Alaska Responsible Fisheries Management Certification Program is granted to the US Alaska Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management and fished with benthic longline (within Alaska's 200 nm EEZ).

7. Evaluation of Fundamental Clauses

7.1. Section A. The Fisheries Management System

7.1.1. Fundamental Clause 1

There shall be a structured and legally mandated management system based upon and respecting International, National and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.

Number of Supporting clauses	**13**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized evidence:

1.1. There shall be an effective legal and administrative framework established at local and national level appropriate for the fishery resource and conservation and management.

Evidence

No significant change has occurred in the management of the Alaska Pacific Halibut fishery since the full assessment final report in January 2017. Fisheries resources conservation and economic viability, through research and management are important principles of the bilateral administrative framework used by Canada and USA to manage the fishery.

The International Pacific Halibut Commission (IPHC) and National Marine Fisheries Service (NMFS) manage fishing for Pacific halibut through regulations established under authority of the Northern Pacific Halibut Act of 1982 (Halibut Act). The IPHC promulgates regulations governing the Pacific halibut fishery under the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea (Convention) (signed on March 2, 1953) as amended by a Protocol Amending the Convention (signed on 29th March 1979). Regulations developed by the IPHC are subject to approval by the Secretary of State with concurrence from the Secretary of Commerce (Secretary).

After approval by the Secretary of State and the Secretary, the IPHC regulations are published in the *Federal Register* as annual management measures. The Halibut Act also provides the North Pacific Fishery Management Council (Council) with authority to develop regulations, including limited access regulations that are in addition to, and not in conflict with, approved IPHC regulations. Such Council–developed regulations may be implemented by NMFS only after approval by the Secretary. The Council has exercised this authority most notably in the development of its IFQ Program. Congressional action is not required to modify the IFQ Program. However, CDQ allocations are specified in the MSA and changes to the CDQ allocations would require Congressional action https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf.

Updates for 2017 relevant to halibut fishery management provided benefits of flexible catch share utilization and improve monitoring, through protocols such as:

- CDQ groups leasing of IFQ quotas (https://www.npfmc.org/ifqcdq/)

- Halibut abundance-based PSC management (https://www.npfmc.org/halibutpsc/)
- Electronic monitoring (https://www.npfmc.org/electronic-monitoring-2/)

CDQ groups leasing of IFQ quotas

In June 2017 the Council took final action to approve a regulatory amendment that would allow CDQ groups the opportunity to lease Area 4B, 4C, and 4D halibut IFQ in years where the catch limits are below certain thresholds. In Area 4B, this option would become available to the groups if the catch limit was 1 million pounds or lower. This option would be available for Area 4C and 4D when the catch limit in Area 4CDE was at or below 1.5 million pounds. Leased IFQ would be available to vessels less than or equal to 51 feet length overall (LOA), subject to the groups' internal management. This action would not convert IFQ to CDQ.

Vessels harvesting leased halibut IFQ would follow all halibut IFQ regulations (e.g. vessel use caps) with one exception. Area 4D IFQ that is leased by a CDQ group (catcher vessel IFQ as well as class A IFQ), would be permitted to be fished in Area 4E.

The Council intends that IFQ would be leased by non-residents of CDQ communities for use by residents. Thus, in any year that CDQ groups use this additional opportunity, the groups would be required to submit a report specifying the criteria used to select IFQ holders leasing to a CDQ group, the criteria used to determine who can receive leased IFQ, and the amount and type of IFQ leased. In this way, the groups will be able to demonstrate how the benefits from this flexibility are reaching the residents of CDQ communities as intended. https://www.npfmc.org/ifqcdq/

Halibut Abundance-Based PSC Management

In June 2017 the Council reviewed a discussion paper on development of abundance-based approaches for BSAI halibut PSC limits. This builds upon previous work to provide the information necessary for the Council to develop abundance-based PSC limit alternatives for analysis. Following review of some specific aspects of the indices and plans for the next discussion paper, the Council moved to provide additional direction for the expanded discussion paper for October. Specific direction on limiting the set of abundance indices, providing an illustrative starting point and shape of control rule and other directions for inclusion in the paper were provided by the Council motion. The full Council motion is posted on the website. An expanded discussion paper will be provided for the October 2017 Council meeting to facilitate selection of alternatives for this abundance-based approach for BSAI PSC limits. The paper will be available by the end of August for review. https://www.npfmc.org/halibutpsc/

Electronic Monitoring

The Council reviewed the Electronic Monitoring (EM) Workgroup report from their March 2017 meeting. In addition to discussing how the 2017 program is working, a workplan for giving public input on the statement of work for an EM contract, and planning for the transition of the current EM pre-implementation program to an integrated Observer Program, the Workgroup also reviewed the EM Integration action proposed rule and the scope of the 2018 EM deployment pool. The Council motion addressed two areas:

- The Council requested that the agency develop an EM program for 2018 that is generally similar to EM deployment in 2017, except that the Council supports expanding the size of the EM pool in 2018 to

accommodate up to 120 longline vessels and up to 45 pot vessels, provided there is funding to support this pool size.

- The Council directed staff to submit comments to the agency on behalf of the Council on the EM Integration Proposed Rule, in line with the six areas highlighted by the consensus of the EM Workgroup. **https://www.npfmc.org/electronic-monitoring-2/**

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

The IPHC is a bilateral, international treaty, established with the primary purpose of managing the whole pacific halibut stock over its entire area of distribution which extends from California to the Bering Sea. As the biological stock unit encompasses multiple jurisdictions (U.S. and Canada) the IPHC considers exploitation by all parties when defining exploitation levels and determining stock health to avoid overfishing/depletion of the resource. IPHC conducts extensive research on Pacific halibut throughout the entire area through which the species migrates during its life cycle. Additionally, the IPHC explicitly considers halibut life cycle and migration when recommending apportionment of catch limits between regulatory areas. Within the Alaskan EEZ, NPFMC and NMFS also consider the entire range through which halibut migrate during its life cycle. http://www.iphc.washington.edu/documents/basictext/IPHC-2017-Rules-of-Procedure.pdf and https://www.npfmc.org/

1.3./1.4/1.5./1.6. Transboundary stocks

As explained above, the IPHC considers management of the stock throughout its full range, and leads a cooperative forum which is structure between the U.S. and Canada that provides for a joint management and conservation system aimed at ensuring effective conservation and management of the Eastern North Pacific halibut stock and its environment. Stock assessment and harvest rates are prepared for joint management areas. Furthermore, Federal regulations was established in 2015, with regards to areas 2C and 3A focused on controlling harvest from Chartered fishing sector, in order to enhance information of the sector interaction as well as conservation of Pacific Halibut. Since 2014, the IPHC implemented Management Strategy Evaluation with frameworks for performance review with regards to specific conservation objectives; in addition the setline survey areas was expanded including areas 2A and 4A; also the established halibut fishery bycatch working group is focused on reduction of discard mortality levels across the full range of the fishery.

The IPHC conducts numerous projects annually to support both of its major mandates namely stock assessment and basic halibut biology. Current projects include standardized stock assessment fishing surveys covering an area that stretches from northern California to the end of the Aleutian Island chain and port sampling aimed at collecting 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 IPHC explicitly considers halibut life cycle and migration when recommending apportionment of catch limits between regulatory areas. Within the Alaskan EEZ, NPFMC and NMFS also consider the entire range through which halibut migrate during its life cycle.

The Pacific halibut within the IPHC convention area is considered to comprise a single stock. This assertion is based on studies indicating northwest larval drift being balanced by southeast compensatory migration of juveniles and adults and tagging studies showing movement of fish over broad spatial scales. http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-

5.8_Pacific_halibut_tagging_studies.pdf

1.7. Review and Revision of conservation and management measures

The Alaskan halibut and sablefish IFQ program has gone through numerous innovations over the years and has been officially modified many times since initial implementation including modifications to trading restrictions, eligibility rules, administrative catch accounting systems and more. In December 2016 the IPHC released the Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program.

The intent of the review was to evaluate the IFQ Program as required by the MSA and within the framework of the scope requested by the Council and its advisory bodies. Primarily, the IFQ Program was examined with respect to how well it has met its 10 original policy objectives and how it is providing entry opportunities for new participants, an objective that the Council has sought to provide through numerous revisions since the IFQ Program was implemented. The Council, its Advisory Panel (AP), Scientific and Statistical Committee (SSC), and IFQ Implementation Committee all provided feedback on the proposed structure and policy scope of this review document at the December 2015 and February 2016 Council meetings.

In the 20 years since implementation of the IFQ Program, this was the first formal and comprehensive review of the program. However, in this time there have been numerous regulatory impact reviews and reports produced by Council and NMFS staff that provide relevant information about QS ownership and transfers, IFQ use and landings, and with respect to specific provisions in the program. This IFQ Program Review synthesized much of the information provided in these previous reports and analyses[1].

In addition to this, both the IPHC and the NPFMC annually review their previous, current, and possible future conservation and management measures. The Ninety-third Annual Meeting of the International Pacific Halibut Commission was held from Monday, January 23 through Friday, January 27, 2017 in Victoria, British Columbia at the Delta Hotels Victoria Ocean Pointe Resort**.**

During this meeting the Commission adopted a proposal aimed at eliminating a recently identified bias in Pacific halibut removal estimates (net weight), by requiring all commercial Pacific halibut to be landed and weighed with their heads attached for data reporting purposes and to be subject to the 32-inch minimum size limit which supersedes Section 13 of the IPHC Pacific halibut fishery regulations. The Commission also adopted a proposal aimed at harmonising IPHC and NMFS regulations regarding fishing in multiple regulatory areas in Alaska superseding Section 18 of the IPHC Pacific halibut fishery regulations, as well as adopting new catch limits and fishing periods. http://www.iphc.washington.edu/meetings/2017am/IPHC-2017-AM093-R-Report_of_the_AM093.pdf

The NPFMC sets its agenda for each meeting in response to both current priority issues and possible future changes/events with the potential to impact the halibut fishery[2] with all meetings being open to the public comment. The continual public input into the NPFMC process effectively provides public scrutiny of the NPFMC's activities with issues being discussed continuously as long as they remain of importance to the stakeholder.

Some of the most recent (2016-17) NPFMC review concerning the halibut fishery include the development of

[1] https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf
[2] http://www.npfmc.org/council-meeting-archive/

abundance-based approaches for BSAI halibut PSC limits and regulatory amendment that would allow CDQ groups the opportunity to lease Area 4B, 4C, and 4D halibut IFQ in years where the catch limits are below certain thresholds[3].

1.8. Transparent management arrangements and decision making

In 2012 an outside performance review of the Commission structure, commissioned by the IPHC itself, found the Commission's protocols and decision-making processes at the time to be somewhat lacking in definition and transparency[4]. In response to this the IPHC undertook a number of changes aimed at better defining the Commission's rules of procedure and increasing the transparency of decision-making processes. As a result of these changes:

- The IPHC's advisory bodies were directed to develop or amend their rules of procedure in order to make their operations more transparent and predictable
- All Commission meetings are now treated as open unless specifically closed (Examples of specifically closed meetings might include those pertaining to personnel, financial or commercially sensitive matters)
- Agendas for IPHC meetings allow more time for public comment and discussion
- The web broadcast now allows submission of comments and questions from the on-line audience
- Both attendees and web audience participants are now afforded the opportunity to engage the Commission in two-way dialogue during meetings
- The range of meeting materials and updates posted on the IPHC website has been expanded, and the period of posting prior to meetings increased. This has greatly increased the information available to the public before, during, and after meetings allowing for more focused public comment.

The IPHC also directed the Conference Board (CB) and the Processor Advisory Group (PAG) to open their meetings to the public.

In 2014 the IPHC self-reported its progress against the recommendations of, and commitments resulting from the 2012 performance review[5]. Following the changes to Commission procedures since the performance review responses to all management issues are provided in the form of supporting documents, minutes of meetings, and public testimony published on the IPHC website. Annual reports posted on the website include the Annual IPHC meeting[6], and the "RARA", a detailed IPHC Report of Assessment and Research Activities[7].

2nd IPHC Performance Review

Noting that the 1st Performance Review of the IPHC occurred in 2011 – 12 (see paper IPHC – 2017 – AM 093 - 17, and that the generally agreed best practice among RFMOs requires a Performance Review to be undertaken every 3 - 5 years, the IPHC has agreed to undertake a 2nd Performance Review of the IPHC during 2017. In this regard the Commission requested that the IPHC Secretariat finalize the draft performance review terms of reference and criteria , as well as provide a proposed process and budget to conduct the review, to be considered at the 2017 Annual Meeting (AM093) for implementation during 2017. The plan should include anticipated Commissioner and

[3] https://www.npfmc.org/npfmc-newsletters/
[4] http://www.iphc.int/documents/review/FINAL_IPHC_Performance_Review-April30.pdf
[5] http://www.iphc.int/documents/review/PerformancereviewprogressreportJan2014.pdf
[6] http://www.iphc.washington.edu/meetings/2017am/IPHC-2017-AM093-R-Report_of_the_AM093.pdf
[7] http://www.iphc.washington.edu/library/raras/485-rara2016.html

IPHC Secretariat support, as well as recommendations regarding the use of outside contractors to conduct the review[8].

The NPFMC consultative and decision making process relative to halibut and all the other fishery resources managed are considered transparent and as a model from other Fishery Management Organizations to be modeled upon.

1.9. Compliance with international conservation and management measures

The fishery does not occur in the high seas and as such this Clause is **NOT APPLICABLE.**

[8] http://www.iphc.int/meetings/2017am/IPHC-2017-AM093-18-P.pdf

7.1.2. Fundamental Clause 2

Management organizations shall participate in coastal area management institutional frameworks, decision-making processes and activities related to the fishery and its users, in support of sustainable and integrated resource use, and conflict avoidance.

Number of Supporting clauses	**10**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized evidence:

2.1./2.2./2.3./2.4. Policy, legal and institutional frameworks adopted to achieve sustainable and integrated use of marine resources along with mechanisms to avoid conflict shall be in place. Representatives of the fisheries sector and fishing communities shall be consulted in decision making processes and information related to management measures shall be disseminated.

Evidence

No significant changes have occurred since the re-assessment in January 2017. An appropriate policy, legal and institutional framework is adopted in order to achieve sustainable and integrated use of living marine resources, taking into account the fragility of coastal ecosystems, the finite nature of their natural resources and the needs of coastal communities. The state of Alaska is a cooperating agency in the NEPA process for federal actions, giving it a seat at the table for federal actions. Collectivity cooperation among NEPA and existing agencies (such as, ADFG, DEC, DNR, USFWS, ANILCA, OPMP and BOEM), facilitates appropriate processes for managing Alaska's coastal resources in a transparent, organized and sustainable way. In addition, these planning and management framework 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. Both the NPFMC and the IPHC decision making processes are open to public input and consultation and the information produced through these fora, for the management of the halibut resources in Alaska, are publically available. As for 2017, the IPHC is also going through a second performance review to improve its internal processes and expand the transparency of its decision making process[9].

The IPHC, NMFS, NPFMC[10] cooperatively manage halibut stocks within the Alaskan EEZ. The NMFS and NPFMC as federal agencies participate in coastal area management-related institutional frameworks through federal National Environmental Policy Act (NEPA) process[11]. NEPA documents are require to be produced each time regulations are renewed or amended meaning all proposed regulations include NEPA considerations. The NEPA process requires information to be made publically available and provides a robust opportunity for public involvement and ensures decisions are made in collaboration with fishery managers, fishermen, fishing organizations and fishing communities.

[9] http://www.iphc.int/meetings/2017am/IPHC-2017-AM093-18-P.pdf
[10] http://www.npfmc.org/
[11] https://ceq.doe.gov/docs/get-involved/Citizens_Guide_Dec07.pdf

Other State and federal entities that participate in ensuring the sustainable and integrated use of living marine resources within the Alaskan EEZ include, but are not limited to:

Alaskan Department of Environmental Conservation (DEC)[12]
The DEC implements statutes and regulations affecting air, land and water quality and is the lead state agency charged with implementing the federal Clean Water Act.

Alaska Department of Fish and Game (ADFG)[13]
ADFG has jurisdiction over the mouths of designated anadromous fish streams and legislatively designated state special areas (critical habitat areas, sanctuaries, and refuges). Some marine species also receive special consideration through the State's Endangered Species program.

Alaskan Department of Natural Resources (DNR)[14]
DNR manages all state-owned land, water, and natural resources except for fish and game and use the state Endangered Species Program to preserve the habitats of species threatened with extinction.

DNR Office of Project Management and Permitting (OPMP)[15]
The OPMP coordinates the review of larger scale projects in the state such as transportation, oil and gas, mining, federal grants, ANILCA coordination, and land use planning.

U.S. Fish and Wildlife Service (USFWS)[16]
The USFWS fulfills functions including enforcement of federal wildlife laws, protection of endangered species, restoration of nationally significant fisheries and conservation and restoration of wildlife habitat. Additionally, the USFWS distributes monies collected through the Sport Fish and Restoration Program to State fish and wildlife agencies for fishery projects, boating access and aquatic education.

Bureau of Ocean Energy Management (BOEM)[17]
The BOEM is responsible for managing environmentally and economically responsible development and provide safety and oversight of the offshore oil and gas leases. The activities of BOEM overlap extensively with those of ADNR, ADFG and ADEC given the potential impacts of such activities on marine resources.

Alaska has institutional and legal frameworks that determine the possible uses of coastal resources, govern access to them and take into account the rights of coastal fishing communities and their customary practices when doing so. The management framework explicitly recognizes and accounts for the rights of people dependent on marine fishing through NPFMC process, the Western Alaska Community Development Quota (CDQ) Program, allowances for subsistence halibut fishery in Alaskan waters and consultation with tribes and Native corporations.

NPFMC processes
The Council system mandated under the MSA of which the NPFMC is part was designed so that fisheries

[12] http://dec.alaska.gov/
[13] http://www.adfg.alaska.gov/
[14] http://dnr.alaska.gov/
[15] http://dnr.alaska.gov/commis/opmp/
[16] http://www.fws.gov/help/about_us.html
[17] http://www.boem.gov/uploadedFiles/Proposed_OCS_Oil_Gas_Lease_Program_2012-2017.pdf

management decisions were made at the regional level allowing input from affected stakeholders. NPFMC meetings are open and public testimony is taken ensuring that the rights of coastal communities and their historic access to the fishery are considered in the decision making process.

Dissatisfied parties affected by Council and NMFS decisions can appeal the decision to the Appeals Office in the NMFS Alaska Regional Office, which adjudicates appeals of initial administrative determinations and whose jurisdiction includes the halibut IFQ and CDQ Programs as well as other management programs. These dispute resolution mechanisms have proven to be effective at dealing with most issues avoiding the necessity for disputes to escalate to the stage of legal action. However, in cases where processes have not resulted in the resolution of disputes, parties can and do resolve the disputes in the federal court system.

The IPHC and NPFMC meetings provide fora for resolution of potential conflicts with users being afforded the opportunity to testify in person or in writing. In addition, stakeholders may review and submit written comments to the NMFS on proposed rules published in the Federal Register.

The Western Alaska Community Development Quota (CDQ) Program[18]
The Western Alaskan Community Development Quota (CDQ) Program is a federal fisheries program, authorized and governed by the MSA as amended in 2006 (MSA Section 305(i)(1)), which aims to promote fisheries related economic development in western Alaska. The Program involves 65 eligible communities within a fifty-mile radius of the Bering Sea coastline split into six regional organizations, referred to as CDQ groups. The Program allocates a portion of the BSAI harvest of halibut to CDQ groups.

Subsistence halibut fishing[19]
Implemented in 2003, the subsistence halibut fishery allows rural and Alaska native persons to 'practice the long-term customary and traditional harvest of Pacific halibut for food in a non-commercial manner'. Before fishing under the subsistence halibut regulations, fishermen must obtain a Subsistence Halibut Registration Certificate (SHARC) and comply with SHARC registration and reporting processes. Special permits for community harvest, ceremonial, and educational purposes also are available to qualified Alaska communities and Alaska Native Tribes.

Consultation with tribes and Native corporations[20]
In Alaska, NOAA's National Marine Fisheries Service (NMFS) consults with tribes and Native corporations about Federal actions that may affect tribal governments and their members. In fact the Alaska National Interest Lands Conservation Act (ANILCA[21]) which conveyed large sections of federal land to settle Alaska native lands claims specifically directs federal agencies to consult and coordinate with the State of Alaska. Executive Order 13175 sets the framework for regular and meaningful consultation and collaboration with Alaska Native representatives in the development of policies, legislation, regulations, and programs.

Risks and uncertainties related to the policies set up for the management of coastal areas are taken into account within and throughout the various NEPA processes, NPFMC proceedings as well as through ANILCA and the Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP).

[18] https://alaskafisheries.noaa.gov/fisheries/cdq
[19] https://alaskafisheries.noaa.gov/fisheries/subsistence-halibut
[20] https://alaskafisheries.noaa.gov/tribal-consultations
[21] http://dnr.alaska.gov/commis/opmp/anilca/

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

NOAA's Alaska Fisheries Science Center (AFSC) runs the Economic and Social Sciences Research Program in Alaska[22]. The aim of the Program is to provide economic and sociocultural information to assist NMFS in meeting its stewardship responsibilities with activities being conducted in support of this mission including:

- collecting economic and sociocultural data relevant for the conservation and management of living marine resources
- developing models to use that data both to monitor changes in economic and sociocultural indicators and to estimate the economic and sociocultural impacts of alternative management measures
- preparing reports and publications
- participating on NPFMC, NMFS, and inter-agency working groups
- preparing and reviewing research proposals and programs
- preparing analyses of proposed management measures
- assisting Alaska Regional Office and NPFMC staff in preparing regulatory analyses
- providing data summaries

Many of the activities of the Program are conducted in collaboration with other Federal and State agencies and universities. Current research topics being addressed include regional economic impact models, behavioral models of fishing operations, indicators of economic performance, and the non-market valuation of living marine resources.

Regarding socio-economic data collection, AFSC's Economic and Social Sciences Research Program produces an annual Economic Status Report of the Groundfish fisheries in Alaska. This comprehensive report (Fissel, et. al. 2016) provides estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, values of catch and resulting food products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, and employment on at-sea processors. The report contains a wide range of analyses and comments on the performance of a range of indices for different sectors of the North Pacific fisheries, and relates changes in value, price, and quantity, across species, product and gear types, to changes in the market. This report includes extensive economic data for the commercial Pacific Halibut fishery.

In 2005, the Alaska Fisheries Science Center (AFSC) compiled baseline socioeconomic information about 136 Alaska communities most involved in commercial fisheries. In 2010 and 2011, the AFSC went through the process of evaluating the community profiles and determining how to update them. A NOAA Technical Memorandum finalized in October 2011 documents the process been undertaken to update the *Community Profiles for North Pacific Fisheries – Alaska* (NOAA-TM-AFSC-230). In addition, the communities to be included in the updated document were reevaluated to ensure that communities with significant reliance on commercial, recreational and subsistence fishing are included. A total of 196 communities have been profiled. The new profiles add a significant amount of new information to help provide a better understanding of each community's reliance on fishing. Introductory materials cover purpose, methods, and an overview of the profiled communities in the larger context of the state of Alaska and North Pacific fisheries. The community profiles comprise additional information including, but not limited to, annual population fluctuation, fisheries-related infrastructure, community finances,

[22] http://www.afsc.noaa.gov/REFM/Socioeconomics/Default.php

natural resources, educational opportunities, fisheries revenue, shore-based processing plant narratives, landings and permits by species, and subsistence and recreational fishing participation, as well as information collected from communities in the Alaska Community Survey, which was implemented during summer 2011, and the Processor Profiles Survey, which was implemented in Fall 2011. https://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php.

2.6./2.7/2.8. Research and monitoring of the coastal environment, mechanisms for cooperation and coordination, appropriate technical capacities and financial resources, conflict avoidance amongst user groups

Monitoring of the coastal environment in Alaska is performed by federal and state agencies. The NMFS and NPFMC as federal agencies participate in coastal area management-related institutional frameworks through federal NEPA processes. Other State and federal entities that cooperate at the sub-regional level in order to improve coastal area management include:

- Alaskan Department of Environmental Conservation (DEC)
- Alaska Department of Fish and Game (ADFG)
- Alaskan Department of Natural Resources (DNR)
- DNR Office of Project Management and Permitting (OPMP)
- U.S. Fish and Wildlife Service (USFWS)
- Bureau of Ocean Energy Management (BOEM)

Other entities involved in collaborative research in the North Pacific region include the Alaska Fisheries Science Center (AFSC), North Pacific Research Board (NPRB), NMFS Pacific Marine Environmental Lab (PMEL) and institutes of higher learning such as the University of Alaska Fairbanks' (UAF) Institute of Marine Science (IMS).

The NPRB funds major research projects in the Gulf of Alaska[23] and the Bering Sea[24] aimed at examining physical and biological mechanisms that determine the survival of juvenile groundfishes in the GOA and understanding the impacts of climate change and dynamic sea ice cover on the eastern BS ecosystem respectively. For oceanography, the NPRB has funded numerous studies describing baseline oceanographic parameters and supported environmental buoy arrays.

PMEL regularly collect oceanographic and environmental data important to understanding the changing habitat of halibut and other marine species in Alaskan waters[25].

Additionally the IPHC, in collaboration with Washington Sea Grant, developed a sampling protocol for collecting seabird occurrence data and oceanographic data on the IPHC setline surveys. The 2016 longline research cruise for example was the eighth consecutive year of the IPHC coastwide oceanographic data collection program[26]. Oceanographic data are collected using water column profilers during the IPHC fishery-independent setline survey that spans the area from southern Oregon in the U.S. northward to British Columbia, into the Gulf of Alaska, Bering Sea, and Aleutian Islands. The IPHC has operated profilers since 2000 on a limited basis, and coastwide since 2009.

