FAO-BASED RESPONSIBLE FISHERY MANAGEMENT CERTIFICATION SURVEILLANCE REPORT

For The

Alaska Pollock Commercial Fisheries

Facilitated By the

Alaska Seafood Marketing Institute

Assessors: **Vito Ciccia Romito, (Lead Assessor)**
Jeff Fargo, Assessor
Geraldine Criquet, Assessor

Report Code: **AK/POL/001.3/2014**
Published January 2015

Global Trust Certification Ltd.
Head Office, 3rd Floor, Block 3,
Quayside Business Park,
Mill Street, Dundalk, Co. Louth.
T: +353 42 9320912
F: +353 42 9386864
web: www.GTCert.com

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

I. Summary and Recommendations

The Alaska Seafood Marketing Institute (ASMI), requested an assessment of the Alaska pollock, *Gadus chalcogrammus,* (formerly *Theragra chalcogramma*) commercial fisheries according to the FAO Based Responsible Fisheries Management (RFM) Certification Program. The application was made in April 2010. Assessment commenced in April 2010 with assessment validation before proceeding to full assessment and final certification determination in December 2011.

This report is the **3rd Surveillance Report (ref: AK/POL/001.3/2014)** for the Alaska pollock federal and state commercial fisheries following Certification award against the FAO-Based RFM Program, awarded the 6th December 2011. The objective of the Surveillance Report is to monitor for any changes/updates (after 12 months) in the management regime, regulations and their implementation since the previous assessment (in this case, second surveillance audit in 2013) and to determine whether these changes (if any) and current practices, remain consistent with the overall confidence rating scorings of the fishery allocated during initial certification. 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. No non-conformances were identified since certification was granted.

The certification covers the Alaska pollock, *Gadus chalcogrammus,* (formerly *Theragra chalcogramma*) commercial fisheries employing pelagic trawl gear within Alaska jurisdiction (200 nautical miles EEZ) and subjected to federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

The surveillance assessment was conducted according to the Global Trust Certification procedures for FAO – Based Responsible Fisheries Management Certification using the FAO – Based RFM Conformance Criteria V1.2 fundamental clauses as the assessment framework.

The assessment was conducted by a team of Global Trust appointed Assessors comprising of one externally contracted fishery expert and Global Trust internal staff. Details of the assessment team are provided in Appendix 1.

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

II. Assessment Team Details

Vito Ciccia Romito, Lead Assessor
SAI Global/ Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth, Ireland.
T: +353 (0)42 9320912
F: +353 (0)42 9386864

Dr. Géraldine Criquet, Assessor
SAI Global/ Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth, Ireland.
T: +353 (0)42 9320912
F: +353 (0)42 9386864

Jeff Fargo, Assessor
Independent fisheries scientist consultant
Nanaimo, British Columbia
Canada

1. Introduction

This Surveillance Report documents the 3rd Surveillance Assessment (2014) of the Alaska pollock commercial federal and state fisheries originally certified on December 6th, 2011, and presents the recommendation of the Assessment Team for continued FAO-Based RFM Certification.

Unit of Certification

The Alaska pollock (or walleye pollock), *Gadus chalcogrammus,* (formerly *Theragra chalcogramma*) commercial fisheries employing pelagic trawl gear within Alaska jurisdiction (200 nautical miles EEZ) and subjected to federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management, underwent their 3rd surveillance assessment against the requirements of the FAO-Based RFM Conformance Criteria Version 1.2 Fundamental clauses.

This 3rd Surveillance Report documents the assessment result for the continued certification of commercially exploited Alaska pollock fisheries to the FAO-Based RFM Certification Program. This is a voluntary program that has been supported by ASMI who wishes to provide an independent, third-party certification that can be used to verify that these fisheries are responsibly managed according to the FAO-Based RFM Program.

The assessment was conducted according to the Global Trust procedures for FAO-Based RFM Certification using the fundamental clauses of the FAO-Based RFM Conformance Criteria Version 1.2 (Sept 2011) in accordance with EN45011/ISO/IEC Guide 65 accredited certification procedures. The assessment is based on the fundamental clauses specified in the FAO-Based RFM Conformance Criteria. It is based on six major components of responsible management derived from the FAO Code of Conduct for Responsible Fisheries (1995) and Guidelines for the Eco-labeling 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 13 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 3rd Surveillance Assessment, in 2014, the assessment team recommends that continued Certification under the FAO-Based Responsible Fisheries Management Certification Program is maintained for the management system of the applicant fishery, the Alaska pollock, *Gadus chalcogrammus,* (formerly *Theragra chalcogramma*) commercial fisheries employing pelagic trawl gear within Alaska jurisdiction (200 nautical miles EEZ) and subjected to federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

2. Fishery Applicant Details

Applicant Contact Information			
Organization/ Company Name:	**Alaska Seafood Marketing Institute**	Date:	**April 2010**
Correspondence Address:	**International Marketing Office and Administration Suite 200**		
Street :	**311 N. Franklin Street**		
City :	**Juneau**		
State:	**Alaska AK 99801-1147**		
Country:	***USA***		
Phone:	**(907) 465-5560**	**E-mail Address:**	***info@alaskaseafood.org***
Key Management Contact Information			
Full Name:	*(Last)* **Alex**	*(First)* **Oliveira**	
Position:	***Seafood Technical Program Director***		
Correspondence Address:	***U.S. Marketing Office*** ***Suite 310***		
Street :	**150 Nickerson Street**		
City :	***Seattle***		
State:	***Washington 98109-1634***		
Country:	***USA***		
Phone:	**(206) 352-8920**	**E-mail Address:**	*marketing@alaskaseafood.org*
Nominated Deputy:	***As Above***		
Deputy Phone:	**As Above**	**Deputy E-mail Address:**	**aoliveira@alaskaseafood.org**

3. Unit of Certification

Unit of Certification			
U.S. ALASKA POLLOCK COMMERCIAL FISHERIES			
Fish Species (Common & Scientific Name)	***Geographical Location of Fishery***	***Gear Type***	***Principal Management Authority***
Alaska (Walleye) pollock *Gadus chalcogrammus*, (formerly *Theragra chalcogramma)*	*Gulf of Alaska* *and* *Bering Sea & Aleutian Islands*	*Pelagic trawl,* *And* *Other gears (bottom trawl, jig, longline, pot) from other non-directed pollock fisheries legally landing pollock*	*National Marine Fisheries Service (NMFS)* *North Pacific Fishery Management Council (NPFMC)* *Alaska Department of Fish and Game (ADFG) &* *Board of Fisheries (BOF)*

4. Surveillance Meetings

Date	Organization	Relevant Meetings attended
Monday Dec. 8th 2014.	North Pacific Fishery Management Council, December 2014 Meetings, Hilton Hotel, Anchorage, Alaska.	• C-2 BS Salmon Bycatch • C-4 BSAI Groundfish Specifications (including pollock)
Tuesday Dec. 9th 2014	North Pacific Fishery Management Council, December 2014 Meetings, Hilton Hotel, Anchorage, Alaska.	• C-4 BSAI Groundfish Specifications • C-5 GOA Groundfish Specifications (including pollock) • Enforcement Committee
Wednesday Dec. 10th 2014	North Pacific Fishery Management Council, December 2014 Meetings, Hilton Hotel, Anchorage, Alaska	• C-4 BSAI Groundfish Specifications • Executive Director's Report (including review of staff work plan for GOA trawl bycatch management) • NMFS Management Report • ADFG Management Report • NOAA Enforcement Report • USCG Report
Thursday Dec. 11th 2014	North Pacific Fishery Management Council, December 2014 Meetings, Hilton Hotel, Anchorage, Alaska	• C-5 GOA Groundfish Specifications • C-2 BS Salmon Bycatch
Friday Dec. 12th 2014	North Pacific Fishery Management Council, December 2014 Meetings, Hilton Hotel, Anchorage, Alaska	• D-3 Pribilof Canyon corals

5. Assessment Outcome Summary

Fundamental Clauses Summaries

Clause 1: Structured and legally mandated management system

Evidence adequacy rating: High

The Alaska pollock commercial fisheries are managed by the North Pacific Fishery Management Council (NPFMC) and the NOAA's National Marine Fisheries Service (NMFS) in the federal waters (3-200 nm); and by the Alaska Department for Fish and Game (ADFG) and the Board of Fisheries (BOF) in the state waters (0-3 nm). In federal waters, Alaska pollock fisheries are managed under the NPFMC's Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands (BSAI) Groundfish Fishery Management Plans (FMPs) written and amended subject to the Magnuson Stevens Act (MSA). The state pollock fishery in Prince William Sound is managed using a Guideline Harvest Level (GHL) set as a percentage of the GOA federal ABC. The US Coast Guard (USCG), the NMFS Office of Law Enforcement (OLE) and the Alaska Wildlife Troopers (AWT) and/or deputized ADFG staff, enforce fisheries regulations in federal and state waters respectively.

Clause 2: Coastal area management frameworks

Evidence adequacy rating: High

No significant change has occurred since the previous surveillance assessment in 2013.

The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. These include decision-making processes and activities relevant to fishery resources and users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. With regards to conflict avoidance and resolution between different fisheries, the North Pacific Fishery Management Council (NPFMC) and the Board of Fisheries (BOF) tend to avoid conflict by actively involving stakeholders in the process leading up to decision making. Both entities provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Council and the BOF actively encourages stakeholder participation, and all their deliberations are conducted in open, public sessions. Effectively, these meetings provide forums for avoidance of potential fisheries conflicts.

Clause 3: Management objectives and plan

Evidence adequacy rating: High

The Magnuson Stevens Fishery Conservation and Management Act (MSA) is the primary domestic legislation governing the management of the nation's marine fisheries. Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. These include Groundfish FMPs for the Gulf of Alaska and the Bering Sea & Aleutian Islands which incorporate the pollock fisheries in those regions. Both FMPs present long-term management objectives for the Alaska pollock fishery and were updated in 2014. In state waters (0-3 nm), the Prince William Sound (PWS) pollock fishery is

managed by ADFG and the BOF using "5 AAC 28.263. Prince William Sound Pollock Pelagic Trawl Management Plan" which sets the regulations for the directed state pollock fishery.

Clause 4: Fishery data

Evidence adequacy rating: High

The NMFS and the ADFG collect fishery data and conduct fishery independent surveys to assess the pollock fishery and ecosystems in GOA and BSAI areas. GOA and BSAI SAFE documents provide complete descriptions of data types and years collected. Records of catch and effort are firstly recorded through the elanding (electronic fish tickets) catch recording system and secondly, collected by vessel captains in voluntary and required logbooks. Fishery independent data are collected in regular surveys of both the GOA and BSAI regions and by the observer program present in both regions. A summer acoustic trawl survey is carried out annually, alternating between the GOA and EBS areas. Bottom trawl surveys are carried out yearly in the EBS and biennially in the GOA and AI. Other sources of data (such as vessel-of-opportunity, crab, and international surveys) are also considered during the stock assessment process. The Prince William Sound pollock stock is estimated by ADFG bottom trawl surveys in summer and hydroacoustic surveys in winter (when possible).

Clause 5: Stock assessment

Evidence adequacy rating: High

Guided by MSA standards, and other legal requirements, the NMFS has a well-established institutional framework for research developed within the AFSC. Scientists at the AFSC conduct research and stock assessments on pollock in Alaska each year, producing annual Stock Assessment and Fishery Evaluation (SAFE) reports for the federally managed EBS, GOA, Aleutian Islands and Bogoslof pollock stocks. These SAFE reports summarize the best-available science, including the fishery dependent and independent data, document stock status, significant trends or changes in the resource, marine ecosystems, and fishery over time, assess the relative success of existing state and Federal fishery management programs, and produce recommendations for annual quotas and other fishery management measures. The annual stock assessments are peer reviewed by experts and recommendations are made annually to improve the assessments.

Clause 6: Biological reference points and harvest control rule

Evidence adequacy rating: High

The ASFC SAFE reports consist of three volumes: a volume containing stock assessments, a volume containing economic analysis, and a volume describing ecosystem considerations. The stock assessment volume contains a chapter or sub-chapter for each stock or stock complex in the "target species" category, and a summary chapter prepared by the Groundfish Plan Team. Each chapter contains estimates of all annual harvest specifications except TAC, all reference points needed to compute such estimates, and all information needed to make annual status determinations with respect to "overfishing" and "overfished. The NPFMC harvest control system is a complex and multi-faceted suite of management measures to address issues related to sustainability, legislative mandates, and quality of information. The tier system specifies the maximum permissible Allowable Biological Catch (ABC) and of the Overfishing Level (OFL) for each stock in the complex (usually individual species but sometimes species groups). The EBS pollock stock in Alaska is categorized as tier 1a while the GOA pollock and AI stocks are categorized as tier 3b. For Tier 1 stocks, reliable

estimates are available of B and B_{MSY}, and a reliable probability density function is available for F_{MSY}. For Tier 3 stocks, the spawner-recruit relationship is uncertain, so that MSY cannot be estimated with confidence. Hence, a surrogate based on $F_{40\%}$ is used, following findings in the scientific literature in the 1990s. For Tier 3 stocks, the MSY proxy level is defined as $B_{35\%}$. Stocks in tiers 1-3 are further categorized (a) (b) or (c) based on the relationship between B and B_{MSY} (or proxy), with (a) indicating a stock where biomass is above B_{MSY} (or proxy), (b) indicating a stock where biomass is below B_{MSY} but above (0.05 x B_{MSY}), and (c) indicating a stock where biomass is below (0.05 x B_{MSY}). The category assigned to a stock determines the method used to calculate ABC and OFL.

Clause 7: Precautionary approach

Evidence adequacy rating: High

There are three core components to the application of the precautionary approach in Alaskan groundfish fisheries. Firstly, the FMP for each management area sets out an Optimum Yield (OY) for the groundfish complex as a whole, which includes pollock along with the majority of targeted groundfish species. The second component is the tier system, which assigns each groundfish stock to a tier according to the level of scientific understanding, data available and uncertainty associated with the fishery. Each tier has an associated set of management guidelines, particularly in relation to calculating the level of catch permitted. The more data-deficient a stock, the higher the tier's number, and the more conservatively catch limits are set. At present the GOA and AI pollock fisheries are assigned to tier 3 and the EBS pollock fishery to tier 1. The third component is the Annual Catch Limit (ACL), Overfishing Limit (OFL), Acceptable Biological catch (ABC) and Total Allowable Catch (TAC) system. ACL is the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures. OFL is the limit reference point of annual catch after which overfishing is determined to be occurring. For Alaska groundfish stocks, OFL is equal to the expected catch that would occur at the rate (or proxy thereof) which is estimated to provide the maximum sustainable yield (F_{msy}). ABC is a recommended level of annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. TAC is the annual catch target for a stock or stock complex, derived from the ABC by considering social and economic factors and management uncertainty (i.e., uncertainty in the ability of managers to constrain catch so the ACL is not exceeded, and uncertainty in quantifying the true catch amount).

Clause 8: Management measures

Evidence adequacy rating: High

The Magnuson Stevens Act is the federal legislation that defines how fisheries off the United States EEZ are to be managed. From this legislation and NPFMC objectives, the management system for the Alaska groundfish fisheries has developed into a complex suite of measures comprised of harvest controls—e.g., OY, TAC, ABC, OFL, ACL—effort controls (limited access, licenses, cooperatives), time and/or area closures (habitat protected areas, marine reserves), by-catch controls (PSC limits, Maximum Retainable Allowances (MRA), gear modifications, retention and utilization requirements), observers, monitoring and enforcement programs, social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions (SSL)). The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information.

Clause 9: Management measures to produce maximum sustainable levels

Evidence adequacy rating: High

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The rigorous process in place for over 30 years ensures that annual quotas are set at conservative, sustainable levels for all managed groundfish stocks. Model projections indicate that the pollock stocks in Alaska is neither overfished nor approaching an overfished condition. The Maximum Sustainable Yield (MSY), defined in the BSAI and GOA groundfish FMPs, is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions, fishery technological characteristics (e.g., gear selectivity), and distribution of catch among fleets. The MSY allows defining the reference points used to manage the groundfish fisheries such that TAC ≤ ABC <OFL.

Clause 10: Appropriate standards of fisher's competence

Evidence adequacy rating: High

Alaska enhances through education and training programs the education and skills of fishers and, where appropriate, their professional qualifications. Records of fishers are maintained along with their qualifications.

Clause 11: Effective legal and administrative framework

Evidence adequacy rating: High

The Alaska pollock fishery fleet uses enforcement measures including vessel monitoring systems (VMS) on board vessels, USCG boardings and inspection activities. The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce fisheries laws and regulations. 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). State regulations are enforced by the Alaska Wildlife Troopers (AWT).

Clause 12: Framework for sanctions

Evidence adequacy rating: High

*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 Alaska Wildlife troopers enforce state water regulations with a number of statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation.

Clause 13: Impacts of the fishery on the ecosystem

Evidence adequacy rating: High

The NPFMC, NOAA/NMFS, and other institutions interested in the North Pacific conduct assessments and research on environmental factors affecting pollock and associated species and their habitats. Findings and conclusions are published in SAFE documents, annual Ecosystem Considerations documents, and other research reports. The SAFE documents for BSAI and GOA pollock summarize ecosystem considerations for the stocks. They include sections for ***1)*** *Ecosystem effects on the stock; and* ***2)*** *Effects of the pollock fishery on the ecosystem. SAFE reports also describe results of first-order trophic interactions for pollock from the ECOPATH model, an ecosystem modelling software package. Ecosystem modelling is used to provide an indication of the role of pollock within the food web, and broader ecosystem variables such as climate are reported upon annually in a region-encompassing ecosystem considerations analysis. Two significant ecosystem concerns in relation to the pollock fishery are its possible indirect effects on Steller sea lions, and the quantity of salmon bycatch. Both of these issues are addressed directly in the SAFE assessments, and management measures by State and Federal management agencies are in place to attempt and minimize their severity. Biomass of other pollock predators appears to be stable or increasing in recent years. Habitat interactions of this fishery are not considered significant.*

6. Conformity Statement

The Assessment Team recommends that continued certification under the FAO Based Responsible Fisheries Management Program is granted to the Alaska pollock, *Gadus chalcogrammus,* (formerly *Theragra chalcogramma*) commercial fisheries employing pelagic trawl gear within Alaska jurisdiction (200 nautical miles EEZ) and subjected to federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

7. FAO-Based Conformance Criteria Fundamental Clauses for Surveillance Reporting

A. The Fisheries Management System

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.

FAO CCRF 7.1.3/7.1.4/7.1.9/7.3.1/7.3.2/7.3.4/7.6.8/7.7.1/10.3.1

FAO Eco 28

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating determination

The Alaska pollock commercial fisheries are managed by the North Pacific Fishery Management Council (NPFMC) and the NOAA's National Marine Fisheries Service (NMFS) in the federal waters (3-200 nm); and by the Alaska Department for Fish and Game (ADFG) and the Board of Fisheries (BOF) in the state waters (0-3 nm). In federal waters, Alaska pollock fisheries are managed under the NPFMC's Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands (BSAI) Groundfish Fishery Management Plans (FMPs) written and amended subject to the Magnuson Stevens Act (MSA). The state pollock fishery in Prince William Sound is managed using a Guideline Harvest Level (GHL) set as a percentage of the GOA federal ABC. The US Coast Guard (USCG), the NMFS Office of Law Enforcement (OLE) and the Alaska Wildlife Troopers (AWT) and/or deputized ADFG staff, enforce fisheries regulations in federal and state waters respectively.

The Magnuson-Stevens Fishery Conservation and Management Act (or Magnuson-Stevens Act in short, MSA) provides the primary layer of governance for the federal Alaska pollock fisheries. This year, in May 2014, the At Sea Processor Association, one of the major harvesters and processors of Alaska pollock in the BSAI, has submitted formal comments to U.S. Senators Mark Begich and Marco Rubio on the 2014 Magnuson-Stevens Act (MSA) Reauthorization Staff Working. The comments were coordinated between the At-Sea Processor Association and other major Alaska and Pacific Northwest (PNW) fisheries organizations. http://www.nmfs.noaa.gov/sfa/magact/

The federal agencies involved in pollock management within Alaska's EEZ (NMFS, NPFMC), and all of their activities and decisions, are subject to the MSA. The MSA, as amended last on January 12th 2007, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all Fishery Management Plans (FMPs) must be consistent. The state of Alaska has its governance authority within the State of Alaska's constitution which calls for management in line with Maximum Sustainable Yield (MSY), and State statutes that reflect regulatory guidance and conservation management requirements developed by the Alaska Board of Fisheries (BOF) in connection with the Alaska Department for Fish and Game (ADFG). This constitutes the State's analog to federal standard of fisheries management.

The FMPs, more specifically, 1) the GOA Groundfish FMP, and 2) the BSAI Groundfish FMP govern the management of the pollock federal fisheries. Both the GOA and the BSAI FMPs were most recently updates in 2014. In federal waters (3-200 nm), the Alaska pollock fisheries are managed by the NPFMC and the NMFS Alaska Region. With jurisdiction over the million square mile EEZ off Alaska, the NPFMC has primary responsibility for groundfish management in the GOA and BSAI, including pollock, Pacific cod, flatfish, Atka mackerel, sablefish, and (offshore) rockfish species harvested mainly by trawlers, hook and line, longliners and pot fishermen. The NPFMC submits their recommendations/plans to the NMFS for review, approval, and implementation.

http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf

NMFS makes those recommendations available for public review and comment (partly by publication) before taking final action by issuing legally binding Federal regulations. In addition, the NMFS Alaska Fisheries Science Center conducts biological studies, annual stock surveys and publishes annual stock assessment reports. The NMFS is also charged with carrying out the federal mandates of the U.S. Department of Commerce with regard to commercial fisheries such as approving and implementing FMPs and FMP amendments recommended by the NPFMC. The US Coast Guard (USCG) is responsible for enforcing FMP regulations at sea, in conjunction with NMFS Office of Law Enforcement (OLE) enforcement ashore. Also, the USCG enforces laws to protect marine mammals and endangered species, international fisheries agreements (i.e. UN High Seas Driftnet Moratorium in the North Pacific), and foreign encroachment.

http://www.npfmc.org/
http://www.uscg.mil/d17/
http://alaskafisheries.noaa.gov/sustainablefisheries/default.htm

In state waters (0-3 nm), an open access state-waters fishery takes place in Prince William Sound (PWS); the guideline harvest level (GHL) for this fishery is deducted from the combined federal Western, Central, and West Yakutat Gulf of Alaska Regulatory Area (W/C/WYAK) acceptable biological catch (ABC), and has ranged from a low of 2.0 million lb in 2004 and 2005 to a high of 8.5 million lb in 2014. The PWS state pollock fishery is managed using a harvest rate strategy, where the Guideline Harvest Level (GHL) is the product of the biomass estimate, instantaneous natural mortality rate (0.3) and a precautionary factor of 0.75. Biomass is estimated by state conducted bottom trawl surveys in summer and hydroacoustic surveys in winter (though not in all years). The State sets the GHL, which is deducted from the federal Allowable Biological Catch (ABC). The management plan (5 AAC 28.263) specifies that fishery occurs in three section located within the Inside District; no more than 60 percent of the GHL may be taken from any one section in order to reduce potential impacts on the endangered population of Steller sea lions by geographically apportioning the catch. The management plan also restricts bycatch to no more than 5 percent of the total round weight of pollock harvested, and the ADFG further manages bycatch by apportioning the percentage among the following species groups: rockfish (0.5%), salmon (0.04%), shark (0.96%), squid (3.0%), and other species (0.5%). The directed fishery for pollock in PWS has typically experienced low bycatch rates relative to many other groundfish fisheries. Currently, the GHL is

determined as 2.5 percent of the combined W/C/WYAK ABC based on the GHL historical percent average from 2001 to 2010. ADFG has and may reserve a percentage of the calculated GHL for a test fishery. Revenues from these test fisheries are used to fund PWS commercial fishery management, including groundfish stock assessment and inseason pollock catch sampling.