[23] http://www.nprb.org/gulf-of-alaska-project/about-the-project/
[24] http://www.nprb.org/bering-sea-project/about-the-project/
[25] http://www.pmel.noaa.gov
[26] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-5.1_Oceanographic_monitoring.pdf

Oceanographic data were collected at a total of 1,206 stations out of a possible 1,366. The coldest near-bottom water (-0.67°C) was detected, once again, around St. Matthew Island in the Bering Sea. The warmest near-bottom water (12.25°C) was the shallow water off the southern end of Kodiak Island. The U.S. West Coast once again had the lowest near-bottom dissolved oxygen of the surveyed area, but the hypoxic zone that was prevalent for several years (through 2013) was not detected. Counts of live seabirds, taken immediately following gear retrieval, have been conducted during IPHC fishery-independent setline surveys since 2002. The Convention waters, extending from off Oregon northward to Alaska and the EEZ border with Russia, are surveyed annually between late May and early September. A total of 19,553 seabird counts have been conducted over the last 15 years, with 1,362 occurring in 2016[27].

ADFG Habitat Division[28] conducts research on coastal and marine environments throughout Alaska in an effort to document and mitigate human-related impacts, changes in habitat & species abundance. The agency also collects physical and chemical data, including temperature, depth, salinity and conductivity during their St. Matthew's pot survey using data loggers placed on the survey pots.

The NMFS' Habitat Conservation Division (HCD) works to avoid, minimize, or offset adverse anthropogenic effects 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 including commercial fishing. The HCD focuses on activities in habitats used by federally managed fish species in marine, estuarine, and freshwater areas[29].

The Coast Guard enforces fisheries laws at sea including regulations to aid the protection and/or recovery of marine protected species and their associated habitats[30].

The IPHC is financially resourced through money it receives from both the U.S. and Canadian governments, through the Department of State and DFO respectively. It is considered part of the U.S. Federal government for purchasing and travel and is afforded not-for-profit status in the U.S.[31] The costs incurred by the NMFS in its management of the Alaskan halibut IFQ Program are recovered as obligated by the MSA through a fee to be paid by IFQ fishermen based on the ex-vessel value of their catches landed under the Program.

IPHC and NPFMC meetings provide fora for resolution of potential conflicts with users being afforded the opportunity to testify in person or in writing. These dispute resolution mechanisms have proven to be effective at dealing with most issues avoiding the necessity for disputes to escalate to the stage of legal action. However, in cases where processes have not resulted in the resolution of disputes, parties can and do resolve the disputes in the federal court system.

[27] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.7_Trends_in_seabird_counts.pdf
[28] http://www.adfg.alaska.gov/index.cfm?adfg=habitatresearch.main
[29] http://www.fakr.noaa.gov/habitat/default.htm
[30] http://www.uscg.mil/hq/cg5/cg531/LMR.asp
[31] http://www.iphc.int/about-iphc.html

7.1.3. Fundamental Clause 3

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

Number of Supporting clauses	**7**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized evidence:

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

Evidence

No significant changes have occurred since the re-assessment in January 2017. USA and Canada agreement and long term objectives for management, conservation, and sustainable utilization of Pacific halibut in the North Pacific has been in use since 1923. Relevant fisheries management plans are developed from these management objectives and included: seasonal fishery closures, halibut bycatch restrictions in other fisheries, IFQ and CDQ, as well as systems for mandatory reporting catch (removals), fishery monitoring, and persecutions where violations are identified. The IPHC promulgates regulations governing the Pacific halibut fishery under the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea (Convention) (signed on March 2, 1953) as amended by a Protocol Amending the Convention (signed on 29th March 1979). Regulations developed by the IPHC are subject to approval by the Secretary of State with concurrence from the Secretary of Commerce (Secretary). After approval by the Secretary of State and the Secretary, the IPHC regulations are published in the *Federal Register* as annual management measures. Overall management objectives of NMFS includes promoting 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 Stevens Act or MSA) that provided authority for regulating these fisheries.

The Halibut Act also provides the North Pacific Fishery Management Council (Council) with authority to develop regulations, including limited access regulations that are in addition to, and not in conflict with, approved IPHC regulations. Such Council–developed regulations may be implemented by NMFS only after approval by the Secretary[32].

The IPHC is currently undertaking a major Management Strategy Evaluation (MSE) process with the aim of developing a formal process of evaluating existing and alternative management procedures for Pacific halibut. The Commission's Management Strategy Evaluation process is a formal process in which to evaluate the performance of alternative management procedures for the Pacific halibut stock against a range of scenarios that encompass observation and process uncertainty in stock assessments, alternative hypotheses about stock dynamics and structural assumptions. To assist and help guide this process the Commission formed a

[32] https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

Management Strategy Advisory Board (MSAB) comprised of harvesters (commercial, sport, and subsistence), fisheries managers (DFO, NMFS, and regional fishery management councils), processors, and IPHC commissioners. The MSAB is working with IPHC staff to initially define clear measurable objectives for the Pacific halibut fishery, define candidate management procedures (MP) for testing within the MSE framework, and define the performance measures to evaluate alternative MPs.

At the end of the October 2013 meeting, the MSAB has established a set of preliminary working management objectives and a set of working performance measures which are an essential component of the MSE process. The working set of management objectives are directly related to stock conservation and fishery performance. The MSAB held two meetings in 2016[33].

The main items covered at the 26–27 October 2016 MSAB meeting (MSAB08) were adoption of the Terms of Reference, a discussion on the intent of the fishery management goals and objectives, a presentation on the current harvest policy and management procedures that the MSAB may consider, and preparation for the IPHC Interim and Annual Meetings. The presentation on the current and realized harvest policy, described in detail in (Hicks and Keith 2017), identified some issues with the current harvest policy that can be remedied by moving to a revised harvest policy that accounts for mortality of all sizes of fish from all sources. Preparation for the Interim and Annual Meetings involved identifying the need for guidance from Commissioners and drafting a recommendation to Commissioners encouraging the evaluation of an alternative harvest policy approaches that take into account all sizes of fish.

3.2. Management measures should limit excess fishing capacity, promote responsible fisheries, take into account artisanal fisheries, protect biodiversity and allow depleted stocks to recover.

The fishery is a closed access fishery managed under an Individual fishing Quota (IFQ) system. In 1991, the NPFMC recommended an IFQ Program for management of the fixed gear (hook and line) halibut and sablefish fisheries off Alaska. The Secretary of Commerce approved the Council's IFQ Program as a regulatory amendment in 1993, and the program was implemented by NMFS for the fishing season in 1995 (58 FR 215). The fundamental component of the IFQ Program is QS, issued to participants as a percentage of the QS pool for a species-specific IFQ regulatory area, which is translated into annual IFQ allocations in the form of fishable pounds. The IFQ Program was developed to address issues associated with the race-for-fish that had resulted from the open-access and effort control management of the halibut and sablefish fisheries[34]. Specifically, the Council identified several problems that emerged in these fisheries due to the previous management regime, including increased harvesting capacity, decreased product quality, increased conflicts among fishermen, adverse effects on halibut and sablefish stocks, and unintended distributions of benefits and costs from the fisheries. The stock is currently at B41, well above the B30 reference point and the fishery is not considered to have significant effects on reduction of biodiversity in the ecosystem.

Pacific halibut is taken throughout its range as a personal use (or subsistence) harvest by several fisheries. The primary harvests occur in the treaty Indian ceremonial and subsistence fishery in the waters off northwest Washington State, the First Nations food fish fishery in British Columbia, and the subsistence fishery by rural residents and federally-recognized native tribes in Alaska. The coastwide personal use estimate for 2016 is 1.2 Mlbs (544.3 mt). New estimates for all areas are not available so proxy estimates are used: the allocation amount

[33] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-4.6_Developments_in_MSE_and_MSAB.pdf
[34] https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

was used for the Area 2A treaty Indian ceremonial and subsistence fishery estimate and the 2014 estimate was used again for Alaska in 2016. The estimate for Area 2B remained unchanged[35].

[35] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.4_Personal_use.pdf

7.2. Section B. Science and Stock Assessment Activities

7.2.1. Fundamental Clause 4

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

Number of Supporting clauses	**13**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Minor Non-Conformance
Non Conformances	1 Minor (4.2)

Summarized evidence:

4.1. All fishery removals and mortality of the target stock(s) shall be considered by management.

Evidence

No significant changes have occurred since the re-assessment in January 2017. Full stock assessment consistent with contemporary methods was completed at the end of 2016 (Stewart and Hicks, 2016). All fishery removals and mortality of Pacific halibut are considered in the assessment and management of the stock. Reliable and accurate data are provided annually to IPHC to assess the status of Pacific halibut fisheries and ecosystems. These data include information on retained catch in the commercial and sport fisheries, the subsistence fisheries, as well as estimates of bycatch, and discards in other fisheries. Several data reporting systems are in place for the various fishery components to ensure timely and accurate collection and reporting of catch data. Fishery-independent surveys produce important, high-quality abundance and trend information for assessment and management of the Pacific halibut stock. The IPHC has conducted fishery-independent setline surveys in selected areas during most years since 1963, and has carried out a coast-wide survey with a consistent sampling design since 1998. The IPHC has also taken part in the NMFS Bering Sea groundfish trawl survey since 1998 and the NMFS Aleutian Islands trawl survey since 2012. These two NMFS surveys contribute Pacific halibut data from areas either poorly covered or not covered by the Commission's own fishery-independent survey. In this chapter, the authors report on the results of the IPHC and the NMFS surveys, as well as analysis of data derived from them. In 2016, the IPHC expanded the survey in the Area 4D Edge (Webster and Soderlund 2017). This year's expansion was the third in a series of planned survey expansions that will eventually cover all regulatory areas. The two NMFS trawl surveys are described in Sadorus et al. 2017a and Sadorus et al. 2017b[36].

IPHC Survey

In 2016, fourteen commercial longline vessels (four Canadian and ten U.S.A.), were chartered by the IPHC for survey operations. During a combined 77 trips and 698 charter days, these vessels fished/survey 29 charter regions, covering habitat from southern Oregon to the island of Attu in the Aleutian Islands, and north along and including the Bering Sea continental shelf. As a continued part of a multi-year coastwide effort to expand the survey depth profile, 83 stations were added to Regulatory Area 4D, which included depths as shallow as 50 fathoms (91 m) and as deep as 400 fathoms (732 m). All 1,366 survey stations planned for the 2016 survey season were either scouted or completed. Of these stations, 1,359 (99.5%) were considered successful for stock

[36] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.0_Executive_summary.pdf

assessment analysis. A total of 14 special projects were facilitated and completed, and 15,505 otoliths were collected coastwide. Approximately 681,553 pounds (~309 t) of Pacific halibut, 43,374 pounds (~20 t) of Pacific cod, and 42,152 pounds (~19 t) of rockfish were landed from the setline survey stations. Compared to the 2015 survey, weight-per-unit-effort increased in Regulatory Areas 3A, 3B, 4A, and, 4C, with decreases in areas 2A, 2C, and 4D. Weight-per-unit-effort in Regulatory Areas 2B and 4B remained the same as in 2015[37].

NMFS Surveys

The National Marine Fisheries Service groundfish trawl survey has taken place since 1979 and the IPHC has participated in the survey on an annual basis since 1998 by directly sampling Pacific halibut from survey catches. The 2016 standard survey took place aboard two vessels from 28 May to 3 August. IPHC field biologists were deployed on the F/V Vesteraalen for all trips. Lengths were collected for all Pacific halibut caught on both vessels. On the vessel staffed by IPHC, a total of 1,329 Pacific halibut were encountered. The Pacific halibut caught were randomly divided into two groups; biological sampling and tagging. In the tagging group, only those fish < 82 cm fork length were tagged and released while the remainder were measured and released as soon as possible. A total of 556 Pacific halibut otoliths were collected along with, sex, maturity, and prior hooking injury information, and 424 fish were tagged and released. One hundred ninety-eight tissue samples for energetics analysis were obtained from a portion of the otolithed fish and fin clips for genetic analysis were obtained from both those fish and all tagged Pacific halibut. The Bering Sea abundance estimate was 66 million fish which is slightly higher than the estimate for 2015. The total biomass was estimated at 338.8 million pounds (153,677 t) which was substantially lower than the 2015 estimate of 380 million pounds (172,365 t)[38].

In 2016, the IPHC participated for the third consecutive time in the National Marine Fisheries Service Aleutian Islands Biennial Bottom Trawl Survey. The survey covered the area surrounding the Aleutian Islands between Unimak Pass in the east and Stalemate Bank in the west. A total of 409 Pacific halibut were encountered by the IPHC-staffed vessel, F/V Sea Storm. Of those, 209 were sampled for length, age structures, sex, maturity, and prior hooking injuries. The remaining 200 were selected for the tagging sample, and of those, 170 were released with wire tags attached. The remaining were either outside the target size for tagging or were not deemed to be in good enough condition after capture, and all were subsequently measured and released. Both biomass and abundance of Pacific halibut were estimated at their lowest levels since 1986[39].

Removals

Known Pacific halibut removals consist of target fishery landings and discards (wastage), bycatch in non-target fisheries, research (included with fishery landings), sport, and personal use. Over the period 1917-2016 removals have totaled 7.1 billion lbs (3.2 million t), ranging annually from 34 to 100 million lbs (16,000-45,000 t) with an annual average of 63 million lbs (~29,000 t). Annual removals were above average from 1985 through 2010 and have decreased annually from a peak in 2004 in response to management measures. Commercial fishery landings in 2016 were approximately 25.0 million pounds (~11,400 t), up from a low of 23.7 million pounds (~10,700 t) in 2014. Bycatch mortality was estimated to be 7.1 million pounds (~3,200 t), the lowest level in the estimated time

[37] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.1_2016_IPHC_fishery_independent_survey.pdf
[38] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.3_Bering_Sea_NMFS_trawl_survey.pdf
[39] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.4_Aleutian_Islands_NMFS_trawl_survey.pdf

series, beginning with the arrival of foreign fishing fleets in 1962. The total sport removals were estimated to be 7.4 million pounds (~3,300 t), down slightly from 2015. Removals from all sources in 2016 (Figure 1) were estimated to be 41.9 million pounds (~19,000 t), down slightly from 42.1 million pounds in 2015 (~19,100 t).

Data are initially compiled by management area and then aggregated to the coastwide level and to four geographical regions: Area 2 (2A, 2B, and 2C), Area 3 (3A, 3B), Area 4 (4A, 4CDE) and Area 4B.

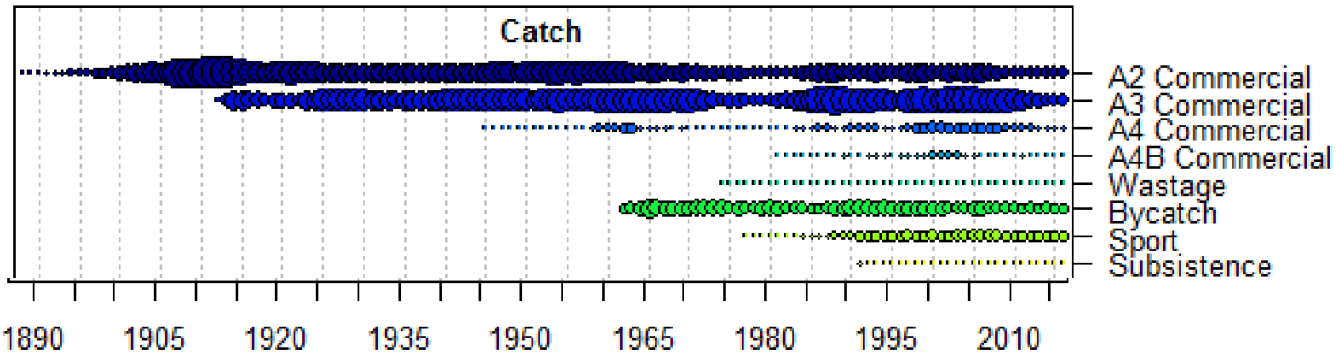


Figure 1: Removals (commercial, wastage, bycatch, sport and subsistence) from the halibut fishery from 1885 to 2016. (Source: Stewart and Hicks, 2017)

In addition to the removals (including all sizes of Pacific halibut), the assessment includes data from both fishery dependent and fishery independent sources as well as auxiliary biological information (Table 2).

Table 2: Estimated removals of Pacific Halibut for 2016 based on data through 11 November, 2016. All values reported in millions of net pounds. (Source: Hicks and Stewart 2017)

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
O26 Non-FCEY									
Comm. wastage	0.04	0.23	NA	NA	0.21	0.05	0.06	0.07	0.64
Bycatch	0.10	0.24	0.03	1.34	0.65	0.32	0.14	1.84	4.64
Sport (+ wastage)	NA	NA	1.33	1.56	0.01	0.01	0.00	0.00	2.91
Pers./Subs.	NA	0.41	0.43	0.23	0.02	0.01	0.00	0.08	1.17
Total Non-FCEY	0.14	0.87	1.79	3.13	0.88	0.38	0.20	1.98	9.36
O26 FCEY									
Comm. wastage	NA	NA	0.12	0.36	NA	NA	NA	NA	0.48
CSP Sport (+wastage)[1]	0.51	1.09	0.88	2.00	NA	NA	NA	NA	4.48
Pers./Subs.	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Comm. Landings[2]	0.64	6.14	4.01	7.52	2.75	1.38	1.12	1.48	25.03
Total FCEY	1.17	7.23	5.01	9.88	2.75	1.38	1.12	1.48	30.01
TCEY	1.31	8.09	6.80	13.01	3.62	1.76	1.32	3.47	39.37
U26									
Comm. wastage	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.06
Bycatch	0.00	0.02	0.00	0.71	0.33	0.22	0.01	1.17	2.45
Total U26	0.00	0.02	0.00	0.72	0.36	0.22	0.01	1.18	2.51
Total Mortality	1.31	8.12	6.80	13.73	3.98	1.98	1.33	4.64	41.89

[1] Includes commercial fish leased to the recreational sector: XRQ in Area 2B and Guided Angler Fish (GAF) in Areas 2C and 3A.

[2] Includes overage/underage and research catches.

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

A minor non-conformance identified during the re-assessment in January 2017, with regards to limited observer coverage on vessel <40ft. Evidence of progress included the recommendation and implementation of Electronic Monitoring (starting 2017 fishing season) among smaller vessels (<40f) that currently do not participate in the observer program; evidence of the performance of the electronic monitoring program is expected to be available during the next (2018) surveillance assessment. A Client corrective action plan was provided and accepted for the non-conformance on sub-clause 4.2. This NC will remain open throughout the period of certificate (5 years) until the medium confidences move to high as the corrective actions take effect.

Beginning January 1, 2013, amendment 86 (BSAI) and amendment 76 (GOA) were added to the Federal Fisheries Regulations 50 CFR Part 679: Fisheries of the Exclusive Economic Zone Off Alaska. In compliance with the MSA, these amendments restructured the funding and deployment system for observers in the North Pacific groundfish and halibut fisheries and include some vessels less than 60 ft. in length, as well as halibut vessels in the North Pacific Groundfish Observer Program.

Halibut vessels are registered with the NMFS and can be selected on a vessel or trip basis, under the Observer Declare and Deploy System (ODDS), administered by the Fisheries Monitoring and Analysis Division of NMFS at AFSC. The program is covered by fees assessed on landings from both the CDQ and IFQ fisheries. Each year NMFS presents its deployment plan at the October and December meetings of NPFMC.

The NPFMC has established an intention to integrate electronic monitoring (EM) into the Observer Program for the fixed gear small-boat groundfish and halibut fisheries, so that EM may be used to collect data to be used in catch estimation (retained and discarded) for this fleet. The NPFMC has set an interim goal of pre-implementation in the small boat (40-57.5 feet length overall) longline fleet in 2016, focusing on vessels that have trouble carrying an observer due to various limitations.

As part of the 2017 Annual Deployment Plan (ADP) and recognizing the challenging logistics of putting observers on small vessels, NMFS continues to recommend that vessels less than 40ft be in the no selection pool for observer coverage but be considered for testing of electronic monitoring since NMFS has no data from this segment of the fleet. NMFS recommends continuing to allow hook-and-line and pot vessels <57.5 ft LOA where taking an observer is problematic an opportunity to 'opt-in' to the EM selection pool to participate in the EM cooperative research under the 2017 EM pre-implementation plan that is being developed by the EM workgroup. NMFS also recommends that vessels participating in the EM selection pool be required to log trips in ODDS. This will improve the ability of NMFS to determine which vessels are in the EM selection pool, when they are fishing, and provides a necessary compliance monitoring tool.

Observer at-sea deployment

- The program met expected rates of coverage for all of the full coverage and trip-selection strata.
- In the trip selection strata, the realized (and expected) coverage rates were 15.0% (15.41%) for hook-and-line vessels.

EM selection pool

- In 2016 vessels participating in the EM selection pool were not required to log trips in ODDS, instead there were two selection processes:
- EM Voluntary 30%: vessels were required to notify NMFS of their intent to fish at least 30 days in advance of each of 4 selection time-periods: Jan-Feb, Mar-Jun, Jul-Oct, and Nov-Dec. Vessels were subject to a 30% chance of selection and if selected, they carried EM for all trips during the time period.
- EM Voluntary 100%: Vessels that did not notify NMFS 30 days in advance of a time period were automatically selected to carry an EM system, if one was available.
- The EM Voluntary 30% strata met the coverage rate expectations for three out of four fishing periods. In the fourth period (Nov-Dec), no vessels notified NMFS of their intent to fish and thus no vessels were selected.
- The EM Voluntary 100% strata did not meet expected coverage rates in any fishing period.

Overall, in 2016, through the Electronic Monitoring (EM) Pre-implementation plan, EM was offered to all hook-and-line vessels 40-57.5 ft in length. A total of 42 vessels opted-in to the EM selection pool, 24 of which were selected to carry EM systems.

In March 2017, NMFS published a proposed rule to implement EM as a new component of the fishery research

plan[40].

Notable changes to observer deployment on vessels in the partial coverage category for 2017 include the specific strata definitions, associated selection rates, and further expansion of participation in EM cooperative research and the EM selection pool. Based on recommendations from the Council in June 2016, NMFS evaluated two additional changes to the strata definitions for the 2017 ADP: 1) different treatment of trips from vessels delivering to tender vessels and those that do not deliver to tender vessels and 2) separate treatment of catcher/processors in the partial coverage category. Following analysis in the Draft 2017 ADP, the NMFS and Council adopted the following stratification scheme (see table below) with sample sizes allocated according to an optimization based on discarded groundfish for the 2017 ADP.

In Table 3, the changes in the Observer Program sampling design is provided and includes definition of sampling strata, selection pools, and observer coverage categories in each year from 1990 to 2017. The observer coverage rates set through the Annual Deployment Plan are noted in black and the realized coverage rates evaluated in the Annual Report are noted in parentheses. CP = catcher/processor vessel; CV = catcher vessel; H&L = hook-and-line gear; LOA = vessel length overall.

Table 3: Changes in Observer program sampling design 1990 -2017. (Source: http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/Final2017EMPreimpPlan.pdf)

<table>
<tr><th rowspan="2">Year</th><th>Full observer coverage category</th><th colspan="3">Partial observer coverage category</th></tr>
<tr><th>Full selection pool
Observer coverage required on all trips</th><th>Trip selection pool
Observer coverage required on all randomly selected trips</th><th>Vessel selection pool
Randomly selected vessels required to carry an observer for all trips in a time period</th><th>No selection pool
Observer coverage not required</th></tr>
<tr><td>2017</td><td>Regulatory full ≥ 100%</td><td>Trawl: 18% | Trawl Tender: 14% | H & L: 11% | H & L Tender: 25% | Pot: 4% | Pot Tender: 4%</td><td rowspan="3">N/A</td><td rowspan="4">Vessels <40′ LOA and Jig gear</td><td>Voluntary EM Pre-implementation ~90 vessels</td></tr>
<tr><td>2016</td><td rowspan="3">Regulatory full | Opt-in Full</td><td>Trawl: 28% (28.0) | H & L: 15% (15.0) | Pot: 15% (14.7)</td><td>Voluntary EM Pre-implementation 60 vessels</td></tr>
<tr><td>2015</td><td>Large Vessel: 24% (23.4)
• Trawl CVs
• Small CPs
• H&L/Pot CVs ≥ 57.5′
Small Vessel: 12% (11.2)
• H&L/Pot CVs >40′ and <57.5′</td><td>Voluntary EM Pre-implementation 12 vessels</td></tr>
<tr><td>2014</td><td>All Trawl CVs and H&L/Pot vessels ≥ 57.5′: 16% (15.1)</td><td>H&L/Pot CVs >40′ and <57.5′: 12% (15.6)</td><td>Voluntary EM</td></tr>
<tr><td>2013</td><td>All Trawl CVs and H&L/Pot vessels ≥ 57.5′: 14.5% (14.8)</td><td>H&L/Pot CVs >40′ and <57.5′: 11% (10.6)</td><td colspan="2">Vessels <40′ LOA and Jig gear</td></tr>
<tr><td colspan="5">Observer Program Restructure</td></tr>
<tr><td>1990 - 2012[7]</td><td>Regulatory Full ≥ 100%</td><td colspan="3">Vessels self-selected coverage (i.e., choose when to take an observer)
• 30% of fishing days by gear/quarter and at least one trip per fishery.
• CVs ≥ 60′ and < 125′ LOA targeting groundfish
• Other CPs and processing plants when not required 100%.</td><td></td></tr>
</table>

[7] Coverage requirements are generalized based on requirements implemented prior to 2013.