In 1999 the BOF directed the ADFG to establish a PWS pollock trawl fishery management plan to reduce potential impacts on the endangered population of Steller sea lions by geographically apportioning the catch. Although pollock in the GOA are considered one stock, pollock in PWS had not been assessed by NMFS GOA surveys; though recently NMFS have assisted with the winter acoustic survey. Therefore, ADFG surveys of pollock in PWS are used to set the Guideline Harvest Level, rather than setting the Guideline Harvest Level in PWS as a fraction of the federal Total Allowable Catch for the Gulf of Alaska.
http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.management

Parallel fisheries for pollock take place in state waters around Kodiak Island, in the Chignik Area and along the South Alaska Peninsula. In these areas the State's Emergency Order adopting federal regulations is used to manage openings, closures and catch. A parallel groundfish fishery occurs where the State allows the federal species total allowable catch (TAC) to be harvested in State waters. Parallel fisheries occur for pollock, Pacific cod, and Atka mackerel species, for some or all gear types. Opening state waters allows the effective harvesting of fishery resources because many fish stocks straddle State and Federal jurisdiction and in some cases a significant portion of the overall federal TAC is harvested within State waters. Groundfish fisheries that are not actively managed by the State of Alaska open as parallel fisheries utilizing fishing seasons, bycatch limits, area closures, and allowable gear types (sectors) from federal fishery management measures in adjacent waters of the Exclusive Economic Zone (EEZ). Although the State cannot require vessels fishing inside state waters during the Federal fishery to hold a Federal permit, it can adopt regulations similar to those in place for the Federal fishery if those regulations are approved by the Board of Fisheries and meet State statute. An example of a Federal fishery regulation that was concurrently adopted by the Board of Fisheries is the Steller sea lion protection measures implemented in 2001. The effort in the patrol and enforcement of state waters regulations is entrusted to the Marine Enforcement Section (MES) of the Alaska Wildlife Troopers (AWT).

http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.management
http://dps.alaska.gov/awt/Marine.aspx

Intergovernmental Consultative Committee (ICC)

NOAA and the Federal Agency for Fisheries of the Russian Federation signed a Joint Statement on Enhanced Fisheries Cooperation (April 29, 2013). The Joint Statement reaffirms the May 1988 Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Mutual Fisheries Relations while also identifying three major areas of future cooperation: 1) combating global Illegal Unreported and Unregulated (IUU) fishing; 2) collaborating on science and management of Arctic Ocean living marine resources ; and 3) advancing conservation efforts in the Ross Sea region of Antarctica. NOAA and the Russian Fisheries Agency

have an excellent history of science cooperation. NOAA hopes that the joint statement will further strengthen the foundation of that cooperation. These meetings have also resulted in US vessels conducting acoustical surveys with Russian Federation scientists in the Federation's zone of the Bering Sea (yearly summer surveys).

http://www.nmfs.noaa.gov/ia/slider_stories/2013/04/us_russia.html
http://www.nmfs.noaa.gov/ia/slider_stories/2013/04/agreement.pdf

The Convention on the Conservation and Management of the Pollock Resources in the Central Bering Sea (Also called the "Donut Hole" convention)

The "Donut Hole" convention agreement established responsibility for the conservation, management, and optimum utilization of pollock resources in the high seas area of the Bering Sea. Member states (China, Japan, Korea, Poland, Russia, and the United States) have maintained a moratorium on commercial pollock fishing in the Convention Area since 1993 in an effort to allow the stock to rebuild. The moratorium is still active. The United States continues to promote and support these international conservation measures (http://www.nmfs.noaa.gov/ia/bilateral/docs/US-Russia_ICC_IA_Book.pdf).

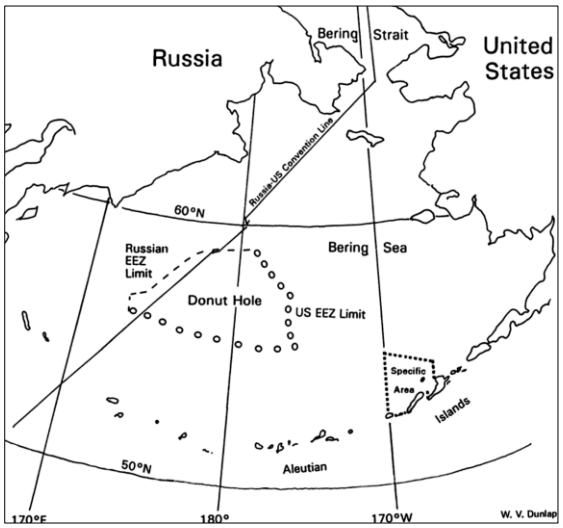


Figure 1. The Donut Hole area in the Bering Sea.

Alaska Pollock across the Russian federation line

In the Gulf of Alaska, pollock are considered as a single stock separate from those in the Bering Sea and Aleutian Islands. They are semi-demersal (i.e., semi-bottom dwelling) distributed from near the surface to depths of 500 m. In the BSAI region, three areas are identified for pollock management purposes. These include the eastern Bering Sea shelf, the Aleutian Islands Region and the Central Bering Sea - Bogoslof Island area. In late winter/early spring pollock form huge spawning aggregations, including those found in Shelikof Strait and the eastern Bering Sea northwest of Unimak Island. Smaller aggregations in the Gulf of Alaska include those at the Shumagin Islands, the entrance to Prince William Sound, and near Middleton Island. In summer, large aggregations have been found on the east side of Kodiak Island, nearshore along the southern Alaska Peninsula, and other areas. Pollock migrate seasonally between spawning and feeding areas. They feed on copepods, euphausiids, and fish, and are preyed on by other fish, marine mammals, and seabirds. Pollock enter the fishery around age 3 and live to 15 years or more. In the Russian EEZ, pollock are considered to form two stocks, a western Bering Sea stock centered in the Gulf of Olyutorski, and a northern stock located along the Navarin shelf from 171°E to the U.S. - Russia Convention line. There is some indication (based on NMFS surveys) that the fish in the northern region may be a mixture of eastern and western Bering Sea pollock with the former predominant.

The stocks of pollock within Alaska's Eastern Bering Sea occur largely within the Alaska EEZ, but there is some apparent migration of pollock to the northwest which can result in varying amounts of Eastern Bering Sea shelf pollock found in the Cape Navarin area of Russia. This seasonal movement is thought to be ontogenetic (with younger pollock in a nursery area in the northern zone) with regular migrations to the southeast region for spawning and summer shelf regions for feeding.

http://www.afsc.noaa.gov/REFM/Docs/2013/EBSpollock.pdf

The 2014 summer acoustic survey, found that most of the pollock biomass in the Bering Sea was in the U.S. exclusive economic zone (EEZ), distributed between the Pribilof Islands and Cape Navarin, between roughly the 80 m and 200 m isobaths. The survey found that approximately 95% of the pollock biomass was found within the Alaska EEZ and the remaining 5% within the Russian EEZ, in the Cape Navarin area. Note that there was no summer acoustic survey in 2013. The figure below shows the overall biomass of pollock in the Eastern and Western Bering Sea in 2014.

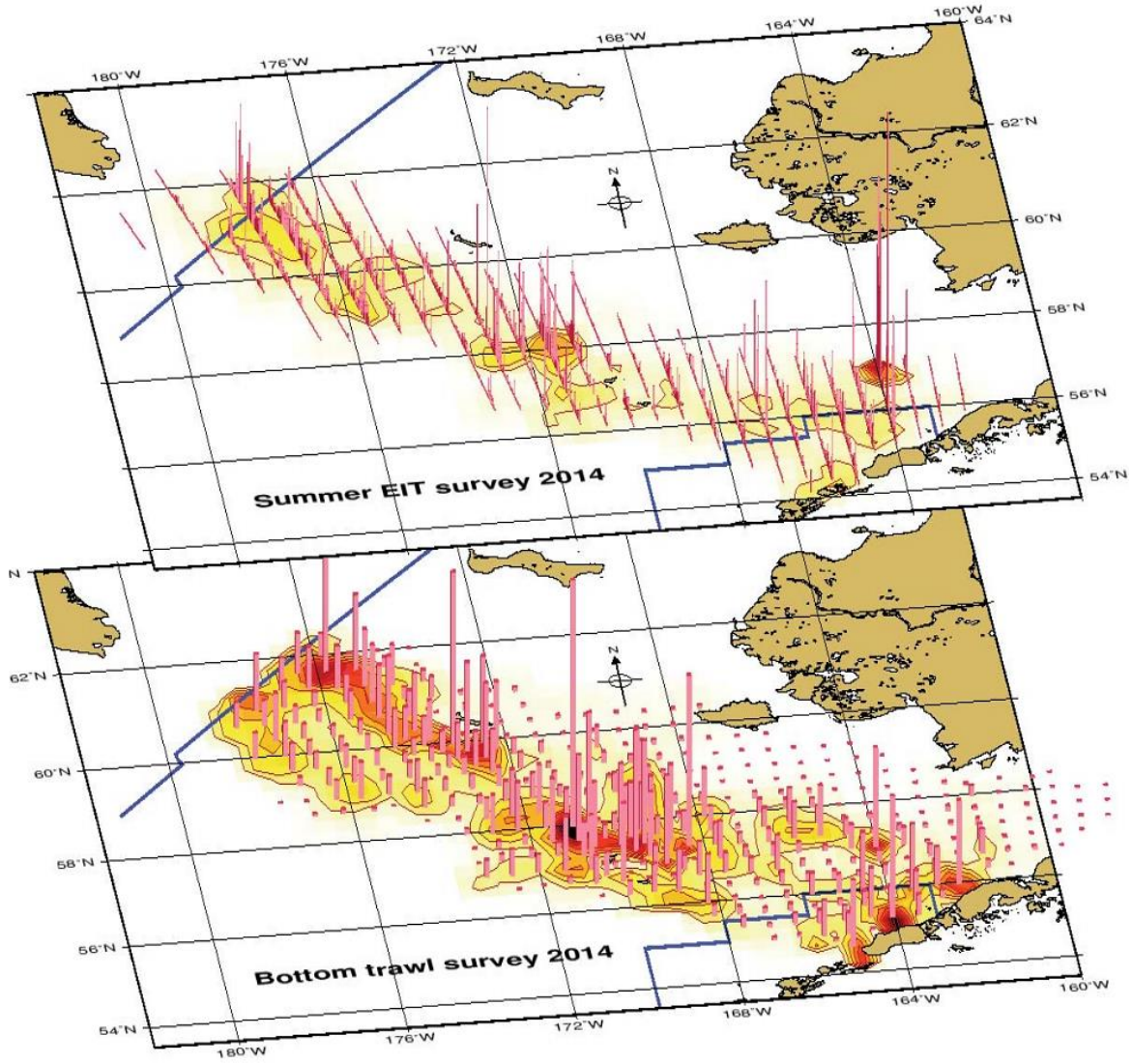


Figure 2. Comparison of the mid-water EBS pollock density from the Acoustic Trawl (AT) survey (top layer) and that of the Bottom Trawl Survey (BTS) (bottom layer). The blue line in the SE corner of the region delineates the Steller sea lion conservation area (SCA).

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf

These surveys are largely carried out by the U.S. (apart in 2002 by Russia). Stock assessments used for management of the stock in Alaska (setting the upper limit of the TAC) have considered this migration and possible removals using sensitivity analyses. Results of these sensitivity analysis presented in past EBS pollock SAFE Reports indicate that the default approach used (i.e., implicitly assuming movement and subsequent harvests within the Russian zone represent a component of additional mortality) provides added precaution to the U.S. TAC setting process. Also, the assessment model attempts to incorporate inter-annual variability of movement into the Russian zone by allowing for time-varying age-specific survey selectivity.

http://www.afsc.noaa.gov/REFM/Docs/2013/EBSpollock.pdf
http://www.afsc.noaa.gov/REFM/Docs/2013/AIpollock.pdf
http://www.afsc.noaa.gov/REFM/Docs/2013/BOGpollock.pdf
http://www.afsc.noaa.gov/REFM/Docs/2013/GOApollock.pdf

New in 2014

C9 Bering Sea Canyons Motion – North Pacific Fishery Management Council
April 13, 2014

The purpose of the Bering Sea Canyons Motion adopted in April 2014 is to determine whether and how the Council should recommend amendment of the BSAI Groundfish and Crab FMPs to protect known, significant concentrations of deep-sea corals in the Pribilof Canyon and the adjacent slope from fishing impacts under the appropriate authorities of the MSA.
This action may identify a discrete area or areas of significant abundance of deep sea corals in, and directly adjacent to, the Pribilof canyon, assess the potential for fishing impacts on the identified area or areas of significant coral abundance, evaluate the historical and current patterns of fishing effort and fish removals in and adjacent to the Pribilof Canyon, consider the types of management measures that would be appropriate to conserve discrete areas of significant coral abundance while minimizing impacts on established fishing activity, and identify the appropriate authority under which the Council may take action.

The North Pacific Fishery Management Council has taken significant steps to protect coral and coral habitats in the Aleutian Islands and Gulf of Alaska. Recent models and data have shown that Pribilof Canyon and some areas along the Bering Sea slope may also contain deep sea coral. Results of surveys planned for summer 2014 should further refine the understanding of coral occurrence within the canyons and slope habitats, and this information will be useful in refining alternatives developed in response to this purpose and need. There is historical fishing activity that occurs within and around the Pribilof Canyon. Deep sea corals may be important habitat for several commercially important fish species managed by the Council, and may provide important ecosystem services for the maintenance of healthy Bering Sea ecosystems. Consistent with the Council's adopted policy for incorporating the Ecosystem Approach to fisheries management and the authorities of the MSA, the Council intends to initiate action to investigate where and how to protect coral in the Pribilof Canyon and directly adjacent slope (http://www.npfmc.org/bering-sea-canyons/).

C-5 Bering Sea Salmon Bycatch Council motion – June 7, 2014

In June 2014, the Council initiated an analysis of Chinook and chum salmon bycatch measures in the Bering Sea pollock fishery with the following purpose and need statement and alternatives:

The current chum salmon bycatch reduction program under Amendment 84 does not meet the Council's objectives to prioritize Chinook salmon bycatch avoidance, while preventing high chum salmon bycatch and focusing on avoidance of Alaska chum salmon stocks; and allow flexibility to harvest pollock in times and places that best support those goals. Incorporating chum salmon avoidance through the Incentive Plan Agreements (IPAs) should more effectively meet those objectives by allowing for the establishment of chum measures through a program that is sufficiently flexible to adapt to changing conditions quickly.

The current Chinook salmon bycatch reduction program under Amendment 91 was designed to minimize bycatch to the extent practicable in all years, under all conditions of salmon and pollock abundance. While Chinook salmon bycatch impact rates have been low under the program, there is evidence that improvements could be made to ensure the program is reducing Chinook salmon bycatch at low levels of salmon abundance. This could include measures to avoid salmon late in the year and to strengthen incentives across both seasons, either through revisions to the IPAs or regulations. Five non mutually exclusive alternative have been provided.
http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chinook-salmon-bycatch/

2014 Steller Sea Lion Biological Opinion

Section 7 Consultation Biological Opinion – Authorization of Alaska groundfish fisheries under the Proposed Revised Steller Sea Lion Protection Measures, April 2014.

NOAA Fisheries stated that proposed changes to fishing restrictions in the Aleutian Islands are not likely to jeopardize the continued existence of the endangered western population of Steller sea lions or adversely modify Steller sea lion critical habitat, according to a biological opinion issued on April 2nd 2014 under the Endangered Species Act.
The agency estimates that the proposed fishery management changes would relieve roughly two-thirds of the economic burden imposed on Aleutian Islands' fishermen by sea lion protection measures that took effect in 2011. Fishermen could see new regulations in place by January 2015.
The agency's previous biological opinion on the effects of fisheries, issued in 2010, found that the ongoing groundfish fisheries in the western and central Aleutian Islands were likely to jeopardize the continued existence of Steller sea lions and adversely modify their critical habitat. This led NOAA Fisheries to develop a "Reasonable and Prudent Alternative" under the ESA, which closed the Atka mackerel and Pacific cod fisheries in the western Aleutians in 2011, and further restricted these fisheries in the central Aleutians. The 2010 opinion underwent two external reviews—one commissioned by NOAA and undertaken by the Center for Independent Experts, and a second provided by the states of Alaska and Washington. NOAA Fisheries conducted several new analyses in response to the reviews, which are incorporated into the new 2014 opinion.

The new biological opinion was developed based on the best available scientific information and notes that considerable changes have occurred in the Aleutian Islands fisheries, coupled with new data and analyses that help give the agency a better picture of the potential for commercial fisheries to compete with sea lions for Pacific cod, Atka mackerel and pollock.

Beginning in 2014, NOAA and the North Pacific Fishery Management Council split the total allowable catch for Pacific cod between the Bering Sea fishing grounds and the Aleutian Islands, resulting in far less allowable Pacific cod harvest in the Aleutians. Additional changes that are being considered would limit the amount, timing and location of Atka mackerel, Pacific cod and pollock harvests inside Steller sea lion critical habitat in the Aleutians.

NOAA Fisheries remains concerned that large fishery harvests from important areas in the Aleutians over a short amount of time has the potential to deplete concentrations of fish that Steller sea lions depend upon. However, the proposed measures would limit and spread out the catch enough to meet the requirements of the Endangered Species Act, and are consistent with NOAA Fisheries' views on dispersing the harvest in space and time to avoid localized depletion of fish that are prey species for Steller sea lions.

NOAA Fisheries is completing an environmental impact statement on the new fishery management measures, and expects to implement the new regulations in January 2015.

http://alaskafisheries.noaa.gov/newsreleases/2014/ssl040214.htm

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.

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

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating Determination

No significant change has occurred since the previous surveillance assessment in 2013.

The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. These include decision-making processes and activities relevant to fishery resources and users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. With regards to conflict avoidance and resolution between different fisheries, the North Pacific Fishery Management Council (NPFMC) and the Board of Fisheries (BOF) tend to avoid conflict by actively involving stakeholders in the process leading up to decision making. Both entities provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Council and the BOF actively encourages stakeholder participation, and all their deliberations are conducted in open, public sessions. Effectively, these meetings provide forums for avoidance of potential fisheries conflicts.

NEPA and ACMP

The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. These include decision-making processes and activities relevant to fishery resources and users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. 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. The NEPA process is essentially a biological/environmental, and socio-economic impact assessment where proposed options for significant developments and/or changes in current management practices are evaluated, before a final decision is taken. One of the latest NEPA analyses has seen the restructuring of the observer program to cover the previously unobserved vessels less than 60 feet LOA participating in groundfish and halibut harvest.
http://www.afsc.noaa.gov/FMA/Manual_pages/MANUAL_pdfs/manual2013.pdf

The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. Fisheries are relevant to the NEPA process in two ways. First, each NPFMC fisheries package must go through the NEPA review process. Second, any project that could impact fisheries (i.e., oil and gas, mining, coastal construction projects, etc.,) that is either on federal lands, in federal waters, receives federal funds or requires a federal permit, must go through the NEPA process. In this manner, both fisheries and non-fisheries projects that have a potential to impact fisheries have a built in process by which concerns of the NPFMC, NMFS, state agencies, industry, other stakeholders or the public must be accounted for.

DEC

The Alaska Department of Environmental Conservation (DEC) implements statutes and regulations affecting air, land and water quality. DEC is the lead state agency for implementing the federal Clean Water Act and its authorities provide considerable opportunity to maintain high quality fish and wildlife habitat through pollution prevention (http://dec.alaska.gov/).

ADFG

ADFG protects estuarine and marine habitats primarily through cooperative efforts involving other state and federal agencies and local governments. 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 Endangered Species program.

DNR

The Alaska Department of Natural Resources (DNR) manages all state-owned land, water and natural resources except for fish and game. This includes most of the state's tidelands out to the three mile limit and approximately 34,000 miles of coastline. DNR authorizes the use of log-transfer sites, access across state land and water, set-net sites for commercial gill net fishing, mariculture sites for shellfish farming, lodge sites and access for the tourism industry, and water rights and water use authorizations. DNR also uses the state Endangered Species Act to preserve natural habitat of species or subspecies of fish and wildlife that are threatened with extinction (http://dnr.alaska.gov/).

USFWS

The U.S. Fish and Wildlife Service (USFWS) is a bureau within the Department of the Interior. Its objectives include 1) Assisting in the development and application of an environmental stewardship ethic, based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility; 2) Guide the conservation, development, and management of the US's fish and wildlife resources. 3) Administer a national program to provide the public opportunities to understand, appreciate, and wisely use fish and wildlife resources. The USFWS functions include enforcement of federal wildlife laws, protection of endangered species, management of migratory birds, restoration of nationally significant fisheries, conservation and restoration of wildlife habitat such as wetlands, help of foreign governments with their international conservation efforts, and distribution of hundreds of millions of dollars, through the Wildlife Sport Fish and Restoration program, in excise taxes on fishing and hunting equipment to State fish and wildlife agencies (http://www.fws.gov/help/about_us.html).

ANILCA

The Alaska National Interest Lands Conservation Act (ANILCA) directs federal agencies to consult and coordinate with the state of Alaska. State agencies responsible for natural resources management, tourism, and transportation work as a team to provide input throughout federal planning processes (http://dnr.alaska.gov/commis/opmp/anilca/).

BOEM

The Bureau of Ocean Energy Management (BOEM) (previously Minerals and Management) 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 and the process for application and approval of oil exploration permits overlaps extensively with evaluations by ADNR, ADFG and ADEC given the potential impacts of such activities on anadromous and other marine resources and their habitat. An example of this is provided by the *Cook Inlet Offshore Oil & Gas Exploration Permit Application & Approval Process* available at: http://dog.dnr.alaska.gov/Permitting/Documents/Arcadis/Arcadis_Flowchart_CookInletOffshore_Draft.pdf

OPMP

The Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP) coordinates the review of larger scale projects in the state. Because of the complexity and potential impact of these projects on multiple divisions or agencies, these projects typically benefit from a single primary point of contact. A project coordinator is assigned to each project in order to facilitate interagency coordination and a cooperative working relationship with the project proponent. The office deals with a diverse mix of projects including transportation, oil and gas, mining, federal grants, ANILCA coordination, and land use planning. Every project is different and involves a different mix of agencies, permitting requirements, statutory responsibilities, and resource management responsibilities (http://dnr.alaska.gov/commis/opmp/).

The assessment team considers that collectively: the NEPA process, existing agencies and processes (e.g. ADFG, ADEC, DNM, USFWS, ANILCA OPMP, and BOEM), and the existing intimate and routine cooperation between federal and state agencies managing Alaska's coastal resources is capable of planning and managing coastal developments in a transparent, organized and sustainable way.

Conflict Avoidance in the fisheries sector

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

In 2005, the AFSC compiled baseline socioeconomic information about Alaskan fishing communities

in the first edition of *Community Profiles for North Pacific Fisheries – Alaska* (NOAA-TM-AFSC-160). Between 2010 and 2011, AFSC went through the process of updating the profiles (NOAA-TM-AFSC-230). A total of 195 communities have now 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. The profiles include information collected from communities in the Alaska Community Survey, which was conducted during summer 2011, and the Processor Profiles Survey, which was conducted in fall 2011. The community profiles are available at the following url: http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php and the latest report at the following url: http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf.

The coastal zone is monitored as part of the coastal management process using physical, chemical, biological, economic and social parameters. Involvement include federal and state agencies and programs including the U.S. Forest Service, U.S. Fish and Wildlife Service, NMFS Pacific Marine Environmental Lab (PMEL), the Alaska Department of Environmental Conservation (DEC) Division of Water, ADFG Habitat Division, the AFSC's *"Ecosystem Monitoring and Assessment Program",* The NMFS' Habitat Conservation Division (HCD) and their Essential Fish Habitats (EFH) monitoring and protection program, the U.S. Coast Guard, the NMFS Alaska Regional Office's Restricted Access Management Program (RAM), the Alaska National Interest Lands Conservation Act (ANILCA) federal agencies cooperation directive, and the Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP) coordinating the review of large scale projects in the state of Alaska.

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

FAO CCRF 7.3.3/7.2.2

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

The Magnuson Stevens Fishery Conservation and Management Act (MSA) is the primary domestic legislation governing the management of the nation's marine fisheries. Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. These include Groundfish FMPs for the Gulf of Alaska and the Bering Sea & Aleutian Islands which incorporate the pollock fisheries in those regions. Both FMPs present long-term management objectives for the Alaska pollock fishery and were updated in 2014. In state waters (0-3 nm), the Prince William Sound (PWS) pollock fishery is managed by ADFG and the BOF using "5 AAC 28.263. Prince William Sound Pollock Pelagic Trawl Management Plan" which sets the regulations for the directed state pollock fishery.

GOA and BSAI FMPs objectives

The MSA, as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. 1851), with which all fishery management plans must be consistent. Under the direction of the NPFMC, the GOA and BSAI FMPs define nine management and policy objectives that are reviewed annually. They are:

1) Prevent Overfishing;
2) Promote Sustainable Fisheries and Communities;
3) Preserve Food Webs;
4) Manage Incidental Catch and Reduce Bycatch and Waste;
5) Avoid Impacts to Seabirds and Marine Mammals;
6) Reduce and Avoid Impacts to Habitat;
7) Promote Equitable and Efficient Use of Fishery Resources;
8) Increase Alaska Native Consultation and;
9) Improve Data Quality, Monitoring and Enforcement.

The national standards and management objectives defined in GOA and BSAI FMPs provide adequate evidence to demonstrate the existence of long-term objectives clearly stated in these management plans. Both FMPs present long-term management objectives for the Alaska pollock fishery. These include sections that describe a Summary of Management Measures and Management and Policy Objectives. The BSAI and GOA FMPs define specific management measures to avoid excess fishing capacity and maintain stocks that are economically viable for the fishing communities and industry to harvest and process. Management objectives to promote economic conditions for responsible fisheries, take into account the interests of subsistence, small-scale, and artisanal fisheries, define three management objectives to conserve biodiversity of aquatic habitats and protect endangered species; and describe management measures to assess environmental impacts from human activities.

http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf

State Management: 5 AAC 28.089 Guiding Principles for groundfish fishery regulations

The BOF will, to the extent practicable, consider the following guiding principles when taking actions associated with the adoption, amendment, or repeal of regulations regarding groundfish fisheries:

(1) conservation of the groundfish resource to ensure sustained yield, which requires that the allowable catch in any fishery be based upon the biological abundance of the stock;
(2) minimization of bycatch of other associated fish and shellfish and prevention of the localized depletion of stocks;
(3) protection of the habitat and other associated fish and shellfish species from non sustainable fishing practices;
(4) maintenance of slower harvest rates by methods and means and time and area restrictions to ensure the adequate reporting and analysis necessary for management of the fishery;
(5) extension of the length of fishing seasons by methods and means and time and area restrictions to provide for the maximum benefit to the state and to regions and local areas of the state;
(6) harvest of the resource in a manner that emphasizes the quality and value of the fishery product;
(7) use of the best available information presented to the board; and
(8) cooperation with the NPFMC and other federal agencies associated with groundfish fisheries management.
http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section089.htm

Prince William Sound FMP

In state waters (0-3 nm), the Prince William Sound (PWS) pollock fishery is managed by ADFG and the BOF; "*5 AAC 28.263.* The *Prince William Sound Pollock Pelagic Trawl Management Plan*" sets the regulation for the directed state pollock fishery. The plan indicates the three fishery subareas in PWS (Bainbridge Section; Knight Island Section; Hinchinbrook Section), the gear allowed (pelagic trawl), the maximum guideline harvest level percentage that can be taken out any of these areas (60%), and the total bycatch weight of all species allowed (5% of total round weight of pollock harvested). To assure the harvest levels and bycatch caps are controlled, the BOF implemented a 300,000 pound trip limit in the PWS pollock fishery (5 AAC 28.070 & 5 AAC 28.073). This assures an orderly fishery and controls harvest power in a remote trawl fishery.

http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section263.htm

B. Science and Stock Assessment Activities

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

FAO CCRF 7.1.9/7.4.4/7.4.5/7.4.6/8.4.3/12.4
ECO 29.1-29.3

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating determination

The NMFS and the ADFG collect fishery data and conduct fishery independent surveys to assess the pollock fishery and ecosystems in GOA and BSAI areas. GOA and BSAI SAFE documents provide complete descriptions of data types and years collected. Records of catch and effort are firstly recorded through the elanding (electronic fish tickets) catch recording system and secondly, collected by vessel captains in voluntary and required logbooks. Fishery independent data are collected in regular surveys of both the GOA and BSAI regions and by the observer program present in both regions. A summer acoustic trawl survey is carried out annually, alternating between the GOA and EBS areas. Bottom trawl surveys are carried out yearly in the EBS and biennially in the GOA and AI. Other sources of data (such as vessel-of-opportunity, crab, and international surveys) are also considered during the stock assessment process. The Prince William Sound pollock stock is estimated by ADFG bottom trawl surveys in summer and hydroacoustic surveys in winter (when possible).

The NMFS and the ADFG collect CPUE and biological information from the fishery (fishery dependent data) via on-board observers and information from regular surveys (fishery independent data), to assess the pollock stocks and their ecosystems in the GOA and BSAI areas. SAFE documents are used to determine stock status and contain complete descriptions of data types and time frame (Tables 1-4). Note that for the 2014 GOA SAFE report all pre-1984 trawl survey data was excluded due to inconsistencies in design and purpose over time. The NMFS BSAI and GOA surveys which began in 1984 provide the basis for stock biomass estimates. Also, the egg production index (1981-1992) was removed from the model because that survey is no longer being conducted.

Table 1. Summary of data sources used for the 2014 GOA stock assessment.

Source	*Type*	*Years*
Fishery	Total catch biomass	1970-2013
Fishery	Age composition	1975-2013
Shelikof Strait acoustic survey	Biomass	1992-2014
Shelikof Strait acoustic survey	Age composition	1992-2014
NMFS bottom trawl survey	Area-swept biomass	1990-2013
NMFS bottom trawl survey	Age composition	1990-2013
ADFG trawl survey	Area-swept biomass	1989-2013
ADFG survey	Age composition	2000, 2002, 2004, 2006, 2008, 2010, 2012

http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

Table 2. Summary of data sources available for the 2014 EBS stock assessment.

Source	Type	Years
Fishery	Catch biomass	1964-2014
Fishery	Catch age composition	1964-2013
Fishery	Japanese trawl CPUE	1965-1976
EBS bottom trawl	Area-swept abundance (numbers) index	1982-2014
EBS bottom trawl	Proportions at age	1982-2014
Acoustic trawl survey	Population abundance (numbers) index	1979, 1982, 1985, 1988, 1991, 1994, 1996, 1997, 1999, 2000, 2002, 2004, 2006-2010, 2012, 2014
Acoustic trawl survey	Proportions at age	1979, 1982, 1985, 1988, 1991, 1994, 1996, 1997, 1999, 2000, 2002, 2004, 2006-2010, 2012, 2014
Acoustic vessels of opportunity (AVO)	Population abundance (numbers) index	2006-2013 (same as in 2013)

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf

Table 3. Summary of data sources used for the 2014 AI stock assessment.

Source	Data	Years
NMFS AI Bottom Trawl Survey (ALBIOMASS_INPFC)	Survey Biomass	1991, 1994, 1997, 2000, 2002, 2004, 2006, 2010, 2012, and 2014
NMFS AI Bottom Trawl Survey (RACEBASE.SPECIMEN)	Survey Age Data	1980, 1983, 1986, 1991, 1994, 1997, 2000, 2002, 2004, 2006, 2010, and 2012
AKFIN Domestic Blend (COUNCIL.COMPREHENSIVE_BLEND_CA)	Total Catch	1991-2014
Ianelli et al. 2001	Total Catch	1978-1990
Observer Program (OBSINT.DEBRIEFED_AGE)	Fishery Age Data	1978-1987, 1994-1996, and 1998
AICASS	Fishery Age Data	2006 - 2008

http://www.afsc.noaa.gov/REFM/Docs/2014/AIpollock.pdf

Table 4. Summary of data sources used for the 2014 BI stock assessment.

Source	Type	Years
Fishery	Catch biomass	1977-2014
Fishery	Catch age composition	1988
Acoustic trawl survey	Population biomass (q=1)	1988-2003, 2005-2007, 2009, 2012, 2014
Acoustic trawl survey	Proportions at age	1988-2003, 2005-2007, 2009, 2012

http://www.afsc.noaa.gov/REFM/Docs/2014/BOGpollock.pdf

Fishery Dependant Data

North Pacific Fishery Observer Program

Data gathered under the auspices of the North Pacific Groundfish Observer Program (NPGOP) covers all biological information associated with commercial fisheries, including catch weights (landings and discards), catch demographics (species composition, length, sex and age) and interactions with sharks, rays, seabirds, marine mammals and other species with limited or no commercial value. Beginning in 2013, Amendment 86 to the FMP of the BSAI and Amendment 76 to the FMP of the GOA establish the new North Pacific Groundfish and Halibut Observer Program. All vessels fishing for groundfish in federal waters are required to carry observers, at their own expense, for at least a portion of their fishing time.

Observer data is collated and utilized for the following:

1) to monitor target catch and bycatch;
2) to understand the population status and trends of fish stocks and protected species, as well as the interactions between them;
3) to determine the quantity and distribution of net benefits derived from living marine resources;
4) to predict the biological, ecological, and economic impacts of existing management actions and management actions proposed. http://www.npfmc.org/observer-program/

The NMFS collects the necessary information from a number of sources to conserve and manage the groundfish and halibut fisheries in the Gulf of Alaska (GOA) and the Bering Sea and Aleutian Islands (BSAI) management areas. Data collected by well-trained, independent observers are a cornerstone of management of the Federal fisheries off Alaska. These data are needed by the North Pacific Fishery Management Council (Council) and NMFS to comply with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Marine Mammal Protection Act, the Endangered Species Act, and other applicable Federal laws and treaties.

The FMA division also deploys staff to monitor landings at shore-based facilities and collect demographic biological data (species, length/age, sex etc…) which is subsequently provided to the Alaska Fisheries Science Center for stock assessment purposes.
http://www.npfmc.org/observer-program/

Observer report for 2013 (published in 2014)

Fees and budget

Federal start-up funding was sufficient to pay for observer coverage until fees were collected and available for use. NMFS successfully implemented the ex-vessel based fee collection program recommended by the Council to fund observer coverage in the partial coverage category.
Cooperation by processors and fishermen in the first year was instrumental to the success of the fee collection program. A total of $4,251,452 in observer fees was collected for 2013. The breakdown in contribution to the observer fee by species is: 38% halibut, 31% sablefish, 19% Pacific cod, 10% pollock, and 2% all other groundfish species.

Deployment Performance Review

The 2013 Observer Report presents a review of the deployment of observers in 2013 relative to the intended sampling plan and goals of restructured observer program. One goal of the observer program restructuring action was to address longstanding concerns about statistical bias of observer collected data. In evaluating the 2013 sampling plan for the deployment of observers, the review identified situations where bias may exist and recommendations for further evaluation were provided, including improvements to the deployment process that could be considered by NMFS for the 2015 Annual Deployment Plan.

Where the anticipated deployment goals met?

Evaluation of the deployment performance was conducted at the stratum level. Each stratum is defined by the sampling unit (i.e., vessels or trips) and/or rate of sampling. There were two strata under partial coverage: vessel selection and trip selection (the selection unit being vessels or trips, respectively).

Trip Selection

- The realized rates of coverage for 2013 met the anticipated coverage goals for all trip selection strata.
- The Observer Declare and Deploy System performed as expected throughout the year and was unaffected by the government shutdown in October.

Vessel Selection

- Coverage levels in vessel selection were less than expected values during the first five selection periods (January - October). The random selection of vessels for observer coverage was abandoned and all eligible vessels were selected during the last period (November-December). During this selection period coverage levels achieved the anticipated number of vessels specified in the 2013 ADP.
- Vessels were selected for sampling based on whether they fished within a particular selection period in 2012. This meant that any vessels that did not fish in 2012 but did fish in 2013 were not part of the selection pool. This discrepancy between the selection list (sampling frame), and the list of vessels that actually fished (target frame), resulted in some vessels within the vessel selection stratum having no probability of selection. The number of vessels that fished in 2013, but not in 2012, ranged between 9 (January-February) and 49 (July-August) vessels. This problem was evident in all six vessel selection periods. The percent of non-response (vessels that were selected and fished, but were not observed, largely because of conditional releases) ranged between 13% and 71% with peak values between May and July.
- The combination of the conditional releases and a poorly defined list of vessels resulted in NMFS having to select a greater number of vessels in each selection period than desired to reach anticipated selection goals in 2013, decreased the sampling efficiency of the selection.

Dockside Sampling

- Coverage rates for dockside sampling did not meet the objective of deploying observers to complete salmon sampling during all pollock offloads in the Gulf of Alaska. The Observer Program sampled 91% of pollock deliveries. The sampling plan presented several challenges for obtaining a census of deliveries: notifications were not always made, observers were not always available when and where a pollock delivery was made, salmon held by the processing plant may not have represented a census of all salmon from which the observer obtained his or her systematic sample.

Was the Coverage Representative?

Trip Selection

- No large differences in temporal patterns were apparent in the actual number of observed trips versus the anticipated number of observed trips throughout the year. Although small deviations from the anticipated number of observed trips were evident at the start and end of the year.
- Spatial analysis across federal reporting areas showed the anticipated coverage rates generally were as expected (e.g., consistent spatial patterns of extreme values).
- The OSC evaluated whether observed and unobserved trips had similar characteristics. The empirical distributions showed no large differences in trip length, weight of landed catch per trip, number of NMFS areas fished, or diversity of species caught during a trip. However, small sample sizes during some periods made determining inconsistencies difficult.
- No obvious pattern in trip duration for tender versus non-tender trips was apparent, but the number of observed tender trips was too low to examine on a fine temporal or spatial scale.

Vessel Selection

- The impact of non-response (i.e., a vessel that was selected to be observed but was not) on the spatial distribution of observer coverage on vessel-selected trips was large. In total, 52% of the vessels, and 50% of the trips resulting from these vessels were expected to be observed, but were not due to conditional releases. This high level of non-response, coupled with a low sample size and using vessels as a selection unit likely resulted in systematic spatial coverage issues, with coverage levels being consistently different than expected in Federal reporting area 650 (Southeast Outside District) for much of the year (March and October).
- The small sample sizes per selection period made distinguishing differences in trip attributes between observed and unobserved portions of the fleet difficult. With this caveat in mind, NMFS did not observe large differences in trip duration or landed catch weight. They did observe differences in the number of NMFS areas visited per trip and the diversity of species in landed catch (observed trips had landings with higher diversity).

Sample Size Metrics

- As expected, reporting areas and gear types that had more fishing effort had higher probabilities of having observer data in that gear/area/stratum combination. There were differences in the probability of an observed trip between gear types, with trawl generally having a higher probability of observation due to concentrated fishing in fewer areas (e.g. more trips in any given area) whereas hook-and-line was more disperse (e.g., fewer trips in an area) and more areas/stratum combinations had a higher probability of zero observer coverage.

Observer Availability

- With few exceptions, observers for the partial coverage category were available to deploy on vessels in the trip and vessel selection pools. The restructured program resulted in observer coverage on many vessels less than 60 feet that had not previously been observed,

and the contracted observer provider company was able to successfully deploy observers to many remote port locations.

Compliance and Enforcement

- During 2013, AKD agents and officers engaged with industry and the Observer Program in 731 hours of observer related outreach, education, and compliance assistance. Agents and officers in all AKD field offices responded to industry questions and potential observer related violations and participated in industry outreach and Agency meetings.
- Outreach and a collaborative agency response resulted in good industry awareness of the restructured Observer Program and an overall high level of compliance.

A measure of observer coverage for catch in the pollock fishery has been provided for the BSAI and GOA fleets in the tables below.

Table 5. Total catch (retained and discard) of groundfish species and halibut (in metric tons) caught in the Gulf of Alaska in 2013.

			Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
Sector	Species Caught	Trip Disposition	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard
Catcher/ Processor	Deepwater Flatfish	Observed	16	47			8,837	3,400				
		Total	17	49			8,837	3,400				
	Halibut	Observed		308				547				
		Total		309				547				
	Other groundfish	Observed	38	337			1,031	889				
		Total	39	345			1,031	889				
	Pacific cod	Observed	3,110	98			1,068	760				
		Total	3,128	99			1,068	760				
	Pollock	Observed	4	6			1,156	1,335				
		Total	4	6			1,156	1,335				
	Rockfish	Observed	65	129			11,271	1,522				
		Total	79	129			11,271	1,522				
	Sablefish	Observed	536	11			393	47				
		Total	649	11			393	47				
	Shallow-water flats	Observed		4			1,219	34				
		Total		4			1,219	34				
Catcher Vessel	Deepwater Flatfish	Observed	<1	31			2,698	429		<1	75	1
		Total	1	417			12,946	1,972	<1	1	546	29
	Halibut	Observed	677	746				186		1		19
		Total	10,947	11,613	1			1,262		89		30
	Other groundfish	Observed	50	370			259	210	5	8	34	6
		Total	550	5,825	<1		1,528	1,071	207	244	309	36
	Pacific cod	Observed	960	118			1,992	159	329	1	113	<1
		Total	7,712	1,899	476		17,576	1,524	16,749	109	740	3
	Pollock	Observed	15	3			1,137	164	<1	<1	12,906	60
		Total	90	34	17		8,556	602	12	8	81,471	359
	Rockfish	Observed	78	90			6,898	115		<1	1,913	10
		Total	957	898	27		7,394	209	<1	8	2,129	64
	Sablefish	Observed	1,187	56			344	<1		<1	<1	<1
		Total	9,871	566			404	<1		<1	1	<1
	Shallow-water flats	Observed	<1	2			609	16		<1	<1	<1
		Total	<1	16	<1		3,987	179	<1	2	73	2

Table 6. Total catch (retained and discard) of groundfish species and halibut (in metric tons) caught by catcher/processors in the BSAI in 2013.

Sector	Species Caught	Trip Disposition	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
			Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard
Catcher/ Processor	Atka Mackerel	Observed	2	23			20,750	658	<1	<1	1	<1
		Total	2	23			20,750	658	<1	<1	1	<1
	Flatfish	Observed	4	1,818			224,539	14,507	<1	295	6,351	2,281
		Total	4	1,854			224,562	14,508	<1	295	6,351	2,281
	Halibut	Observed	36	5,617				3,036		10		217
		Total	36	5,704				3,036		10		217
	Other groundfish	Observed	6	1,149			60	3,894	3	46	89	78
		Total	6	1,159			60	3,895	3	46	89	78
	Pacific cod	Observed	120,207	3,068			38,587	1,216	6,789	26	4,971	4
		Total	122,032	3,090			38,592	1,216	6,789	26	4,972	4
	Pollock	Observed	4,446	608			34,623	3,375	1	4	566,988	36
		Total	4,500	612			34,623	3,375	1	4	567,093	36
	Rockfish	Observed	104	172			31,066	722	<1	<1	265	60
		Total	129	175			31,066	722	<1	<1	265	60
	Sablefish	Observed	318	15			187	2			<1	
		Total	481	15			187	2			<1	
	Turbot	Observed	728	636			24,010	3,379	<1	1	270	121
		Total	751	652			24,010	3,379	<1	1	270	121
	Skates	Observed	5,687	14,441			1,176	2,925			592	705
		Total	5,730	14,645			1,176	2,927			592	705
	Sharks	Observed	<1	41			<1	5			1	15
		Total	<1	41			<1	5			1	15

Table 7. Total catch (retained and discard) of groundfish species and halibut (in metric tons) caught by catcher vessels in the BSAI in 2013.

Sector	Species Caught	Trip Disposition	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
			Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard
Catcher Vessel	Atka Mackerel	Observed		0			<1	1		<1	60	9
		Total		0			<1	2	<1	3	60	9
	Flatfish	Observed		1			8	262	<1	<1	1,067	8
		Total		15			10	382	<1	6	1,101	8
	Halibut	Observed	233	78				318		1		26
		Total	2,256	513	25			416		17		27
	Other groundfish	Observed		3			2	158	0	10	111	1
		Total	<1	49			2	217	40	376	113	1
	Pacific cod	Observed	13	26			27,953	173	760	4	2,354	1
		Total	1,039	361	15		36,423	240	23,369	73	2,392	1
	Pollock	Observed		0			1,320	805		<1	539,680	221
		Total	<1	0			1,578	1,033	1	1	548,741	224
	Rockfish	Observed	3	15			<1	10		<1	224	48
		Total	38	78			<1	15	<1	6	225	48
	Sablefish	Observed	42	2				0	4	<1	<1	
		Total	569	14				0	438	1	<1	
	Turbot	Observed		20			2	159		<1	206	<1
		Total	<1	96			2	209	<1	31	211	<1
	Skates	Observed		58			1	145			179	61
		Total	1	297			1	189			185	62
	Sharks	Observed		1			<1	<1			1	19
		Total		19			<1	<1		<1	1	19

Source: http://alaskafisheries.noaa.gov/sustainablefisheries/observers/annualrpt2013.pdf

Dockside Deployments and coverage rates

Coverage rates in dockside observer deployments did not meet stated objectives and warrant further investigation. Observer dockside deployments were made to comply with the sampling requirements for obtaining genetics tissues from the bycatch of salmon within the pollock fishery. Dockside, this sampling design requires a census of the primary sampling units (pollock landings) and a systematic random sample of individual salmon in the bycatch. Rates of sampling individual fish are set from anticipated bycatch amounts and desired numbers of samples from the Auke Bay Laboratory of the AFSC. In the Bering Sea, Amendment 91 to the BSAI FMP facilitates the interception of pollock deliveries at dockside processing plants by observers by requiring 100% coverage and modifications to the way fish are offloaded increase the likelihood of detection of salmon bycatch in the offload.

In the Gulf of Alaska, a voluntary agreement between fishermen, processors, and NMFS was in place in 2012 that was codified into regulation as Amendment 93 of the GOA FMP. Amendment 93 does not carry full-coverage requirements for observers nor does it require modifications to the offload process to improve salmon bycatch detection. Amendment 93 in the Gulf of Alaska requires that the processing plant notify NMFS that a pollock delivery has occurred and set aside any salmon bycatch it obtains in the offload until an observer has had a chance to quantify it. This system offers multiple challenges for obtaining a census of deliveries: notifications may not be always made, observers may not always be available when and where a pollock delivery is made, and salmon held by the processing plant may not represent a census of all bycatch salmon from which the observer obtains his or her systematic sample. In addition, the definition of a pollock delivery is dependent on the captain at sea, the processor for dockside notification, and the percentage of pollock in the landed catch in the resulting data. For a combination of these reasons, the Observer Program sampled from only 91% of the pollock deliveries in the 2013 observer program review, defined by landed data and regulations as greater than or equal to 20% pollock in the landed catch.

Spatial Patterns in Dockside Deployments.

In full-coverage operations, which include those under Amendment 91 in the BSAI, the Observer Program obtained near census of all pollock deliveries; only three of 1,956 pollock deliveries were not observed (0.2%). In the partial-coverage operations, the Observer Program was able to sample from 73% of operations where pollock landings occurred. Most of these 739 deliveries occurred in Kodiak, where the Observer Program was stationing observers for this purpose; 92% of pollock offloads were observed in this port. The potential errors in properly identifying a pollock offload are illustrated by the number of non-pollock offloads observed. Such errors in the sampling frame for dockside observers appear to be minor (0.3%).

Table 8. Coverage in trip units for full and trip selection; vessels for vessel selection.

Stratum	Date		Trips (#)		Vessels (#)		Coverage (%)		95% percentile		Meets or exceeds expected?
	Start	End	Total	Observed	Total	Observed	Actual	Expected	Lower	Upper	
Full Coverage											
Regulatory	Jan. 1	Dec. 31	4,485	4,482	173	170	99.9	100.00			Yes
Voluntary			353	353	35	35	100.0				Yes
Total Full	Jan. 1	Dec. 31	4,840	4,835	178	175	99.9	100.00			
Partial Coverage: Trip Selection											
CV 1	Jan. 1	Jun. 21	2,375	386	267	151	16.2	14.8	13.3	16.2	Yes
CP 1			confidential				18.8		0.0	31.2	Yes
CV 2	Jun. 22	Aug. 16	250	23	69	15	9.2	11.1	7.6	15.2	Yes
CP 2			confidential				7.1		0.0	28.6	Yes
CV 3	Aug. 17	Dec. 31	1,308	177	206	96	13.5	14.8	12.9	16.7	Yes
CP 3			confidential				0.0		0.0	35.7	Yes
Total Trip	Jan. 1	Dec. 31	3,977	590	302	187	14.8	14.5[11]			

Partial Coverage: Vessel Selection											
1	Jan. 1	Feb. 28	262	16	51	3	5.9	13.7			**No**
2	Mar. 1	Apr. 30	453	45	146	13	8.9	11.6			**No**
3	May 1	Jun. 30	549	22	212	9	4.2	11.8			**No**
4	Jul. 1	Aug. 31	384	15	151	6	4.0	12.5			**No**
5	Sep. 1	Oct. 31	483	29	164	12	7.3	12.8			**No**
6	Nov. 1	Dec. 31	118	27	47	7	14.9	14.9			**Yes**
Total Vessel	Jan. 1	Dec. 31	2,249	154	388	41	10.6	11.0			
Partial Coverage: No Selection											
NMFS Do Not Deploy	Jan. 1	Dec. 31	3,040	0	610	0	0	0			**Yes**
Dockside											
Pollock	Jan. 1	Dec. 31	2,695[12]	2,972[3]			90.7	100.0			**No**

[11] Calculated from (sum(r_t*N_t))/ sum (N_t).
[12] Represents landings, not trips.

http://alaskafisheries.noaa.gov/sustainablefisheries/observers/annualrpt2013.pdf

Annual Deployment Plan for 2015

On September 2014, the Council approved the Annual Deployment Plan for 2015 with the following recommendations:

- Use trip selection strata to assign vessels in 2015.
- Using two selection strata for 2015: small vessel trip selection and large vessel trip selection.
- Use 12% selection probability for the small vessel trip selection stratum and 24% selection probability for the large vessel stratum.
- Allow conditional releases in 2015 for vessels in the small vessel trip selection stratum that: 1) do not have sufficient life raft capacity to accommodate an observer, and/or 2) to assist in addressing bunk space limited vessels, have been selected for two consecutive trips (e.g., the third consecutive trip is released).
- Vessels selected by NMFS to participate in EM Cooperative Research will be in the no selection pool while participating in such research.
- Trawl vessels that fish for Pacific cod in the BSAI will be given the opportunity to opt-in to full observer coverage and carry an observer at all times while fishing in the BSAI using the same approach as 2014.
- The Annual Report will include information to evaluate a sunset provision, including information on the potential for bias that could be introduced through life raft conditional release, the costs to an individual operator of upgrading to a larger life raft, and the enforcement disincentives from downgrading one's life raft.

http://www.npfmc.org/observer-program/ (see C1 Observer ADP Council Motion – FINAL 10/9/14)

Electronic monitoring

NMFS and the Council have developed an Electronic Monitoring (EM) Strategic Plan to integrated video monitoring into the Observer Program. Pacific States Marine Fisheries Commission (PSMFC) launched the Electronic Monitoring (EM) program in 2012 in anticipation of the Pacific Fishery Management Council (PFMC) considering EM as a compliance monitoring tool in the newly implemented Pacific Trawl Rationalization Program. In 2014, PSMFC expanded its EM program to work with the National Marine Fisheries Service - Electronic Monitoring Cooperative Research and Implementation Program which "has been developed to be responsive both to the NPFMC EM Strategic Plan, and to Senate language included in the 2014 NMFS appropriations bill, which directed NMFS to work with the small boat fixed gear fleet to implement a program designed to test the functionality of available electronic monitoring systems." (NMFS 2014)

Multiple research tracks are being undertaken as part of this cooperative research. At the February 2014 EM workshop in Juneau, a draft EM monitoring approach (EM approach 1) for deploying standard EM cameras was presented by industry members based on information needs outlined in a NOAA memo delivered to the EM workgroup. EM approach 1 identified fishery specific data elements, priority species, operator responsibilities and other operational factors to be tested in order to identify and inform decision points for NPFMC consideration. The 2014 field work that resulted from EM workgroup discussion had two initial objectives. The first was to collect field data to define, evaluate and verify assumptions associated with specific information requirements for technology based monitoring of Alaskan fixed gear fleets. Tasks under this objective include; evaluating the ability of EM reviewers to identify species grouping suggested by the NOAA memo, testing the ability of EM review to determine halibut release methods and injury codes, and evaluating logbook effort data needed to support an EM program. The second objective involved testing operational components of an EM program in order to identify field service needs and develop local support capacity.

Tasks under this objective include; evaluating camera configurations, testing handling procedures such as full retention of rockfish to aid in the identification of cryptic species, identifying field support services needed to ensure data quality, and evaluating the role of dockside monitoring in validating handling procedures and/or improving data quality. Also included in this objective was collecting cost data and identifying decision points related to cost factors.