The definition of the "no selection pool" in 2017 is similar to that used in 2015 and 2016 and includes fixed gear vessels less than 40 ft LOA, all vessels fishing with jig gear (which includes handline, jig, troll, and dinglebar troll

[40] https://www.federalregister.gov/documents/2017/03/23/2017-05753/fisheries-of-the-exclusive-economic-zoneoff-alaska-integrating-electronic-monitoring-into-the-north

gear), and vessels participating in the EM Selection Pool. The EM Selection Pool has been expanded since 2016. For 2017 the Council recommended expanding the number of vessels to 90 hook-and-line vessels and 30 pot vessels. To date there have been 72 hook-and-line vessels and 18 pot vessels for a total of 91 fixed-gear vessels that have volunteered to participate in the EM selection pool to carry EM systems as described in the 2017 EM Pre-Implementation Plan[41]. Five vessels volunteered to carry stereo camera equipment and were also included in the no selection pool.

In Table 4, the total catch (retained and discard) of observed halibut and sablefish (in metric tons) caught in 2016 is provided by *catcher/processors (row 1 and 2) and catcher vessels (row 3 and 4) in the Gulf of Alaska*. Empty cells indicate that no catch occurred[42].

Table 4: Total catch (retain and discarded) of observed halibut and sablefish (mt) in 2016. (Source: http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/Final2017EMPreimpPlan.pdf)

	GULF OF ALASKA CATCHER/PROCESSORS											
	HOOK AND LINE			JIG			NON-PELAGIC TRAWL			POT			PELAGIC TRAWL		
	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%
Pacific Halibut															
Retained															
Discarded	810	822	**98%**				343	343	**100%**						
Sablefish (Black Cod)															
Retained	275	348	**79%**				385	385	**100%**						
Discarded	54	58	**93%**				98	98	**100%**						

	GULF OF ALASKA CATCHER VESSELS														
	HOOK AND LINE			JIG			NON-PELAGIC TRAWL			POT			PELAGIC TRAWL		
	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%
Pacific Halibut															
Retained	1,042	8,657	**12%**	0	4	**0%**									
Discarded	839	7,874	**11%**				222	1,566	**14%**	22	153	**14%**	19	22	**87%**
Sablefish (Black Cod)															
Retained	965	7,463	**13%**	0	<1	**0%**	295	452	**65%**				3	29	**11%**
Discarded	69	673	**10%**				9	80	**11%**	1	7	**17%**	<1	3	**12%**

In Table 5, the total catch (retained and discard) of observed halibut and sablefish (in metric tons) caught in 2016 is provided by *catcher/processors (row 1 and 2),* by *catcher vessels delivering to motherships (row 3 and 4), and by catcher vessels delivering to shoreside (row 5 and 6) in the Bering Sea/Aleutian Islands*. Empty cells indicate that no catch occurred[42].

Table 5: Total catch (retain and discarded) of observed halibut and sablefish (mt) in 2016, including catcher vessels delivering to shoreside. (Source: http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/Final2017EMPreimpPlan.pdf)

	BERING SEA/ALEUTIAN ISLANDS CATCHER/PROCESSORS														
	HOOK AND LINE			JIG			NON-PELAGIC TRAWL			POT			PELAGIC TRAWL		
	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%

[41] http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/Final2017EMPreimpPlan.pdf
[42] http://www.afsc.noaa.gov/Publications/ProcRpt/PR2017-07.pdf

Pacific Halibut												
Retained												
Discarded	2,418	2,426	**100%**		2,240	2,240	**100%**	6	6	**100%**	83	83 **100%**
Sablefish (Black Cod)												
Retained	84	117	**72%**		263	263	**100%**				12	12 **100%**
Discarded	63	63	**100%**		5	5	**100%**				1	1 **100%**

	BERING SEA/ALEUTIAN ISLANDS CATCHER VESSELS DELIVERING TO MOTHERSHIPS											
	HOOK AND LINE			JIG			NON-PELAGIC TRAWL			POT			PELAGIC TRAWL		
	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%
Pacific Halibut															
Retained															
Discarded							220	220	**100%**				2	2	**100%**
Sablefish (Black Cod)															
Retained							1	1	**100%**				<1	<1	**100%**
Discarded							<1	<1	**100%**						

	BERING SEA/ALEUTIAN ISLANDS CATCHER VESSELS DELIVERING TO SHORESIDE														
	HOOK AND LINE			JIG			NON-PELAGIC TRAWL			POT			PELAGIC TRAWL		
	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%	Observed	Total	%
Pacific Halibut															
Retained	306	1,975	**16%**												
Discarded	90	646	**14%**				198	404	**49%**	3	23	**15%**	20	20	**100%**
Sablefish (Black Cod)															
Retained	7	221	**3%**				0	<1	**0%**	61	177	**34%**	5	5	**100%**
Discarded	1	14	**6%**							1	2	**46%**	1	1	**100%**

4.3. Management entities shall make data available in a timely manner and in an agreed format in accordance with agreed procedures.

The NMFS and NPFMC have extensive information on management of halibut. These organizations make data yearly available several updates across any 12 months period to allow changes in management/regulations as they occur through the meeting schedule system. These data are made widely available through websites, publications and at various publically-attended meetings. Data on certain aspects of commercial fishing are confidential, such as individuals or individual vessels in the analysis of fishery CPUE data, depending on the number of individuals or entities involved. For this surveillance report in 2017, all necessary (updated 2016-17) key document such as stock assessment report, observer report and other documents, records and regulations were available[43].

4.4/4.5. States shall stimulate the research required to support national policies related to fish as food and collect sufficient knowledge of social, economic and institutional factors relevant to the fishery in question to support policy formulation.

State and national policies regarding seafood are guided by the Alaska Seafood Marketing Institute (ASMI), U.S. Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), and the U.S. National Institute of Health (NIH). ASMI is the state agency primarily responsible for increasing the economic value of Alaskan seafood

[43] http://www.iphc.washington.edu/library/raras/485-rara2016.html

through marketing programs, quality assurance, industry training and sustainability certification. ASMI's role includes conducting or contracting for scientific research to develop and discover health, dietetic, or other uses of seafood harvested and processed in the state[44].

Socio-economic data collection and economic analyses are required to varying degrees under the Regulatory Flexibility Act (RFA), the MSA, the NEPA, the Endangered Species Act, and other applicable laws. AFSC's Economic and Social Sciences Research Program produces an annual Economic Status Report of the Groundfish fisheries in Alaska (Fissel et al. 2016[45]). This comprehensive report provides estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, values of catch and resulting food products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, and employment on at-sea processors. The report contains a wide range of analyses and comments on the performance of a range of indices for different sectors of the North Pacific fisheries, including flatfish, and relates changes in value, price, and quantity, across species, product and gear types, to changes in the market.

4.6. States shall investigate and document traditional fisheries knowledge and technologies, in particular those applied to small scale fisheries, in order to assess their application to sustainable fisheries conservation, management and development.

A major component of small scale fisheries for Alaskan halibut is covered by ceremonial and subsistence (personal use) fishing. The subsistence halibut fishery off Alaska was formally recognized in 2003 by the NPFMC and implemented by IPHC and National Marine Fisheries Service (NMFS) regulations. The fishery allows the customary and traditional use of halibut by rural residents and members of federally-recognized Alaska native tribes who can retain halibut for non-commercial use, food, or customary trade.

Personal use categories include ceremonial and subsistence removals in the Area 2A treaty Indian fishery; the sanctioned First Nations Food, Social, and Ceremonial (FSC) fishery conducted in British Columbia; federal subsistence fishery in Alaska; and U32 halibut retained in Areas 4D and 4E under IPHC regulations. Details for these have been reviewed in the 2016 RARA (Stewart and Hicks 2017).

Further information on the personal use (subsistence) harvest of Pacific halibut through 2016 has also been published (Goen 2017[46]).

4.7. States conducting scientific research activities in waters under the jurisdiction of another State shall ensure that their vessels comply with the laws and regulations of that State and international law.

The major scientific activity for Pacific halibut is the annual setline survey conducted by IPHC, using commercial vessels from USA and Canada. In 2016 the survey encompassed both nearshore and offshore waters of southern Oregon, Washington, British Columbia, southeast Alaska, the central and western Gulf of Alaska, Aleutian Islands, and the Bering Sea continental shelf (Henry et al. 2017). Thus only the waters under jurisdiction of USA and Canada, the two countries involved in IPHC, were surveyed. Survey activities were compliant with all laws and regulations of those countries, registered commercial halibut vessels were chartered, and all catches in the survey were recorded and reported.

[44] http://www.alaskaseafood.org/health-nutrition/
[45] https://www.afsc.noaa.gov/refm/stocks/plan_team/economic.pdf
[46] www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.4_Personal_use.pdf

4.8. States shall promote the adoption of uniform guidelines governing fisheries research conducted on the high seas.

Not applicable, both fishery and survey research activities occur and are carried out within the jurisdictions of the USA and Canada EEZ. No activities occur in the high seas outside the 200 nm EEZ of the US and Canada.

4.9/4.10/4.11. States shall promote and enhance the research capacities of developing countries, support (upon request) States engaged in research investigations aimed at evaluating stocks which have been previously un-fished or very lightly fished.

Not applicable, operations of the fishery takes place in USA and Canada; these areas are not considered developing countries.

7.2.2. Fundamental Clause 5

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

Number of Supporting clauses	**7**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized Evidence:

5.1 States shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, social science, aquaculture and nutritional science. The research shall be disseminated accordingly. States shall also ensure the availability of research facilities and provide appropriate training, staffing and institution building to conduct the research, taking into account the special needs of developing countries.

Evidence

No significant changes have occurred since the re-assessment in January 2017. Full stock assessment consistent with contemporary methods was completed at the end of 2016 (Stewart and Hicks, 2016).

The International Pacific Halibut Commission (IPHC)[47] 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 within the Convention waters of both nations. The IPHC receives money from both the U.S. and Canadian governments to support a director and staff.

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 (IPHC 2017). A number different studies is also underway including tagging studies to understand migration patterns, physiology and genetics research, otoliths and aging work as well as climate and ecosystem related research (see http://www.iphc.washington.edu/library/raras/485-rara2016.html for details). In conjunction with ongoing programs, the IPHC conducts numerous biological and scientific experiments to further the understanding and information about Pacific halibut.

The Bering Sea Project, a partnership between the NPRB and the National Science Foundation, is studying the Bering Sea ecosystem from atmospheric forcing and physical oceanography to humans and communities, as well as socio-economic impacts of a changing marine ecosystem. Scientists and researchers from a number of agencies and universities are involved. Ecosystem modelling, sound data management and education and outreach activities are included in the program[48].

[47] http://www.iphc.int/about-iphc.html

[48] http://www.nprb.org/assets/images/uploads/01.10_bsag_web.pdf

Regarding socio-economic data collection, AFSC's Economic and Social Sciences Research Program produces an annual Economic Status Report of the Groundfish fisheries in Alaska. This comprehensive report (Fissel, et. al. 2016) provides estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, values of catch and resulting food products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, and employment on at-sea processors. The report contains a wide range of analyses and comments on the performance of a range of indices for different sectors of the North Pacific fisheries, and relates changes in value, price, and quantity, across species, product and gear types, to changes in the market. This report includes extensive economic data for the commercial Pacific Halibut fishery.

Since 2002, the Commission has been working cooperatively with the Alaska Department of Environmental Conservation (ADEC) in a project monitoring environmental contaminants in Alaskan fish. The fish being studied include salmon (5 species), sheefish, pike, pollock, pacific cod, lingcod, black rockfish, sablefish, and halibut. The fish are analyzed for organochlorine pesticides, dioxins, furans, polybrominated diphenyl ethers, PCB congeners, methyl mercury and heavy metals (arsenic, selenium, lead, cadmium, nickel, and chromium). Results from these studies are used to identify ADEC's future research needs.

To date, 2,088 samples have been tested by ADEC. The mean level of total mercury for these samples has been 0.309 ppm (for comparison, the Food and Drug Administration (FDA) limit of concern is based on methyl mercury (~85% of total mercury) levels of 1.000 ppm, the Environmental Protection Agency (EPA) and Canadian Food Inspection Agency (CFIA) level of concern is 0.500 ppm) ranging from non-detectable to 2.000 ppm. Results from analysis of persistent organic pollutants (POP's - pesticides, selected PCB congeners, dioxins, and furans) found that in general these compounds are either undetectable in halibut or well below other marine fish species. This is a positive finding and is likely attributable to the lower fat content in halibut compared to these other species.

Analysis by the Alaska Department of Health and Social Services (DHSS) has found that most species of Alaska fish contain mercury levels that are too low to constitute a health risk. However, some Alaska fish species are consistently found to have elevated mercury levels; as such, consumption restrictions for these species are warranted for pregnant women, women of childbearing age that may become pregnant, nursing mothers, and children[49].

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

Pollution and physical habitat alteration are not considered issues related to the management of the Pacific halibut resources.

The 2016 IPHC stock assessment reports the status of the Pacific halibut (*Hippoglossus stenolepis*) resource in the Convention Area, including the Exclusive Economic Zones of the United States of America and Canada. Commercial fishery landings in 2016 were approximately 25.0 million pounds (~11,400 t, 'net' weights = head and guts removed; this is approximately 75% of the round weight), up from a low of 23.7 million pounds (~10,700 t) in 2014. Bycatch mortality was estimated to be 7.1 million pounds (~3,200 t), the lowest level in the estimated time series. The 2016 IPHC fishery-independent setline survey estimates of coastwide aggregate legal (O32; over 32 inches (81.3 cm) in length) WPUE were 6% higher than the value observed in 2015, representing the fifth year of stable catch rates. Age distributions in 2016 from both the survey and fishery remained similar to

[49] http://www.iphc.washington.edu/research/biology/environ.html

those observed in 2011-15, indicating a relatively stable stock, but not showing clear evidence of strong coastwide recent recruitment events. At the coastwide level, individual size-at-age continues to be very low relative to the rest of the timeseries, although there has been little change over the last several years. This stock assessment consists of an ensemble of four equally-weighted models, two long time-series models, and two short time-series models either using data sets by geographical region, or aggregating all data series into coastwide summaries. As has been the case since 2012, this stock assessment is based on the approximate probability distributions derived from the ensemble of models, thereby incorporating the uncertainty within each model as well as the uncertainty among models. The results at the end of 2016 indicate that the Pacific halibut stock declined continuously from the late 1990s to around 2010, as a result of decreasing size-at-age, as well as somewhat weaker recruitment strengths than those observed during the 1980s. Since the estimated female spawning biomass (SB) stabilized near 200 million pounds (~90,100 t) in 2010, the stock is estimated to have been increasing gradually.

The SB at the beginning of 2017 is estimated to be 212 million pounds (~96,200 t), with an approximate 95% confidence interval ranging from 153 to 286 million pounds (~69,400-129,700 t). Recruitment estimates show the largest recent cohorts in 1999 and 2005, and there is little information on the relative strength of subsequent cohorts, which will be the most important for stock productivity over the next decade. A comparison of the median current ensemble SB to reference levels specified by the current harvest policy suggests that the stock is currently at 41% of equilibrium unfished levels; however, the probability distribution indicates considerable uncertainty, with a 5/100 (5%) probability the stock is below the SB 30% level.

Stock projections for a range of alternative management actions were conducted using the integrated results from the stock assessment ensemble, summaries of the 2016 fishery, and other sources of mortality, as well as the results of apportionment calculations and the target harvest rates from current IPHC harvest policy. The results for 2017 show somewhat more risk than those from last year's assessment: the stock is projected to increase gradually over 2018-20 in the absence of any removals, and for removals of up to around 40 million pounds (~18,100 t). For removals around 40 million pounds (~18,100 t), projections are slightly decreasing. The risk of stock declines begins to increase rapidly for levels of harvest above 40 million pounds (~18,100 t) of total mortality, becoming more pronounced by 2020. The current IPHC Harvest Policy (the Blue Line) suggests that 37.9 million pounds, ~17,200 t, total removals, corresponds to a 56/100 (56%) chance of stock decline in 2018 and the *status quo* SPR line (41.6 million pounds, ~18,900 t) corresponds to a 68/100 (68%) chance of stock decline in 2018[50].

The state of the halibut stock is consistently managed through a series of organised topics of research. Since its inception, the IPHC has had a long history of research activities devoted to describe and understand the biology of the Pacific halibut (*Hippoglossus stenolepis*). Currently, the main objectives of the Biological and Ecosystem Science Research Program at IPHC are to: 1) To identify and assess critical knowledge gaps in the biology of the Pacific halibut; 2) To understand the influence of environmental conditions; and 3) To apply the resulting knowledge to reduce uncertainty in current stock assessment models.

The new proposed Five-Year Research Plan for the period 2017-21 includes extensive studies covering five major research areas: 1) Reproduction (i.e., sex identification, maturity estimates), 2) Growth (i.e., decrease in size-at-age, temperature effects), 3) Discard mortality rates (i.e., physiological condition and survival post-release of bycatch), 4) Migration (i.e., larval dispersal, adult and reproductive migrations) and 5) Genetics and Genomics (i.e., genetic population structure, genome characterization)[51].

[50] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-4.2_Assessment_of_the_Pacific_halibut_stock.pdf

[51] www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-1.1_Research_Plan.pdf

The research activities performed by the International Pacific Halibut Commission (IPHC) Secretariat staff during 2016, highlight several of the research topics that IPHC has been investigating over the last few years. A great majority of these studies are conducted using the fishery-independent setline survey (setline survey) that IPHC conducts annually covering the distribution range of the Pacific halibut and underscores the importance of the setline survey as an essential research platform for IPHC.

One of the landmark activities that are performed annually (since 2009) in the setline survey is the environmental monitoring effort that collects oceanographic data from all setline survey stations in the form of depth, salinity, temperature, dissolved oxygen, pH and chlorophyll concentration information. In 2016, oceanographic data was successfully collected from a total of 1,206 stations (Sadorus and Walker 2017). The setline survey has also allowed for the collection of biological data from Pacific halibut in order to understand the biology of this species, with emphasis on growth, physiological condition, reproduction and migration[52].

Another major ecosystem research report is the AFSC Ecosystem Consideration Report series (see https://access.afsc.noaa.gov/reem/ecoweb/) The Ecosystem Considerations reports are produced annually to compile and summarize information about the status of the Alaska marine ecosystems for the North Pacific Fishery Management Council, the scientific community and the public. As of 2016, there are separate reports for the Eastern Bering Sea (EBS), Aleutian Islands (AI), the Gulf of Alaska (GOA), and Arctic (forthcoming) ecosystems. These reports include ecosystem assessments, and ecosystem and ecosystem-based management indicators that together provide context for ecosystem-based fisheries management in Alaska.

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

IPHC is, by definition, an international organization established in 1923 for the preservation of the Pacific halibut fishery in waters off Canada and the United States of America. Thus there is extensive cooperation on various aspects of research, stock assessment, and management of Pacific halibut between the fisheries agencies (e.g. DFO and NMFS) of these two nations. Declaration of the 200 mile EEZ's by both countries in the late 1970's drastically reduced and eventually eliminated halibut fishing in Alaskan waters by countries other than Canada and USA.

For halibut management, there has also been cooperative research and surveys carried out on the stock involving other nations, such as the 1984 US-Japan bottom trawl survey in the GOA (Brown 1986), but it has been quite limited. Pacific halibut caught in Russian areas of the Bering Seas are believed to be of a different stock, and are thus not included in the IPHC assessments. There is some contact between IPHC and Russian scientists regarding halibut research in the Bering Sea area.

There is considerable discussion and exchange between IPHC and NPFMC on management issues related to Alaska Pacific halibut. Currently, both organizations are cooperating to develop a Halibut Management Framework[53], designed to improve coordination between the Council and IPHC. One goal is for better alignment of the two management bodies when dealing with halibut needs among the various directed fishery and bycatch user groups.

2016 NPFMC Halibut Management Framework Draft

[52] www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.0_Executive_summary.pdf
[53] http://www.iphc.int/meetings/2015im/8b_C8_NPFMC_Halibut_Management_Framework.pdf

A 2016 draft was released after public review following the June 2015 Council direction. The overall goal of this NPFMC-IPHC Framework is to identify, define, and track the most important issues/topics/questions necessary to guide the Council's decisions about halibut management, and to inform Council interactions with the IPHC. It also serves as a record or catalogue of ongoing Council activities and stakeholder involvement, research and mmanagement projects, and the interaction among Council, NFMS management and AFSC, Plan teams, the IPHC, and stakeholders[54].

5.4. The fishery management organizations shall 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.

The only relevant transboundary issues for the Alaskan Pacific halibut stock are between Canada and USA, and these are dealt with in the IPHC. Both countries have extensive scientific programs for halibut research and assessment, and collaborate on numerous topics related to science and management. Evidence for this is contained in the IPHC annual Reports of Assessment and Research Activities[55].

5.5. Data generated by research shall be analysed and the results of such analyses published in a way that ensures confidentiality is respected, where appropriate.

Data collected by scientists from the many surveys and halibut fisheries are analyzed and presented in peer reviewed meetings and/or in primary literature, following rigorous scientific protocols. Results of these analyses are disseminated in a timely fashion through numerous methods, including scientific publications, and as information on IPHC, NMFS and the NPFMC websites, in order to contribute to fisheries conservation and management. The core of halibut specific information for 2016-2017 is available at http://www.iphc.washington.edu/library/raras/485-rara2016.html.

Confidentiality of individuals or individual vessels (e.g. in the analysis of fishery CPUE data) is fully respected where necessary. By Alaska Statute (16.05.815 Confidential Nature of Certain Reports and Records[56]), except for certain circumstances, vessel/owner specific records obtained by the state concerning the landing of fish, shellfish, or fishery products and annual statistical reports of fishermen, buyers, and processors may not be released.

[54] http://iphc.int/meetings/2016am/bb/11_01_HalibutManagementFrameworkv8.pdf
[55] http://www.iphc.int/library/raras.html
[56] http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section815.htm

7.3. Section C. The Precautionary Approach

7.3.1. Fundamental Clause 6

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

Number of Supporting clauses	**4**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized Evidence:

6.1/6.2/6.3/6.4 States shall determine for the stock both safe targets for management (Target Reference Points) and limits for exploitation (Limit Reference Points), shall measure the status of the stock against these reference points and agree to actions to be undertaken if reference points are exceeded.

Evidence

No significant changes have occurred since the re-assessment in January 2017. Full stock assessment are conducted annually, and fisheries management and conservation are based on precautionary and ecosystem based approaches.

Since 1985, the IPHC has followed a constant harvest rate 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 area-specific harvest rate to the estimate of exploitable biomass in each IPHC regulatory area. The apportionment percentages and the target harvest rates for each regulatory area (21.5% for Areas 2A-3A, and 16.125% for Areas 3B-4CDE) together result in a target distribution for the annual TCEY. The scale of this distribution is based on the estimate of the coastwide exploitable biomass at the beginning of 2017 from the 2016 stock assessment (Stewart and Hicks et al 2017). 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 2016 stock assessment for 2017 management consists of an ensemble of four equally-weighted models, two long time-series models, and two short time-series models either using data sets by geographical region, or aggregating all data series into coastwide summaries. As has been the case since 2012, this stock assessment is based on the approximate probability distributions derived from the ensemble of models, thereby incorporating the uncertainty within each model as well as the uncertainty among models. The results at the end of 2016 indicate that the Pacific halibut stock declined continuously from the late 1990s to around 2010, as a result of decreasing size-at-age, as well as somewhat weaker recruitment strengths than those observed during the 1980s. Since the estimated female spawning biomass (SB) stabilized near 200 million pounds (~90,100 t) in 2010, the stock is estimated to have been increasing gradually. The SB at the beginning of 2017 is estimated to be 212 million pounds (~96,200 t), with an approximate 95% confidence interval ranging from 153 to 286 million pounds (~69,400-129,700 t). Recruitment estimates show the largest recent cohorts in 1999 and 2005, and there is little

information on the relative strength of subsequent cohorts, which will be the most important for stock productivity over the next decade.

Based on the 2016 stock assessment (Stewart and Hicks 2017), comparison of the median current ensemble SB to reference levels specified by the current harvest policy suggests that the stock is currently at 41% of equilibrium unfished levels; however, the probability distribution indicates considerable uncertainty, with a 5/100 (5%) probability the stock is below the SB 30% (B30 target reference point) level. The 41% biomass level is above the B30 (target) and B20 (limit) reference points, and therefore above any level where the harvest control rule would need to be applied to reduce harvest rates.