Track 1 began in spring 2014 with deployment of EM systems on nine vessels in two home ports. The vessels were all longline vessels targeting sablefish (*Anoplopoma fimbria*) and/or Pacific halibut (*Hippoglossus stenolepis*). Forty eight trips were monitored using systems from Archipelago Marine Research Ltd (AMR) and Saltwater, Inc. (Saltwater) before the end of June when host vessels transitioned to other fisheries. The interim funding for the track 1 effort also ended in June. Overall, the 2014 field work helped provide a better understanding of field operation requirements in an Alaskan setting. It also created a controlled setting for deployment of EM technology and enabled industry to gain familiarity with EM systems. Technicians were trained and EM systems were deployed on vessels as a part of the field testing. Therefore, the basic operational elements are in place to carry out technology based monitoring on a limited scale, experiment with different

approaches, and develop procedures that inform program design and facilitate future scaling to other ports. PSMFC will be analyzing data sets from trips where the EM data are complete and where dockside monitoring information could be used to assess rockfish species identification. Both service providers were tasked to document their respective efforts and provide a summary of lessons learned. Data from the 2014 field work will continue to be evaluated and used to inform recommendations for the 2015 field season.
http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-276.pdf
http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/PSMFC_EMProgram.pdf

Catch data

The Alaska Regional office of NOAA Fisheries over sees fisheries that occur in US waters, covering 842,000 square nautical miles off the coast of Alaska. The office provides up to date catch reports for Fisheries Management.

Table 9. Gulf of Alaska catch report through December 13, 2014 (catch data shown in mt). Note that the vast majority of pollock is caught in the Western and Central Gulf.

Western, Central Pollock

Seasons	Account	Total Catch	Quota	Remaining Quota	% Taken	Last Week Catch
X	Pollock, 610 Shumagin	13,364	30,884	17,520	43%	0
X	Pollock, 620 Chirikof	83,078	84,274	1,196	99%	0
X	Pollock, 630 Kodiak	42,747	42,452	-295	101%	0

West Yakutat

Seasons	Account	Total Catch	Quota	Remaining Quota	% Taken	Last Week Catch
	Arrowtooth Flounder	52	6,900	6,848	1%	0
	Deep Water Flatfish	5	5,532	5,527	0%	0
	Shallow Water Flatfish	2	2,039	2,037	0%	0
	Flathead Sole	1	3,525	3,524	0%	0
	Rex Sole	1	813	812	0%	0
	Pacific Ocean Perch	1,870	1,931	61	97%	0
	Dusky Rockfish	87	1,384	1,297	6%	0
	Other Rockfish	61	580	519	11%	0
	Pollock	1,056	4,741	3,685	22%	0
	Sablefish (Hook-and-Line)	1,517	1,495	-22	101%	0
	Sablefish (Trawl)	152	221	69	69%	0

Southeast

Seasons	Account	Total Catch	Quota	Remaining Quota	% Taken	Last Week Catch
	Arrowtooth Flounder	17	6,900	6,883	0%	0
	Deep Water Flatfish	4	3,911	3,907	0%	0
	Shallow Water Flatfish	1	577	576	0%	0
	Flathead Sole	0	171	171	0%	0
	Rex Sole	0	1,027	1,027	0%	0
	Pacific Ocean Perch	0	2,124	2,124	0%	0
	Dusky Rockfish	4	201	197	2%	0
	Other Rockfish	38	200	162	19%	0
	Pollock	1	12,625	12,624	0%	0
	Demersal Shelf Rockfish	105	274	169	38%	0
	Sablefish (Hook-and-Line)	2,824	2,695	-129	105%	0

http://alaskafisheries.noaa.gov/2014/car110_goa.pdf

Table 10. BSAI catch report through December 13, 2014 (catch data shown in mt).

Bering Sea

Seasons	Account	Total Catch	Quota	Remaining Quota	% Taken	Last Week Catch
	Other Rockfish (includes CDQ)	320	400	80	80%	0
	Pacific Ocean Perch (includes CDQ)	7,436	7,684	248	97%	0
	Sablefish (Hook-and-Line and Pot)	210	536	326	39%	0
	Sablefish CDQ (Hook-and-Line and Pot)	70	134	64	52%	0
	Sablefish (Trawl)	33	569	536	6%	0
	Sablefish CDQ (Trawl)	1	50	49	2%	0
	Greenland Turbot	1,402	1,481	79	95%	0
	Greenland Turbot CDQ	76	178	102	43%	0
X	Pacific Cod CDQ	24,368	26,418	2,050	92%	499
X	Pollock, AFA Inshore	555,518	556,640	1,122	100%	0
X	Pollock, AFA Catcher Processor	445,178	445,312	134	100%	0
X	Pollock, AFA Mothership	111,000	111,328	328	100%	0
X	Pollock CDQ	128,549	128,600	51	100%	0
	Pollock, Incidental Catch, non-Bogoslof (includes CDQ)	56,770	38,770	-18,000	146%	319
	Pollock, Incidental Catch, Bogoslof (includes CDQ)	427	75	-352	569%	0

http://alaskafisheries.noaa.gov/2014/car110_bsai_with_cdq.pdf

Fishery independent data collection

AFSC uses catch-rate and biological data collected from bottom trawl surveys (BTS) conducted aboard NMFS and commercial vessels. The catch-rate data are used to produce biomass estimates for individual species/stocks in GOA and BSAI. Biological data collected include information on age, length, weight and maturity, used to assess growth, reproduction, and mortality for species/stocks. AFSC research vessels also conduct acoustic trawl (AT) surveys to produce direct estimates of biomass using sonar technology. Acoustic data are also collected from commercial vessels (AVO) conducting trawl surveys.

Gulf of Alaska

Gulf of Alaska Bottom Trawl survey

Trawl surveys have been conducted by Alaska Fisheries Science Center (AFSC) every three years (beginning in 1984) to assess the abundance of groundfish in the Gulf of Alaska. Starting in 2001, the survey frequency was increased to every two years. The survey uses a stratified random design, with 49 strata based on depth, habitat, and management area. Area-swept biomass estimates are obtained using mean CPUE (standardized for trawling distance and mean net width) and stratum area. The survey is conducted from chartered commercial bottom trawlers using standardized poly-Nor'eastern high opening bottom trawls rigged with roller gear.

Estimates of numbers at age from the bottom trawl survey are obtained from random otolith samples and length frequency samples. Numbers at age are estimated by INPFC area (Shumagin, Chirikof, Kodiak, Yakutat and Southeastern) using a global age-length key and CPUE-weighted length frequency data by INPFC area. The combined Shumagin, Chirikof and Kodiak age composition is used in the assessment model. Ages for the 2013 survey, and show very high estimates of age-1 pollock abundance in all areas. In the Central and Western portion of the Gulf of Alaska, pollock of ages 4-8 were relatively abundant in all areas. After excluding the age-1 fish, mean age decreased from Shumagin area (6.7 years) to the Southeast area (4.1 years).

http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

Shelikof straight acoustic survey

Acoustic surveys to assess the biomass of pollock in the Shelikof Strait area have been conducted annually since 1981 (except 1982 and 1999). Survey methods and results for 2014 are summarized in a NMFS report. Biomass estimates using the Simrad EK echosounder from 1992 onwards were re-estimated to take into account recently published work of eulachon acoustic target strength. Previously, acoustic backscatter was attributed to eulachon based on the percent composition of eulachon in trawls, and it was assumed that eulachon had the same target strength as pollock. Since the target strength of eulachon was much lower than pollock, the acoustic backscatter could be attributed entirely to pollock even when eulachon were known to be present. In 2008, the noise-reduced R/V Oscar Dyson became the designated survey vessel for acoustic surveys in the Gulf of Alaska. In winter of 2007, a vessel comparison experiment was conducted between the R/V Miller Freeman (MF) and the R/V Oscar Dyson(OD), which obtained an OD/MF ratio of 1.132 for the acoustic backscatter detected by the two vessels in Shelikof Strait.

The 2014 biomass estimate for Shelikof Strait is 842,138 t, which is a 6% decrease from 2013, but is still larger than any other biomass estimate in Shelikof Strait since 1985. The biomass of pollock ≥43 cm (a proxy for spawning biomass) is 17% lower than the 2013 estimate, but there were fewer areas surveyed in 2014. In addition to the Shelikof Strait survey, acoustic surveys in winter 2014 covered the Shumagin Islands spawning area, Sanak Gully, Marmot Gully, and Izhut Bay. Several other surveys had been planned for winter of 2014, including Pavlof Bay, and Chirikof, but were unable to be completed due to scheduling issues with the R/V Oscar Dyson. The following table provides results from the 2014 winter acoustic surveys:

Area	Biomass ≥43 cm (t)	Percent	Total biomass (t)	Percent
Sanak Gully	7,318	1.3%	7,319	0.8%
Shumagin Islands	5,899	1.1%	37,346	4.1%
Shelikof Strait	539,990	96.8%	842,138	93.3%
Marmot Gully	4,605	0.8%	14,992	1.7%
Izhut Bay	178	0.0%	454	0.1%
Total	557,990		902,249	

http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

The egg production biomass estimates are not used in the assessment model and have been replaced by the acoustic surveys in Shelikof Strait which show a similar trend over the period when both were conducted.

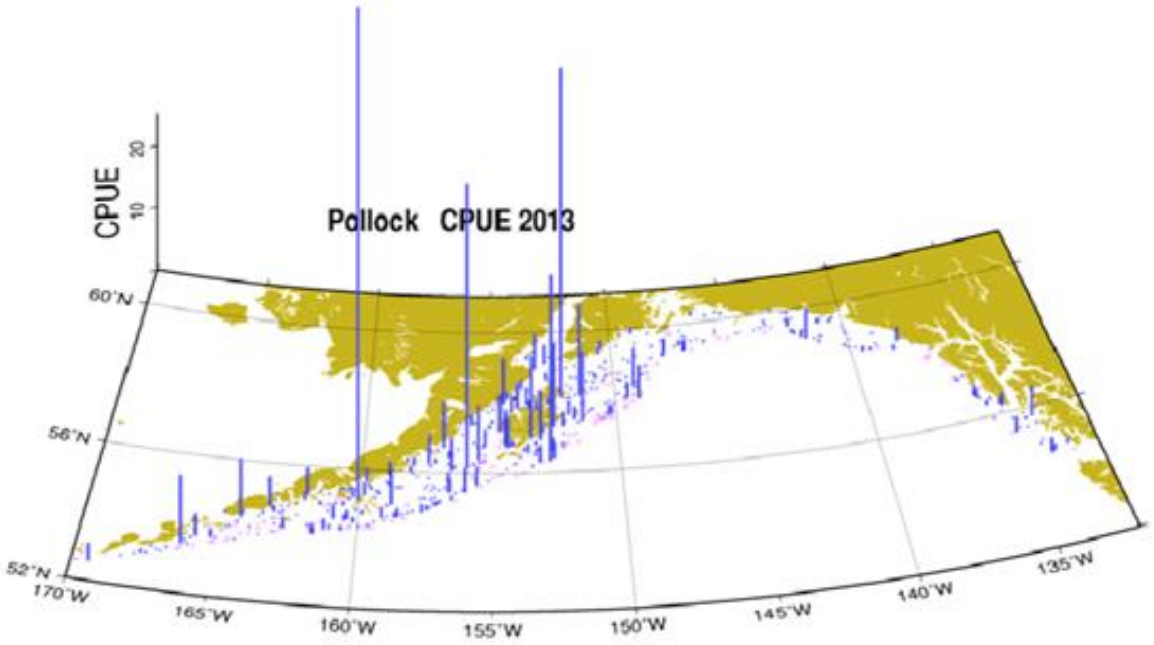


Figure 3. Pollock catch per unit effort (CPUE) for the 2013 NMFS bottom trawl survey in the Gulf of Alaska. https://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

ADFG crab and groundfish trawl survey

The Alaska Department of Fish and Game (ADFG) has conducted bottom trawl surveys of nearshore areas of the Gulf of Alaska since 1987. Although these surveys are designed to monitor population trends of Tanner crab and red king crab, walleye pollock and other fish are also sampled. Standardized survey methods using a 400-mesh eastern trawl were employed from 1987 to the present. The survey is designed to sample a fixed number of stations from mostly nearshore areas from Kodiak Island to Unimak Pass, and does not cover the entire shelf area. The average number of tows completed during the survey is 360. Details of the ADFG trawl gear and sampling procedures are summarized in a NMFS report. The 2014 biomass estimate for pollock for the ADFG crab/groundfish survey was 100,158 t, down 2% from the 2013 biomass estimate.

Table 11. Biomass estimates (t) of walleye pollock from acoustic surveys in Shelikof Strait, NMFS bottom trawl surveys (west of 140 W. long.), egg production surveys in Shelikof Strait and ADFG crab/groundfish trawl surveys. An adjustment of +1.05% was made to the NMFS bottom trawl biomass time series to account for unsurveyed biomass in Prince William Sound. In 2001, when the NMFS bottom trawl survey did not extend east of 147 W. long., an expansion factor of 2.7% derived from previous surveys was used for West Yakutat.

	Shelikof Strait acoustic survey					
	R/V Miller Freeman		*R/V Oscar*	*NMFS bottom trawl west of*	*Shelikof Strait egg*	*ADFG crab/groundfish*
Year	*Biosonics*	*EK500*	*Dyson*	*140° W lon.*	*production*	*survey*
1981	2,785,755				1,788,908	
1982						
1983	2,278,172					
1984	1,757,168			720,548		
1985	1,175,823				768,419	
1986	585,755				375,907	
1987				732,660	484,455	
1988	301,709				504,418	
1989	290,461				433,894	214,434
1990	374,731			825,609	381,475	114,451
1991	380,331				370,000	
1992		713,429			616,000	127,359
1993		435,753		755,786		132,849
1994		492,593				103,420
1995		763,612				
1996		777,172		666,521		122,477
1997		583,017				93,728
1998		504,774				81,215
1999				607,409		53,587
2000		448,638				102,871
2001		432,749		219,072		86,967
2002		256,743				96,237
2003		317,269		398,469		66,989
2004		330,753				99,358
2005		356,117		358,017		79,089
2006		293,609				69,044
2007		180,881		282,356		76,674
2008			208,032			83,476
2009			265,971	669,505		145,438
2010			429,730			124,110
2011				667,131		100,839
2012			335,836			172,007
2013			891,261	957,817		102,406
2014			842,138			100,158

https://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

Eastern Bering Sea

Eastern Bering Sea Continental shelf bottom trawl survey

Trawl surveys have been conducted annually by the AFSC to assess the abundance of crab and groundfish in the Eastern Bering Sea since 1979 and since 1982 using consistent areas and gears. For pollock, this survey has been instrumental in providing an abundance index and information on the population age structure. This survey is complemented by the acoustic trawl surveys that sample mid-water abundance levels. Between 1991 and 2014 the BTS biomass estimates ranged from 2.28 to 8.39 million t. In the mid-1980s and early 1990s several years resulted in above-average biomass estimates. The stock appeared to be at lower levels during 1996-1999 then increased moderately until about 2003 and since then has averaged about 3.7 million t—excluding the jump in biomass observed in 2014 (which brings the 2004-2014 average to just over 4 million t). These surveys are multi-purpose and serve as a consistent measure of environmental conditions such as temperature characterizations that reflect the cold conditions experienced during 2006-2013. Large-scale zoogeographic shifts in the EBS shelf due to temperature changes have been documented during a warming trend. However, after a period of relatively warm conditions ending in 2005, seven years were below average, indicating that the zoogeographic responses may be less temperature dependent than initially appeared. Bottom temperatures increased in 2011 to about average from the low value in 2010 but declined again in 2012-2013 and in 2014 increased dramatically along with surface temperatures. Beginning in 1987 NMFS expanded the standard survey area farther to the northwest. The pollock biomass levels found in these “non-standard” strata were highly variable, ranging from 1% to 22% of the total biomass; the 2014 estimate is 12% compared to the overall average of 6% overall. In some years (e.g., 1997 and 1998) some stations had high catches of pollock in that region and this resulted in high (CVs of 95% and 65% for 1997 and 1998 respectively). This region is contiguous with the Russian border and these strata improve coverage over the range of the exploited pollock stock. The use of the additional strata was evaluated in 2006 and accepted as appropriate by the Council’s SSC. The 2014 biomass estimate was 7.43 million t, about 55% more than the average for this survey (4.8 million t). This survey estimate ranks 2nd out of the 27 estimates since 1987 and is the largest estimate since 2003. The distribution of pollock was spread throughout the shelf region, with the biggest concentrations in the middle and outer domain of the shelf and relatively unconstrained by the warmer bottom temperatures. Comparing the past several years shows that pollock appear to occur at higher densities in most stations in 2014 (Figure 4).

Acoustic trawl surveys

BSAI acoustic trawl surveys are conducted biennially and are designed to estimate the off-bottom component of the pollock stock (compared to the BTS which are conducted annually and provide an abundance index of the near-bottom pollock). Relative estimation errors for the total biomass (presented as CVs) were derived from a one-dimensional (1D) geostatistical method. This method accounts for observed spatial structure for sampling along transects. As done in previous assessments, the other sources of error (e.g., target strength, trawl sampling) were accounted for by inflating the annual error estimates to have an overall average CV of 20% for application within the assessment model.

The 2014 summer AT survey was characterized by the predominance of 2-year old pollock—in fact the highest level observed since 1982. The survey results also indicated relatively high numbers of 1-

year-old pollock, and a relatively abundant 6-year old age group. The latter is consistent with the 2012 observations of 4-year olds (and consistent with other survey and fishery data on the 2008 year class).

Spatially, the 2014 mid-water pollock distribution differed from recent years. The biomass estimated east of 170º W was 41% compared to an average of 26% since 1994. Also, the distribution of pollock within the SCA rose to 12% compared to the 2007-2012 average of 71% (and 1994-2014 average of 16%). Overall, the mid-water pollock densities from the AT survey were consistent with the findings from the bottom trawl survey in that pollock were wide-spread throughout the shelf but with lower concentrations in the mid-water zone compared to the bottom zone.

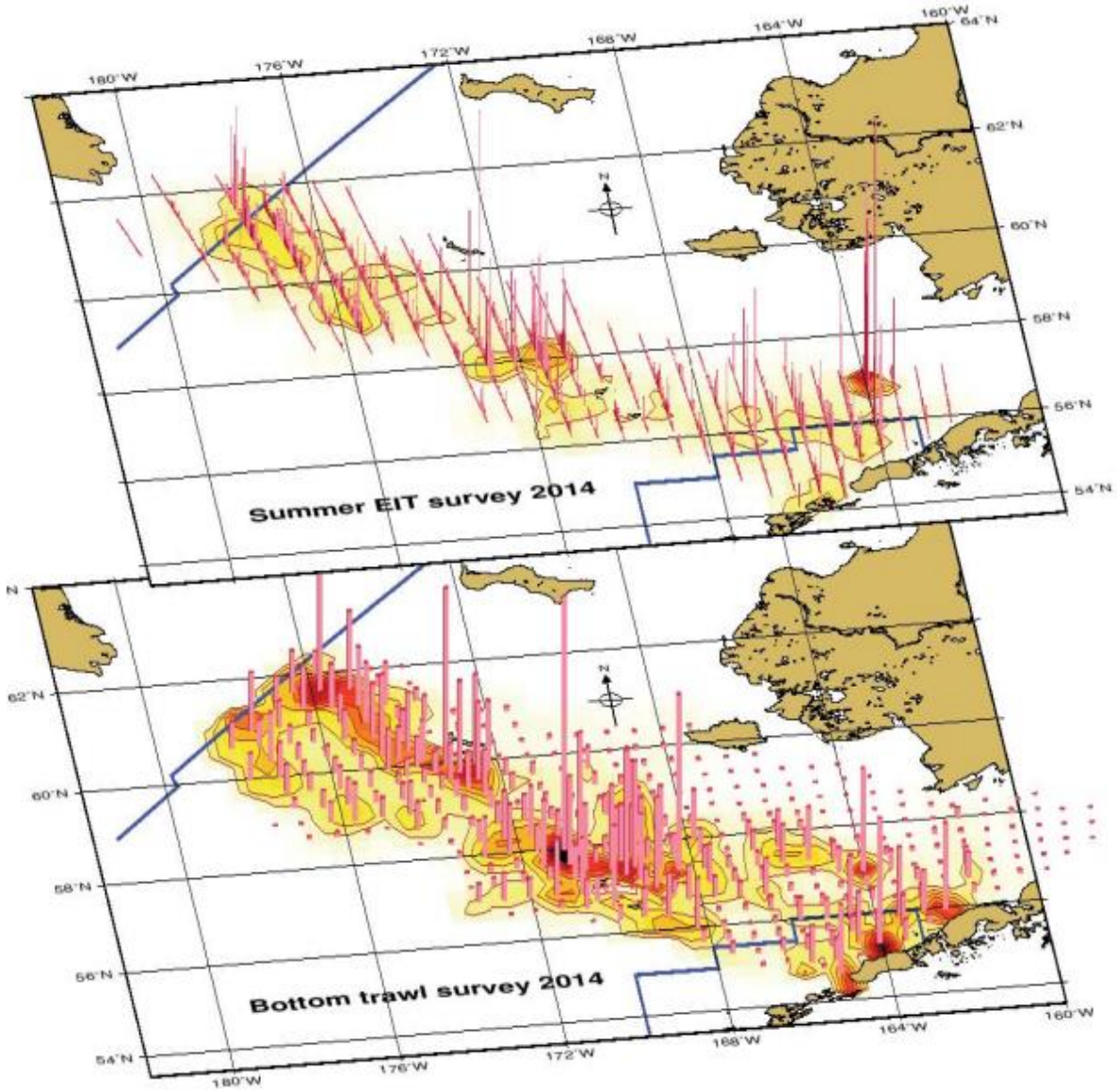


Figure 4. Comparison of the mid-water EBS pollock density from the AT survey (top layer) and that of the BTS (bottom layer). The blue line in the SE corner of the region delineates the Steller sea lion conservation area (SCA). http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf

Table 12. Bottom-trawl survey estimated numbers (millions) at age used for the stock assessment model, 1982-2014 based on strata 1-9. Shaded cells represent years where only strata were surveyed. Standard errors and CVs are based on design-used sampling errors.

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	StdErr	CV
1982	948	2,271	2,433	3,115	1,061	144	100	48	30	19	12	7	3	1	1	10,192	1,273	12%
1983	3,918	576	1,278	2,267	5,055	1,554	286	157	71	61	46	16	7	5	2	15,300	1,192	8%
1984	367	281	399	1,152	1,458	3,426	652	145	68	24	16	6	4	5	2	8,005	791	10%
1985	4,785	677	2,563	833	2,876	1,835	1,272	252	65	53	19	6	7	1	0	15,244	1,949	13%
1986	2,188	497	362	1,338	816	1,383	1,220	1,123	358	56	26	11	1	3	1	9,381	837	9%
1987	345	559	723	538	3,246	913	918	370	1,197	189	57	23	4	2	2	9,088	1,126	12%
1988	1,070	512	1,198	2,286	1,012	3,319	1,002	786	462	1,117	107	64	13	17	9	12,976	1,466	11%
1989	762	225	428	1,411	3,198	645	2,486	379	471	182	581	101	89	45	64	11,067	1,136	10%
1990	1,721	241	86	552	1,110	3,754	759	1,906	198	373	58	544	47	36	48	11,432	1,373	12%
1991	2,419	660	234	76	461	429	1,421	534	1,158	304	419	87	265	38	35	8,539	827	10%
1992	1,338	324	1,703	285	319	536	478	689	310	595	212	268	117	92	73	7,340	808	11%
1993	2,347	333	709	2,972	647	521	275	384	527	325	286	208	165	91	110	9,900	920	9%
1994	1,249	521	395	1,115	3,026	530	141	124	143	268	166	233	89	86	145	8,232	973	12%
1995	1,443	138	270	1,224	1,604	2,566	1,086	288	179	116	219	91	167	68	101	9,561	1,809	19%
1996	1,434	346	155	308	806	1,125	1,027	349	87	94	65	123	40	74	100	6,134	508	8%
1997	2,239	339	147	180	2,166	1,008	626	782	137	70	53	59	96	32	111	8,042	1,082	13%
1998	625	549	281	185	354	2,024	529	342	269	68	31	11	24	28	65	5,385	592	11%
1999	817	704	646	701	401	726	1,846	514	260	243	91	39	16	24	82	7,110	834	12%
2000	921	292	353	1,189	1,223	648	571	1,874	737	394	172	116	36	17	76	8,618	1,017	12%
2001	1,465	841	441	407	1,034	1,093	475	239	718	518	201	163	66	23	65	7,750	696	9%
2002	644	300	621	894	928	1,205	627	307	421	792	396	179	107	33	37	7,491	769	10%
2003	376	124	723	1,178	1,377	1,244	1,651	915	411	536	1,081	469	179	89	69	10,421	1,863	18%
2004	320	225	140	1,036	1,005	762	448	486	242	151	152	275	118	29	23	5,413	499	9%
2005	345	124	185	799	2,319	1,578	838	387	297	230	60	127	207	81	84	7,662	743	10%
2006	715	62	96	317	791	1,006	647	312	179	155	75	47	67	91	90	4,649	427	9%
2007	2,023	48	116	337	1,057	1,245	905	656	278	125	116	101	47	58	113	7,225	669	9%
2008	442	99	82	148	421	852	673	471	300	118	100	76	35	19	120	3,955	431	11%
2009	674	165	342	372	219	319	433	342	250	123	82	27	28	14	59	3,449	415	12%
2010	408	115	204	2,055	930	295	261	278	295	203	175	64	39	23	51	5,396	707	13%
2011	982	100	208	285	1,433	707	210	121	189	189	157	120	51	24	64	4,841	453	9%
2012	964	188	344	2,472	572	915	313	125	94	130	106	94	79	28	51	6,474	611	9%
2013	973	99	189	744	3,702	865	547	194	66	60	79	60	56	31	41	7,706	625	8%
2014	1,701	438	203	268	1,233	4,494	2,346	508	281	103	40	56	58	27	70	11,827	792	7%
Avg	1,302	393	553	1,001	1,450	1,323	820	497	326	242	165	117	70	37	60	8,358	915	11%

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf

Biomass index from Acoustic-Vessels-of-Opportunity (AVO)

In 2014 acoustic data were collected from commercial fishing vessels used for the eastern Bering Sea bottom trawl (BT) survey as in 2013. These data link integrated 38 kHz backscatter from an index area since 2006 and became formally included in the assessment in 2013 (Ianelli et al. 2013). The index remains the same as last year, with the time series covering the period 2006-2013. In 2015 the SAFE authors anticipate updating the index with the 2014 and 2015 estimates. This will provide some information on mid-water pollock abundance because the next AT survey in the region is planned for 2016. http://www.afsc.noaa.gov/publications/procrpt/pr2014-04.pdf

Bering-Aleutian Salmon International Survey (BASIS)

As part of the "Bering-Aleutian Salmon International Survey" (BASIS) project research has also been directed toward the relative density and quality (in terms of condition for survival) of young-of-year

pollock. Previous studies linked strong Bering Sea pollock recruitment to years with warm sea temperatures and northward transport of pollock eggs and larvae. As part of the Bering-Aleutian Salmon International Survey (BASIS) project research has also been directed toward the relative density and quality (in terms of condition for survival) of young-of-year pollock. For example, Moss et al. (2009) found age-0 pollock were very abundant and widely distributed to the north and east on the Bering Sea shelf during 2004 and 2005 (warm sea temperature; high water column stratification) indicating high northern transport of pollock eggs and larvae during those years. More recent research found that warmer conditions tended to result in lower pollock recruitment in the EBS. This is consistent with the hypothesis that when sea temperatures on the eastern Bering Sea shelf are warm and the water column is highly stratified during summer, age-0 pollock appear to allocate more energy to growth than to lipid storage, leading to low energy density prior to winter. This then may result in increased over-winter mortality
http://www.afsc.noaa.gov/refm/docs/2014/EBSpollock.pdf

Bogoslof Island

Background

Prior to 1977, few pollock were caught in the Donut Hole or Bogoslof region. Japanese scientists first reported significant quantities of pollock in the Aleutian Basin in the mid-to-late 1970's, but large-scale fisheries in the Donut Hole only began in the mid 1980's. By 1987 significant components of these catches were attributed to the Bogoslof Island region; however, the actual locations were poorly documented. The Bogoslof fishery primarily targeted winter spawning aggregations but in 1992, this area was closed to directed pollock fishing.