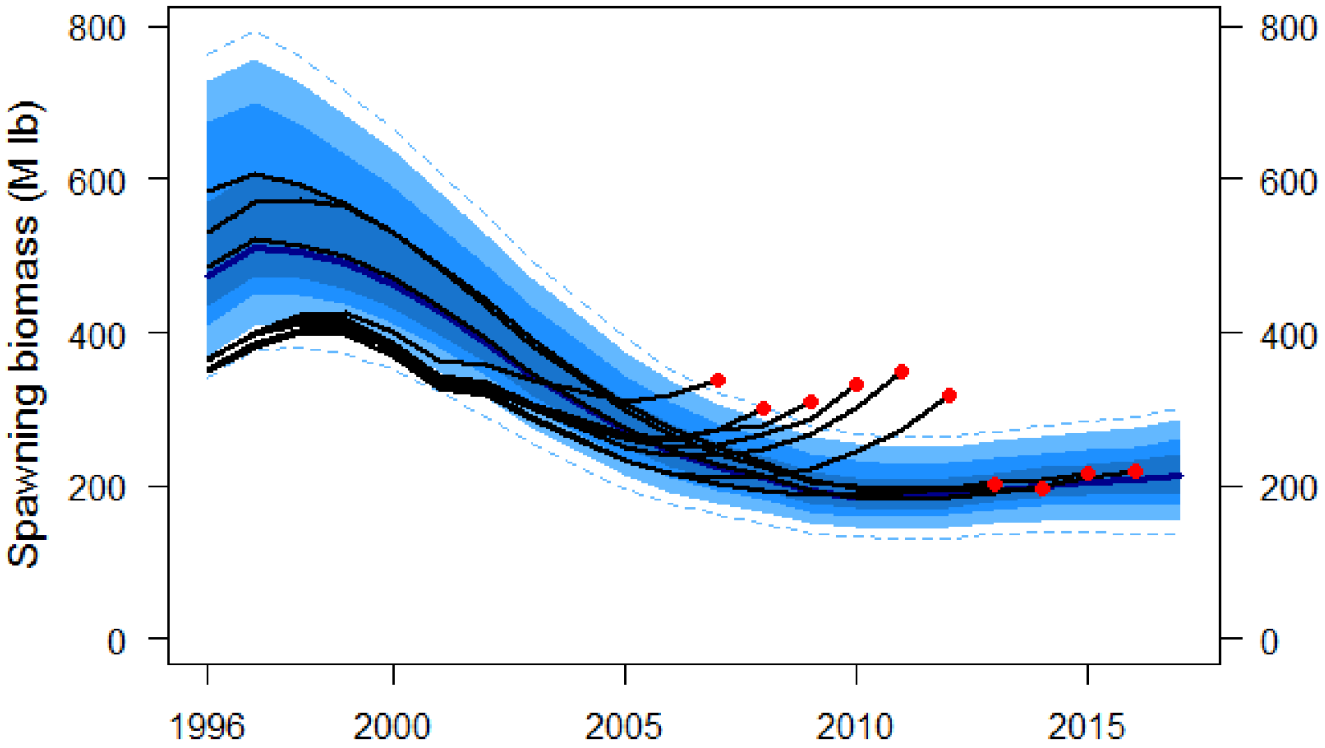


Figure 2: Retrospective comparison among recent stock assessments (Source: Stewart and Hicks 2017)

Figure 2**,** provides a retrospective comparison among recent stock assessments. The black lines denote point estimates from previous assessments conducted in 2006-2015. The shaded area represents the approximate probability distribution from the 2016 ensemble.

All sources of estimated removals for 2016 correspond to a fishing intensity point estimate of *F47%,* which is considered to be at or below target rates for many similar stocks. In the past, harvest rates have generally exceeded target levels, but have been decreasing in recent years as management actions have reduced the harvest levels. Exploitation rates for the individual management areas are established separately to ensure that overfishing does not occur in local areas.

7.3.2. Fundamental Clause 7

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

Number of Supporting clauses	**5**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized Evidence:

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.

Evidence

No significant changes have occurred since the re-assessment in January 2017. Full stock assessment are conducted annually, and fisheries management and conservation are based on precautionary and ecosystem based approaches.

Precautionary approach-based reference points are used in the management of this stock, as described in Clause 6. The scientific information and stock assessments available (as described in Clauses 4 and 5) are at a consistently high level, and provide the necessary basis for conservation and management decisions. Scientific advice for management of the stock is presented for different harvest levels which explain the risk of biomass levels at different harvest strategies.

Similar to periods of 2012, the 2016 end of year stock assessment is based on the approximate probability distributions derived from the ensemble of models, thereby incorporating the uncertainty within each model as well as the uncertainty among models. The results at the end of 2016 indicate that the Pacific halibut stock declined continuously from the late 1990s to around 2010, as a result of decreasing size-at-age, as well as somewhat weaker recruitment strengths than those observed during the 1980s. Since the estimated female spawning biomass (SB) stabilized near 200 million pounds (~90,100 t) in 2010, the stock is estimated to have been increasing gradually. The SB at the beginning of 2017 is estimated to be 212 million pounds (~96,200 t), with an approximate 95% confidence interval ranging from 153 to 286 million pounds (~69,400-129,700 t). Recruitment estimates show the largest recent cohorts in 1999 and 2005, and there is little information on the relative strength of subsequent cohorts, which will be the most important for stock productivity over the next decade.

A comparison of the median current ensemble SB to reference levels specified by the current harvest policy suggests that the stock is currently at 41% of equilibrium unfished levels; however, the probability distribution indicates considerable uncertainty, with a 5/100 (5%) probability the stock is below the $SB_{30\%}$ level. Stock projections for a range of alternative management actions were conducted using the integrated results from the stock assessment ensemble, summaries of the 2016 fishery, and other sources of mortality, as well as the results of apportionment calculations and the target harvest rates from current IPHC harvest policy.

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

Not applicable. The halibut fisheries in question are very well established and extensively managed.

7.4. Section D. Management Measures

7.4.1. Fundamental Clause 8

Management shall adopt and implement effective management measures designed to maintain stocks at levels capable of producing maximum sustainable yields, including harvest control rules and technical measures applicable to sustainable utilization of the fishery and be based upon verifiable evidence and advice from available scientific and objective, traditional sources.

Number of Supporting clauses	**17**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	High Conformance
Non Conformances	N/A

Summarized evidence:

8.1. 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, and be based on verifiable and objective scientific and/or traditional sources. In the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact shall be considered.

Evidence

No significant changes have occurred since the re-assessment in January 2017. Conservation and management of the fishery is based on harvest control rule to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% (B30 threshold level) of a level defined as the unfished level. Target harvest rates are established for each regulatory area (21.5% for Areas 2A-3A, and 16.125% for Areas 3B-4CDE) to ensure that localized overfishing does not occur.

Typically, the NPFMC determines the regulations for halibut taken as (prohibited species) by-catch in the Alaskan fisheries under its management, and requires that all halibut caught incidentally in these groundfish fisheries must be discarded, regardless of whether the fish is living or dead. Recent measures have been introduced within NPFMC to reduce the halibut bycatch in the Gulf of Alaska groundfish fisheries. There are numerous technical management measures aimed at conservation and sustainable utilization of the halibut resources. Under the individual fishing quota share system, the fishing capacity (vessels and gear) has been reduced, seasons were extended and wastage was reduced. Longline is the principal gear utilized for this fishery. Regulations are in place to address discards. General spawning areas have been mapped in Alaska, and the halibut fishery is closed during peak spawning times, by regulation. The NPFMC has established Marine Protected Areas and additional trawl closures that benefit juvenile fish and adult spawners. Bycatch of seabirds has been addressed by specific regulations now including the use of streamer (tory) lines, night setting, line shooters and lining tubes.

The current IPHC harvest policy was developed during the mid-2000's and is described in detail in several documents (e.g., Clark and Hare 2006, Hare and Clark 2008). This harvest policy is based on a sloping harvest control rule, designed to maintain a constant harvest rate on exploitable biomass when the stock is above the threshold reference point of 30% (B30) of unfished biomass. The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% of the unfished level. The objective is to keep the stock above 30% of its unfished level 80% of the time.

A comparison of the median current ensemble SB to reference levels specified by the current harvest policy suggests that the 2017 stock is currently at 41% of equilibrium unfished levels; however, the probability distribution indicates considerable uncertainty, with a 5/100 (5%) probability the stock is below the SB 30% level. Stock projections for a range of alternative management actions were conducted using the integrated results from the stock assessment ensemble, summaries of the 2016 fishery, and other sources of mortality, as well as the results of apportionment calculations and the target harvest rates from current IPHC harvest policy.

Mean weight per unit effort (WPUE) of Pacific halibut from the IPHC fishery-independent setline survey is used to estimate how the coastwide stock is distributed among Regulatory Areas. In 2016, WPUE was estimated by fitting space-time models to the survey data. The total constant exploitation yield (TCEY) for Pacific halibut in each of the regulatory areas is determined by apportioning estimated coastwide biomass by Area then multiplying that portion of the biomass by area specific harvest rates (constant levels if stock is above B30). Current policy requires the IPHC to account for sources of removals not under its control (e.g. bycatch in various Alaskan trawl fisheries) in order to achieve its conservation mandate, and what remains is allocated to the directed fishery for halibut.

The current harvest control rule (HCR) reference points (B30, B20) have been reviewed by IPHC at various times (see Hare 2001; Stewart et al. 2015). The HCR is aimed at producing a yield that is slightly less than MSY, but with greater stability (Martell et al. 2016b).

The fishery is also managed through a series of technical regulations that includes, among others: in season actions, fishing periods, closed areas and commercial catch limits, fish size limits and safe release of halibut, logs, and legal fishing gears[57].

The fleet is managed under an IFQ system. In 1991, the Council recommended an IFQ Program for management of the fixed gear (hook and line) halibut and sablefish fisheries off of Alaska. The Secretary of Commerce approved the Council's IFQ Program as a regulatory amendment in 1993, and the program was implemented by NMFS for the fishing season in 1995 (58 FR 215). The fundamental component of the IFQ Program is QS, issued to participants as a percentage of the QS pool for a species-specific IFQ regulatory area, which is translated into annual IFQ allocations in the form of fishable pounds. The IFQ Program was developed to address issues associated with the race-for-fish that had resulted from the open-access and effort control management of the halibut and sablefish fisheries. Specifically, the Council identified several problems that emerged in these fisheries due to the previous management regime, including increased harvesting capacity, decreased product quality, increased conflicts among fishermen, adverse effects on halibut and sablefish stocks, and unintended distributions of benefits and costs from the fisheries. A recent 20 year IFQ program review was finalized in December 2016.

The Pacific halibut longline fishery was one of the first fully domestic fisheries to become established off Alaska. As the groundfish fisheries developed, regulations were implemented to limit bycatch of halibut, so as to minimize impacts on the domestic halibut fisheries. Halibut are taken as incidental catch in federally managed groundfish trawl, hook-and-line, and pot fisheries in the Gulf and Alaska and Bering Sea/Aleutian Islands areas. Interception of juvenile and adult halibut (~30 cm and greater) occurs in trawl fisheries targeting groundfish species (such as rockfish, flatfish, pollock, and Pacific cod). Incidental catch of halibut also occurs in groundfish hook-and-line and pot fisheries that typically focus on Pacific cod. Regulations require that all halibut caught incidentally in these groundfish fisheries must be discarded, regardless of whether the fish is living or dead. Halibut catch is controlled in the groundfish fisheries using prohibited species catch (PSC) limits. PSC limits are applied to specific target

[57] http://www.iphc.washington.edu/publications/regs/2017iphcregs_v20170405.pdf

fisheries, gear types, and seasons. During some fishing years, halibut PSC limits have resulted in the closure of specific groundfish fisheries prior to the fleet harvesting the available TAC[58].

In June 2015, the Council took final action to reduce halibut PSC mortality limits in the BSAI groundfish fisheries overall from 4,426 mt to 3,515 mt, a 21% reduction. PSC limits in the BSAI groundfish fisheries are apportioned among sectors and gear types (currently to all trawl fisheries and longline fisheries for all targets except IFQ sablefish), and a different reduction was applied to each[59].

In June 2012, the Council submitted Amendment 95 to the Gulf of Alaska Groundfish FMP in order to reduce occurrence of halibut bycatch in Gulf's groundfish fisheries. According to the amendment, the reductions were to be achieved by implementing more restrictive halibut PSC limits for trawl and hook-and-line groundfish sectors. Reduced PSC limits were phased in, beginning in 2014, and have been fully realized as of 2016. The overall PSC limit reductions are:

- 7 percent reduction for hook-and-line catcher/processors;
- 15 percent reduction for hook-and-line catcher vessels;
- 1 mt reduction for the hook-and-line demersal shelf rockfish fishery in the Southeast Outside district;
- 15 percent reduction for trawl.

Halibut PSC limits are apportioned to the groundfish fisheries annually through the groundfish harvest specifications process.

Directed halibut fisheries (commercial and charter) are expected to benefit from reduced groundfish fishery bycatch of halibut under Amendment 95. Under this action, the commercial groundfish fisheries that incidentally capture halibut while targeting groundfish are expected to lose approximately $10M annually by 2016[59].

The IPHC is developing a Management Strategy Evaluation (MSE) for the P. halibut stock mainly through its Management Strategy Advisory Board (MSAB). The MSAB has been working to develop candidate management objectives, procedures to achieve these objectives, and performance metrics with which to measure success. The Board has developed five overarching fishery management objectives for the MSE (total mortality, size limit, harvest control rule, allocation by area, and reduction in bycatch) as well as a number of specific stock and fishery objectives. The 9th Session of the IPHC Management Strategy Advisory Board (MSAB09) was conducted in May 2017[60].

8.2. States shall prohibit dynamiting, poisoning and other comparable destructive fishing practices.

No dynamiting, poisoning or similarly comparable destructive practices are carried out in Alaska. The Pacific halibut fishery is prosecuted only with demersal longline gear.

8.3. States shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery.

The IPHC currently apportions the QS for the halibut fishery among commercial, sport and personal use and

[58] https://www.npfmc.org/halibut-bycatch-overview/
[59] https://www.npfmc.org/bsai-halibut-bycatch/
[60] http://www.iphc.info/Pages/MSAB-Meetings-9.aspx

subsistence sectors. The NPFMC is responsible for allocation of the halibut resource among user groups in Alaska waters.

One of the Council's policy priorities is to improve outreach and communications with rural communities and Alaska Native entities and develop a method for systematic documentation of Alaska Native and community participation in the development of fishery management actions. In 2009, the Council approved a recommendation to initiate a standing Rural Outreach Committee to provide input to the Council on ways to improve outreach to communities and Alaska Native entities. The committee was initiated in June 2009. The Council identified three primary tasks for the committee:

1. To advise the Council on how to provide opportunities for better understanding and participation from Alaska Native and rural communities;
2. To provide feedback on community impacts sections of specific analyses, if requested; and
3. To provide recommendations regarding which proposed Council actions need a specific outreach plan and prioritize multiple actions when necessary.

The committee has been instrumental in recommending and implementing changes to improve overall outreach and two-way communication with rural stakeholders, as well as assisting in the development of project-specific, long-term outreach plans for Council actions[61].

In addition to the NPFMC for a, the IPHC serves its parties by allowing continuous participation to a number of its advisory bodies which include:

The Conference Board is an IPHC advisory panel representing Canadian and United States halibut fishers. The Board was created by the Commission in 1931 to obtain advice and recommendations from halibut harvesters on conservation measures and halibut management. The Board also reviews staff reports and recommendations and provides its advice concerning these items to the Commission at its Annual Meeting, or on other occasions as requested.

The Board is self-regulating in terms of membership and in 2016, there were 49 members from the US and 39 from Canada participated to its proceedings[62]. Its members are designated by unions, vessel owner organizations, and associations of harvesters throughout the halibut range and include commercial, sport, and tribal interests. The CB is co-chaired by U.S. and Canadian representatives Appendix 14.2

The **Processor Advisory Group** is an IPHC advisory panel representing the Canadian and United States processing industry. It advises the Commission on issues related to the management of halibut resources in the Exclusive Economic Zone of North America. Recognizing the particular expertise the processing industry can provide, the PAG was founded in 1995. The PAG encourages stability and growth of the North American halibut industry by fostering a cooperative relationship, better understanding, and a spirit of mutual benefit among seafood processors, fishermen, and the Commission. The Commission relies on the PAG for comprehensive industry advice on various potential conflicts between participants within a given fishery resource or area, and on the extent to which the halibut resources are managed by the Commission.

[61] https://www.npfmc.org/committees/rural-outreach-committee/
[62] http://www.iphc.info/Public%20Docs/IPHC-2017-CB087-R%20-%20Report%20of%20the%20CB087.pdf

The Commission approved the formation of a **Management Strategy Advisory Board** (MSAB) to oversee the MSE process and to advise the Commission and Staff on the development and evaluation of candidate objectives and strategies for managing the fishery. The MSE process will help the Commission develop and thoroughly test alternative management procedures, prior to actually implementing any management changes for the fishery. The Commission selected a Board of 24 official and ex-officio members representing viewpoints from commercial, sport, processing, Tribal/First Nations, and Fisheries Councils and managers.

The **Research Advisory Board (RAB)** was formed in 2000 to provide the Commission staff with insight on issues of concern to the halibut industry. The Board meets annually with the Executive Director and staff and is composed of active members of the fishing community who are interested in contributing to the direction of IPHC research. A report of the proceedings and recommendations is presented to Commissioners and becomes part of the research discussion at the Interim and Annual Meetings.

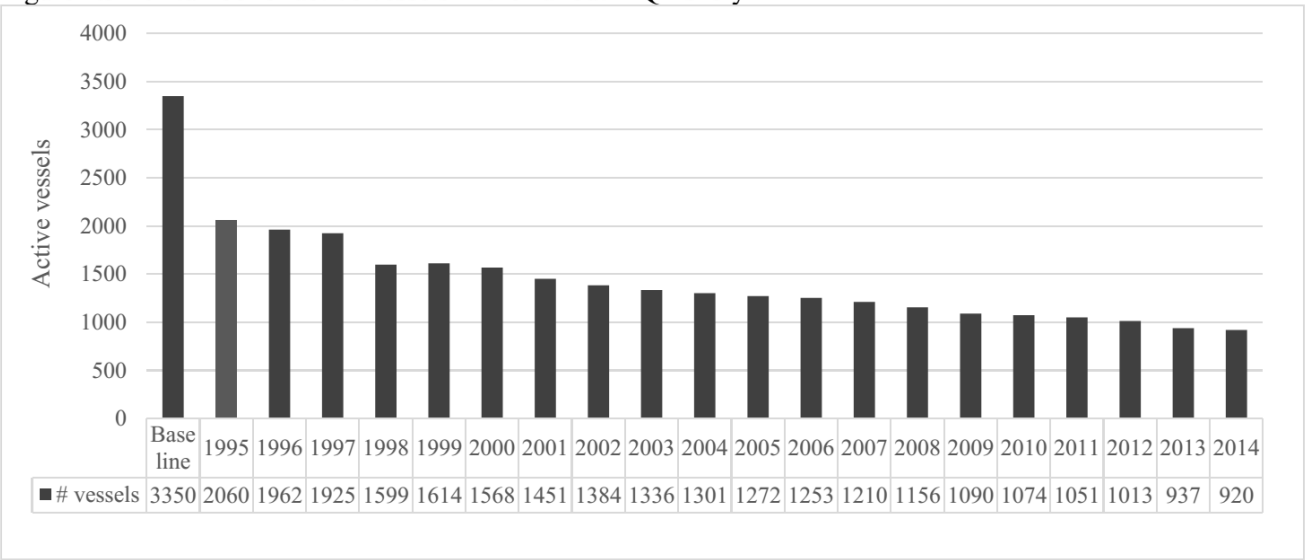
At the 2013 Annual Meeting, the International Pacific Halibut Commission approved the formation of a **Scientific Review Board (SRB)** to provide an independent scientific review of Commission science products and programs, and to support and strengthen the stock assessment process. In the near term, this standing peer review process is expected to focus on a review of the annual stock assessment model and harvest policy prepared by the IPHC staff[63].

8.4. Mechanisms shall be established where excess capacity exists, to reduce capacity. Fleet capacity operating in the fishery shall be measured. States shall maintain, in accordance with recognized international standards and practices, statistical data, updated at regular intervals, on all fishing operations and a record of all authorizations to fish allowed by them.

The Halibut fishery in Alaska is a closed access fishery managed using an IFQ system. Vessels participating in the fleet (Figure 3) have decreased since implementation of the IFQ program in 1993[64]. Annually, NMFS issues eligible QS holders an IFQ fishing permit that authorizes participation in the IFQ fisheries. Those to whom IFQ permits are issued may harvest their annual allocation at any time during the eight plus-month IFQ halibut and sablefish seasons. The IFQ program is a complex management program authorized by federal regulations, which, along with the various definitions required can be viewed on a NOAA website[65] .

[63] https://iphchalibut-public.sharepoint.com/
[64] https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf
[65] https://alaskafisheries.noaa.gov/fisheries-679regs

Figure 2.3-10 Number of active vessels in the halibut IFQ fishery



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
# vessels	3350	2060	1962	1925	1599	1614	1568	1451	1384	1336	1301	1272	1253	1210	1156	1090	1074	1051	1013	937	920

Source: RAM IFQ landings database sourced through AKFIN. The baseline represents an average of the 1992 through 1994 values ADF&G Fish Tickets.

Figure 3: Number of active vessels in the Pacific halibut IFQ fishery 195-2014

8.5. Technical measures shall be taken into account, where appropriate, in relation to: fish size, mesh size or gear, closed seasons, closed areas, areas reserved for particular (e.g. artisanal) fisheries, protection of juveniles or spawners.

IPHC regulations covering the directed halibut fisheries can be found on the IPHC website[66].Concerning specific technical measures, a brief summary by category, as contained in these IPHC regulations, is as follows:

The IPHC establishes halibut season (open and closed) dates under authority of the Halibut Act. NMFS establishes IFQ sablefish season dates by publishing a notice annually, in the Federal Register, and these have been set simultaneous with those for halibut to reduce waste and discards. Separate dates and seasons exist for the sport fisheries in the various areas, as outlined in the IPHC regulations.

Areas closed to halibut fishing are defined in IPHC regulations, and include certain specific waters in the Bering Sea in Isanotski Strait. A number of areas in GOA and BSAI waters are closed to trawling (and thus to halibut bycatch outside the directed fisheries). Other areas require use of modified bottom trawls. These specific areas are defined in the NMFS regulations[67] .

Size limits for halibut in the commercial fishery are as follows, from the IPHC regulations: No person shall take or possess any halibut that: (a) with the head on, is less than 32 inches (81.3 cm) as measured in a straight line, passing over the pectoral fin from the tip of the lower jaw with the mouth closed, to the extreme end of the middle of the tail; or (b) with the head removed, is less than 24 inches (61.0 cm) as measured from the base of the pectoral fin at its most anterior point to the extreme end of the middle of the tail. Specific size limits also exist for

[66] http://www.iphc.washington.edu/publications/regs/2017iphcregs.pdf
[67] https://alaskafisheries.noaa.gov/sites/default/files/679b22.pdf

the sport fisheries, and can vary by area.

The only legal gear for directed halibut fishing is hook and line, with exceptions for some sablefish traps and pots (allowable bycatch of halibut). Halibut retained as bycatch in trawl fisheries in Alaskan waters must be released as Prohibited Species Catch, whether the fish are dead or alive, and these limits are set by NPFMC.

In 2003, the subsistence halibut fishery off Alaska was formally recognized by the NPFMC, and regulations were implemented by IPHC and NMFS. The fishery allows the customary and traditional use of halibut by rural residents and members of federally-recognized Alaska native tribes who can retain halibut for non-commercial use, food, or customary trade. The NMFS regulations defined legal gear, number of hooks, and daily bag limits, and IPHC regulations set the fishing season. Prior to subsistence fishing, eligible persons registered with NMFS Restricted Access Management to obtain a Subsistence Halibut Registration Certificate (SHARC). Further details on personal harvest of Pacific halibut, including catch data, can be found in Goen 2017[68].

The full suite of NMFS fishery regulations for Alaskan waters can be found on their website[69] .

8.6. Fishing gear shall be marked.

Fishing gear is marked. Details can be found in the IPHC regulations for Pacific halibut fishing, Section 19, of the 2017 Fishery Regulations[70]:

(4) All setline or skate marker buoys carried on board or used by any United States vessel used for halibut fishing shall be marked with one of the following: (a) the vessel's State license number; or (b) the vessel's registration number.
(5) The markings specified in paragraph (4) shall be in characters at least four inches in height and one-half inch in width in a contrasting color visible above the water and shall be maintained in legible condition.

8.7. Measures shall be introduced to identify and protect depleted resources and those resources threatened with depletion, and to facilitate the sustained recovery/restoration of such stocks. Also, efforts shall be made to ensure that resources and habitats critical to the well-being of such resources which have been adversely affected by fishing or other human activities are restored.

The halibut stock in Alaska is assessed and is currently not depleted, but above target reference point, currently at 41% of equilibrium unfished levels[71]. The main fishing gear used to capture halibut is longline, which has minimal impact on seabed habitat.

8.8/8.9/8.10/8.11/8.12/8.13. States shall encourage the development and implementation of technologies and operational methods that reduce waste and discards and reduce the loss of fishing gear. The implications of the introduction of new fishing gears, methods and operations shall be assessed and the effects of such introductions monitored. New developments shall be made available to all fishers and shall be disseminated and applied

[68] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.4_Personal_use.pdf
[69] https://alaskafisheries.noaa.gov/fisheries-679regs
[70] http://www.iphc.washington.edu/publications/regs/2017iphcregs.pdf
[71] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-4.2_Assessment_of_the_Pacific_halibut_stock.pdf

appropriately.

The halibut fleet utilises demersal longline gear by law. IPHC regulations[72] require all halibut that are caught and are not retained to be immediately released 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. IPHC's By-catch Working Group also reviews selectivity studies and fishing practices intended to reduce waste and bycatch. A 2014 WG report and list of publications considered by this WG[73], along with IPHC studies on hook type, size, bait, effect of fish size, etc. can be found on the IPHC website[74].

The groundfish trawl industry in Alaska can deploy halibut excluder devices in their gear with success. A project, implemented in Oregon and California, entitled "Improving the Selectivity of Bottom Trawls to Reduce Bycatch of Pacific Halibut in the West Coast Groundfish Trawl Fishery" responded to fishermen's concern for Pacific halibut bycatch. The NMFS, in collaboration with the Pacific States Marine Fisheries Commission (PSMFC) and the Alaska Whitefish Trawlers Association, tested the efficacy of a flexible sorting grate bycatch reduction device (BRD) designed to reduce halibut bycatch[75]. The results showed that halibut bycatch was reduced numerically by 57% and by 62% by weight. Target species loss ranged from 9% to 22%.

Exempted Fishing Permits (EFPs) have been granted by NMFS to some trawler fleets in Alaskan waters in 2016 to allow halibut deck sorting experiments, with the aim of reducing halibut mortality on fish required under PSC limits to be returned to the sea. The program requires observer coverage and electronic video monitoring on all vessels, and is supported by previous scientific study. An example of an EFP for this fishery can be found on the NOAA Alaska fisheries website[76].

Information on the amount of gear lost or abandoned by the halibut longline fishery was collected through logbook interviews or from fishing logs received via mail. A recent IPHC analysis showed that the number of legal-sized halibut estimated to have been taken by lost or abandoned gear decreased by over 95% between 1985 and 2012[77]. Under IPHC regulations, vessels fishing for halibut in Alaska must record the amount and location of all fishing gear deployed, including any lost gear. All fishing gear must be marked in accordance with IPHC regulations.

8.14. Policies shall be developed for increasing stock populations and enhancing fishing opportunities through the Use of artificial structures.

Not applicable. The halibut stock is not depleted below target reference points or subjected to enhancing practices.

[72] http://www.iphc.int/publications/regs/2016iphcregs.pdf
[73] http://www.iphc.int/research/245-bycatch.html
[74] http://www.iphc.int/research/biology/hook.html
[75] http://marineconservationalliance.org/seafacts-the-development-of-halibut-excluders/
[76] https://alaskafisheries.noaa.gov/sites/default/files/efp2016-01-050616permit.pdf
[77] http://www.iphc.int/publications/rara/2012/rara2012053_commwastage.pdf

7.4.2. Fundamental Clause 9

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

Number of Supporting clauses	**3**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized evidence:
9.1./9.2./9.3. Education and training programs.

Evidence

No significant changes have occurred since the re-assessment in January 2017. Any aspirant halibut fisher must have 150 days of halibut fishing experience before being able to purchase halibut IFQs under NMFS/NOAA rules. 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[78].

The State of Alaska, Department of Labor and 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 crewmembers for employment in the Alaskan maritime industry[79]. This 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, and 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 ship simulator, computer based navigational laboratory, and modern classrooms. The Center's mission is to provide Alaskans with the skills and technical knowledge to enable them to be productive in Alaska's 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 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[80]. In addition, MAP conducts sessions of their Alaska Young Fishermen's Summit (AYFS). AYFS is designed to provide training, information and networking opportunities for commercial fishermen early in their careers.

[78] http://www.nmfs.noaa.gov/sfa/management/catch_shares/about/documents/ak_halibut_sablefish.pdf
[79] http://www.avtec.edu/
[80] http://seagrant.uaf.edu/map/fisheries/

The summit will focus on building leadership and networking capacity in the Alaska commercial fishing industry through three days of intensive training. The fast-paced program features industry leaders providing insights on fishing business management, the fisheries management process, and the role of Alaska seafood in the global marketplace. In 2017, the AYFS will coincide with the North Pacific Fisheries Management Council December meeting in Anchorage.

The Alaska Marine Safety Education Association (AMSEA) provides courses on small boating safety, drill conductor training, stability and damage control, ergonomics and survival at sea training[81].

[81] http://www.amsea.org/commercial-fishermen

7.5. Section E. Implementation, Monitoring and Control

7.5.1. Fundamental Clause 10

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

Number of Supporting clauses	**6**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized evidence:

10.1. Enforcement agencies and framework:

Evidence

No significant changes have occurred since the re-assessment in January 2017. The Northern Pacific Halibut Act governs the commercial, sport, charter, and subsistence halibut fisheries in the U.S. The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska fisheries laws and regulations, especially 50CFR679. The Alaska Wildlife Troopers enforce halibut regulations in state waters. All landings of halibut must be reported to NMFS via its mandatory “e-landings” reporting system.

OLE and USCG are responsible for enforcement of regulations in the IFQ fisheries. OLE is responsible for shoreside enforcement and provides after hours surveillance while USCG engages in at-sea enforcement. The USCG documents at-sea violations and refers them to OLE for final action. OLE employs a multifaceted strategy to maximize compliance in the IFQ fisheries. This strategy includes educational outreach, partnerships, patrols, inspections, and investigations. OLE spends thousands of hours annually providing marine resource users with compliance assistance, including staffing booths at organized events, daily contacts in communities, ports, harbors, and at-sea to ensure that the most current and accurate regulatory information is widely distributed and understood.

OLE works closely with the Wildlife Troopers and the USCG to maximize compliance by sharing information, intelligence, knowledge, and resources. The formalized JEA with the Wildlife Troopers provide the state with federal funding for personnel, equipment, operations, and authorization for the Wildlife Troopers to enforce federal fishing regulations while engaged in their regular duties. OLE also spends thousands of hours annually conducting patrols to provide a visible deterrence to potential violators, to monitor fishing and other marine activities, to detect violations, to conduct compliance inspections, and to provide compliance assistance. OLE personnel investigate reports or complaints of IFQ violations as well as regularly analyze IFQ data that may lead to investigations of abnormal activity and missing or questionable information. OLE has identified two monitoring and enforcement concerns related to IFQ fishing requirements.

Quota share in the IFQ Program are allocated by specific regulatory area. False reporting of the area of harvest for IFQ is a concern for OLE. Such area fished violations have the potential to significantly impact the IFQ fisheries because the IPHC establishes catch limits by management area and NMFS tracks IFQ catch by area to ensure these

catch limits are not exceeded. OLE has limited ability to track at sea fishing activity and areas fished without the use of VMS. In cases where VMS data is available, it has been instrumental in prosecuting false reporting violations in the IFQ fisheries where a fisherman has caught fish in one area, and upon landing, reported it from a different area. Requiring the use of VMS in IFQ fisheries would substantially improve OLE's ability to prosecute false reporting violations. This intentional violation is hard to detect without VMS and has the potential to impact the fishery resource.

The second enforcement concern is a type of IFQ overage caused when a QS holder on board a vessel has IFQ in two areas, but the vessel does not have VMS or an observer onboard. In this situation the QS holder is not allowed to harvest more fish in any one area than the amount of IFQ he has available for that given area. Violation of this requirement is commonly referred to as a multiple area violation and is considered an IFQ overage even though the QS holder has IFQ in both areas. This type of violation can result in significant fines and forfeiture of the "overage". Requiring VMS in the IFQ fisheries could help fishery participants avoid unintentional multiple area overages.

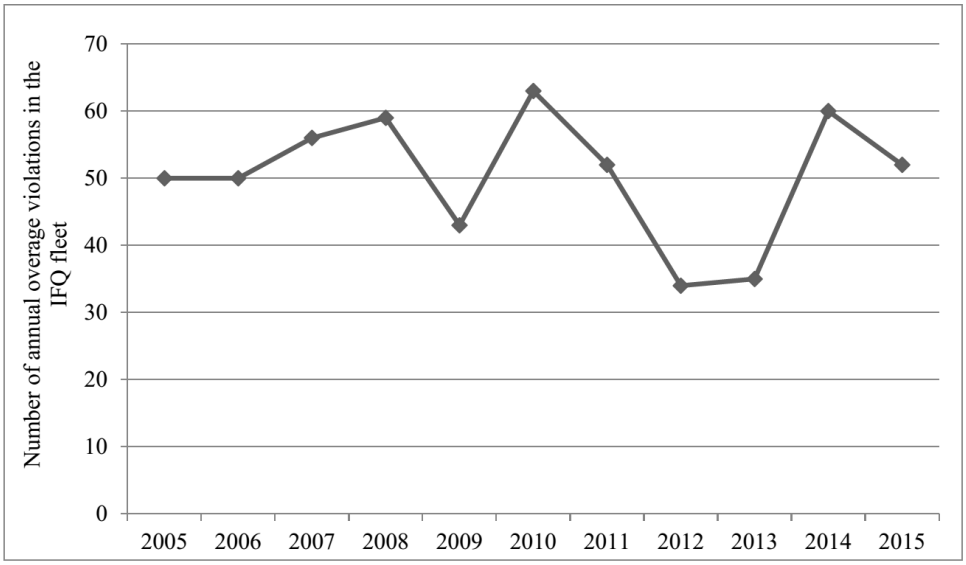
In Table 6 shoreside and at-sea IFQ fisheries violations is reported for2005 through 2015. The data is not standardized in any way. Annual changes in violations may be a factor of regulatory changes (increases/decreases in the number of potential violations), OLE's staffing changes in various ports, or changes in USCG patrol and/or OLE's shoreside monitoring efforts.

Table 6: Fishery related violation monitoring 2005-2015. (Source: http://dps.alaska.gov/awt/Marine.aspx)

Violation Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Not Maintaining continuous transit during a closed period	0	0	0	0	0	0	0	0	2	0	0
Failure to use Seabird Avoidance Gear	1	8	9	0	3	0	0	2	14	6	2
Fishing in Closed Area	2	2	4	1	2	1	4	8	4	1	0
FFP/IFQ Permit/Cardholder not onboard	8	5	0	1	9	4	3	6	13	3	6

Expired FFP	12	24	13	1	9	3	16	4	1	0	0
Missing Boarding Ladder	2	2	0	2	8	5	1	1	7	1	1
Insufficient Sea Bird Avoidance	13	7	2	3	2	5	4	2	0	0	0
Logbook Discrepancy	2	1	10	6	5	8	1	7	11	6	1
Fishing for halibut without a permit	8	7	8	7	13	10	6	5	7	1	1
Subsistence Fishing with too many hooks	4	0	1	20	1	10	2	1	1	0	0

If a person exceeds their remaining IFQ account balance at the time of landing by over 10%, this becomes an overage violation and an enforcement action rather than an administrative adjustment to an IFQ account. An overage violation is detected at the time of landing if the IFQ landing is in excess of 10% of the remaining balance on the IFQ account at the time of landing. When a QS holder exceeds this balance by more than 10%, the entire overage is seized by the government. NOAA's Office of Law Enforcement (OLE) administers all overage violations above the 10% allowable adjustment threshold. The underlying reason for this variability is uncertain, but is likely to be a combination of fluctuations in monitoring/enforcement effort, IFQ fishermen's behavior, and changes in the regulatory environment and catch per unit effort. This inter-annual variability does not seem to be a factor of changes in the number of total IFQ permits, which have consistently decreased from 2005 to 2015 (Figure 4).



Source: NOAA OLE

Figure 4: Overage violations in the IFQ fleet, 2005-2015. (Source: NOAA OLE)

10.2./10.3/10.4. Fishing permit requirements:

All vessels harvesting halibut must be authorized and permitted (by way of license and ITQ) to fish, in accordance

with federal regulations, 50CFR679[82]. Further, all halibut harvesting must be conducted in accordance with the NPFMC's IFQ program[83].

[82] https://alaskafisheries.noaa.gov/fisheries-679regs
[83] https://alaskafisheries.noaa.gov/fisheries/ifq

7.5.2. Fundamental Clause 11

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

Number of Supporting clauses	**3**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Full Conformance
Non Conformances	N/A

Summarized evidence:

11.1/11.2/11.3. Enforcement policies and regulations, state and federal:

Evidence

No significant changes have occurred since the re-assessment in January 2017. The sanction and violation framework are based on the Magnuson-Stevens Act (50CFR600.740 Enforcement policy) provides four basic enforcement remedies for violations: 1) Issuance of a citation (a type of warning), usually at the scene of the offense, 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. In some cases, the Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine.

The Northern Pacific Halibut Act governs the commercial, sport, charter, and subsistence halibut fisheries in the U.S. The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska fisheries laws and regulations, especially 50CFR679. The Alaska Wildlife Troopers enforce halibut regulations in state waters. The violations in this fishery are reported to and investigated by NOAA's Office of Law Enforcement's Alaska Division and prosecuted by NOAA's Office of General Counsel's Enforcement Section. Penalties (Table 7) under the Halibut Act are as follows[84]:

[84] http://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf

Table 7: Offence level and penalty matrix according to the MSA. (Source: http://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf)

Penalty Matrix for the Northern Pacific Halibut Act of 1982

	Level of Culpability			
Gravity Offense Level	A Unintentional	B Negligent	C Reckless	D Intentional
I	Written warning-$2,000	Written warning-$4,000	$2,000-$6,000	$6,000-$8,0000
II	$2,000-$5,000	$4,000-$6,000	$6,000-$10,000	$10,000-20,000
III	$5,000-$10,000	$10,000-$15,000	$15,000-$20,000	$20,000-$40,000 Permit sanction of 5-20 days for subsequent violations*
IV	$10,000-$15,000	$15,000-$25,000	$20,000-$40,000 Permit sanction of 10-20 days for subsequent violations*	$40,000-$60,000 Permit sanction of 20-60 days*
V	$15,000-$25,000	$25,000-$40,000 Permit sanction of 10-20 days for subsequent violations *	$40,000-$65,000 Permit sanction of 20-60 days*	$65,000-$120,000 Permit sanction of 60-180 days*
VI	$25,000-$40,000 Permit sanction of 5-20 days for subsequent violations *	$40,000-$65,000 Permit sanction of 20-60 days*	$65,000-$120,000 Permit sanction of 60-180 days*	$120,000-statutory maximum Permit sanction of up to one year *

*Under catch share or similar programs, where permits allow for a certain amount of catch per year (instead of fishing days per year), permit sanctions will be assigned as a percentage of the quota, at a rate of 0.27% for each day of permit sanction time listed in the matrixes (100% divided by 365 days per year is approximately 0.27% per day).

OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. NOAA Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and

Litigation (GCEL).

The MSA provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy):

1. Issuance of a citation, 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.

In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In summary, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator[85].

[85] http://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf

7.6. Section F. Serious Impacts of the Fishery on the Ecosystem

7.6.1. Fundamental Clause 12

Considerations of fishery interactions and effects on the ecosystem shall 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 shall be appropriately assessed and effectively addressed.

Number of Supporting clauses	**16**
Supporting clauses applicable	N/A
Supporting clauses not applicable	N/A
Overall level of conformity	Minor Non-Conformance
Non Conformances	1 Minor (12.6)

Summarized evidence:

12.1. Assessment of environmental effects on target stocks and ecosystem

Evidence

No significant changes have occurred since the re-assessment in January 2017. 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 by the IPHC, NMFS/NPFMC and ADFG. Appropriate scientific evaluations are conducted using best available information from surveys and commercial data. Limitations in data transparency from <40feet vessel is identified and is being addressed through management actions. Electronic monitoring program is being implemented to deliver necessary improvements. Marine resource management is multi-dimensional (with regards to stakeholders as well as resources), and are guided by information that is updated annually or more frequency, and the precautionary as well as ecosystem based approaches are applied to deliver conservation, sustainability and optimum economic management measures.

The IPHC compared long-term changes in Pacific halibut recruitment and growth with long-term changes in climate and stock size[86]. IPHC scientists found that environmental variability—both interdecadal and inter-annual—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 (Martell et al 2015).

2016 was the eighth consecutive year of the IPHC coastwide oceanographic data collection program. Oceanographic data are collected using water column profilers during the IPHC fishery-independent setline survey that spans the area from southern Oregon in the U.S. northward to British Columbia, into the Gulf of Alaska, Bering Sea, and Aleutian Islands. The IPHC has operated profilers since 2000 on a limited basis, and coastwide since 2009. Oceanographic data were collected at a total of 1,206 stations out of a possible 1,366. The coldest near-bottom water (-0.67°C) was detected, once again, around St. Matthew Island in the Bering Sea. The warmest near-bottom water (12.25°C) was the shallow water off the southern end of Kodiak Island. The U.S. West Coast once again had the lowest near-bottom dissolved oxygen of the surveyed area, but the hypoxic zone that was prevalent for several

[86] http://www.iphc.int/papers/clim.pdf

years (through 2013) was not detected.

Scientists with the NMFS have conducted numerous studies and continue research on the impacts of acidification in the North Pacific Ocean[87].

Another major ecosystem research report is the AFSC Ecosystem Consideration Report series (see https://access.afsc.noaa.gov/reem/ecoweb/) The Ecosystem Considerations reports are produced annually to compile and summarize information about the status of the Alaska marine ecosystems for the North Pacific Fishery Management Council, the scientific community and the public. As of 2016, there are separate reports for the Eastern Bering Sea (EBS), Aleutian Islands (AI), the Gulf of Alaska (GOA), and Arctic (forthcoming) ecosystems. These reports include ecosystem assessments, and ecosystem and ecosystem-based management indicators that together provide context for ecosystem-based fisheries management in Alaska.

Further relative information with regards to halibut fishery interaction with ecosystem components is included in the following sections;

Gulf of Alaska[88]

In the 2016 report on the Western GOA, fish apex predator survey biomass is currently below its 30-year mean, although the declining trend seen in recent years has leveled off. The trend is driven primarily by arrowtooth flounder which, along with halibut, had been declining since 2005. Both increased slightly in 2015. It is unknown whether these increases were due to distributional shifts in the warm water. The Gulf of Alaska in 2016 was characterized by warm conditions that were first seen in 2014, and have continued as reflected in the positive PDO pattern. Anomalously warm conditions are expected to continue through the winter.

Bering Sea[89]

The eastern Bering Sea in 2016 was characterized by warm conditions that began in late 2013. The PDO remained positive with neutral to weak La Nina conditions predicted for the winter of 2016-17. The regional 2016 fish apex predator (of which halibut is a component) survey biomass is currently above its 30-year mean, although the increasing trend seen from 2009-2014 has leveled. The increase from below average values in 2009 back towards the long term mean is driven primarily by increases in Pacific cod from low levels in the early 2000s.

Aleutian Islands[90]

Biomass of pelagic forager and apex fish predator foraging guilds decreased across the region between the 2014 and 2016 surveys, although patterns varied among species. The overall decrease may indicate a response to the warmer water, such as poor condition or habitat shift, or reflect high variances commonly observed in estimated biomass among surveys.

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

[87] http://www.afsc.noaa.gov/Publications/ProcRpt/PR2008-07.pdf
[88] https://access.afsc.noaa.gov/reem/ecoweb/index.php?ID=3
[89] https://access.afsc.noaa.gov/reem/ecoweb/Index.php?ID=1
[90] https://access.afsc.noaa.gov/reem/ecoweb/Index.php?ID=2

North Pacific Research Board (NPRB)[91]
The NPFB conducts research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean prioritizing on research efforts designed to address pressing fishery management or marine ecosystem information needs.

Bering Sea Integrated Ecosystem Research Program[92]
The Bering Sea Integrated Ecosystem Research Program 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)[93]
The Gulf of Alaska Integrated Ecosystem Research Project (IERP) 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.

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.

[91] http://www.nprb.org/
[92] http://www.nprb.org/bering-sea-project
[93] http://gulfofalaska.nprb.org/

Also, the Pacific States Marine Fisheries Commission[94] coordinates research activities, monitors fishing activities, collects and maintains databases on marine fish occurring off the California, Oregon, Washington, and Alaska coast.

12.2 Research and Institutional capacity for environmental impact assessment

There is sufficient research and institutional capacity for environmental impact assessment between the agencies that collaborate to manage Pacific halibut in Alaska. The IPHC, NPFMC and NOAA/NMFS conduct assessments and research related to fishery impacts on ecosystems and habitats and how environmental factors affect the fishery. Findings and conclusions are published in the Ecosystem section of the SAFE document, annual Ecosystem Considerations documents, NEPA analysis and other various research reports[95].

12.3./12.4/12.5/12.6. Fishery Interaction with the ecosystem, non-target catches, discards associated, dependent or endangered species

No significant changes have occurred since the re-assessment in January 2017. The NC with regards to sub-clause 12 remain unclosed, however the Client Action Plan was accepted. Evidence of progress included the recommendation and implementation of Electronic Monitoring (starting 2017 fishing season) among smaller vessels (<40f) that currently do not participate in the observer program; evidence of the performance of the electronic monitoring program is expected to be available during the next (2018) surveillance assessment. A Client corrective action plan was provided and accepted for the non-conformance on sub-clause 12.6. This NC will remain open throughout the period of certificate (5 years) until the medium confidences move to high as the corrective actions take effect.

Halibut bycatch in other fisheries[96]

The IPHC relies upon information supplied by observer programs run by domestic agencies for bycatch estimates in most fisheries. Non-IPHC research survey information is used to generate estimates of bycatch in the few cases where fishery observations are unavailable. Trawl fisheries off British Columbia (BC) are comprehensively monitored and bycatch information is provided to IPHC by DFO.

The NPFMC adopts Pacific halibut bycatch mortality limits for the Alaskan groundfish fisheries during its annual specification process in the fall of the preceding year. Currently, the limits are set by management area (GOA and BSAI). The limits are fixed in regulation and can only be changed through a formal amendment, which can take up to a year. For both regions, regulations allow the NPFMC to apportion the trawl and fixed-gear limits into seasonal amounts and by fishery, to enable the groundfish fisheries to maximize their groundfish catch within the specified limits.

Gulf of Alaska

The final year of a phased three-year reduction in GOA bycatch limits occurred in 2016. The reduction for the trawl sector was implemented through a 7% reduction in 2014, an additional 5% in 2015 (to 12%), and finally 3% for 2016, thereby totaling 15% across three years. The reductions resulted in new trawl fishery limits of 1,848 t in

[94] http://psmfc.org
[95] https://access.afsc.noaa.gov/reem/ecoweb/Index.php?ID=20
[96] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.6_Incidental_catch_of_halibut.pdf

2014, 1,759 t in 2015, and 1,706 t in 2016 and beyond for all trawl vessels. For the hook-and-line fleet, the reduction varied by vessel type. The bycatch limit for the hook-and-line catcher/processor (CP) fleet was reduced 7%, which was implemented as one step in 2014. The hook-and-line catcher vessel (CV) bycatch limit was reduced by 15%, on the same 3-year reduction schedule as the trawl sector.

The trawl limit was divided by season for shallow water and deep water fisheries, as has been the practice since 1991. Bycatch management in the GOA fixed-gear fisheries in 2016 was similar to previous years in that limits were assigned to specific fisheries. The bycatch limit was set at 266 t (0.44 million pounds) for all fixed-gear fisheries, a slight reduction from 2015. The fixed-gear fisheries target primarily Pacific cod (*Gadus macrocephalus*) in the central and western GOA during the winter and rockfish in the eastern GOA in the spring. The fixed-gear limit is divided between the CV and CP sectors; the sector limits are further divided seasonally. All pot and jig gear fisheries, as well as the sablefish (*Anoplopoma fimbria*) Individual Fishing Quota (IFQ) fishery, are exempted from the bycatch limits.

Bering Sea/Aleutian Islands

The Pacific halibut bycatch mortality limits for the 2016 BSAI trawl and fixed-gear fisheries totaled 3,515 t (5.8 million pounds net), a drop of 23.2% from the previous caps which had been in place since 1999. The BSAI fixed-gear fisheries were allocated a total bycatch limit of 710 t (1.17 million pounds), with 7.5% (53 t; 0.09 million pounds) reassigned to Community Development Quota (CDQ) fisheries, leaving 657 t (1.09 million pounds). This was divided between the hook-and-line fishery for Pacific cod and all other fixed-gear fisheries. The Pacific cod fishery bycatch limit was further divided between CPs and CVs.

All pot and jig fisheries were exempted from Pacific halibut mortality closures. The sablefish IFQ hook-and-line fishery was also exempted from the bycatch limit. The 2016 trawl fishery bycatch mortality limit was 2,805 t (4.64 million pounds). By regulation, a fixed amount of 315 t (0.52 million pounds) is reallocated to CDQ fisheries (gear-nonspecific), leaving 2,490 t (4.12 million pounds) for all remaining trawl fisheries. Amendment 80 separated the trawl fleet into an A80 sector and a Limited Access sector. The latter group includes the pollock co-ops created by the AFA. Within the A80 fleet, the bycatch limit was assigned to the Alaska Seafood Cooperative and the Alaska Groundfish Cooperative. In addition, the NPFMC created bycatch limit sideboards for the AFA vessels which apply to these vessels when they fish in non-AFA fisheries, i.e., any target species other than pollock. The CDQ program operated throughout the year and a fixed amount of the trawl bycatch limit (315 t; 0.52 million pounds) and 7.5% of the hook-and-line bycatch limit (53 t; 0.09 million pounds) were allocated to the CDQ program, which was then subdivided among six participating CDQ groups in proportion to their groundfish allocations[97].

In Table 8 eestimates (thousands of pounds, net weight) of bycatch mortality of Pacific halibut by year, regulatory area, and fishery is provided for 2007 through 2016. Estimates for 2016 are preliminary and subject to change as new information becomes available.