In 1991, the only year with extensive observer data, the fishery timing coincided with the open seasons for the EBS and Aleutian Islands pollock fisheries (the Bogoslof management district was established in 1992 by FMP amendment 17). However, after March 23, 1991 the EBS region was closed to fishing and some effort was re-directed to the Aleutian Islands region near the Bogoslof district. In subsequent years, seasons for the Aleutian Islands pollock fishery were managed separately. Bycatch and discard levels were relatively low from these areas when there was a directed fishery (e.g., 1991). Updated estimates of pollock bycatch levels from other fisheries were small in recent years. The increase in pollock bycatch in 2010 (9 t in 2008 to 73 in 2009 and 176 t in 2010) can be attributed to the non-pelagic trawl arrowtooth flounder target fishery. The majority of pollock bycatch in the Bogoslof region continues to be occurring in the non-pelagic trawl arrowtooth flounder target fishery. For all fisheries there were 57 t of pollock catch in 2013 and 428 t in 2014.

Acoustic trawl survey

NMFS acoustic-trawl survey biomass estimates are the primary data source used in this assessment. Since 2000, the values have varied between 292,000 t and 67,000 t. The most recent AT survey of the Bogoslof spawning stock was conducted in March of 2014 and resulted in a biomass estimate of 112,070 t.

Table 13. Estimated retained, discarded, and total pollock catch (t) from the Bogoslof region.

Year	Discarded	Retained	Total
1991	20,327	295,711	316,038
1992	240	1	241
1993	308	578	886
1994	11	545	556
1995	267	66	334
1996	7	492	499
1997	13	150	163
1998	3	5	8
1999	11	18	29
2000	20	10	29
2001	28	231	258
2002	12	1,031	1,042
2003	19	5	24
2004	< 1		< 1
2005	< 1	< 1	< 1
2006	< 1	< 1	< 1
2007	< 1	< 1	< 1
2008	< 1	9	9
2009	6	67	73
2010	53	124	176
2011	23	150	173
2012	5	74	9
2013	< 1	56	57
2014	54	374	428

Source: NMFS Regional office Blend database and catch accounting system.
http://www.afsc.noaa.gov/REFM/Docs/2014/BOGpollock.pdf

Aleutian Islands

As of October 6, 2014, 0 t had been taken in the directed fishery for 2014. In 2010, 2011, 2012, and 2013 1,285, 1,208 t, 975 t, and 2,964 t were harvested as bycatch in other fisheries. In 2014, as of October 6, 2,347 t had been taken as bycatch in other fisheries. The increase in catch for 2013 and 2014 has been primarily in the arrowtooth flounder fishery. This fishery changed fishing tactics to fish more shallow than in previous years to avoid Greenland turbot bycatch. Since 2005 the TAC has been constrained to 19,000 t or the ABC, whichever is lower, by statute.

The RACE Aleutian Islands bottom trawl (AIBT) surveys

The RACE Aleutian Islands bottom trawl (AIBT) surveys prior to 2004 indicate that most of the pollock biomass was distributed roughly equally between the Eastern (541) and Central Aleutian Islands area (542). The 2004 Aleutian Islands trawl survey showed a significant decline in the Central Aleutian Islands area and a near doubling of the Eastern Aleutians Islands pollock abundance estimate from the 2002 survey. In the 2006 AIBT survey the Central and Western biomass estimates remained stable while the Eastern population was nearly half the 2004 estimate and back to 2002 levels, but the CV for this estimate was 90.2%. The 2010 survey shows an increase in abundance

throughout the survey area with a larger increase in the Eastern area and slight increases in the Central and Western area. The Eastern portion of the survey continues to have by far the highest abundance levels, but the CV for the Eastern area remains high at 64%. During the 1991-2002 surveys, a number of large to medium-sized tows were encountered throughout the Aleutians indicating a fairly well distributed population. This is very different from the 2004 through 2014 survey estimates which indicated a low level of pollock abundance in both Central and Western areas, and a much higher pollock density in the Eastern area with only a few large hauls making up the majority of the abundance. The 2004 survey encountered a single large tow near Seguam pass that when expanded to the entire stratum made up the majority of the estimated pollock biomass. The 2006 and 2010 surveys revealed very few pollock throughout the NRA, except for large tows in Seguam Pass and in the Delerof Islands. The 2006 and 2010 survey found higher concentrations of pollock in the Delerof Islands than in 2004, but are consistent with the distribution of pollock in the 2002 survey. The 2012 and 2014 again show very little pollock in this area. The general trend for the 2002 through 2014 pollock distribution is a low level of pollock abundance in the Central and Western Aleutians with a more abundant, but patchy distribution of pollock in the Eastern Aleutians resulting in highly imprecise survey estimates. Although the largest proportion of the pollock biomass in the 2012 and 2014 surveys were observed in the Eastern Aleutians (Area 541), the surveys did not find large concentrations of pollock in the east as it had in the prior two surveys. The 2014 survey estimate for the NRA area was 85,316 t, 93% higher than the 2012 estimate. The 2014 estimate for Area 543, the western Aleutians, was 176% higher than the 2012 estimate, Area 542 was down 8% and Area 541 was up 102%, from the 2012 biomass estimates. The 2014 survey had a greater number of tows in Area 541 with higher CPUE compared to the previous five surveys. The 2014 estimate for Area 542 was the lowest recorded. The estimate for Area 543 was the highest estimate since 1997. http://www.afsc.noaa.gov/refm/docs/2014/AIpollock.pdf

PWS surveys

Stock assessment and surveys have been conducted by the NMFS/AFSC in the GOA every 2 years since 2001. From 1984 through 2000, they were done every 3 years. The survey uses a stratified random design with 49 strata based on depth habitat and management area. Biomass is estimated using mean CPUE and stratum area. Commercial bottom trawlers are used to conduct the survey using standardized trawls: typically, 800 tows are completed with 70% of the trawls containing pollock. PWS is not surveyed by the AFSC bottom trawl survey, but a total pollock biomass estimate including PWS is derived.

The AFSC's Resource Assessment and Conservation Engineering Division conducted a survey in the summer of 2013 and produced a gulf-wide pollock biomass estimate of 1,014,846 t., the highest biomass in the time series. This estimate resulted in the highest historical GHL in the PWS pollock pelagic trawl survey, 8.6 million pounds in 2014. AFSC has plans to conduct a winter acoustic pollock survey in 2015 inside PWS.

The total 2014 harvest in the directed PWS pollock trawl fishery was 5,220,121 lb. harvested by 19 vessels in 7 days. Prior to the beginning of the directed pollock fishery, an average of 4,551 lb. of pollock was harvested annually between 1988 and 1994. Interest and participation in the PWS directed pollock fishery has varied since 1995 with a maximum of 33 vessels registered during the

1999 season and a minimum of 6 vessels registered chasing the 2003 season. An average of 3,746 of registered vessels participated although the participation rate has been rising in recent years. In 2013, 52% of registered vessels (14) participated, and in 2014. 68% of registered vessels (19) participated these were the highest levels in the history of the fishery Harvest ranged from 1.40 million lb. in 2008 (39% of the GHL) to 6.33 million lb. in 1995 (144% of the GHL). Average harvest between 2000 and 2014 was 3.21 million lb. (130% of the GHL).

The length of the season for the PWS fishery has varied over time. During the earliest years of the fishery the season lasted approximately 1 week. Between 1999 and 2010, season length varied between 36 days and 84 days, and in recent seasons (2011-2013) the season shortened to 14 days to 24 days. The 2014 season was only 7 days long. Because of section harvest caps instituted in 2000, individual sections often close in advance of season closures. These section closures show similar trends with lengths between 20 days and 84 days during 2000 to 2010 and between 2 days and 13 days in recent years (2011-2014).
http://www.adfg.alaska.gov/fedaidpdfs/FMR14-42.pdf

Table 14. Prince William Sound directed pollock trawl fishery annual harvest, effort, guideline harvest level (GHL) and season length, 1995-2014.

Year	GHL (million lb)	Season days	Vessels	Harvest (lb)	Harvest % of GHL	Test fish (lb)
1995	2.1-4.4	26	9	6,325,575	144%	215,025
1996	3.1	5	11	3,265,740	105%	421,137
1997	3.9	8	10	4,319,707	111%	539,123
1998	3.9	7	11	4,031,725	103%	631,751
1999	4.6	36	6	4,673,074	102%	490,761
2000[a]	3.1	70	4	2,256,504	73%	366,724
2001	3.1	64	[b]	[b]	[b]	381,502
2002	3.8	70	3	2,364,143	62%	177,071
2003	3.8	84	3	2,421,773	64%	54,224
2004	2.0	68	3	1,928,458	96%	400,677
2005	2.0	48	6	1,677,157	84%	317,183
2006	3.6	58	8	3,486,449	97%	590
2007	3.6	69	5	2,339,978	65%	259,155
2008	3.6	56	5	1,395,933	39%	0
2009	3.6	60	8	3,249,441	90%	300,806
2010	3.6	42	11	3,662,919	102%	311,853
2011	3.6	17	7	3,377,325	94%	339,683
2012	6.1	24	9	5,785,295	95%	0
2013	5.8	14	14	5,770,151	99%	496,856
2014	8.6	7	19	5,220,121	61%	0
Average 2000–2014	4.0	50	7	3,209,689	80%	227,088

[a] Pollock harvest sections were created in 2000.
[b] Confidential information.

Table 15. Prince William Sound annual pollock harvest and effort by gear type.

			Harvest (lb)			
Year	Vessels	Landings	Other gear[a]	Trawl gear[b]	Test fishery[c]	Total
1988	[d]	[d]	1,548	[d]		1,548
1989	6	9	639	919		1,558
1990	8	14	1,514	6,588		8,102
1991	5	7	272			272
1992	15	23	2,591	6,341		8,932
1993	3	7	191	5,442		5,633
1994	5	7	5,811			5,811
Average	6	10	1,795	2,756		4,551
Directed trawl fishery begins						
1995	23	66	10,220	6,325,575	215,025	6,550,820
1996	13	28	1,296	3,271,583	421,137	3,694,016
1997	16	49	3,762	4,323,129	539,123	4,866,014
1998	17	51	2,680	4,013,725	631,751	4,648,156
1999	15	62	11,890	4,673,074	490,761	5,175,725
2000	16	49	4,039	2,260,510	366,724	2,631,273
2001	5	20	[d]	3,128,066	381,502	3,509,669
2002	3	21	0	2,364,143	177,071	2,541,214
2003	5	28	0	2,422,364	54,224	2,476,588
2004	5	18	0	1,929,009	400,677	2,329,686
2005	8	20	0	1,677,157	317,183	1,995,145
2006	8	15	0	3,486,499	590	3,487,089
2007	7	16	6	2,340,728	259,155	2,599,889
2008	6	8	5	1,395,933	0	1,395,938
2009	10	17	[d]	3,249,442	300,806	3,550,268
2010	35	52	5,094	3,662,919	311,853	3,979,866
2011	28	46	13,608	3,377,325	339,683	3,730,616
2012	14	26	168	5,785,295	0	5,785,463
2013	29	53	3,484	5,770,151	496,856	6,270,491
Average	14	34	4,070	3,445,128	316,896	3,748,344

[a] Includes jig, pot, and longline harvest from the Inside and Outside Districts

[b] Includes pollock bycatch in PWS shrimp trawl fishery

[c] Fish landed and sold under the ADF&G's program receipts authority are listed as "test fishery" and not included in vessels or landings.

[d] Confidential data due to the low number of participants.

Table 16. Prince William Sound directed pollock fishery harvest and bycatch by species or species group, 1995-2014.

		Reported bycatch [a,b]											
		Rockfish		Salmon		Shark		Squid		Misc.		Total bycatch	
Year	Pollock harvest	lb	%	lb	%	lb	%	lb	%	lb	%	lb	%
1995	6,325,575	67	0.00%	76	0.00%	378	0.01%	1,346	0.02%	5,135	0.08%	7,002	0.11%
1996	3,265,552	0	0.00%	0	0.00%	2,724	0.08%	437	0.01%	3,836	0.12%	6,997	0.21%
1997	4,319,707	12	0.00%	42	0.00%	648	0.02%	17,016	0.39%	2,076	0.05%	19,794	0.46%
1998	4,013,725	10	0.00%	285	0.01%	7,825	0.19%	21,663	0.54%	11,909	0.30%	41,692	1.04%
1999	4,673,074	260	0.01%	2,088	0.04%	14,022	0.30%	5,968	0.13%	2,727	0.06%	25,065	0.54%
2000	2,256,504	1,368	0.06%	535	0.02%	2,024	0.09%	5,487	0.24%	974	0.04%	10,388	0.46%
2001	3,128,036	4,031	0.13%	372	0.01%	4,061	0.13%	30,499	0.98%	1,594	0.05%	40,557	1.30%
2002	2,364,143	28,993	1.23%	1,262	0.05%	52,480	2.22%	179,933	7.61%	3,431	0.15%	266,099	11.26%
2003	2,421,772	3,824	0.16%	189	0.01%	7,254	0.30%	20,417	0.84%	8,319	0.34%	40,003	1.65%
2004	1,928,458	2,086	0.11%	151	0.01%	3,148	0.16%	10,890	0.56%	3,848	0.20%	20,123	1.04%
2005	1,677,157	8,289	0.49%	775	0.05%	11,483	0.68%	6,044	0.36%	9,841	0.59%	36,432	2.17%
2006	3,486,499	11,303	0.32%	635	0.02%	3,461	0.10%	31,813	0.91%	17,846	0.51%	65,058	1.87%
2007	2,339,978	10,262	0.44%	836	0.04%	2,650	0.11%	11,155	0.48%	2,233	0.10%	27,136	1.16%
2008	1,395,933	20,790	1.49%	48	0.00%	1,550	0.11%	30,619	2.19%	1,066	0.08%	54,073	3.87%
2009	3,249,441	21,093	0.65%	142	0.00%	19,101	0.59%	15,747	0.48%	14,115	0.43%	70,199	2.16%
2010	3,662,919	3,594	0.10%	223	0.01%	3,133	0.09%	17,052	0.47%	21,854	0.60%	45,856	1.25%
2011	3,377,325	5,290	0.16%	50	0.00%	411	0.01%	15,006	0.44%	2,410	0.07%	23,167	0.69%
2012	5,785,295	16,904	0.29%	1,431	0.02%	1,810	0.03%	8,123	0.14%	12,682	0.22%	40,950	0.71%
2013	5,779,241	27,824	0.48%	61	0.00%	3,230	0.06%	86,116	1.49%	3,401	0.06%	120,632	2.09%
2014	5,220,121	67,446	1.29%	260	0.00%	526	0.01%	171,946	3.29%	24,322	0.47%	264,500	5.07%

[a] Includes discards at sea.
[b] Test fish not included.

http://www.adfg.alaska.gov/fedaidpdfs/FMR14-42.pdf
http://alaskafisheries.noaa.gov/frules/79fr12890.pdf

Socio-economic data collection

The Economic and Social Sciences Research Program within NMFS's Resource Ecology and Fisheries Management (REFM) Division provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs. The REFM division presents an annual Economic Status Report of the Groundfish fisheries in Alaska. The ESSRP report provides estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, the ex-vessel value of the groundfish catch, the ex-vessel value of the catch in other Alaska fisheries, the gross product value of the resulting groundfish seafood products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, vessel activity, and employment on at-sea processors. The report also contains analysis and comment of the performance of a range of indices for different sectors of the North Pacific fisheries relate changes in value, price, and quantity, across species, product and gear types, to aggregate changes in the market. The NPFMC, the AFSC, and community stakeholder organizations have identified ongoing collection of community-level socio-economic information that is specifically related to commercial fisheries as a priority.

Table 17. Ex-vessel prices in the groundfish fisheries off Alaska by area, gear, and species, 2009-2013; calculations based on COAR ($/lb. round weight).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska
	Year	Fixed	Trawl	Fixed	Trawl	All Gear
Pollock	2009	0.110	0.174	0.097	0.185	0.184
	2010	0.133	0.173	0.145	0.153	0.154
	2011	0.128	0.161	0.178	0.165	0.165
	2012	0.144	0.171	0.108	0.173	0.173
	2013	0.156	0.176	0.092	0.150	0.152

Notes: 1) Prices are for catch from both federal and state of Alaska fisheries.
2) Prices do not include the value added by at-sea processing except for the value added by dressing fish at sea where the fish have not been frozen. The unfrozen landings price is calculated as landed value divided by estimated or actual round weight.
3) Trawl-caught sablefish, rockfish and flatfish in the BSAI and trawl-caught Atka mackerel in both the BSAI and the GOA are not well represented by on-shore landings. A price was calculated for these categories from product-report prices; the price in this case is the value of the product divided by the calculated round weight and multiplied by a constant 0.4 to correct for value added by processing.
4) The "All Alaska/All gear" column is the weighted average of the other columns.
"*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch Accounting System, Commercial Operators Annual Report (COAR), At-Sea Production Reports, (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

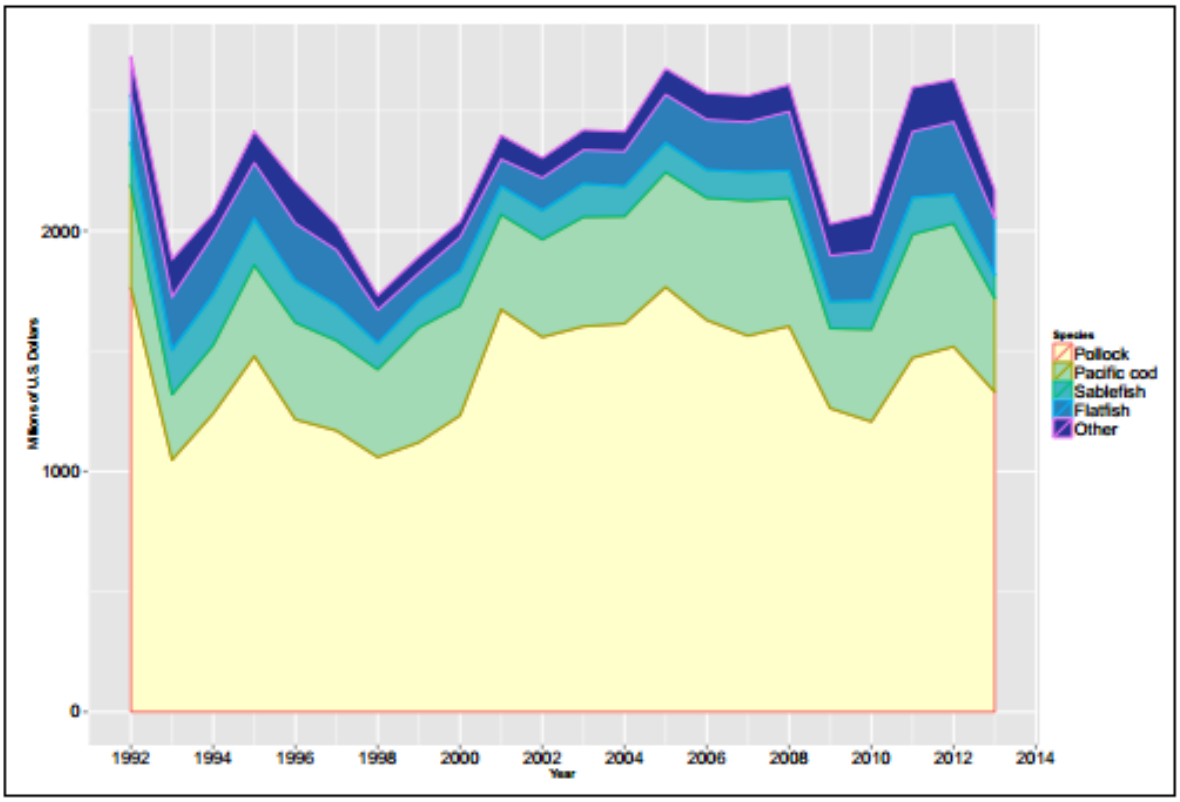


Figure 5. Real gross product value of the groundfish catch off Alaska by species, 1992-2013 (base year = 2013). http://www.afsc.noaa.gov/REFM/docs/2014/economic.pdf.

Community Profiles for North Pacific Fisheries – Alaska

In 2005, the AFSC compiled baseline socioeconomic information about Alaskan fishing communities in the first edition of *Community Profiles for North Pacific Fisheries – Alaska* (NOAA-TM-AFSC-160). Between 2010 and 2011, AFSC went through the process of updating the profiles (NOAA-TM-AFSC-230). A total of 195 communities have now 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. The profiles include information collected from communities in the Alaska Community Survey,

which was conducted during summer 2011, and the Processor Profiles Survey, which was conducted in fall 2011. The community profiles are available at the following url: http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php and the latest report at the following url: http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf.
http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php

Figure 6. Alaska communities profiled.
http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/communityprofiles/Introduction_Methods_Overview.pdf

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.

FAO CCRF 7.2.1/12.2/12.3/12.5/12.6/12.7/12.17

FAO Eco 29-29.3

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

Guided by MSA standards, and other legal requirements, the NMFS has a well-established institutional framework for research developed within the AFSC. Scientists at the AFSC conduct research and stock assessments on pollock in Alaska each year, producing annual Stock Assessment and Fishery Evaluation (SAFE) reports for the federally managed EBS, GOA, Aleutian Islands and Bogoslof pollock stocks. These SAFE reports summarize the best-available science, including the fishery dependent and independent data, document stock status, significant trends or changes in the resource, marine ecosystems, and fishery over time, assess the relative success of existing state and Federal fishery management programs, and produce recommendations for annual quotas and other fishery management measures. The annual stock assessments are peer reviewed by experts and recommendations are made annually to improve the assessments.

The *National Standard Guidelines for Fishery Management Plans* published by the NMFS require that a stock assessment and fishery evaluation (SAFE) report be prepared and reviewed annually for each fishery management plan (FMP). To satisfy this requirement, an annual groundfish SAFE is published for both the BSAI and GOA groundfish fisheries. The SAFE reports summarize the best available scientific information concerning the past, present, and possible future condition of the groundfish stocks and their associated ecosystems. The information contained within the SAFE reports forms the basis for Council decisions on annual harvest levels, technical measures and other management actions. The SAFE assessments are peer reviewed by experts and recommendations are made to improve the assessments through directed research. These recommendations are made by the assessment Plan Teams, the SSC, and during periodic reviews by the Center for Independent Experts (CIE). The recommendations from previous meetings are highlighted in the introductions of the assessment SAFE documents and progress on recommended research is noted accordingly. The most recent CIE review for the GOA pollock assessment was November 17-21, 2014, with several of the recommendations incorporated into the 2014 SAFE.
http://www.afsc.noaa.gov/REFM/Stocks/assessments.htm

The groundfish SAFE reports are divided into sections covering individual stocks. In the case of the GOA, pollock throughout the region is managed and assessed as a single stock (although there is a second, poorly-understood stock in the Southeast, which has no directed pollock fishery, see GOA section below). In the BSAI, the species is managed as three separate stocks: Eastern Bering Sea (EBS), Aleutian Islands (AI) and Bogoslof Island (BI). The input data used to inform the models, and to test their predictions, are discussed in detail under fundamental clause 4, above.
http://www.afsc.noaa.gov/REFM/Stocks/assessments.htm

Gulf of Alaska

The 2014 model was implemented with the following changes based on the 2013 CIE review, SSC and Plan Team comments, and other considerations: 1) starting the model in 1970 rather than 1964 and removing fishery length composition data for 1964-1971, 2) removing summer bottom trawl surveys in 1984 and 1987 and Shelikof Strait acoustic surveys in 1981-1991, 3) estimating summer bottom trawl catchability using a prior and modeling selectivity with an asymptotic curve, rather than fixing catchability at 1.0 and assuming a dome-shaped selectivity curve, 4) using a random walk for changing fishery selectivity parameters rather than time blocks, 5) using an age-specific mortality schedule with higher juvenile mortality, 6) modeling age-1 and age-2 pollock in the winter acoustic surveys as separate indices. All composition data sets were tuned so that input sample sizes were close to the harmonic mean of effective sample size.

Summary of changes in assessment inputs as reported in the December 2014 GOA pollock SAFE

1. Fishery: 2013 total catch and catch at age.
2. Shelikof Strait acoustic survey: 2014 biomass and age composition.
3. NMFS bottom trawl survey: 2013 age composition.
4. ADFG crab/groundfish trawl survey: 2014 biomass.
5. Total catch for all years was re-estimated from original sources
6. Fishery catch at age and weight at age were re-estimated for 1975-1999 from primary databases maintained at AFSC.

Results

The base model projection of female spawning biomass in 2015 is 309,869 t, which is 39.7% of unfished spawning biomass (based on average post-1977 recruitment) and below $B_{40\%}$ (312,000 t), thereby placing Gulf of Alaska pollock in sub-tier "b" of Tier 3. There were two surveys in 2014: the Shelikof Strait acoustic survey and the ADFG crab/groundfish survey. The 2014 biomass estimate for Shelikof Strait is 842,138 t, which is a 6% decrease from 2013, but is still larger than any other biomass estimate in Shelikof Strait since 1985. The ADFG crab/groundfish survey 2014 biomass estimate is close to the 2013 estimate (2% lower). The estimated abundance of mature fish is projected to remain stable near $B_{40\%}$ or to increase in over the next five years.

The author's 2015 ABC recommendation for pollock in the Gulf of Alaska west of 140° W lon. (W/C/WYK) is 191,309 t, which is an increase of 14% from the 2014 ABC. This recommendation is based on a more conservative alternative to the maximum permissible FABC introduced in the 2001 SAFE applied to the base model. In 2016, the ABC based on an adjusted $F_{40\%}$ harvest rate is 250,824 t. The OFL in 2015 is 256,545 t, and the OFL in 2016 if the recommended ABC is taken in 2015 is 321,067 t.

For pollock in southeast Alaska (East Yakutat and Southeastern areas), the ABC recommendation for both 2015 and 2016 is 12,625 t and the OFL recommendation for both 2015 and 2016 is 16,833 t. These recommendations are based on a Tier 5 assessment using the estimated biomass in 2015 and 2016 from a random effects model fit to the 1990-2013 bottom trawl survey biomass estimates in Southeast Alaska, and are unchanged from last year.

Table 18. Stock status for pollock in the Gulf of Alaska in 2014 with estimates of ABC, OFL and for 2015 and projections for 2016.

Quantity/Status	As estimated or specified *last* year for 2014	2015	As estimated or specified *this* year for 2015	2016
M (natural mortality rate)	0.3	0.3	0.3	0.3
Tier	3a	3b	3b	3a
Projected total (age 3+) biomass (t)	972,750	1,723,060	1,883,920	1,927,010
Female spawning biomass (t)				
Projected				
Upper 95% confidence interval	379,861	319,342	406,382	432,820
Point estimate	308,541	267,477	309,869	330,497
Lower 95% confidence interval	250,611	224,035	236,081	253,194
$B_{100\%}$	726,000	726,000	779,000	779,000
$B_{40\%}$	290,000	290,000	312,000	312,000
$B_{35\%}$	254,000	254,000	273,000	273,000
F_{OFL}	0.26	0.22	0.28	0.28
$maxF_{ABC}$	0.22	0.20	0.24	0.24
F_{ABC}	0.20	0.17	0.20	0.22
OFL (t)	211,998	248,384	256,545	321,067
maxABC (t)	183,943	210,071	222,774	272,165
ABC (t)	167,657	185,830	191,309	250,824
Status	As determined *last* year for 2012	2013	As determined *this* year for 2013	2014
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

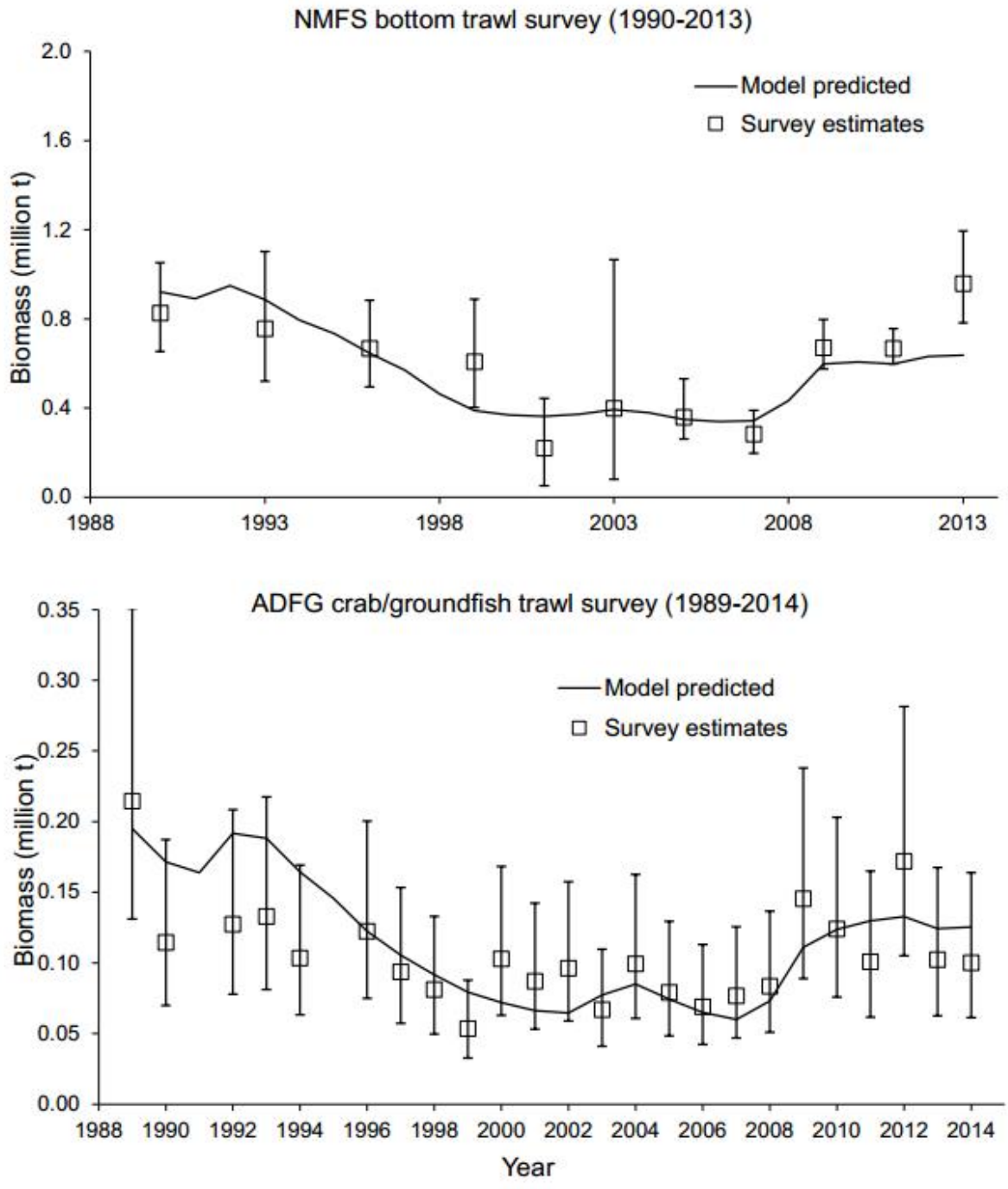


Figure 7. Model predicted and observed survey biomass for the NMFS bottom trawl survey (top), and the ADFG crab/groundfish survey (bottom) for the base model. Error bars indicate plus and minus two standard deviations. Since variance estimates are unavailable for ADFG biomass estimates, an assumed CV of 0.25 is used in the assessment model.

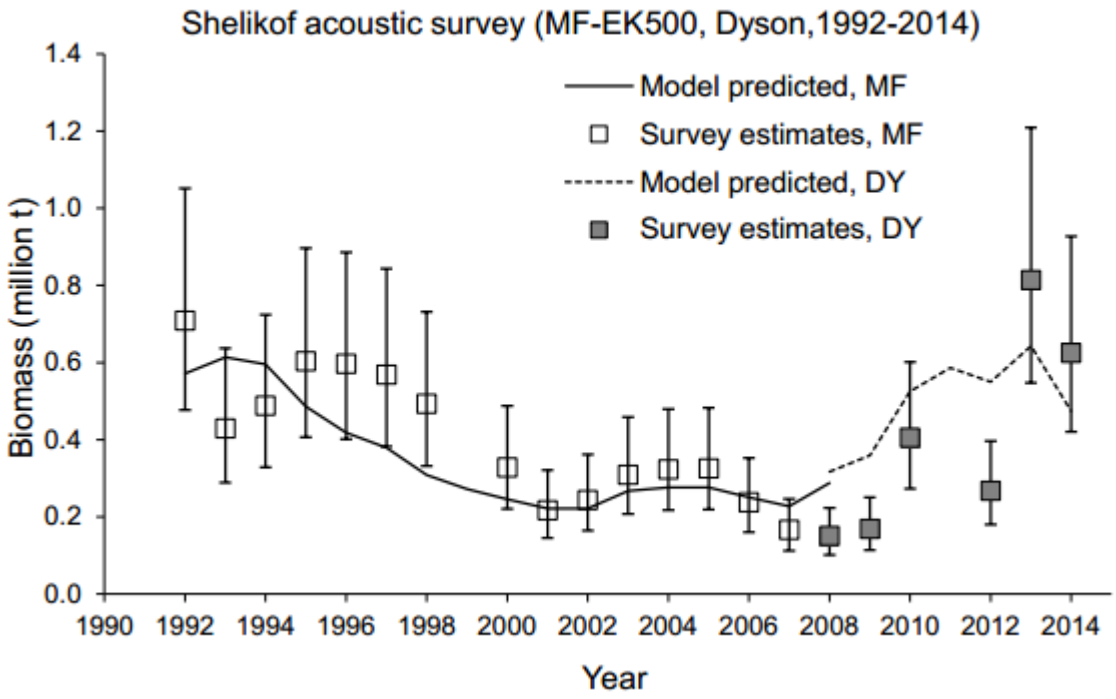


Figure 8. Model predicted and observed survey biomass for the Shelikof Strait acoustic survey for the base model. The Shelikof acoustic survey is modeled with two catchability periods corresponding to the estimates produced by the R/V Miller Freeman (MF) in 1992-2007 and the R/V Oscar Dyson (DY) in 2008- 2014. Error bars indicate plus and minus two standard deviations. A CV of 0.2 is assumed for all acoustic surveys when fitting the model.
http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

Southeast Alaska

For pollock in southeast Alaska (East Yakutat and Southeastern areas), the ABC recommendation for both 2015 and 2016 is 12,625 t and the OFL recommendation for both 2015 and 2016 is 16,833 t. These recommendations are based on a Tier 5 assessment using the estimated biomass in 2015 and 2016 from a random effects model fit to the 1990-2013 bottom trawl survey biomass estimates in Southeast Alaska, and are unchanged from last year.
http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

Eastern Bering Sea

A statistical age-structured assessment model conceptually outlined in Fournier and Archibald (1982) was applied over the period 1964-2013. The current model also was documented in the Academy of Sciences National Research Council. The model was implemented using automatic differentiation software developed as a set of libraries under the C++ language (AD Model Builder). For the model runs, length-stratified age data are used to construct age-length keys for each stratum and sex. These keys are then applied to randomly sampled catch length frequency data and used as input.

Summary of changes in assessment inputs

- The 2014 NMFS summer bottom-trawl survey (BTS) abundance at age estimates are included.
- The 2014 NMFS summer acoustic-trawl (AT) survey estimated abundance-at-age estimates were added.
- Observer data for catch-at-age and average weight-at-age from the 2013 fishery were finalized and included.
- Total catch as reported by NMFS Alaska Regional office was updated and included through 2014.

Results

Table 19. Stock status for Eastern Bering Sea pollock in 2014 with estimates of ABC and OFL for 2014 and projections for 2015 and 2016.

	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
Quantity	2014	2015	2015	2016
M (natural mortality rate, ages 3+)	0.3	0.3	0.3	0.3
Tier	1a	1a	1a	1a
Projected total (age 3+) biomass (t)	8,045,000 t	7,778,000 t	9,203,000 t	9,420,000 t
Projected female spawning biomass (t)	**2,606,000 t**	**2,467,000 t**	2,850,**000 t**	2,950,**000 t**
B_0	5,334,000 t	5,334,000 t	5,162,000 t	5,162,000 t
B_{MSY}	2,122,000 t	2,122,000 t	1,948,000 t	1,948,000 t
F_{OFL}	0.518	0.518	0.587	0.587
$maxF_{ABC}$	0.469	0.469	0.512	0.512
F_{ABC}	0.25	0.22	0.24	0.25
OFL (t)	2,795,000 t	2,693,000 t	3,330,000 t	3,490,000 t
maxABC (t)	2,528,000 t	2,436,000 t	2,900,000 t	3,040,000 t
ABC (t)	1,369,000 t	1,258,000 t	1,350,000 t	1,350,000 t
	As determined *last* year for:		As determined *this* year for:	
Status	2012	2013	2013	2014
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Projections are based on estimated catches assuming 1,350,000 t used in place of maximum permissible ABC for 2015 and 2016.

The survey and fishery data continue to confirm that the 2008 year class is well above average. These age 6 pollock in 2014 were estimated to represent 56% of the female spawning stock biomass (following years when that same class comprised 48% and 56% of the spawning biomass in 2012 and 2013 at ages 4 and 5, respectively. Projections indicate that catches in 2015 of 1.35 million t will result in a stable spawning biomass trend through 2016. The maximum permissible Tier 1a ABC remains high. After examining a other population indicators and some alternative model configurations, an ABC is recommended (1,350,000 t) which is well below the maximum permissible (Tier 1a) value of 2,900,000 t. The Tier 1a overfishing level (OFL) is estimated to be 3,330,000 t.

The 2015 spawning biomass is estimated to be 2,850,000 t (at the time of spawning, assuming the stock is fished at recommended ABC level). This is above the BMSY value of 1,948,000 t. Under Amendment 56, this stock has qualified under Tier 1 and the harmonic mean value is considered a

risk-averse policy since reliable estimates of FMSY and its pdf are available (Thompson 1996). The exploitation-rate type value that corresponds to the FMSY level was applied to the fishable biomass for computing ABC levels. For a future year, the fishable biomass is defined as the sum over ages of predicted begin-year numbers multiplied by age specific fishery selectivity (normalized to the value at age 6) and mean body mass. Since the 2015 female spawning biomass is estimated to be above the BMSY level (1,948,000 t) and the B40% value (2,491,000 t) in 2015 and assuming that the 2015 catch equals 1.35 million t, the OFL and maximum permissible ABC values by the different Tiers would be:

Tier	Year	MaxABC	OFL
1a	2015	2,900,000 t	3,330,000 t
1a	2016	3,040,000 t	3,040,000 t

Tier	Year	MaxABC	OFL
3a	2015	1,637,000 t	2,022,000 t
3a	2016	1,642,000 t	2,026,000 t

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf

Aleutian Islands

The 2014 assessment continued with the reference model presented in the 2012 assessment. The 2013 fishery catch estimate was included in this assessment. Note that the 2012 summer bottom trawl estimate was the lowest on record with only 44,281 t estimated for the area west of 170° w longitude a 69% decrease from the 2010 survey estimate.

Summary of changes in assessment inputs

- Catches for 1978 to 2014 were updated to latest estimates from the catch accounting system (CAS). There were no significant changes except a decrease of the 2013 estimate from 3,500 t to 2,964 t and the addition of the 2014 estimate at 3,000 t.

Summary changes in the assessment model

- For Model 2, the Authors' preferred model, age one pollock were included. The changes to the model make minimal changes to the results, but make the assessment consistent with the other assessment models for this species in the Alaska Region. It also allows for easier assessment of consistency among other modeling platforms such as Stock Synthesis 3.
- Model 3 also includes age 1 but is substantially different with the addition of a vector of differential natural mortality over ages. Natural mortality for Ages 1, 2, and 15 are modeled as deviations from the natural mortality for ages 3-14 fit with a log normal prior on M with a mean of 0.2 and CV of 0.2.

Summary of Results

- The maximum permissible ABC for 2015 and 2016 (assuming the five year average F in 2015 for estimation of 2016 ABC) under Tier 3b are 29,659 t (F=0.25) and 31,900 t (F=0.27), respectively.
- The OFL for 2015 and 2016 under Tier 3b are 36,005 (F=0.32) t and 38,699 t (F=0.33), respectively.
- Long-term FOFL and FABC are 0.395 and 0.315 respectively.
- If the 2015 catch is max TAC of 19,000 t the 2016 projected total age 1+ biomass would be 249,768 t, the 2016 female spawning biomass would be 74,448 t, the 2016 maximum permissible ABC would be 25,915 t, and the 2016 OFL would be 31,553 t.

Table 20. Stock status for Aleutian Islands pollock in 2014 with estimates of ABC and OFL for 2014 and projections for 2015 and 2016.

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015*	2016*
M (natural mortality rate)	0.18		0.18	
Tier	3b		3b	
Projected total (age 2+ for previous and age 1+ for current) biomass (t)	259,525	289,307	228,102	249,523
Projected female spawning biomass (t)				
Projected	81,711	87,479	70,012	71,772
$B_{100\%}$	240,016		207,606	
$B_{40\%}$	96,006		83,042	
$B_{35\%}$	84,006		72,662	
F_{OFL}	0.33	0.33	0.32	0.33
$maxF_{ABC}$	0.26	0.28	0.25	0.27
F_{ABC}	0.26	0.28	0.25	0.27
OFL (t)	42,811	47,713	36,005	38,699
maxABC (t)	35,048	39,412	29,659	31,900
ABC (t)	35,048	39,412	29,659	31,900
Status	As determined *this* year for: 2012	2013	As determined *this* year for: 2013	2014
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

* After 2015, catch of the five year average *F* of 0.0096

* Projections are based on estimated catches of 1,237 t and 1,253 t used in place of maximum permissible ABC for 2015 and 2016,based on the five-year average F (2009-2013) of 0.0096.

http://www.afsc.noaa.gov/REFM/Docs/2014/AIpollock.pdf

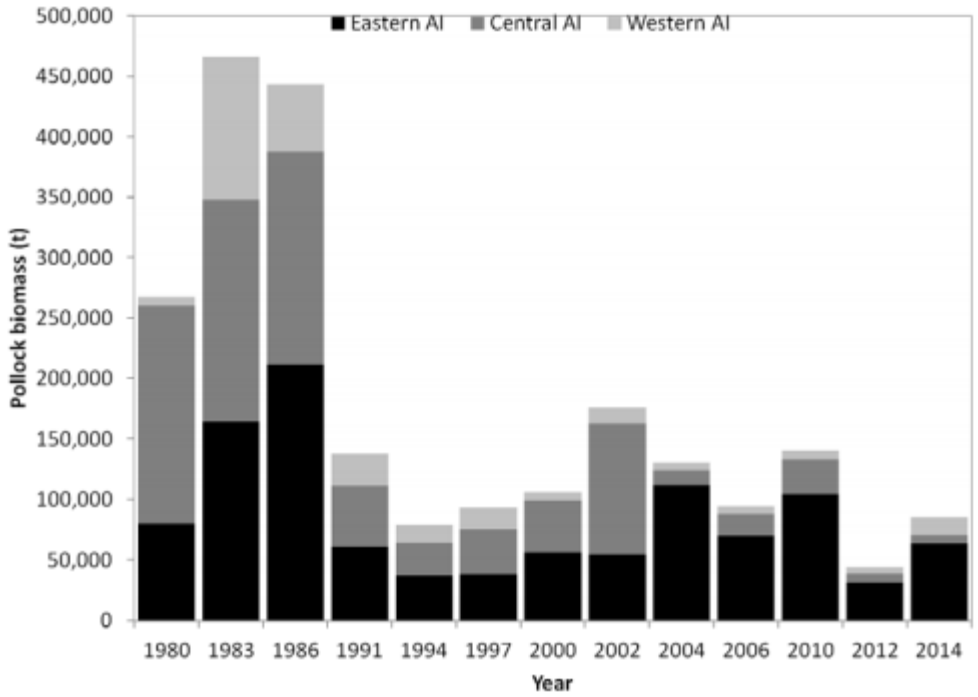


Figure 9. Aleutian Islands bottom trawl survey pollock biomass for the three Aleutian Island management regions. http://www.afsc.noaa.gov/REFM/Docs/2014/AIpollock.pdf

Bogoslof Island Region

The Bogoslof Island region stock (a.k.a. Aleutian Basin stock) has had no directed pollock fishery since 1992, although the species is caught as bycatch in other fisheries in the area. Total bycatch landings are low with 428 t caught in 2014. Maximum permissible ABC and OFL estimates for 2014 and 2015 under Tier 5 rely on exclusively on the NMFS biennial acoustic-trawl survey biomass estimate. Since 2000, the values have varied between 292,000 t and 67,063 t. The most recent AT survey of the Bogoslof spawning stock was in March of 2014 and resulted in a biomass estimate of 112,070 t.

Table 21. Stock status for Bogoslof Island pollock in 2014 with estimates of ABC and OFL for 2014 and projections for 2015 and 2016.

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015	2016
M (natural mortality rate)	0.2	0.2	0.2	0.2
Tier	5	5	5	5
Biomass (t)	67,063	67,063	106,000	106,000
F_{OFL}	0.200	0.200	0.200	0.200
$maxF_{ABC}$	0.150	0.150	0.150	0.150
F_{ABC}	0.150	0.150	0.150	0.150
OFL (t)	13,413	13,413	21,200	21,200
maxABC (t)	10,059	10,059	15,900	15,900
ABC (t)	10,059	10,059	15,900	15,900
Status	As determined *this* year for: 2012	2013	As determined *this* year for: 2013	2014
Overfishing	No	n/a	No	n/a

Harvest Recommendations

Maximum permissible ABC and OFL estimates for 2015 and 2016 under Tier 5 rely exclusively on the NMFS biennial acoustic trawl survey biomass estimate. Biomass was based on the survey averaging approach. The Tier 5 ABC formula is:

$ABC = B2014 \times M \times 0.75$

Using the alternatives requested by the Plan Team and SSC (i.e., alternative survey averaging and examination of natural mortality) gives the following options for consideration:

Description	M	Biomass	ABC	OFL
Recent survey, M=0.2	0.2	112,070	16,811	22,414
Recent survey, M estimated	0.3	112,070	25,216	33,621
Survey average, M=0.2	0.2	106,000	15,900	21,200
Survey average, M estimated	0.3	106,000	23,850	31,800

For consistency with previous year's calculations the recommended ABC is based on the survey average biomass and the natural mortality as in previous years. This results in a maximum permissible Tier 5 ABC of 15,900 t for 2015 and 2016 and an OFL of 21,200 t. The alternative recommendation which uses both the new survey average method and the revised estimate of M would give an ABC and OFL of 23,850 t and 31,800 t, respectively.