[97] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.6_Incidental_catch_of_halibut.pdf

Table 8: bycatch mortality of Pacific halibut 2007-2016. (Source: http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.6_Incidental_catch_of_halibut.pdf

IPHC Reg Area and Gear	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AREA 2A										
Groundfish Trawl	347	351	416	302						
IFQ Bottom Trawl					52	60	53	43	55	55
Other Groundfish Trawl					1	1	2	1	1	1
Groundfish Pot					1	1	0	0	1	1
Hook & Line	40	81	98	46	52	59	9	49	41	41
Shrimp Trawl	0	0	0	0	0	0	0	0	0	0
Total	388	432	513	347	107	120	65	94	98	98
AREA 2B										
Groundfish Bottom Trawl	320	143	213	181	232	189	225	245	326	258
Total	320	143	213	181	232	189	225	245	326	258
AREA 2C										
Crab Pot	23	19	7	18	10	21	13	1	1	1
Groundfish Trawl	0	0	0	0	0	0	0	0	0	0
Hook & Line (non-IFQ)	3	7	5	4	3	8	8	8	12	17
Hook & Line (IFQ)	3	3	3	3	3	12	13	9	7	13
Chatham Str. Sablefish	8	8	8	8	8	n/a	n/a	n/a	n/a	n/a
Clarence Str. Sablefish	25	25	25	25	25	n/a	n/a	n/a	n/a	n/a
Total	62	62	48	58	49	41	34	17	19	30
AREA 3A										
Scallop Dredge	6	3	9	14	12	10	12	24	24	24
Groundfish Trawl	2,347	2,381	2,141	2,030	2,232	1,422	1,336	1,680	1,792	1,741
Hook & Line (non-IFQ)	102	293	197	111	92	238	216	155	223	210
Hook & Line (IFQ)	119	119	119	119	119	25	31	16	33	25
Groundfish Pot	15	13	5	12	23	29	34	12	25	40
Pr Wm Sd Sablefish	10	10	10	10	10	n/a	n/a	n/a	n/a	n/a
Total	2,599	2,819	2,481	2,296	2,488	1,724	1,630	1,888	2,098	2,040
AREA 3B										
Crab Pot	0	0	0	0	0	0	0	0	0	0
Scallop Dredge	0	0	4	0	5	4	8	14	0	0
Groundfish Trawl	795	979	865	676	806	989	733	809	537	790
Hook & Line (non-IFQ)	136	190	256	269	172	105	88	115	96	150
Hook & Line (IFQ)	116	116	116	116	116	24	14	18	15	10
Groundfish Pot	18	18	7	36	21	20	44	18	10	28
Total	1,065	1,303	1,247	1,097	1,120	1,142	887	974	658	979

IPHC Reg Area and Gear	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AREA 4A										
Scallop Dredge	0	0	0	0	0	0	0	0	0	0
Crab Pot	2	7	5	22	14	12	27	0	0	0
Groundfish Trawl	1,418	1,021	1,315	800	789	1,314	606	615	483	423
Hook & Line (non-IFQ)	153	178	220	213	145	130	204	160	149	103
Hook & Line (IFQ)	15	15	15	15	15	5	4	3	3	2
Groundfish Pot	3	8	2	7	8	10	32	27	7	3
Total	1,591	1,229	1,557	1,058	971	1,472	873	805	642	531
AREA 4B										
Crab Pot	2	2	0	0	1	0	3	0	0	0
Groundfish Trawl	293	206	299	371	402	215	116	101	202	144
Hook & Line (non-IFQ)	139	114	119	65	32	27	6	24	20	5
Hook & Line (IFQ)	40	40	40	40	40	12	10	5	2	2
Groundfish Pot	3	2	1	1	1	1	5	2	0	0
Total	477	364	459	477	476	255	140	132	223	150
AREA 4CDE+CA										
Scallop Dredge	0	0	0	0	0	0	0	0	0	0
Crab Pot	43	54	33	63	49	29	29	0	37	37
Groundfish Trawl	4,145	3,469	3,160	3,429	2,496	3,458	4,110	4,205	3,003	2,619
Hook & Line (non-IFQ)	609	978	821	684	472	768	668	538	384	352
Hook & Line (IFQ)	5	5	5	5	5	1	151	11	0	0
Groundfish Pot	1	2	1	1	2	4	18	13	2	2
Total	4,804	4,508	4,021	4,182	3,024	4,260	4,977	4,767	3,425	3,010
AREA 4 Subtotal										
Scallop Dredge	0	0	1	0	0	0	0	0	0	0
Crab Pot	48	63	39	85	65	41	59	0	37	37
Groundfish Trawl	5,856	4,696	4,774	4,600	3,687	4,987	4,832	4,921	3,687	3,186
Hook & Line (non-IFQ)	901	1,270	1,160	962	649	925	878	722	552	460
Hook & Line (IFQ)	60	60	60	60	60	18	165	19	5	3
Groundfish Pot	7	12	4	9	11	15	55	42	8	5
Total	6,872	6,101	6,037	5,717	4,472	5,987	5,989	5,704	4,290	3,691
GRAND TOTAL	**11,305**	**10,860**	**10,540**	**9,696**	**8,468**	**9,203**	**8,830**	**8,921**	**7,488**	**7,095**

[1]Note that some totals may not sum precisely due to rounding.

Bycatch of other species resulting from the halibut directed fishery

IPHC survey bycatch data[98]

The 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 of other species in the halibut fishery, particularly for bycatch of rockfish species, skates, and sharks. The 2016 stock assessments results are as follows. Approximately 112 species of fish and invertebrates were caught as incidental catch during the survey. Though skippers on survey vessels take precautions to avoid marine mammal and bird bycatch, one black-footed albatross (*Phoebastria nigripes*) was captured in Regulatory Area 3B (provided to the Oikonos organization for genetic sampling) and one Steller sea lion (*Eumetopias jubatus*) was hooked on the gear in Area 2C.

Hook occupancy of species groups varied by regulatory area. The predominant incidental catches in Regulatory Areas 2A, 2B, and 3A were sharks. For Area 2C, the most frequent incidental species groups consisted of a nearly equal distribution of sablefish, sharks, and rockfish. The most frequent incidental catch in Areas 3B, 4A, and 4D was Pacific cod. In Areas 4B and 4C the "other species" category was most common and was comprised primarily of yellow Irish lord sculpins (*Hemilepidotus jordani*), unidentified starfish, grenadiers (*Macrouridae*), and arrowtooth flounder (*Atheresthes stomias*).

Spiny dogfish were the largest component of the shark species category in Areas 2A (99%), 2B (98%), 2C (97%), and 3A (99%). Sleeper sharks (*Somniosus pacificus*) were the largest component of the shark species category in Areas 3B (72%), 4A (89%), and 4D (100%). Bocaccio (*Sebastes paucispinus*), canary rockfish (*S. pinniger*), and yelloweye rockfish (*S. ruberrimus*) populations are of concern in Areas 2A, 2B, and 2C, and their numbers often drive catch regulations. Catch rates of bocaccio and canary rockfish are so low on IPHC surveys that it is difficult to make any inferences from them. Trends in bycatch NPUE over the last ten years for the other major incidentally-captured species and species groups show that the encounter rate for most remained relatively constant over time.

Results from the 2016 Electronic Monitoring Project[99]

Twenty-five longline vessels participated in the 2016 pre-implementation EM project. EM data was collected on 34 halibut trips, 12 Pacific cod trips, and 31 sablefish trips containing 230, 160 and 167 hauls respectively. Some vessels participated in more than one fishery. The data spanned 165 halibut sea days, 49 Pacific cod sea days, and 143 sablefish sea days for a total of 357 sea days with trips averaging 4.9, 4.1, and 4.6 days respectively.

[98] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.1_2016_IPHC_fishery_independent_survey.pdf
[99] https://www.afsc.noaa.gov/Publications/ProcRpt/PR2017-07.pdf

Effort Log

Seventy-two of the 77 trips (94%) had a complete logbook submitted with the video data.

Table 9: Table 20: Summary of EM monitored fishing activity for 2016. (Source: https://www.afsc.noaa.gov/Publications/ProcRpt/PR2017-07.pdf)

Data Summary	Longline Halibut	Longline Pacific Cod	Longline Sablefish	All Fisheries
Vessels	17	3	12	**25**
Trips	34	12	31	**77**
Hauls	230	160	167	**557**
Sea Days	165	49	143	**357**
Average Trip Length	4.9	4.1	4.6	**4.6**

Table 10: Counts of video recorded retained and discarded catch. Source: https://www.afsc.noaa.gov/Publications/ProcRpt/PR2017-07.pdf)

	Longline Halibut				
	Retained	Discarded			Unknown
Species		*Interacted w/ Vessel or Crew*	*Drop-off*	*Utilized Onboard*	
Sablefish	3,482	785	29	-	-
Pacific halibut	11,647	10,338	219	-	-
Pacific cod	870	381	10	663	-
Lingcod	209	227	4	-	-
Flatfish					-
Flatfish - unidentified	-	1	2	-	-
Flounder, Arrowtooth	*17*	*81*	-	*26*	-
Flounder, Kamchatka	*3*	*1*	-	*3*	-
Flounder, Kamchatka/Arrowtooth - unid	*51*	*254*	*10*	*83*	-
Flounder, Kamchatka/Arrowtooth Total	71	336	10	112	-
Sole, Dover	-	2	-	-	-
Sole, Flathead	-	1	-	-	-
Sole, Petrale					-
Sole, Rock Sole unidentified	-	2	-	-	-

Continuation – Table 10: Counts of video recorded retained and discarded catch. Source: https://www.afsc.noaa.gov/Publications/ProcRpt/PR2017-07.pdf)

Other Fish					-
Pollock (Walleye Pollock)	1	2	-	-	-
Grenadier (Rattail), Giant	-	8	1	-	-
Grenadier, (Rattail) - unidentified	1	115	6	1	-
Flatnose, Pacific (Codling)					-
Greenling - unidentified	-	1	-	-	-
Ratfish, Spotted	2	76	-	-	-
Ronquil/Searcher - unidentified	2	2	-	-	-
Roundfish - unidentified	-	2	4	-	-
Sculpin - Myoxocephalus unidentified	2	45	-	9	-
Sculpin - unidentified	4	897	1	56	-
Sculpin, Bigmouth	-	1	-	-	-
Sculpin, Great	-	50	1	2	-
Sculpin, Irish Lord - unidentified	-	73	-	5	-
Sculpin, Red Irish Lord	-	29	-	2	-
Sculpin, Yellow Irish Lord	-	236	-	5	-
Fish head /lips or parts	1	16	-	-	-
Fish - unidentified	-	1	4	-	-
Rockfish and Thornyheads					
Rockfish - unidentified	-	3	1	-	-
Rockfish, Black	83	8	-	-	-
Rockfish, Canary	23	2	1	-	-
Rockfish, Dark unidentified	1	5	-	-	-
Rockfish, Dusky (was Light Dusky)	30	23	-	-	-
Rockfish, Northern					-
Rockfish, Quillback	299	85	3	-	-
Rockfish, Red Banded	235	51	1	-	-
Rockfish, Redstripe	-	-	-	-	-
Rockfish, Rosethorn	1	1	-	-	-
Rockfish, Silvergray	15	14	-	-	-
Rockfish, Small Red unidentified	5	18	5	-	-
Rockfish, Tiger	10	-	-	-	-
Rockfish, Yelloweye	1,116	320	9	-	-
Rockfish, Rougheye	*79*	*18*	*1*	-	-
Rockfish, Shortraker	*65*	*159*	*8*	-	-
Rockfish, Shortraker/Rougheye unid.	*226*	*52*	*3*	-	-
Rockfish, Shortraker/Rougheye Total	370	229	12	-	-
Rockfish, Longspine Thornyhead					-
Rockfish, Shortspine Thornyhead	*246*	*12*	*1*	-	-
Rockfish, Thornyhead unidentified	*797*	*113*	*8*	-	-
Rockfish, Thornyheads Total	1,043	125	9	-	-

Continuation – Table 10: Counts of video recorded retained and discarded catch. Source: https://www.afsc.noaa.gov/Publications/ProcRpt/PR2017-07.pdf

	Longline Halibut				
	Retained	Discarded			Unknown
Species		*Interacted w/ Vessel or Crew*	*Drop-off*	*Utilized Onboard*	
Shark					
Shark, Pacific Sleeper (Mud)	-	38	12	-	-
Shark, Spiny Dogfish	2	4,717	13	1	-
Skate					-
Ray, (Skate) - unidentified	-	1	2	-	-
Skate - Soft Snout unidentified	1	253	-	-	-
Skate - Stiff Snout unidentified	-	-	-	-	-
Skate, Alaska	-	15	-	-	-
Skate, Aleutian	-	47	-	-	-
Skate, Bering	-	2	-	-	-
Skate, Big	*	609	24	-	-
Skate, Longnose	1	985	5	-	-
Skate, Roughtail	-	1	-	-	-
Crab					-
Crab - unidentified (Family Unknown)	1	1	-	-	-
Crab, King - unidentified	-	-	-	-	-
Crab, King, Couesi	-	-	-	-	-
Crab, Tanner - Unidentified	-	1	-	-	-
Coral					-
Bryozoans/Coral Unid	-	12	1	-	-
Coral, Red Tree	-	6	-	-	-
Invertebrate					-
Invertebrate - unidentified	-	22	1	-	-
Sand Dollars, Sea Urchins	-	95	1	-	-
Sea Anemone - unidentified	-	32	-	-	-
Sea Whip, Sea Pen - unidentified	-	16	-	-	-
Snail - unidentified	-	78	-	-	-
Snail, Empty Shell	-	-	-	-	-
Sponge - unidentified	-	4	-	-	-
Seaworm - unidentified	-	-	-	-	-
Octopus - unidentified	3	39	7	-	-
Starfish - unidentified	-	84	6	-	-
Starfish, Basket	-	43	1	-	-
Starfish, Brittle	-	6	-	-	-
Starfish, Sunstar	4	1,078	31	-	-
Bird					-
Albatross, Black-footed	-	4	-	-	-
Fulmar, Northern	-	-	-	-	-
Gull - unidentified	-	-	-	-	-
Misc. - rocks, mud, garbage, etc.	4		-	-	-

** The count recorded as retained and later discarded for this species exceeded the number that were recorded as initially retained resulting in a negative number; this type of error can occur if one of the fish is either identified at a different taxonomic level, misidentified, or not recorded. The number retained is considered to be zero.*

Based on the 2016 IPHC survey data and on the limited EM data available from the 2016 Observer Report a few similarities in the bycatch species can be noted.

Spiny dogfish appears to be the main incidentally caught species when targeting halibut (Table 11). Based on the

Dec 2016 GOA Sharks SAFE[100] there is no evidence to suggest that overfishing is occurring for any shark species in the GOA because the OFL has not been exceeded. Total shark catch in 2015 was 1,414 t and catch in 2016 was 1,329 t as of October 3, 2016 for GOA waters. The recommended ABC for 2017 and 2018 is 4,514 t and the OFL is 6,020 t for the shark complex combined. There are currently no directed commercial fisheries for shark species in federally or state managed waters of the GOA, and most incidental catch is not retained. ABC and OFL Calculations and Tier 6* recommendations for spiny dogfish for 2017- 2018 are shown below.

Table 11: Spiny Dogfish stock update 201-2018. (https://www.afsc.noaa.gov/REFM/Docs/2016/GOAshark.pdf)

Spiny Dogfish Quantity	As estimated or *specified last* year for: 2016	2017	As estimated or *recommended this* year for: 2017	2018
M (natural mortality rate)	0.097	0.097	0.097	0.097
Tier	6*	6*	6*	6*
Biomass (t)	56,181	56,181	56,181	56,181
F_{OFL}	0.097	0.097	0.097	0.097
$maxF_{ABC}$	0.073	0.073	0.073	0.073
F_{ABC}	0.073	0.073	0.073	0.073
OFL (t)	5,450	5,450	**5,450**	5,450
maxABC (t)	4,087	4,087	4,087	4,087
ABC (t)	4,087	4,087	**4,087**	4,087
Status	As determined *last* year for: 2014	2015	As determined *this* year for: 2015	2016
Overfishing		n/a		n/a

The shark complex is Tier 6, however, spiny dogfish ABC and OFL are calculated using a Tier 5 approach. It is termed a modified Tier 6 (or Tier 6) because the estimate of biomass is not considered reliable for the species.

Sleeper sharks (Table 11) appear on the IPHC survey and to some degree on the EM data. The BSAI Sharks SAFE of December 2016[101] the shark complex (Pacific sleeper shark, spiny dogfish, salmon shark, and other/unidentified sharks) recommends for 2017 – 2018 a maximum allowable ABC of 517 t and an OFL of 689 t for the shark complex. The stock complex was not overfished in the previous fishing season. Catches for sharks in the BSAI are presented below with halibut estimates.

[100] https://www.afsc.noaa.gov/REFM/Docs/2016/GOAshark.pdf
[101] https://www.afsc.noaa.gov/REFM/Docs/2016/BSAIshark.pdf

Table 12: Estimated catches (t) of Pacific sleeper sharks in the eastern Bering Sea and Aleutian Islands (BSAI) by target fishery. (Source: https://www.afsc.noaa.gov/REFM/Docs/2016/BSAIshark.pdf)

Year	Atka Mackerel	Flatfish	Halibut	Other Species	Pacific Cod	Pollock	Rockfish	Sablefish	Total
2003	0.7	45.4	18.6	0.1	172.6	85.0	0.5	19.7	342.5
2004	2.0	40.0	1.1	0.2	230.1	144.0	0.7	2.3	420.5
2005	0.0	10.4	0.1	0.0	191.2	127.6	0.1	3.8	333.2
2006	0.0	10.8	0.1	0.0	123.2	178.1	0.1	1.0	313.4
2007	1.1	9.6	<0.1	3.7	44.3	181.6	14.5	2.5	257.3
2008	0.1	6.7	0.0	0.0	20.0	97.9	1.2	1.3	127.2
2009	0.6	8.3	0.0	0.0	14.4	24.6	0.6	2.1	50.6
2010	0.0	1.3	0.0	0.0	15.1	10.5	0.1	1.1	28.1
2011	0.0	2.3	0.5	0.1	20.2	18.2	4.8	1.5	47.7
2012	0.9	8.3	0.0	0.0	9.8	27.6	0.6	0.2	47.4
2013	0.0	1.2	20.8	0.0	19.8	20.9	1.6	0.8	65.1
2014	0.0	1.1	0.4	<0.1	36.9	23.7	0.8	0.0	62.9
2015	0.0	2.3	2.1	0.1	36.0	20.2	1.7	0.3	62.6
2016	0.0	6.0	13.6	0.0	29.6	20.2	1.6	0.0	71.0
Avg. Catch 2003-2012	0.5	14.3	2.3	0.4	84.1	89.5	2.3	3.6	
Avg. % 2003-2012	0%	7%	1%	0%	43%	45%	1%	2%	
Avg. Catch 2013-2015	0.0	1.7	8.0	0.0	5.9	1.2	0.3	0.3	
Avg. % 2013-2015	0%	2%	12%	0%	49%	34%	2%	1%	

Longnose and big skate are of mention in the EM data. The BSAI skate complex is managed in aggregate, with a single set of harvest specifications applied to the entire complex. However, to generate the harvest recommendations the stock is divided into two units. Harvest recommendations for Alaska skate *Bathyraja parmifera*, the most abundant skate species in the BSAI, are made using the results of an age structured model and Tier 3. The remaining species ("other skates") including longnose and big skate are managed under Tier 5 due to a lack of data. The Tier 3 and Tier 5 recommendations are combined to generate recommendations for the complex as a whole. Recent catches have being well within the ABC limit.

In Table 13, time series of OFL, ABC, TAC, catch, and retention for the BSAI skate complex, 2011-2016* is provided. All values are in metric tons except for retention rate. Prior to 2011 skates were managed as part of the Other Species complex; data regarding catch in that era can be found in previous BSAI skate assessments. Source: Alaska Regional Office (*2016 data are incomplete; retrieved October 16, 2016)

Table 13: BSAI skate complex time series. (Source: https://www.afsc.noaa.gov/REFM/Docs/2016/BSAIshark.pdf)

year	skate complex OFL	skate complex ABC	skate complex TAC	skate complex catch	skate retention rate
2011	37,800	31,500	16,500	23,748	24%
2012	39,100	32,600	24,700	24,968	29%
2013	45,800	38,800	24,000	27,260	29%
2014	41,849	35,383	26,000	27,450	30%
2015	49,575	41,658	25,700	28,117	28%
*2016**	50,215	42,134	26,000	*22,517*	*21%*

Yelloweye and thornyheads rockfish are also of mention in the EM data. The demersal shelf rockfish (DSR) complex (yelloweye, quillback, copper, rosethorn, canary, China, and tiger rockfish) is assessed on a biennial cycle, with a full stock assessment typically conducted in odd calendar years[102]. Reference values for DSR are summarized in Table 14, with the recommended ABC and OFL values in bold. The stock was not subjected to overfishing last year.

Table 14: Yelloweye stock update 2016-2018. (Source: https://www.afsc.noaa.gov/REFM/Docs/2016/GOAdsr.pdf)

	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
Quantity	2016	2017	2017	2018
M (natural mortality rate)	0.02	0.02	0.02	0.02
Tier	4	4	4	4
Yelloweye Biomass (t)	10,559		10,347	
Specified/recommended F_{ABC}	0.020	0.020	**0.020**	**0.020**
$F_{OFL}=F_{35\%}$	0.032	0.032	0.032	0.032
$maxF_{ABC}$	0.026	0.026	0.026	0.026
Recommended DSR ABC (t)	231[1]	231[1]	**227[1]**	**227[1]**
DSR OFL (t)	364[1]	364[1]	357[1]	357[1]
DSR max ABC (t)	295[1]	295[1]	289[1]	289[1]
Status	As determined last year for:		As determined this year for:	
	2014	2015	2015	2016
Is the stock being subjected to overfishing?	No	n/a	No	n/a

[1]For 2016 and 2017 the non-yelloweye DSR ABCs and OFL are calculated using Tier 6 methodology. Non-yelloweye Tier 6 ABCs and OFL are added to Tier 4 yelloweye ABCs and OFL for total DSR values. .

For the 2017 fishery, SAFE authors recommend the maximum allowable ABC of 1,961 t for thornyhead rockfish[103]. Reference values for thornyhead rockfish are summarized in Table 15, with the recommended ABC and OFL values in bold. The stock was not being subjected to overfishing last year.

[102] https://www.afsc.noaa.gov/REFM/Docs/2016/GOAdsr.pdf
[103] https://www.afsc.noaa.gov/REFM/Docs/2016/GOAthorny.pdf

Table 15: Thornyhead stock update 2016-2018. (Source: https://www.afsc.noaa.gov/REFM/Docs/2016/GOAthorny.pdf)

Quantity	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
	2016	2017	2017	2018
M (natural mortality rate)	0.03	0.03	0.03	0.03
Tier	5	5	5	5
Biomass (t)	87,155	87,155	87,155	87,155
F_{OFL}	$F=M=0.03$	$F=M=0.03$	$F=M=0.03$	$F=M=0.03$
$maxF_{ABC}$	$0.75M=0.0225$	$0.75M=0.0225$	$0.75M=0.0225$	$0.75M=0.0225$
F_{ABC}	0.0225	0.0225	0.0225	0.0225
OFL (t)	2,615	2,615	**2,615**	2,615
maxABC (t)	1,961	1,961	1,961	1,961
ABC (t)	1,961	1,961	**1,961**	1,961
Status	As determined *last* year for:		As determined *this* year for:	
	2014	2015	2015	2016
Overfishing	No	n/a	No	n/a

Overall, based on the above data, the impact of the halibut directed fishery on other species bycatch does not appear to be significant.

ETP species, seabirds and marine mammals interactions

The short-tailed albatross is currently listed as Endangered under the Endangered Species Act and is protected by the Migratory bird Treaty Act which are implemented by the U.S. Fish and Wildlife Service (USFWS). In order to address the issue of bycatch in commercial fisheries, USFWS works with the National Marine Fisheries Service to set bycatch limits for the short-tailed albatross and implement seabird deterrent measures and requirements to reduce incidental take of seabirds[104]. Based on an internet search in June 2017 there does not seem to be any incidental catch in 2016 of short tailed albatross or interactions with Steller sea lions by any of the halibut longline fisheries in Alaska. In the IPHC survey of 2016 one black-footed albatross (*Phoebastria nigripes*) was captured in Regulatory Area 3B (provided to the Oikonos organization for genetic sampling) and one Steller sea lion (*Eumetopias jubatus*) was hooked on the gear in Area 2C (Southeast Alaska)[105]. It is uncertain if these animals were released alive, because details of any injury or changes in the animal's behaviour was not provided in the observer report.

Summary of estimated seabird bycatch in the hook-and-line groundfish and halibut fisheries, BSAI and GOA Groundfish FMP areas, 2007 through 2015. Also for Halibut fisheries 2013 through 2015 only (Table 16).

[104] http://www.adfg.alaska.gov/index.cfm?adfg=shorttailedalbatross.management
[105] http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.1_2016_IPHC_fishery_independent_survey.pdf

Table 16: Seabird bycatch in the hook-and-line groundfish and halibut fisheries. (Source: http://www.adfg.alaska.gov/index.cfm?adfg=shorttailedalbatross.management)

Species/Species Group	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total	Annual Average
Unidentified Albatrosses	17				10		28	33		88	10
Short-tailed Albatross				15	5			9		29	3
Laysan Albatross	13	226	71	222	206	141	200	99	223	1,403	156
Black-footed Albatross	201	303	56	71	222	81	444	297	371	2,046	227
Northern Fulmar	3,678	2,761	7,000	1,902	5,964	2,851	2,697	715	2,892	30,460	3,384
Shearwaters	2,860	1,211	574	502	260	529	195	114	321	6,567	730
Gulls	914	1,481	1,186	1,116	2,224	897	576	730	1,249	10,374	1,153
Kittiwakes	10		10		6	5	3	9	12	56	6
Murres	5	6	13			6				29	3
Puffins				9						9	1
Auklets						7		6	11	25	3
Cormorant									28	28	3
Unidentified Birds	498	541	652	267	387	322	296	77	184	3,225	358
Grand Total	8,195	6,530	9,563	4,105	9,284	4,840	4,439	2,090	5,292	54,337	6,037

The Pacific halibut hook-and-line fishery primarily occurs in the central GOA. Most (83%) of the Pacific halibut hook-and-line fishery seabird bycatch occurred in the GOA and the rest occurred in the BSAI[106]. From 2013 through 2015, estimates of the annual seabird bycatch off Alaska ranged from 176 to 225 seabirds, with an annual average of 193. Seabird bycatch largely included gulls, black-footed albatross, Northern fulmar, and Laysan albatross (Table 17).

Table 17: Estimated bycatch of seabird species in the Pacific halibut hook-and-line fishery, 2013 through 2015, as reported in the CAS. (Source: https://docs.lib.noaa.gov/noaa_documents/NMFS/TM_NMFS_AFKR/TM_NMFS_FAKR_12.pdf)

Species/Species Group	2013	2014	2015	Total	Annual Average
Laysan Albatross	17		40	57	19
Black-footed Albatross	51	61		113	38
Northern Fulmar		19	41	60	20
Gulls	89	99	144	331	110
Unidentified Birds	19			19	6
Grand Total	176	179	225	580	193

Although marine mammals such as sea lions are known to interact with halibut longline gear, bycatch is non-significant (Table 18).

[106] https://docs.lib.noaa.gov/noaa_documents/NMFS/TM_NMFS_AFKR/TM_NMFS_FAKR_12.pdf

Table 18: Summary of Eastern U.S. Steller sea lion mortality and serious injury, by year and type, reported to the NMFS Alaska Region marine mammal stranding network and ADF&G in 2010-2014 (Helker et al. 2016).

Cause of injury	2010	2011	2012	2013	2014	Mean annual mortality
Hooked by recreational SE Alaska salmon troll gear	0	0	0	0	1	0.2
Hooked by Gulf of Alaska longline gear*	1	0	0	0	0	0.2
Entangled in SE Alaska halibut longline gear*	0	1	0	0	0	0.2
Entangled in SE Alaska longline gear*	0	1	0	0	0	0.2
Hooked by SE Alaska salmon troll gear*	0	0	0	3	8	2.2

12.7. Role of the "stock under consideration" in the ecosystem

Pacific Halibut are not typically categorized as a key prey species for any single marine predator. Several comprehensive studies of the food web in various regions of the northern Pacific Ocean have not indicated that halibut are heavily utilized by any predator. Predation on halibut, especially by marine mammals, is apparently low, except in cases where the fish were attached to fishing gear. This is understandable, because adult halibut are large, active animals that would be difficult to capture in open water. Also, their bottom dwelling habits, generally in offshore areas, make them less accessible to predation than schooling, pelagic species[107].

12.8. Pollution – MARPOL.

MARPOL 73/78[108, 109](the "International Convention for the Prevention of Pollution From Ships") is one of the most important treaties regulating pollution from ships. Six Annexes of the Convention cover the various sources of pollution from ships and provide an overarching framework for international objectives. In the U.S., the Convention is implemented through the Act to Prevent Pollution from Ships (APPS).

Under the provisions of the Convention, the United States can take direct enforcement action under U.S. laws against foreign-flagged ships when pollution discharge incidents occur within U.S. jurisdiction. When incidents occur outside U.S. jurisdiction or jurisdiction cannot be determined, the United States refers cases to flag states, in accordance with MARPOL. These procedures require substantial coordination between the Coast Guard, the State Department, and other flag states, and the response rate from flag states has been poor. Different regulations apply to vessels, depending on the individual state.

12.9. Knowledge of the essential habitats for the "stock under consideration" and potential fishery impacts on them.

There is considerable knowledge of the essential habitats for the Pacific Halibut and potential fishery impacts on

[107] https://www.afsc.noaa.gov/REFM/Docs/2016/ecosysGOA.pdf
[108] https://www.law.cornell.edu/uscode/text/33/1901
[109] http://www.gao.gov/assets/230/228813.pdf

them. Pacific halibut are common inhabitants of shallow estuarine waters. Pacific Halibut spend a portion of their life cycles in the estuarine ecosystem complex[110]. Seasonal ocean circulation and stratification patterns, health of species (levels of contaminants, size and weight), population numbers, and food quality all contribute to fish population levels.

Spawning occurs during the winter in deep water (180-450 m) along the continental slope at a number of well-known locations in the Bering Sea, Aleutian Islands, and Gulf of Alaska south to British Columbia. Adult halibut migrate to the continental shelf edge in winter (November through March) to spawn. Major spawning grounds are thought to be concentrated in the central and western Gulf of Alaska (GOA) and the southern Bering Sea shelf edge[111].

Females spawn repeatedly over the season, producing as many as 2 million eggs. Eggs are laid in deep water along the slope and are then left to drift in the ocean currents as they mature through the hatching and larval phases. The eggs develop at depth and larvae remain in the water column for as long as 7 months. As they develop, the larvae move to shallower water and young-of-the-year juveniles (30 mm and larger) are common in shallow, near-shore waters 2-50 m deep in Alaska and British Columbia.

In terms of their general distribution in the first year after settlement. Pacific halibut are found extensively in coastal nursery areas and have been shown to prefer small-grain sandy sediment[112]. Small juveniles consume small crustaceans and other benthic organisms, and become largely piscivorous by 30 cm during their second year. With increasing age and size, the fish move to deeper water and migrate south to the fishing grounds. Halibut are usually on or near the bottom over mud, sand, or gravel banks. Most are caught at depths of 90 to 900 feet, but halibut have been recorded at depths up to 3,600 feet. As halibut mature, they migrate in a clockwise direction in the Gulf of Alaska, countering the drift of eggs and larvae.

Important Fisheries Nursery Grounds

Bristol Bay Fish Nursery[113]

While much of the halibut harvest takes place in the Gulf of Alaska, the waters of Bristol Bay and the southeast Bering Sea shelf are nursery grounds important to the overall health of the Pacific halibut population. Young halibut spend two or three years growing in these rich, nursery areas, after which they migrate to other parts of the Bering Sea, through the Aleutian passes and into the North Pacific where they live out their adult lives. The importance of these nursery grounds has been recognized by fishery managers for decades. In 1967, the IPHC closed a significant area of the southeast Bering Sea to halibut fishing in order to protect young fish during this sensitive life stage (**Error! Reference source not found.** Figure 5)

[110] http://www.seakfhp.org/wp-content/uploads/2013/03/estuaries_cap_final_03_30_11.pdf
[111] http://www.iphc.int/publications/rara/2014/rara2014_24juveniledist.pdf
[112] http://alaska-halibut-fishing-charters.com/halibut_biology.html
[113] http://www.akmarine.org/wp-content/uploads/2014/06/AMCC_bristol-bay-report-01-01-12.pdf

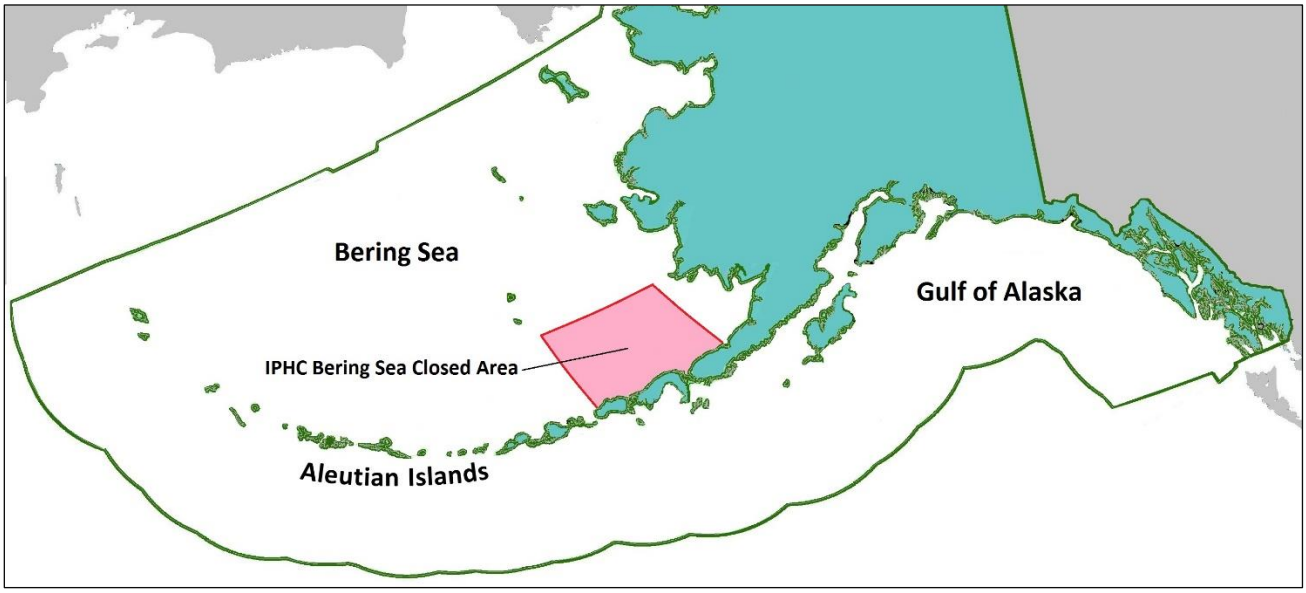


Figure 5: IPHC Bering Sea Closed Area – Closed Area for Juvenile Pacific Halibut. (http://www.akmarine.org/wp-content/uploads/2014/06/AMCC_bristol-bay-report-01-01-12.pdf)

12.10. 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.

Socio-economic data collection and economic analyses are often included under the Regulatory Flexibility Act (RFA), the MSA, the NEPA, the Endangered Species Act, and other applicable laws. AFSC's Economic and Social Sciences Research Program produces an annual Economic Status Report of the Groundfish fisheries in Alaska[114]

The primary mission of the Economic and Social Sciences Research Program is to provide economic and sociocultural information that will assist NMFS in meeting its stewardship responsibilities. Activities in support of this mission include:

- Collecting economic and sociocultural data relevant for the conservation and management of living marine resources
- Developing models to use that data both to monitor changes in economic and sociocultural indicators and to estimate the economic and sociocultural impacts of alternative management measures
- Preparing reports and publications
- Participating on NPFMC, NMFS, and inter-agency working groups
- Preparing and reviewing research proposals and programs
- Preparing analyses of proposed management measures
- Assisting Alaska Regional Office and NPFMC staff in preparing regulatory analyses
- Providing data summaries

Many of these are cooperative activities conducted with other scientists at the Center, other NMFS sites, the NPFMC, other natural resource agencies, and universities. Currently, the research topics being addressed cooperatively by program staff and scientists at the University of Washington, the University of Alaska, and the University of California, Davis include regional economic impact models, behavioral models of fishing operations,

[114] http://www.afsc.noaa.gov/refm/Socioeconomics/Default.php

indicators of economic performance, and the non-market valuation of living marine resources.

Previous studies have examined aspects of the economic impact of the halibut fishery[115].

The Alaskan halibut and sablefish IFQ program has gone through numerous innovations over the years and has been officially modified many times since initial implementation including modifications to trading restrictions, eligibility rules, administrative catch accounting systems and more. In December 2016 the IPHC released the Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program.

The intent of the review was to evaluate the IFQ Program as required by the MSA and within the framework of the scope requested by the Council and its advisory bodies. Primarily, the IFQ Program was examined with respect to how well it has met its 10 original policy objectives and how it is providing entry opportunities for new participants, an objective that the Council has sought to provide through numerous revisions since the IFQ Program was implemented. The Council, its Advisory Panel (AP), Scientific and Statistical Committee (SSC), and IFQ Implementation Committee all provided feedback on the proposed structure and policy scope of this review document at the December 2015 and February 2016 Council meetings. In the 20 years since implementation of the IFQ Program, this was the first formal and comprehensive review of the program[116].

In the original Supplemental Environmental Impact Statement for the IFQ Program, the Council identified 10 policy objectives that it intended to address through specific elements of the IFQ Program. Specifically, in selecting the elements of the IFQ Program the Council attempted to do the following:

1. Address the problems that occurred with the open-access management regime. The Council identified 10 specific problems: Allocation conflicts, gear conflicts, deadloss from lost gear, bycatch loss, discard mortality, excess harvesting capacity, product wholesomeness, and safety, economic stability in the fisheries and communities, and rural coastal community development of a small boat fleet.
2. Link the initial QS allocations to recent dependence on the halibut and sablefish fixed gear fisheries.
3. Broadly distribute QS to prevent excessively large QS from being given to some persons.
4. Maintain the diversity in the fleet with respect to vessel categories.
5. Maintain the existing business relationships among vessel owners, crews, and processors.
6. Assure that those directly involved in the fishery benefit from the IFQ Program by assuring that these two fisheries are dominated by owner/operator operations.
7. Limit the concentration of quota share ownership and IFQ usage that will occur over time.
8. Limit the adjustment cost to current participants including Alaskan coastal communities.
9. Increase the ability of rural coastal communities adjacent to the Bering Sea and Aleutian Islands to share in the wealth generated by the IFQ Program.
10. Achieve previously stated Council goals and objectives and meet MSA requirements.

The reviewed assessed the impacts of the IFQ Program with respect to these initial 10 policy objectives.

12.11. Outcome indicator(s) and management objectives for non-target stocks.

The main management objectives for the halibut fleet in regards to non-target stocks is to minimise their catches and or interactions. After regulations aimed at protecting short tailed albatrosses from longline fishery

[115] http://www.iphc.int/documents/contract/RFPIPHCEconomicStudy2015.pdf
[116] https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

interactions, the most significant outcome indicator for this objective is the improved observer program coverage.

Notable changes to observer deployment on vessels in the partial coverage category for 2017 include the specific strata definitions, associated selection rates, and further expansion of participation in EM cooperative research and the EM selection pool. Based on recommendations from the Council in June 2016, NMFS evaluated two additional changes to the strata definitions for the 2017 ADP: 1) different treatment of trips from vessels delivering to tender vessels and those that do not deliver to tender vessels and 2) separate treatment of catcher/processors in the partial coverage category. Following analysis in the Draft 2017 ADP, the NMFS and Council adopted the following stratification scheme with sample sizes allocated according to an optimization based on discarded groundfish for the 2017 ADP.

12.12. Outcome indicator(s) and management objectives for endangered species.

The main management objectives for the halibut fleet in regards to endangered species refer to regulations aimed at protecting short tailed albatrosses from longline fishery interactions.

In Alaska, seabird avoidance measures are required to be used by operators of all vessels greater than 26 ft LOA using hook-and-line gear while fishing for 1) IFQ halibut, Community Development Quota halibut, or IFQ sablefish in the EEZ off Alaska or State of Alaska (State) waters (0 to 200 nm [nautical miles] combined); or 2) groundfish in the EEZ off Alaska (3 to 200 nm). Vessels greater than 55 ft LOA in the EEZ must use a minimum of a single (if using snap gear) or paired (if using other than snap gear) streamer line of a specified performance and material standard. Vessels greater than 26 ft LOA and less than or equal to 55 ft LOA must use a minimum of a single streamer line or, in limited instances, a minimum of one buoy bag line. An exemption from seabird avoidance regulations exists for operators of vessels in certain locations as well as for operators of vessels less than or equal to 32 ft LOA using hook-and-line gear in IPHC Area 4E in waters shoreward of the EEZ. Additionally, for crew safety, allowances are made to use a single streamer line or no streamer line under specific weather conditions Other than noted above, vessel operators using hook-and-line gear and fishing for groundfish in State waters must comply with State regulations (see 5AAC 28.055). Offal discharged while gear is being set or hauled should be discharged in a manner that distracts seabirds from baited hooks, to the extent practicable (50 CFR part 679. 24(e) (2) (v)). Hooks should be removed from any offal that is discharged. The discharge site on board a vessel must be either aft of the hauling station or on the opposite side of the vessel from the hauling station. Directed discharge of residual bait or offal through chutes or pipes should not occur over sinking hook-and-line gear while gear is being deployed. No endangered short tailed albatrosses where caught as bycatch in 2016[117].

Bycatch of marine mammals is not considered an issue in the halibut or sablefish fleet in Alaska[118].

12.13. Outcome indicator(s) and management objectives for avoiding, minimizing or mitigating the impacts of the unit of certification on essential habitats for the “stock under consideration” and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.

The halibut and sablefish hook and line fisheries are not considered to cause significant damage on essential or highly vulnerable habitats because their footprint is minimal. Overall the habitat effects of this fishery are considered negligible.

[117] https://docs.lib.noaa.gov/noaa_documents/NMFS/TM_NMFS_AFKR/TM_NMFS_FAKR_12.pdf
[118] http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_final_sars_june.pdf

12.14. Outcome indicator(s) and management objectives for dependent predators.

The main management objectives for the halibut fleet in regards to maintaining foodwebs and relationships to existing predators is to avoid overexploitation of the fishery and as such, avoid negative effects on dependant predators. The food web model below estimates that the halibut longline fishery is the apex predator in the GOA ecosystem because it catches both halibut and longnose skate (as well as other skates and sharks), which are high trophic level (TL) predators themselves. The food web visualization shows the strongest flows as thicker lines, with weak flows represented only as highlighted group boxes with no lines; therefore, the major flow to the halibut longline fishery is from halibut themselves. The halibut longline fishery appears as a primary predator of halibut, causing 29% of halibut mortality. Adult halibut consume a mixture of demersal fish and benthic invertebrates, but a single species, pollock, comprises nearly half of the early 1990s adult halibut diet. However, the proportion of pollock in combined adult and juvenile halibut diet declined between 1990 and 2007, concurrent with a decline in assessed pollock biomass. Juvenile halibut feed on benthic invertebrates and are fed upon by sharks and skates.

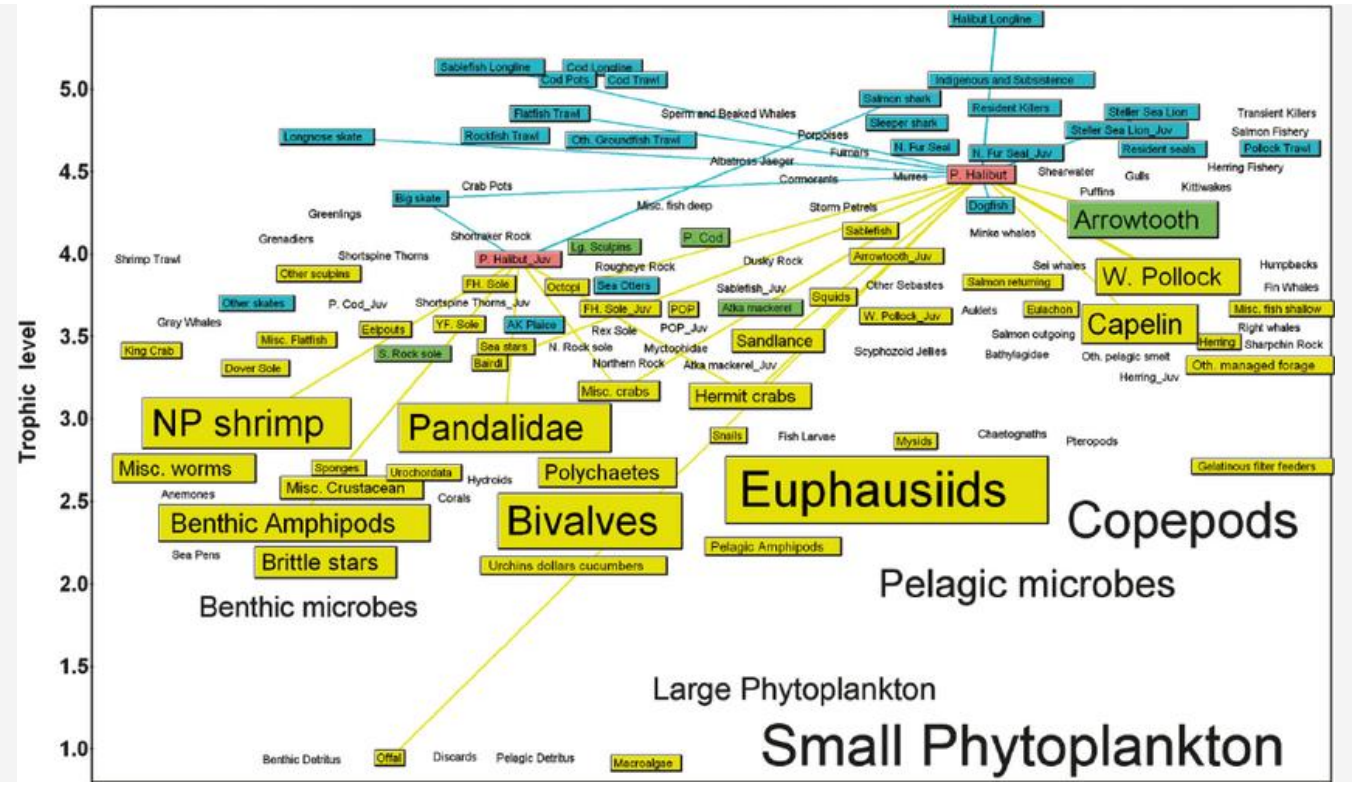


Figure 6: Foodweb relationship model. (Source: Gaichas, et al 2009)

In Figure 6, a food web of Gulf of Alaska (GOA) adult and juvenile Pacific halibut (pink boxes) in the early 1990s is provided. The food web visualization shows predators of halibut highlighted in light blue and prey in yellow, with the strongest flows represented as thicker lines and weak flows represented only as highlighted group boxes with no lines. The significant predators of halibut (light blue boxes joined by light blue lines) include the longline fisheries for halibut and sablefish, trawl fisheries for flatfish, and dogfish, Steller sea lions, and longnose and big skates. Salmon sharks are significant predators of juvenile halibut. Significant prey of halibut (yellow boxes joined by yellow lines) are pollock, capelin, and crabs, with juvenile halibut preying more on shrimp and other benthic

invertebrates. Green boxes indicate groups that are both predator and prey of halibut[119].

12.15. Outcome indicator(s) and management objectives that seek to minimize adverse impacts of the unit of certification, including any enhancement activities, on the structure, processes and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible.

The IPHC main objective for the Pacific halibut resource is to manage the fishery responsibly and ensure conservation of the stock in the midst of its harvesting activities. Such management minimizes adverse impacts of the halibut fleet on the structure, processes and function of the north Pacific ecosystem that are likely to be irreversible or very slowly reversible.

The IPHC, NPFMC and NOAA/NMFS conduct assessments and research related to fishery impacts on ecosystems and habitats and how environmental factors affect the fishery. Findings and conclusions are published in the Ecosystem section of the SAFE document, annual Ecosystem Considerations documents, and the various other research reports. Overall, the fishery is not considered to have significant effects on the structure, process and function of the North Pacific ecosystem.

Species richness and diversity on the eastern Bering Sea shelf have undergone significant variations from 1982 to 2016. The average number of species per haul increased by one to two species from 1995 to 2004, remained relatively high through 2011, and both richness and diversity decreased through 2014 with a moderate increase in richness in 2015/2016 and a large and significant increase in Shannon diversity in 2016. Richness tends to be highest along the 100 m isobath, while diversity tends to be highest on the middle shelf. Local richness is lowest along the slope and in the northern part of the survey region, while diversity is lowest in the inner domain[120].