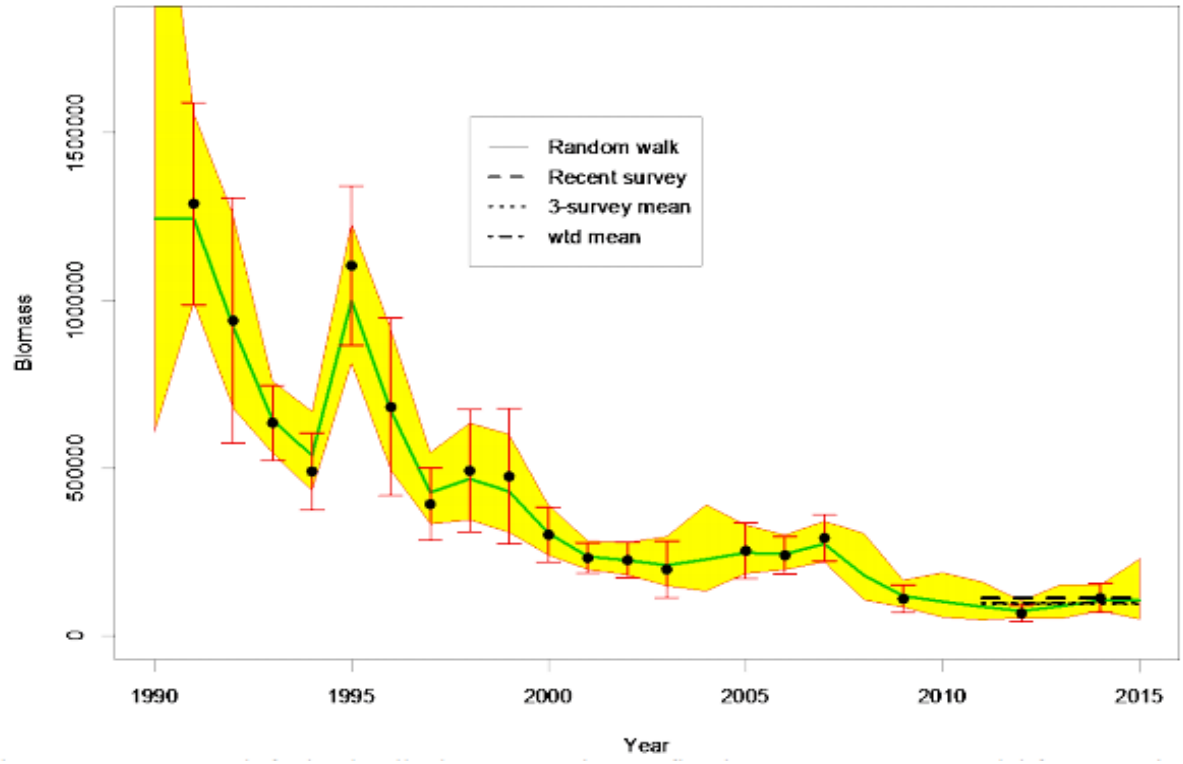


Figure 10. Bogoslof Island pollock survey estimates fitted to a process error model for averaging recruitment. The shade represents the approximate 90% confidence interval from the model. Note that the lines described in the legend appear for the last few years and are difficult to distinguish given the scale. http://www.afsc.noaa.gov/REFM/Docs/2014/BOGpollock.pdf

State-managed fisheries

The state-managed pollock fishery in Prince William Sound is managed using a harvest rate strategy, where the Guideline Harvest Level is the product of the biomass estimate, instantaneous natural mortality rate (0.3) and a precautionary factor of 0.75. The guideline harvest level (GHL) for this fishery is deducted from the combined federal Western, Central, and West Yakutat Gulf of Alaska Regulatory Area (W/C/WYAK) acceptable biological catch (ABC), and has ranged from a low of 2.0 million pounds in 2004 and 2005 to a high of 8.5 million pounds in 2014. Biomass is estimated from the ADFG conducted bottom trawl survey and hydroacoustic surveys done jointly with NMFS.
The state FMP also restricts bycatch to no more than 5 percent of the total round weight of pollock harvested, and the Alaska Department of Fish and Game (ADFG) further manages bycatch by apportioning the percentage among the following species groups: rockfish (0.5%), salmon (0.04%), shark (0.96%), squid (3.0%), and other species (0.5%). The directed fishery for pollock in PWS has typically experienced low bycatch rates relative to many other groundfish fisheries.

Currently, the GHL is determined as 2.5 percent of the combined W/C/WYAK ABC based on the GHL historical percent average from 2001 to 2010. ADFG has and may reserve a percentage of the calculated GHL for a test fishery. Revenues from these test fisheries are used to fund PWS commercial fishery management, including groundfish stock assessment and in-season pollock catch sampling.

Specification and Apportionment of TAC Amounts
The ABC for the pollock stock in the combined Western, Central, and West Yakutat Regulatory Areas (W/C/WYK) has been adjusted to reflect the GHL established by the State for the Prince William Sound (PWS) pollock fishery since its inception in 1995. Based on genetic studies, fisheries scientists believe that the pollock in PWS is not a separate stock from the combined W/ C/WYK population. Since 1996, the Plan Team has had a protocol of recommending that the GHL amount be deducted from the GOA-wide ABC. Accordingly, the Council recommended decreasing the W/C/WYK pollock ABC to account for the State's PWS GHL. At the November 2013 Plan Team meeting, State fisheries managers recommended setting the PWS GHL at 2.5 percent of the annual W/C/WYK pollock ABC. For 2014, this yields a PWS pollock GHL of 4,163 mt, an increase of 1,336 mt from the 2013 PWS GHL of 2,827 t. For 2015, the PWS pollock GHL is 4,646 t, an increase of 1,819 t from the 2013 PWS pollock GHL.
http://www.adfg.alaska.gov/fedaidpdfs/FMR14-42.pdf
http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.management

C. The Precautionary Approach

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.** ***FAO CCRF 7.5.2/7.5.3*** ***Eco 29.2/29.2bis/30-30.2***

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

The ASFC SAFE reports consist of three volumes: a volume containing stock assessments, a volume containing economic analysis, and a volume describing ecosystem considerations. The stock assessment volume contains a chapter or sub-chapter for each stock or stock complex in the "target species" category, and a summary chapter prepared by the Groundfish Plan Team. Each chapter contains estimates of all annual harvest specifications except TAC, all reference points needed to compute such estimates, and all information needed to make annual status determinations with respect to "overfishing" and "overfished. The NPFMC harvest control system is a complex and multi-faceted suite of management measures to address issues related to sustainability, legislative mandates, and quality of information. The tier system specifies the maximum permissible Allowable Biological Catch (ABC) and of the Overfishing Level (OFL) for each stock in the complex (usually individual species but sometimes species groups). The EBS pollock stock in Alaska is categorized as tier 1a while the GOA pollock and AI stocks are categorized as tier 3b. For Tier 1 stocks, reliable estimates are available of B and B_{MSY}, and a reliable probability density function is available for F_{MSY}. For Tier 3 stocks, the spawner-recruit relationship is uncertain, so that MSY cannot be estimated with confidence. Hence, a surrogate based on $F_{40\%}$ is used, following findings in the scientific literature in the 1990s. For Tier 3 stocks, the MSY proxy level is defined as $B_{35\%}$. Stocks in tiers 1-3 are further categorized (a) (b) or (c) based on the relationship between B and B_{MSY} (or proxy), with (a) indicating a stock where biomass is above B_{MSY} (or proxy), (b) indicating a stock where biomass is below B_{MSY} but above (0.05 x B_{MSY}), and (c) indicating a stock where biomass is below (0.05 x B_{MSY}). The category assigned to a stock determines the method used to calculate ABC and OFL.

The NPFMC inaugurated the Tier system in fisheries management. The harvest control rule here depends on the amount of information available and the ratio between total estimated biomass (B) and maximum sustainable yield (B_{MSY}) or, in the case of stocks without a reliable B_{MSY}, a proxy value.
In Tiers 1–3, sufficient information is available to determine a target biomass level, which would be obtained at equilibrium when fishing according to the control rule with recruitment at the average historical level. The control rule is a biomass-based rule, for which fishing mortality is constant when biomass is above the target and declines linearly down to a threshold value when biomass drops below the target. The 2006 reauthorization of the MSA included the requirement that the Council's SSC specify ACLs with accompanying accountability measures when setting annual harvest quotas. The guidelines stipulated that ACL may not exceed ABC and that if ACL=ABC=OFL, then the proposal will prevent overfishing with accountability measures. Because Council's groundfish FMPs are

multiyear plans, their plans provide that if ACL is exceeded in one year, then accountability measures are triggered for the next year to assure compliance (50 CFR 600.310 (f)(5)).

http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf

The methodology for determining stock status for the tier categories is presented in Figure 11 and the associated flow diagram is contained in Figure 12.

Tier 1 Information available: reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY}.
- 1a) Stock status: $B/B_{MSY} > 1$
  - $F_{OFL} = m_A$, the arithmetic mean of the pdf
  - $maxF_{ABC} = m_H$, the harmonic mean of the pdf
- 1b) Stock status: $\alpha < B/B_{MSY} \leq 1$
  - $F_{OFL} = m_A \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
  - $maxF_{ABC} = m_H \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
- 1c) Stock status: $B/B_{MSY} \leq \alpha$
  - $F_{OFL} = 0$
  - $maxF_{ABC} = 0$

Tier 2 Information available: reliable point estimates of B, B_{MSY}, F_{MSY}, $F_{35\%}$, and $F_{40\%}$.
- 2a) Stock status: $B/B_{MSY} > 1$
  - $F_{OFL} = F_{MSY}$
  - $maxF_{ABC} = F_{MSY} \times (F_{40\%}/F_{35\%})$
- 2b) Stock status: $\alpha < B/B_{MSY} \leq 1$
  - $F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
  - $maxF_{ABC} = F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
- 2c) Stock status: $B/B_{MSY} \leq \alpha$
  - $F_{OFL} = 0$
  - $maxF_{ABC} = 0$

Tier 3 Information available: reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.
- 3a) Stock status: $B/B_{40\%} > 1$
  - $F_{OFL} = F_{35\%}$
  - $maxF_{ABC} = F_{40\%}$
- 3b) Stock status: $\alpha < B/B_{40\%} \leq 1$
  - $F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
  - $maxF_{ABC} = F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
- 3c) Stock status: $B/B_{40\%} \leq \alpha$
  - $F_{OFL} = 0$
  - $maxF_{ABC} = 0$

Tier 4 Information available: reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.
- $F_{OFL} = F_{35\%}$
- $maxF_{ABC} = F_{40\%}$

Tier 5 Information available: reliable point estimates of B and natural mortality rate M.
- $F_{OFL} = M$
- $maxF_{ABC} = 0.75 \times M$

Tier 6 Information available: reliable catch history from 1978 through 1995.
- OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information
- maxABC = 0.75 × OFL

Figure 11. Harvest control rules for stocks, where α = 0.05 by default.
http://www.afsc.noaa.gov/program_reviews/2014/background_materials/Groundfish%20Tier%20System.pdf

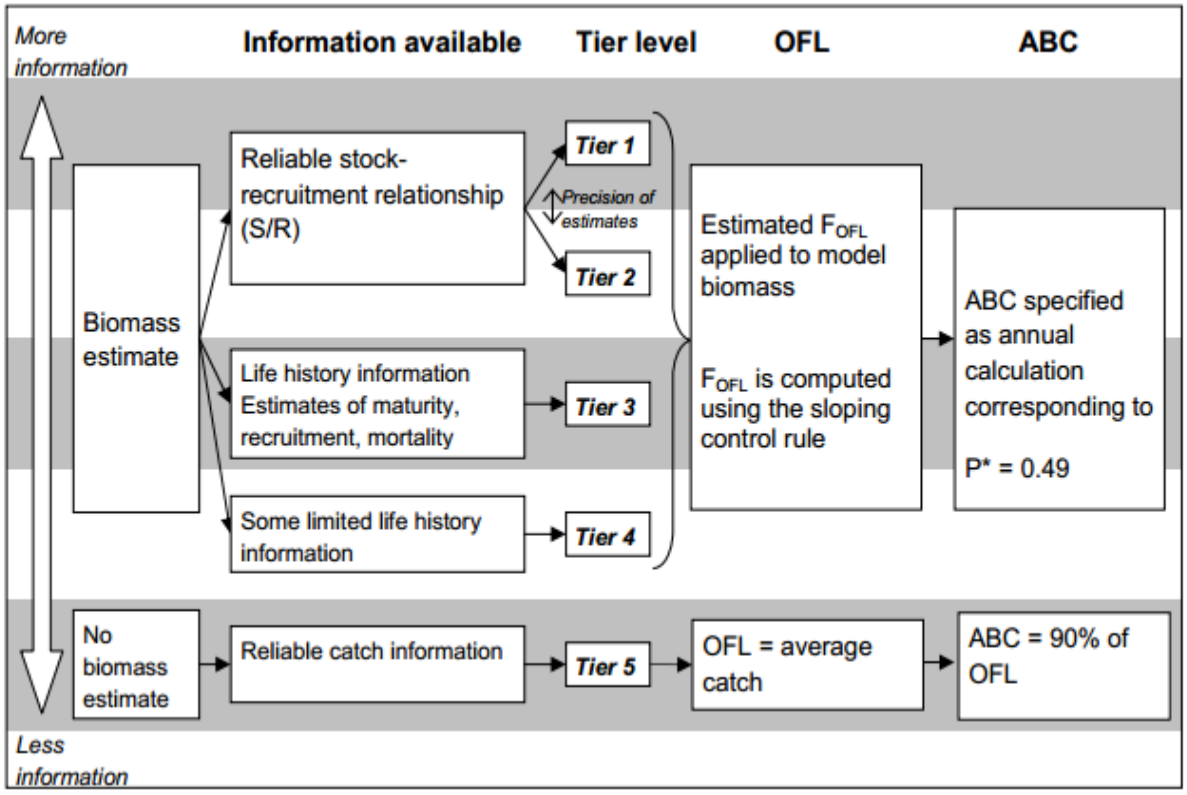


Figure 12. Flow diagram for the NMFS Tier System.
http://access.afsc.noaa.gov/pubs/posters/pdfs/pLivingston02_gf-crab-catch-limits.pdf

GOA and BSAI pollock tier assignment

GOA pollock spawning biomass in 2015 was projected by the 2014 SAFE to be 309,869 t, which is below the $B_{40\%}$ of 312,000 t. This places the stock into tier 3b.

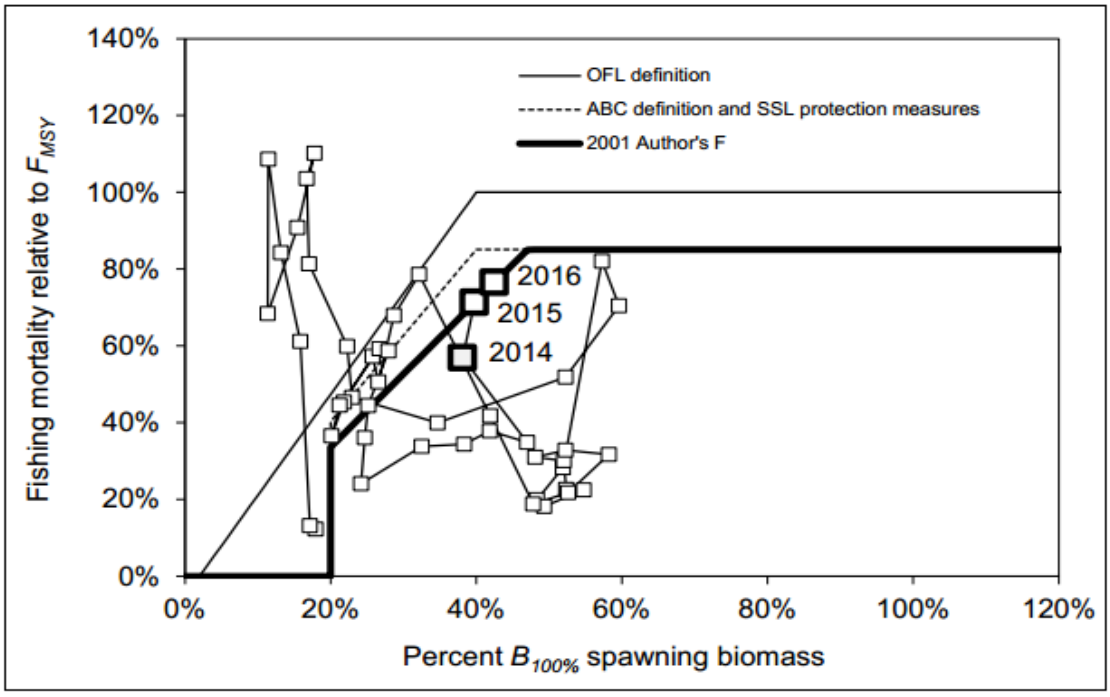


Figure 13. Gulf of Alaska pollock spawning biomass relative to the unfished level and fishing mortality relative to F_{MSY}. The ratio of fishing mortality to F_{MSY} is calculated using the estimated

selectivity pattern in that year. Estimates of $B_{100\%}$ spawning biomass are based on current estimates of maturity at age, weight at age, and mean recruitment. Because these estimates change as new data become available, this figure can only be used in a general way to evaluate management performance relative to biomass and fishing mortality reference levels.

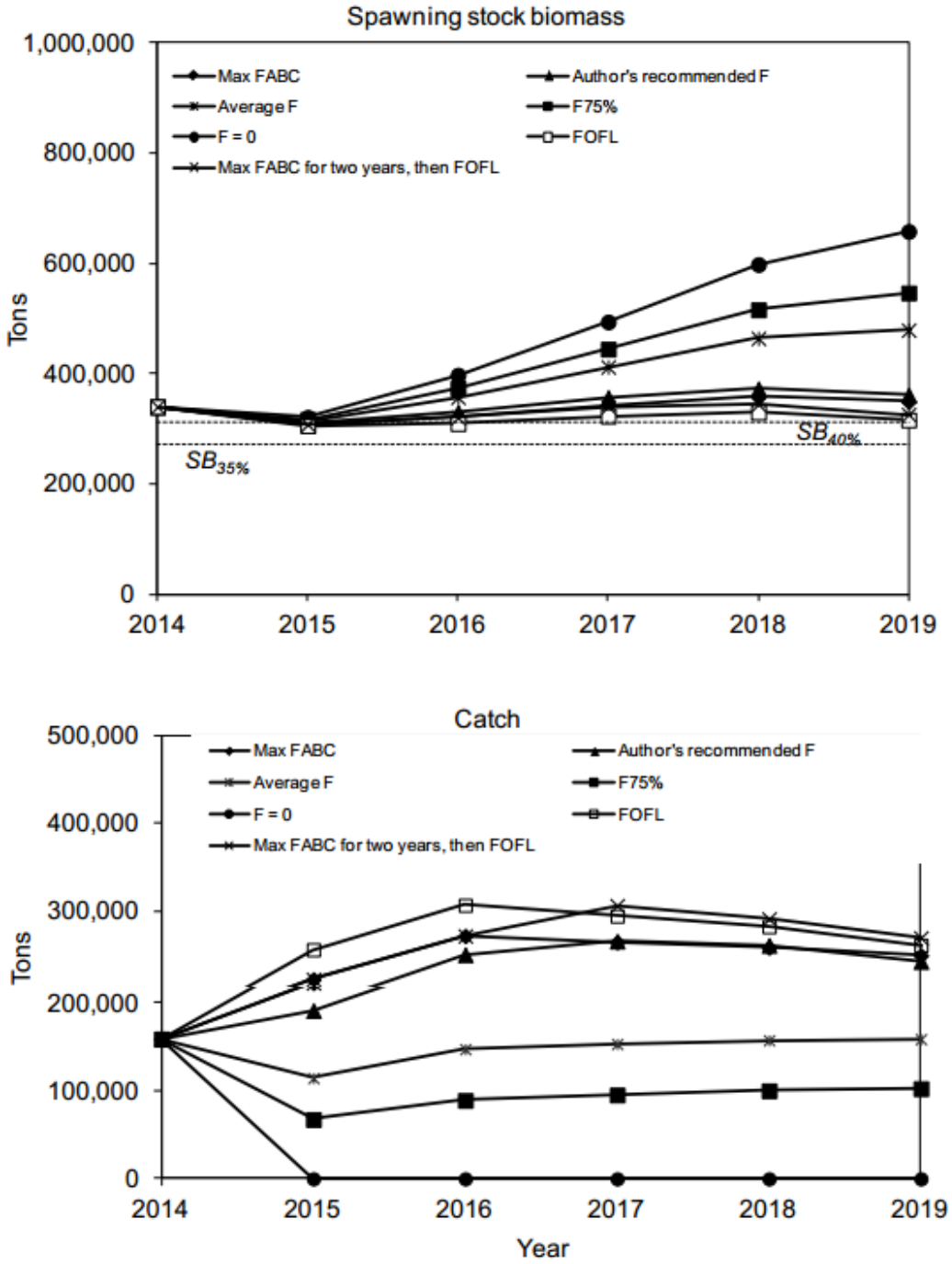


Figure 14. Projected spawning biomass and catches for GOA pollock in 2015-2019 for different harvest rates.

EBS pollock spawning biomass in 2015 was projected by the 2014 SAFE to be 2,467,000 t (at the time of spawning, assuming the stock is fished at recommended ABC level). This is above the B_{MSY} value of 2,122,000 t, placing the stock into tier 1a.

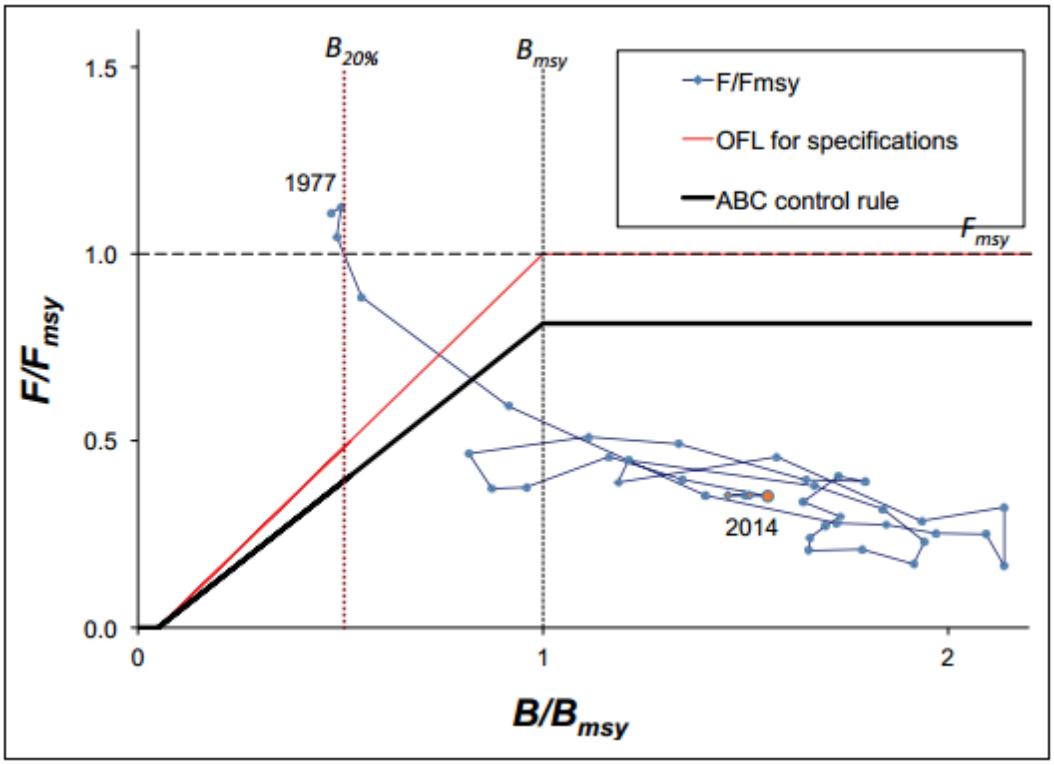


Figure 15. Estimates of spawning biomass relative to annually estimated F_{MSY} values and fishing mortality rates for EBS pollock, 1977-2014 (plus 2015 and 2016 in highlighted dots). Note that the control rules for OFL and ABC are designed for setting specifications in future years.

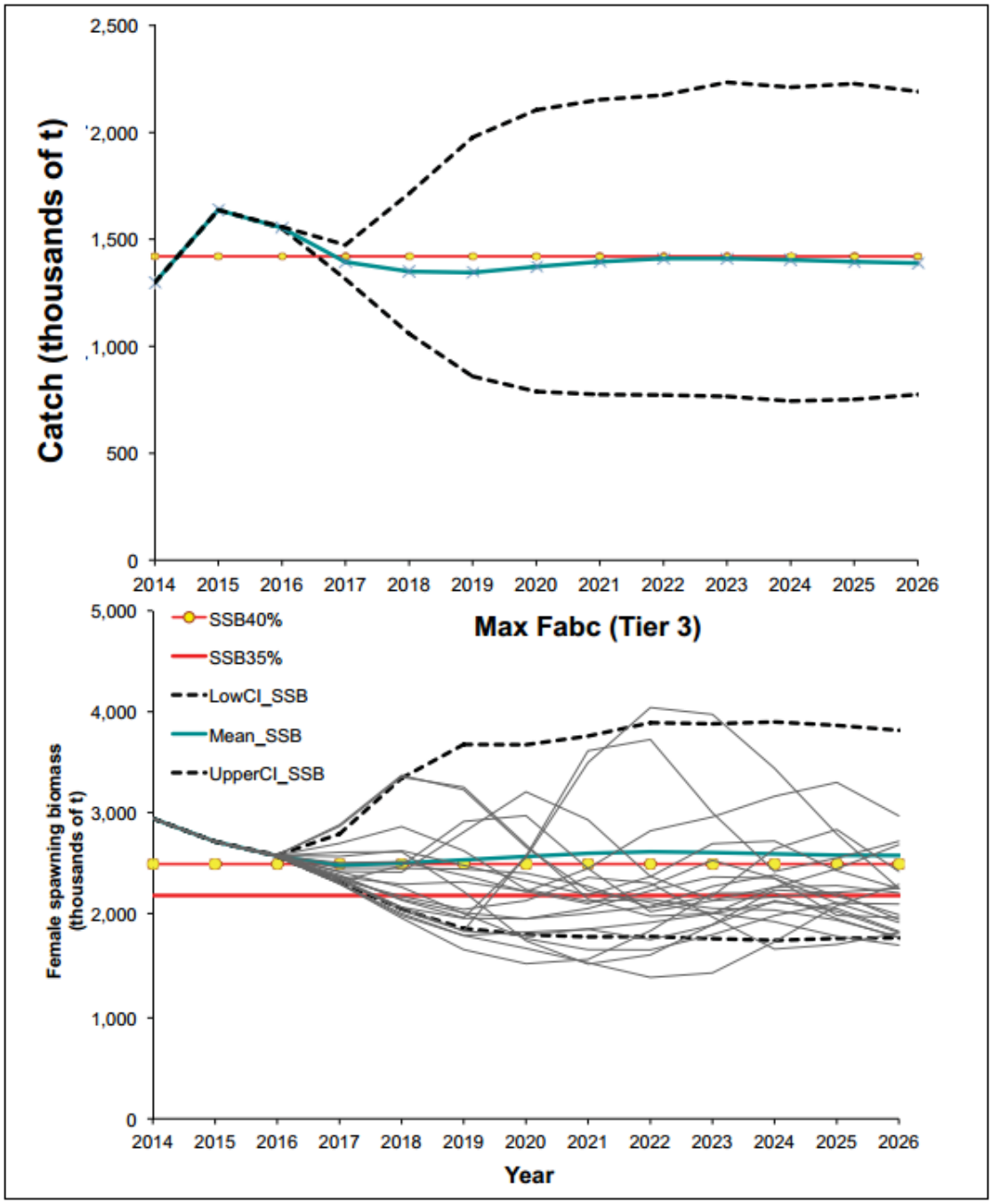


Figure 16. Projected EBS Tier 3 pollock yield (top) and female spawning biomass (bottom) relative to the long-term expected values under $F_{35\%}$ and $F_{40\%}$ (horizontal lines). $B_{40\%}$ is computed from average recruitment from 1978-2012. Future harvest rates follow the guidelines specified under Tier 3 Scenario 1. The grey lines represent a sub-sample of simulated trajectories. Note that the numbers at age 2 in 2014 were set to their median value.