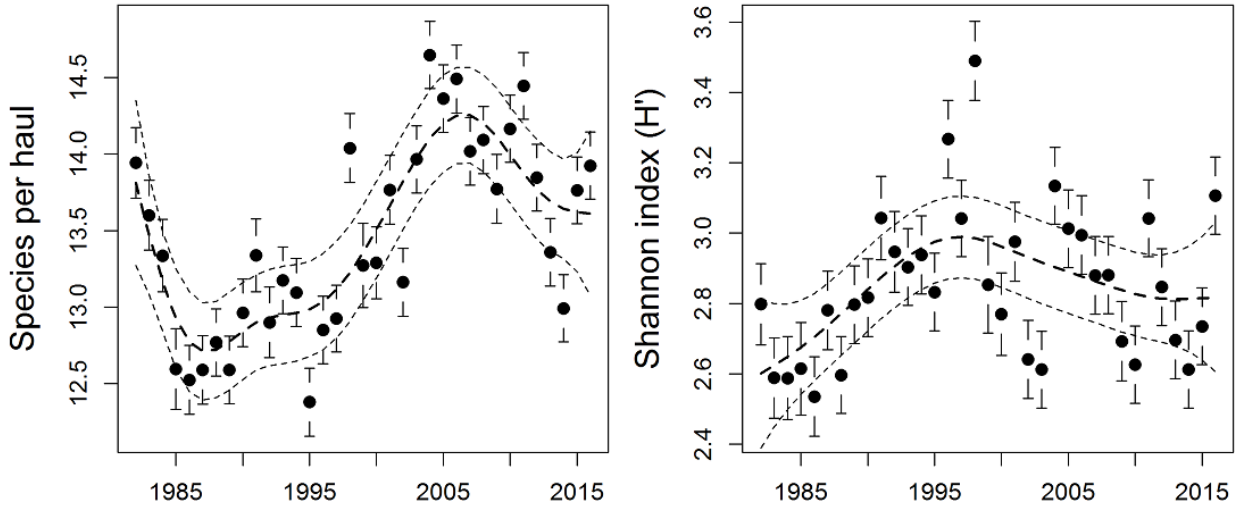


Figure 7: Estimates of species richness in the Bering Sea, from catch hauls. (Source: https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf)

119 https://www.researchgate.net/publication/237153416_Using_Food_Web_Model_Results_to_Inform_Stock_Assessment_Estimates_of_Mortality_and_Production_for_Ecosystem-Based_Fisheries_Management

120 https://www.afsc.noaa.gov/REFM/Docs/2016/ecosysEBS.pdf

Richness and diversity were generally higher in the eastern Gulf of Alaska than in the western Gulf with, on average, 2-3 additional species per haul in the east. Richness has been relatively stable in the western Gulf with relatively low richness in recent years. Local species richness in the eastern Gulf increased substantially in 2013, but declined again in 2015. Diversity in the eGOA has been declining since 2007. Both richness and diversity tend to be highest along the shelf break and slope, with richness peaking at or just below the shelf break (200-300m), and diversity peaking deeper on the slope, as well as in shallow water (< 100m).[121]

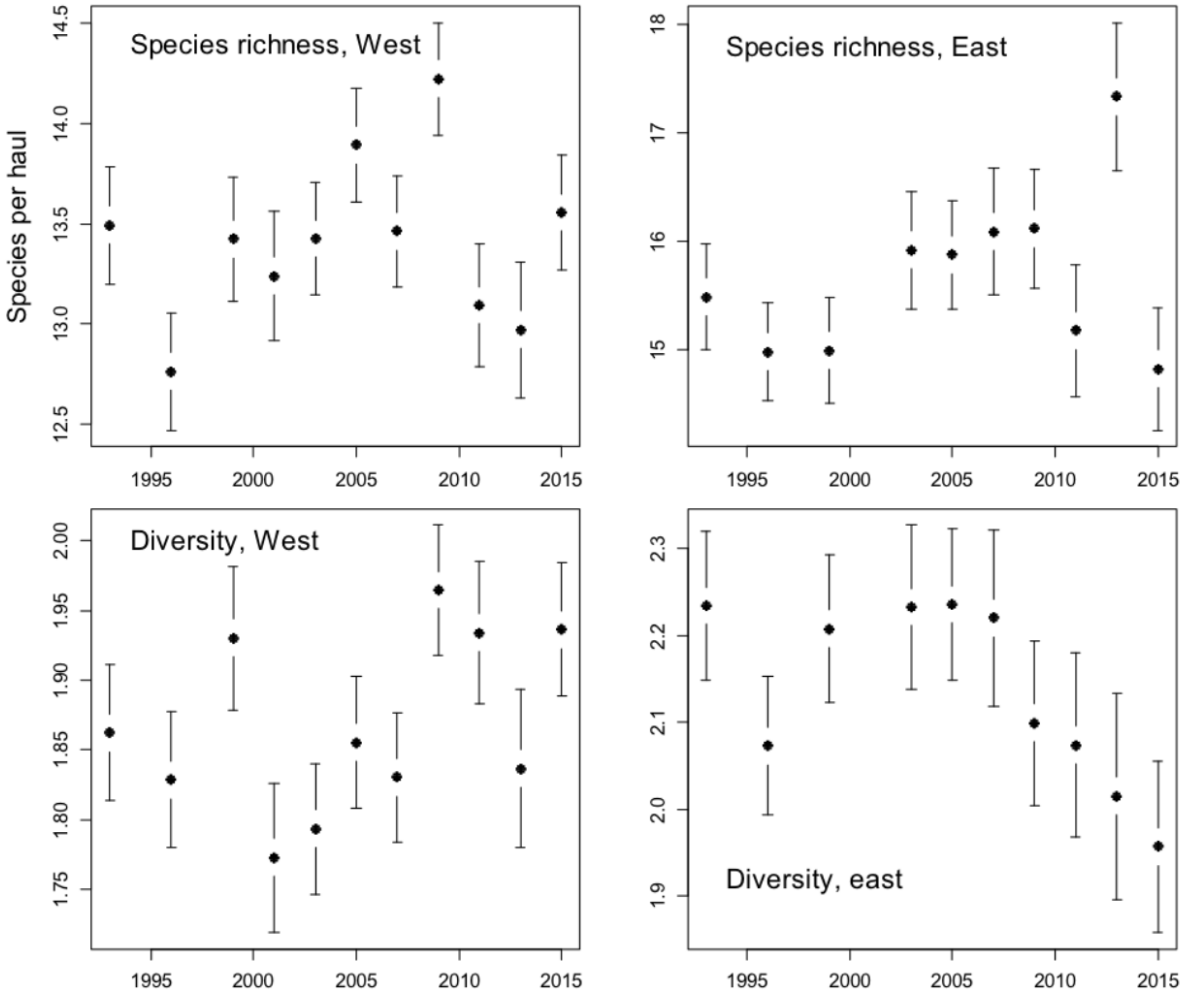


Figure 8: Estimates of species richness in the Gulf of Alaska, from catch hauls. (Source: https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf)

Provided in Figure 8, a model-based annual averages of species richness (average number of species per haul, top panels) and species diversity (Shannon index, bottom panels), 1993-2015, for the Western (left) and Eastern (right) Gulf of Alaska based on 76 fish and invertebrate taxa collected by standard bottom trawl surveys with 95% pointwise confidence intervals. Model means were adjusted for differences in depth, date of sampling, and geographic location.

[121] https://www.afsc.noaa.gov/REFM/Docs/2016/ecosysGOA.pdf

8. Performance specific to agreed corrective action plans

Two minor non-conformances are active for this fishery.

Non-Conformance #1 (MINOR non-conformance: Clause 4.2)
An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures is established for the Alaskan Pacific halibut fishery. However, there is a lack of observer coverage on vessels <40ft LOA, as such the observer scheme does not sufficiently account for the risk posed by the <40ft LOA sector of the commercial Pacific halibut fleet.

A corrective action plan from the client shall detail;

1. how FVOA intends to address this issue, and
2. a set of specific timelines to allow for assessment during the next surveillance activities in 2017, 2018 and 2019 and the second full assessment audit in 2020, as relevant and if needed.

Non-Conformance #2 (MINOR non-conformance: Clause 12.6)
Non-target catches, including discards, of stocks other than Pacific halibut are monitored and likely do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. However, there is a lack of observer coverage on vessels <40ft LOA, as such the observer scheme does not sufficiently monitor and account for non-target catches by the <40ft LOA sector of the commercial Pacific halibut fleet.

This is the first surveillance assessment following the re-assessment in January 2017. An electronic monitoring system is recommended for implementation in the <40ft fleet in order to improve data collection and fishery monitoring. Some progress is made according to the Client Action Plan; however it is not yet sufficient to be considered fulfillment of the NC.

These NC will remain open throughout the period of certificate (5 years) until the medium confidences move to high as the corrective actions take effect.

9. Unclosed, new non-conformances and new corrective action plans

No new non-conformance (NC) was identified during this surveillance assessment of the fishery and the progress identified on the unclosed NC is aligned to the accepted Client Action Plan (CAP).

Unclosed non-conformance (NC) identified from the re-assessment and certification in January 2017 were two minor NC, as detailed below:

Non-Conformance #1 (MINOR non-conformance: Clause 4.2)
An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures is established for the Alaskan Pacific halibut fishery. However, there is a lack of observer coverage on vessels <40ft LOA, as such the observer scheme does not sufficiently account for the risk posed by the <40ft LOA sector of the commercial Pacific halibut fleet.

A corrective action plan from the client shall detail;

3. how FVOA intends to address this issue, and
4. a set of specific timelines to allow for assessment during the next surveillance activities in 2017, 2018 and 2019 and the second full assessment audit in 2020, as relevant and if needed.

Non-Conformance #2 (MINOR non-conformance: Clause 12.6)
Non-target catches, including discards, of stocks other than Pacific halibut are monitored and likely do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. However, there is a lack of observer coverage on vessels <40ft LOA, as such the observer scheme does not sufficiently monitor and account for non-target catches by the <40ft LOA sector of the commercial Pacific halibut fleet.

Evidence of progress on both NC was identified from the recommendation for Electronic Monitoring to be implement (starting 2017) among smaller vessels (<40f) that currently do not participate in the observer program; evidence of this is yet to be seen. A Client corrective action plan was provided and accepted for the non-conformance on sub-clause 4.2 and 12.6. These NC will remain open throughout the period of certificate (5 years) until the medium confidences move to high as the corrective actions take effect.

10. Future Surveillance Actions

Next assessment will be a surveillance assessment before or on the anniversary of the re-certification in 2018.

11. Client signed acceptance of the action plan

The signed Client Action Plan, aligned to the previously mention NC was accepted by the assessment Team on 20th October 2016 (Complete details are outline in the full assessment report - http://www.alaskaseafood.org/wp-content/uploads/2017/02/Alaska-RFM-Final-Full-Assessment-Halibut-Report-Jan-2017-final.pdf).

12. Recommendation and Determination

Following this 1st Surveillance Assessment, the assessment team recommends that continued Certification under the Alaska Responsible Fisheries Management Certification Program is maintained for the management system of the applicant fisheries, the US Alaska Pacific halibut commercial fishery, under international (IPHC), federal (NMFS/NPFMC) and state (ADFG) management and fished with benthic longline (within Alaska's 200 nm EEZ).

13. References

Reference	Hyperlink
ALASKA HALIBUT RE-ASSESSMENT (2017) FINAL CERTIFICATION REPORT	http://www.alaskaseafood.org/wp-content/uploads/2017/02/Alaska-RFM-Final-Full-Assessment-Halibut-Report-Jan-2017-final.pdf
ALASKA HALIBUT (2015/16) SURVEILLANCE REPORT	http://www.alaskaseafood.org/wp-content/uploads/2016/03/Form-2011b-FAO-RFM-AK-Halibut-4th-Surveillance-Assessment-Report_FINAL-September-2015-.pdf
Halibut Discard Mortality Rate (DMR) Working Group Recommendations (2017-2018)	https://www.afsc.noaa.gov/REFM/Docs/2016/AKhalibut.pdf
IPHC Stock Assessment Survey profile data	http://www.ecofoci.noaa.gov/projects/IPHC/efoci_IPHCData.shtml http://www.iphc.int/research/surveys/37-survey-data.html
IPHC oceanographic monitoring program aboard the fishery-independent setline survey in 2016	http://www.iphc.int/publications/rara/2016/IPHC-2016-RARA-26-R-5.1_Oceanographic_monitoring.pdf
IPHC 2015 standardized stock assessment survey	http://www.iphc.int/publications/rara/2015/RARA2015_30SSAsurvey2.pdf
Marine Mammal Laboratory (MML) Research	https://www.afsc.noaa.gov/nmml/
Alaska Ecosystems Program	https://www.afsc.noaa.gov/nmml/alaska/index.php
NOAA Fisheries and Species Managed	https://alaskafisheries.noaa.gov/pr/steller-sea-lions
Catch sharing Congressional Action	https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf.
CDQ groups leasing of IFQ quotas	https://www.npfmc.org/ifqcdq/
Halibut Abundance-Based PSC Management	https://www.npfmc.org/halibutpsc/
Electronic Monitoring	https://www.npfmc.org/electronic-monitoring-2/
Halibut Stock Distribution Management - IPHC	http://www.iphc.washington.edu/documents/basictext/IPHC-2017-Rules-of-Procedure.pdf and https://www.npfmc.org/
IPHC performance review	http://www.iphc.int/documents/review/PerformancereviewprogressreportJan2014.pdf
Alaskan Department of Environmental Conservation (DEC)	http://dec.alaska.gov/
Alaska Department of Fish and Game (ADFG)	http://www.adfg.alaska.gov/
Alaskan Department of Natural Resources (DNR)	http://dnr.alaska.gov/
DNR Office of Project Management and Permitting (OPMP)	http://dnr.alaska.gov/commis/opmp/
U.S. Fish and Wildlife Service (USFWS)	http://www.fws.gov/help/about_us.html
Bureau of Ocean Energy Management (BOEM)	http://www.boem.gov/uploadedFiles/Proposed_OCS_Oil_Gas_Lease_Program_2012-2017.pdf

Reference	Hyperlink
The Western Alaska Community Development Quota (CDQ) Program	https://alaskafisheries.noaa.gov/fisheries/cdq
Subsistence halibut fishing	https://alaskafisheries.noaa.gov/fisheries/subsistence-halibut
Consultation with tribes and Native corporations	https://alaskafisheries.noaa.gov/tribal-consultations
NOAA's Alaska Fisheries Science Center (AFSC) Economic and Social Sciences Research Program	http://www.afsc.noaa.gov/REFM/Socioeconomics/Default.php
Community Profiles for North Pacific Fisheries – Alaska	https://www.pdffiller.com/en/project/124915503.htm?f_hash=cbf6b0&reload=true
Alaska Community Survey	https://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php
NPRB funded research projects in the Gulf of Alaska	http://www.nprb.org/gulf-of-alaska-project/about-the-project/
PMEL oceanographic and environmental data program	http://www.pmel.noaa.gov
NMFS' Habitat Conservation Division (HCD)	http://www.fakr.noaa.gov/habitat/default.htm
Pacific Halibut Subsistence Harvest Allowance	http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.4_Personal_use.pdf
IPHC Survey	http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R 3.1_2016_IPHC_fishery_independent_survey.pdf
NMFS Surveys	http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.3_Bering_Sea_NMFS_trawl_survey.pdf
EM Pre-Implementation Plan	http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/Final2017EMPreimpPlan.pdf
ASMI Health and Nutrition	http://www.alaskaseafood.org/health-nutrition/
Alaska Confidential Nature of Certain Reports and Records	http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section815.htm
Western Gulf of Alaska 2016 Report Card	https://access.afsc.noaa.gov/reem/ecoweb/GOA_report_card.pdf
Fissel, et. al. 2016	Fissel, B., M. Dalton, R. Felthoven, B. Garber-Yonts, A. Haynie, S. Kasperski, J. Lee, D. Lew, A. Santos, C. Seung. K, Sparks 2016. 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, 2015. AFSC, NMFS, NOAA, Seattle WA. https://www.afsc.noaa.gov/refm/stocks/plan_team/economic.pdf
Hicks and Stewart. 2017	Hicks, A.C, Stewart, I.J. 2017. An investigation of the current IPHC harvest policy and potential for

Reference	Hyperlink
	improvement. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016. IPHC-2016-RARA-26-R: 421-438. http://www.iphc.int/publications/rara/2016/IPHC-2016-RARA-26-R-4.6_Developments_in_MSE_and_MSAB.pdf
Assessment of the Pacific halibut stock at the end of 2016	http://www.iphc.int/publications/rara/2016/IPHC-2016-RARA-26-R-4.2_Assessment_of_the_Pacific_halibut_stock.pdf
Webster and Soderlund 2017	Webster, R. and Soderlund, E. 2017. Area 4CDE edge IPHC survey expansion. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016. IPHC-2016-RARA-26-R: 216-219.
Sadorus et al. 2017a	Sadorus, L., Lauth, R., and Ranta, A. 2017a. Results from the Bering Sea NMFS trawl survey in 2016. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016. IPHC-2016-RARA-26-R: 220-231.
Sadorus et al. 2017b	Sadorus, L., Palsson, W. A., and Ranta, A. 2017b. Results from the NMFS Aleutian Islands Biennial Bottom Trawl Survey in 2016. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016. IPHC-2016-RARA-26-R: 232-240 http://www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-3.0_Executive_summary.pdf
Faunce, 2013	Faunce, C.H. 2013. The Restructured North Pacific Groundfish and Halibut Observer Program. NOAA quarterly publication.
North Pacific Observer Program 2016 Annual Report	Alaska Fisheries Science Center and Alaska Regional Office. 2017. North Pacific Observer Program 2016 Annual Report. AFSC Processed Rep. 2017-07, 143 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115. Available at http://www.afsc.noaa.gov/Publications/ProcRpt/PR2017-07.pdf
North Pacific Observer Program 2015 Annual Report	Alaska Fisheries Science Center and Alaska Regional Office. 2016. North Pacific Observer Program 2015 Annual Report. AFSC Processed Rep. 2016-05, 104 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115. Available at https://alaskafisheries.noaa.gov/sites/default/files/2015observerprogramannualreport.pdf
Goen 2017	www.iphc.washington.edu/publications/rara/2016/IPHC-2016-RARA-26-R-2.4_Personal_use.pdf
Henry et al 2017	Henry, E., Soderlund, E., Henry, A. M., Geernaert, T., Ranta, A. M., and Kong, T., Forsberg J. 2017. 2016 IPHC

Reference	Hyperlink
	fishery-independent setline survey. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016: 4175-215.
Brown, E. S. 1986	Brown, E. S. 1986. Preliminary results of the 1984 U.S.-Japan Cooperative Bottom Trawl Survey of the central and western Gulf of Alaska. In Major, R.L. (editor), Condition of groundfish resources of the Gulf of Alaska region as assessed in 1985. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-106. p.259-296.
Stewart, I.J. 2017	Stewart, I.J. 2017. Regulatory area harvest policy calculations and catch tables. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016: 403-420.
Clark and Hare 2006, Hare and Clark 2008	Assessment of the Pacific halibut stock at the end of 2007 – IPHC http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjN2vOOl5rVAhUCJ8AKHXCcBm4QFggwMAE&url=http%3A%2F%2Fwww.iphc.washington.edu%2Fpapers%2Fsa07.pdf&usg=AFQjCNHt6pyFU75ZPYjqbpjwFjPJ7zURZQ Clark, W.G., and Hare, S.R. 2008. Assessment of the Pacific halibut stock at the end of 2007. Int. Pac. Halibut Comm. Report of Research and Assessment Activities 2007: 177-203.
Webster A., R., Stewart, I.J. 2017	Webster A., R., Stewart, I.J. 2017. Setline survey-based apportionment estimates. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016: 395-402.
NPFMC. 2016	NPFMC. 2016. Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program. 474 p. North Pacific Fishery Management Council 605 West 4th, Suite 306 Anchorage, Alaska.
IPHC. 2017	IPHC. 2017. Pacific Halibut Fishery Regulations 2017, Version 2, 5 April 2017. Int. Pac. Halibut Comm. Available at http://www.iphc.washington.edu/publications/regs/2017iphcregs_v20170405.pdf
Martell et al 2015	Martell, S., B. Leaman, G. Kruse, K. Aydin, and K. Holsman. 2015. Fishery, Climate, and Ecological Effects on Pacific Halibut Size-at-age (SAA). North Pacific Research Board, Semi-annual Progress Report, July 2015.
Muto et al 2017	M. M. Muto, V. T. Helker, R. P. Angliss, B. A. Allen, P. L. Boveng, J. M. Breiwick, M. F. Cameron, P. J. Clapham, S. P. Dahle, M. E. Dahlheim, B. S. Fadely, M. C. Ferguson, L. W. Fritz, R. C. Hobbs, Y. V. Ivashchenko, A. S. Kennedy, J. M.

Reference	Hyperlink
	London, S. A. Mizroch, R. R. Ream, E. L. Richmond, K. E. W. Shelden, R. G. Towell, P. R. Wade, J. M. Waite, and A. N. Zerbini. 2017. Alaska marine mammal stock assessments, 2016. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-355, 366 p. doi:10.7289/V5/TM-AFSC-355. Document available: http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-355.pdf
Gaichas et al 2009	Gaichas, S.K., Aydin, K.Y., and Francis, R.c. (2009) Using food web model results to inform stock assessment estimates of mortality and production for ecosystem-based fisheries management. Canadian Journal of Fisheries and Aquatic Sciences. https://www.researchgate.net/publication/237153416_Using_Food_Web_Model_Results_to_Inform_Stock_Assessment_Estimates_of_Mortality_and_Production_for_Ecosystem-Based_Fisheries_Management.

14. Appendices

14.1. Appendix 1 – Assessment Team Details

Assessment Team Details

Based on the technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd., is pleased to confirm the 4th Surveillance assessment team members for the fishery as follows:

Dr. Ivan Mateo, Lead Assessor

Dr. Ivan Mateo has over 15 years' experience working with natural resources population dynamic modeling. His specialization is in fish and crustacean population dynamics, stock assessment, evaluation of management strategies for exploited populations, bioenergetics, ecosystem-based assessment, and ecological statistical analysis. Dr. Mateo received a Ph.D. in Environmental Sciences with Fisheries specialization from the University of Rhode Island. He has studied population dynamics of economically important species as well as candidate species for endangered species listing from many different regions of the world such as the Caribbean, the Northeast US Coast, Gulf of California and Alaska. He has done research with NMFS Northeast Fisheries Science Center Ecosystem Based Fishery Management on bioenergetic modeling for Atlantic cod He also has been working as environmental consultant in the Caribbean doing field work and looking at the effects of industrialization on essential fish habitats and for the Environmental Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Recently Dr. Mateo worked as National Research Council postdoc research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modeling of Alaska sablefish.

Rohan Smith, Assessor

Rohan is a fisheries industry technical and management analyst with qualifications in Aquaculture and Fisheries Management (BSc University of Portsmouth/Sparsholt College), as well as Marine Science, Fisheries and Technology (MSc North Atlantic Fisheries College). He has conducted research evaluating impacts of different fishing activities on marine environments, including vulnerable marine ecosystems in inshore and offshore (24nm) waters of England. He has developed models and approaches that are used to evaluate interactions of fishing and marine ecosystems. His work also include development of integrated sustainable fisheries management plans for Small Island Fisheries of the Caribbean (Montserrat). During this period he participated in research to gather data on mapping of fishing activity, collating catch composition, recording baseline habitat characterisation, reviewing current fishing and ocean policies, as well as readiness of these fisheries to demonstrate sustainability by pre-assessment against the Marine Stewardship Council (MSC) Fisheries sustainability standard. He has participated in MSC full assessments and Surveillance assessments for; Atlanto Scandian Herring, West of Scotland Herring, North Sea herring, and Northeast Atlantic Mackerel, contributing in capacities across Team Member, Lead Assessor, and Principle 2 expert.

Vito Romito, Assessment Team Support

Vito Ciccia Romito is Italian and holds a BSc in Ecology and a MSc in Tropical Coastal Management from Newcastle University in the U.K. After his BSc, he worked in Tanzania as a Marine Research officer at the Mafia Island Marine Park carrying out biodiversity assessments and monitoring studies of coral reef, mangrove and seagrass ecosystems. Subsequently, for his MSc, he worked on fisheries assessment techniques, ecological dynamics of overexploited tropical marine ecosystems, and evaluation of low trophic aquaculture as a support to artisanal reef fisheries. Over the last 5 years he has been fully involved through Global Trust with the FAO-based RFM Assessment and Certification program covering the Alaska commercial salmon, halibut, sablefish, pollock, crab,

Pacific cod and flatfish fisheries as well as the Icelandic cod, saithe, haddock and redfish fisheries. Vito has also participated in IFFO fisheries assessments for anchovy and sardine stocks in both Chile and Peru, and other pre-assessment work in Canada and the Gulf of Mexico. Vito is also lead, third party IRCA approved auditor.

14.2. Appendix 2 – Conference Board IPHC advisory panel representing Canadian US halibut fishers

United States	Canada
Adak Community Development Corp.	A`Tlegay Fisheries Society
Alaska Charter Association	Amalgamaterd Conservation Society
Alaska Travel Association	Annieville Halibut Association
Alaska Longline Fisherman's Association	Area F Troll Association
Alaska Whitefish Trawlers Association	BC Commercial integrated Groundfish Society
Aleut Corp	BC Halibut Longline Fisherman's Assoc.
APICDA Vessel Inc.	BC Longline Fisherman's Association
Area 3B /4A False Pass	BC Tuna Fisherman's Association
Area 4 Harvesters Alliance	BC Wildlife Federation
Central Bering Sea Fishermen's Association	Canadian Sablefish Association
Coastside Fishing Club	Central Coast Indigenous Resource Alliance
Deep Sea Fishermen's Union of the Pacific	Esquimalt Anglers Assn.
Edmonds Veteran Indev Longliners	FAS Seafoods
Point no Point Treaty Council	PHMA
Port Gambel S'Klallam Tribe	Sidney Anglers Association
Pudget Sound Anglers	Sport Fishing Advisory Board – Main
Quiliute Tribe	Sport Fishing Advisory Board - South
Quinault Indian Nation	Sport Fishing Advisory Board - North
Recreational Alliance N. California	Steveston Halibut Assoc.
Recreational Fishing Alliance-Oregon Chapter	Sport Fishing Institute of BC
Seafood Producers Coop	South Vancouver Island Anglers Coalition
SE Alaska Fishermen's Alliance	Ucluelet First Nation
Fishing Vessel Owners Assoc. (FVOA)	Ditidaht First Nation
Freezer Longliner Coalition	Gulf Trollers Association
Halibut Coalition	Council of Haida Nation
Homer Charter Association	Halibut Advisory Board
Jamestown S'Kallum Tribe	Hook and Line Groundfish Association
Humbolt Area Saltwater Anglers	Huu-Ay-Aht First Nation
Kruzof Fisheries	Isand Marine Aquatic Working Group
K Bay Fishermen Association	Kyuquot/Cheklesaht First Nation
Lower Elwa	Northern Halibut Producer's Assoc.
Lummi Indian Nation	Northern Trollers Association
Makah Tribe	North Pac Halibut Fisherman's Assn
Native Village of Mekoryuk	Nuu-Chah-Nulth Tribal Council
North Pacific Fisheries Association	Pacific Coast Fishing Vessel Owners Guild
Petersburg Vessel Owners Association	Pacific Trollers Association

Seward Charter Boat Association
Sitka Charter Boat Owners Association
Sitka Halibut & Blackcod Marketing Assoc.
Skokomish Indian Tribe
St. Paul Fishermen's Association
Tribal Government of St. Paul
Trinadat Rancheria (Tribe in California)
Swinomish Tribal Communities
Tulalip Tribes
United Cook Inlet Drift Association
Westport Charter Association
West Brothers Group
United Fishermans &Allied Workers Union)
Vancouver Island Longline Assoc.
West Coast Guiides Association