AI pollock spawning biomass in 2015 was projected by the 2014 SAFE to be 87,479 t, which is below the $B_{40\%}$ (the B_{MSY} proxy in tier 3 stocks) of 96,066 t. This places the stock into tier 3b.

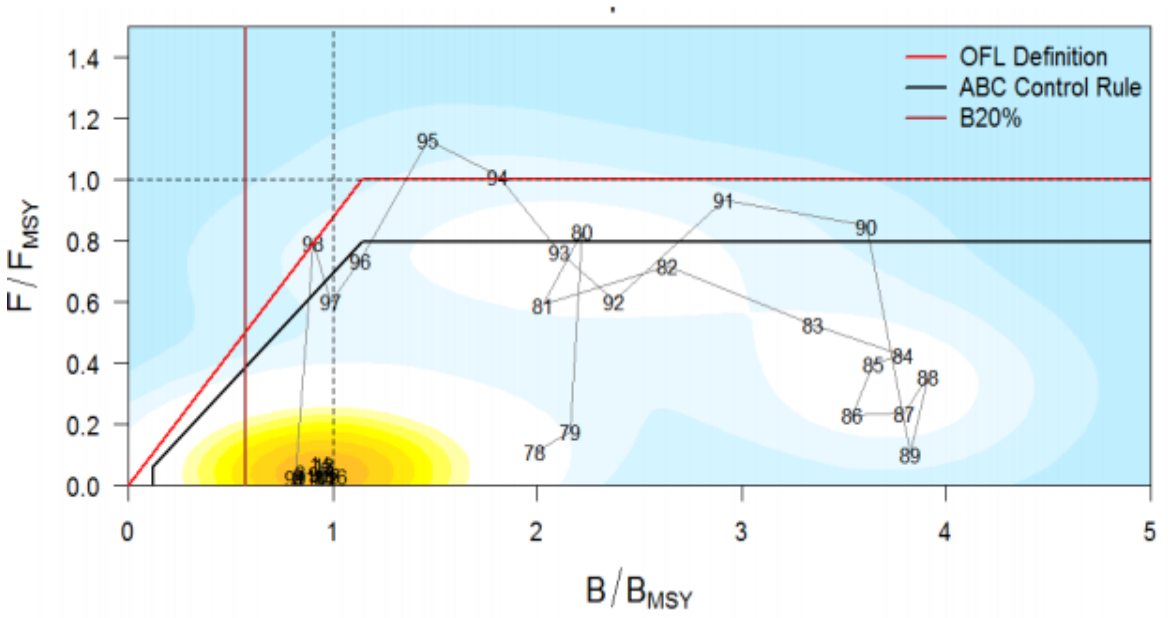


Figure 17. Aleutian Islands pollock spawning biomass relative to B_{msy} and full-selection fishing mortality relative to F_{msy} (1978-2016). The ratio of fishing mortality to F_{msy} is calculated using the estimated selectivity pattern in that year. Color is scaled relative to density of points in the region from high orange to low blue. 2015 and 2016 are plotted with catch assumed to be at the five-year average F.

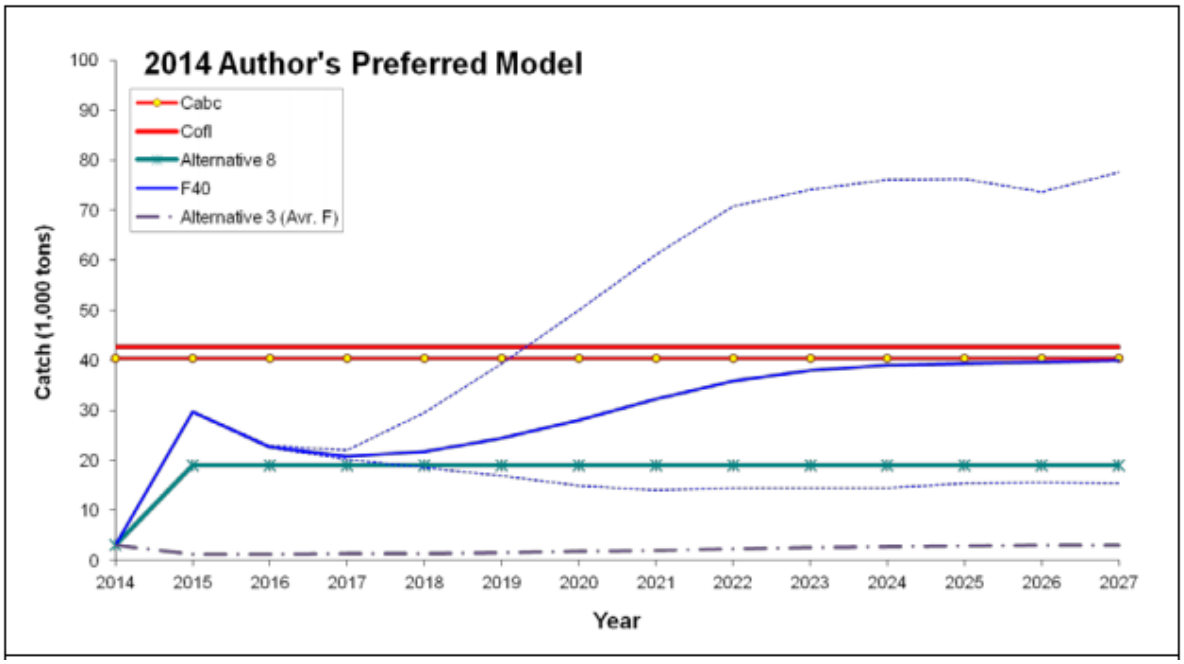


Figure 18. Authors' preferred Model 2 AI pollock projected catch for $F_{40\%}$, Alternative 3 (average F), and Alternative 8 (19,000 t) ABC scenarios.

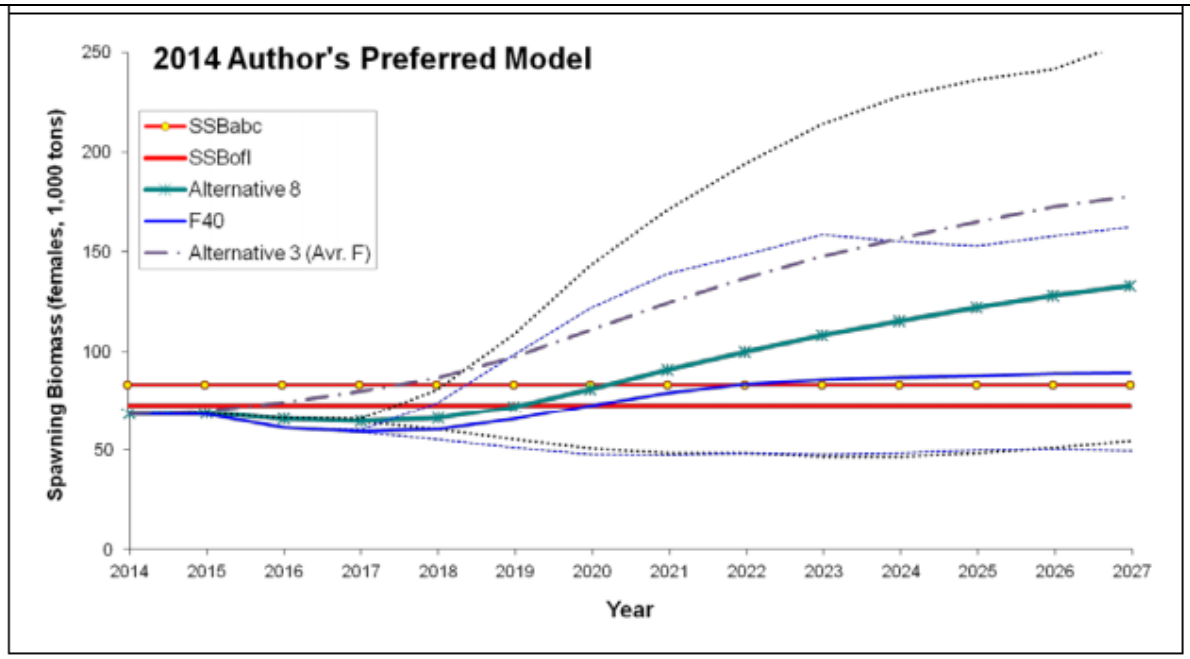


Figure 19. Authors' preferred Model 2 AI pollock projected spawning biomass for $F_{40\%}$ Alternative 3 (average F), and Alternative 8 (19,000 t) ABC scenarios.

The BI spawning biomass in 2015 was projected by the 2014 SAFE to be 67,063 t. The BI stock is categorized as tier 5, with a maximum permissible ABC of 15,900 t for 2015 and 2016 and an OFL of 21,200 t.

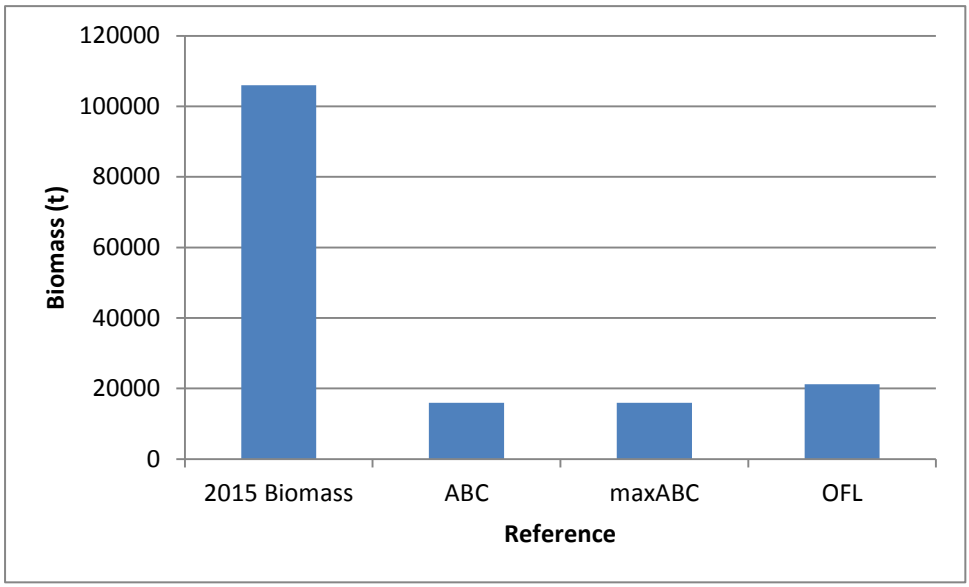


Figure 20. Biomass and catch reference points for Bogoslof Island pollock in 2015.

Overfishing and overfished determinations

None of the EBS, AI, BI or GOA pollock management units are considered overfished or undergoing overfishing. For each stock and stock complex, a determination of status with respect to "overfishing" is made in-season as the fisheries are monitored to prevent exceeding the TAC and annually as follows:

The OFL for a given calendar year is specified at the end of the preceding calendar year on the basis of the most recent stock assessment. For each stock and stock complex, a determination of status with respect to "overfishing" is made in-season as the fisheries are monitored to prevent exceeding the TAC and annually as follows: If the catch taken during the most recent calendar year exceeded the OFL that was specified for that year, then overfishing occurred during that year; otherwise, overfishing did not occur during that year. In the event that overfishing is determined to have occurred, an in-season action, an FMP amendment, a regulatory amendment or a combination of these actions will be implemented to end such overfishing immediately.
A stock or stock complex is determined to be "overfished" if it falls below the MSST. According to the National Standard Guidelines definition, the MSST equals whichever of the following is greater: One-half the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years, if the stock or stock complex were exploited at the MFMT.

http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf
http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf

State waters
The directed pollock trawl fishery GHL is deducted from the combined federal Western, Central and West Yakutat Gulf of Alaska Regulatory Areas (W/C/WYAK) ABCs, and has ranged from 2.0 million lb. in 2004 and 2005 to 8.6 million lb. in 2014. ADFG has used several different approaches to determine the GHL through the years, including: 1) applying 8-10% harvest rates to biomass estimates derived from ADFG summer bottom trawl assessment surveys, 2) using derivations from a spring acoustic survey biomass estimate, 3) mirroring relative annual changes in harvest levels in federal waters of the Gulf of Alaska, and 4) applying the Tier 5 approach similar to that used by the NPFMC to establish the ABC for some groundfish species. Starting with the 2013 season, ADFG and the NPFMC Groundfish Plan Team agreed to calculate the PWS directed pollock trawl fishery GHL as 2.5% of the W/C/WYAK ABC. This percentage was the midpoint between the 2001-2010 average of GHL percent of W/C/WYAK ABC (2.44%) and the 1996 and 2012 level (2.55%). ADFG has reserved a percentage of the calculated GHL for a test fishery. Test fisheries were conducted in all years except 2006, 2008, 2012, and 2014, and revenues were used to fund PWS commercial fishery management, including groundfish stock assessment and in-season pollock catch sampling.
http://www.adfg.alaska.gov/fedaidpdfs/FMR14-42.pdf

Maximum permissible ABC and OFL estimate for 2014 and 2015 under Tier 5 rely exclusively on the NMFS biennial acoustic-trawl survey biomass estimate. Since 2000, the values have varied between 292,000 t and 67,063 t. The most recent AT survey of the Bogoslof spawning stock was in March of

2014 and resulted in a biomass estimate of 112,070 t. The recommended ABC for 2015 is based on a Tier 5 calculation which results in 15,900 t for the next two years. The OFL for the Tier 5 calculation is 21,200 t.

http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.management
http://www.adfg.alaska.gov/FedAidPDFs/sp05-09.pdf

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.**

FAO CCRF 7.5.1/7.5.4/7.5.5
FAO ECO 29.6/32

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

There are three core components to the application of the precautionary approach in Alaskan groundfish fisheries. Firstly, the FMP for each management area sets out an Optimum Yield (OY) for the groundfish complex as a whole, which includes pollock along with the majority of targeted groundfish species. The second component is the tier system, which assigns each groundfish stock to a tier according to the level of scientific understanding, data available and uncertainty associated with the fishery. Each tier has an associated set of management guidelines, particularly in relation to calculating the level of catch permitted. The more data-deficient a stock, the higher the tier's number, and the more conservatively catch limits are set. At present the GOA and AI pollock fisheries are assigned to tier 3 and the EBS pollock fishery to tier 1. The third component is the Annual Catch Limit (ACL), Overfishing Limit (OFL), Acceptable Biological catch (ABC) and Total Allowable Catch (TAC) system. ACL is the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures. OFL is the limit reference point of annual catch after which overfishing is determined to be occurring. For Alaska groundfish stocks, OFL is equal to the expected catch that would occur at the rate (or proxy thereof) which is estimated to provide the maximum sustainable yield (F_{msy}). ABC is a recommended level of annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. TAC is the annual catch target for a stock or stock complex, derived from the ABC by considering social and economic factors and management uncertainty (i.e., uncertainty in the ability of managers to constrain catch so the ACL is not exceeded, and uncertainty in quantifying the true catch amount).

Optimum yield

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The first element of the precautionary approach is the Optimum Yield (OY) for the groundfish complexes in the Bering Sea / Aleutian Islands (BSAI) and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The range for BSAI is 1.4 to 2.0 million mt while the range for GOA is 116 to 800 thousand mt. In practice, only the upper OY limit in the BSAI has been a factor in altering harvests. That is, that the sum of the TACs exceeded the upper range so harvest was constrained to not exceed the OY cap. The NPFMC originally adopted the 2.0 million mt cap to meet the needs of the ecosystem. Trawl assessment surveys indicated that in many years the sum of the ABCs would have exceeded the OY cap if the NPFMC had not set aside the ABC in excess of the cap for ecosystem consideration. Thus, total groundfish harvest limits the total groundfish harvest that can be taken from the BSAI and GOA marine ecosystems, effectively adopting a conservative ecosystem cap approach to fisheries.

Tier system

Specification of catch limits begins with the Maximum Fishing Mortality Threshold (MFMT, also known as the OFL control rule). The MFMT is prescribed through a set of six tiers to which each stock can be assigned. Each tier represents a different level of information availability, and has a corresponding harvest control rule. Stocks with limited available information are assigned to a higher and thus subjected to a more conservative OFL calculation. The GOA pollock stock is currently assigned to tier 3b, and the EBS pollock fishery is currently assigned to tier 1a, the BI stock is assigned to tier 5, and the AI stock is assigned to tier 3b.

OFL, ABC, ACL and TAC

The third element of the precautionary approach is the ACL, OFL, ABC and TAC system. Allowable Biological Catch (ABC) is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. Overfishing Level (OFL) is a limiting catch level, corresponding to fishing at MSY level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. In application, the NPFMC sets TAC ≤ ABC < OFL. Since 1981, actual groundfish harvests have averaged approximately 90% of the cumulative TAC and 65% of the cumulative ABC because of the complex array of accountability measures governing these fisheries. See figure below showing the main catch management measures currently in use by federal management in the BSAI.

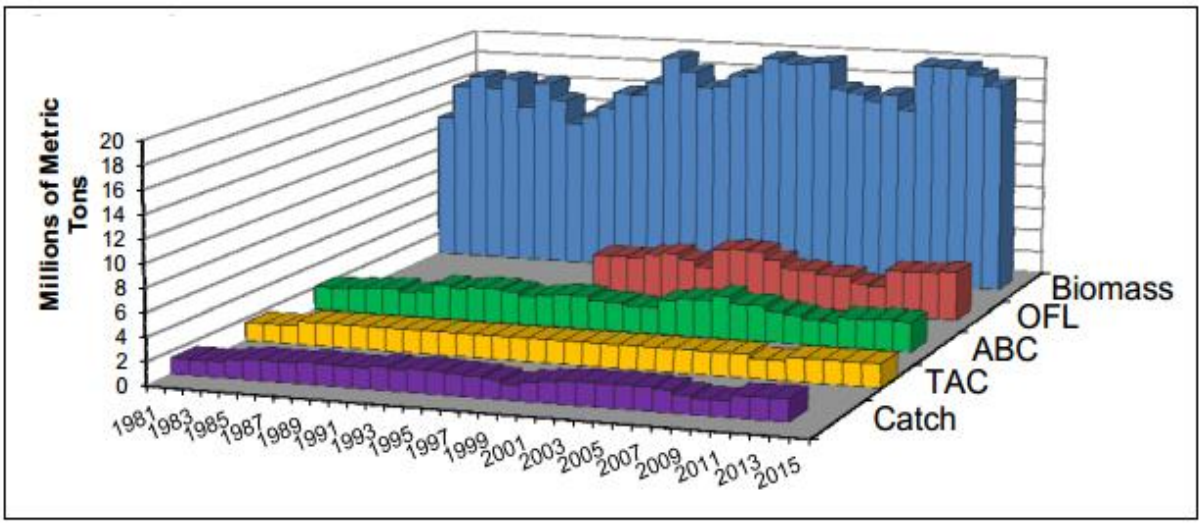


Figure 21. Biomass, Overfishing Level, Acceptable Biological Catch and Total allowable Catch for 1981-2015 and Catch, 1981-2014. 2015 Biomass, ABC and OFLs are those recommended by the Plan Team and assume that total TACs=OY

http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIintro.pdf

Table 22. Status and catch specifications (t) of Walleye pollock in recent years. Biomass for each year corresponds to the projection given in the SAFE reports issued in the preceding year. The age grouping is 3+ for eastern Bering Sea, 2+ for the Aleutian Islands and the survey biomass for Bogoslof, as reported in the respective assessments. The OFL and ABC for 2015 and 2016 are those recommended by the Plan Team. Catch data are current through November 8, 2014.

Area	Year	Biomass	OFL	ABC	TAC	Catch
Eastern Bering Sea	2013	8,140,000	2,550,000	1,375,000	1,247,000	1,270,723
	2014	8,045,000	2,795,000	1,369,000	1,267,000	1,294,703
	2015	9,203,000	3,330,000	1,637,000	n/a	n/a
	2016	9,063,000	3,319,000	1,554,000	n/a	n/a
Aleutian Islands	2013	266,000	45,600	37,300	19,000	2,964
	2014	259,525	42,811	35,048	19,000	2,375
	2015	228,102	36,005	29,659	n/a	n/a
	2016	249,523	38,699	31,900	n/a	n/a
Bogoslof	2013	67,100	13,400	10,100	100	57
	2014	67,063	13,413	10,059	75	427
	2015	106,000	21,200	15,900	n/a	n/a
	2016	106,000	21,200	15,900	n/a	n/a

*In 2013, NMFS reallocated 14,900 t of pollock TAC from the Aleutian Islands to the Bering Sea which increased the Bering Sea TAC to 1,212,400 t and decreased the Aleutian Islands TAC to 4,100 t. In 2014, NMFS reallocated 13,650 t of pollock TAC from the Aleutian Islands to the Bering Sea, which increased the Bering Sea TAC to 1,280,650 t and decreased the Aleutian Islands TAC to 5,350 t.

The Alaska pollock 2015 total allowable catches have been conservative in all the stock regions but especially so in the Eastern Bering Sea Region, which makes up the vast majority (> 90%) of Alaska's landings. In fact the EBS ABC for 2015 has in fact been set at 1,637,000 t, despite a Max_{ABC} of 2,900,000 t.

http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.management
http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf
http://www.afsc.noaa.gov/refm/stocks/plan_team/BSAISAFE.pdf

In-season management

NMFS Alaska Region's In-season Management Branch determines the amount of an individual TAC necessary as incidental catch in other target fisheries. As described previously, ACL is equivalent to ABC. TAC is set either at ABC or below, so managing the fisheries to not exceed TAC is equivalent, or more conservative in some cases, than managing to the ACL. The target fishery is usually closed before reaching the TAC, allowing for bycatch in other fisheries up to the amount of TAC for a species. A directed fishery closure limits retention of a species to a portion of other species TACs open to directed fishing. That portion is called the maximum retainable amount (MRA). The MRA is expressed as a percentage of an alternate target fishery. The percentage relates to the expected rate of catch and may be used as a tool to harvest a species that is low in volume but high in value. All retention is prohibited if the total TAC is caught before the end of the year. Prohibiting retention removes any incentive to increase incidental catch as a portion of other fisheries.

If the ABC is taken and the trajectory of catch indicates the OFL may be approached, additional closures are imposed. To prevent overfishing, specific fisheries identified by gear and area that incur the greatest incidental catch are closed. Closures expand to other fisheries if the rate of take is not

sufficiently slowed. A fishery may also be closed if a PSC limit is reached. Except for scientific purposes, Chinook salmon bycatch management, or the prohibited species donations program, prohibited species cannot be retained in the groundfish fisheries. In the rare occurrence of a TAC being exceeded, the In-season Management Branch will evaluate the conditions that resulted in the overage and determine appropriate management actions that may be needed to prevent a reoccurrence. For example, In-season Management may set the following year's directed fishing allowance lower and the incidental catch allowance higher to provide for an earlier closure of the directed fishery, leaving more fish available outside of the directed fishery before the TAC is reached.

ACLs

The reauthorization of the MSA included the requirement that the Council's SSC specify ACLs with accompanying accountability measures when setting annual harvest quotas. The guidelines stipulated that ACL may not exceed ABC and that if ACL=ABC=OFL, then the proposal will prevent overfishing with accountability measures. Because Council's groundfish FMPs are multiyear plans, their plans provide that if ACL is exceeded in one year, then accountability measures are triggered for the next year to assure compliance (50 CFR 600.310 (f)(5)).

http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf
http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf

State waters

Parallel fisheries for pollock take place in state waters around Kodiak Island, in the Chignik Area, and along the South Alaska Peninsula. An open access state-waters fishery for pollock takes place in Prince William Sound (PWS). The Guideline Harvest Level (GHL) is the product of the biomass estimate, instantaneous natural mortality rate, M, (0.3) and a precautionary factor of 0.75. The guideline harvest level (GHL) for this fishery is deducted from the combined federal Western, Central, and West Yakutat Gulf of Alaska Regulatory Area (W/C/WYAK) acceptable biological catch (ABC). The management plan (5 AAC 28.263) specifies that fishery occurs in three section located within the Inside District; no more than 60 percent of the GHL may be taken from any one section in order to reduce potential impacts on the endangered population of Steller sea lions by geographically apportioning the catch.

The directed pollock trawl fishery GHL is deducted from the combined federal Western, Central and West Yakutat Gulf of Alaska Regulatory Areas (W/C/WYAK) ABCs, and has ranged from 2.0 million lb. in 2004 and 2005 to 8.6 million lb. in 2014. ADFG has used several different approaches to determine the GHL through the years, including: 1) applying 8-10% harvest rates to biomass estimates derived from ADFG summer bottom trawl assessment surveys, 2) using derivations from a spring acoustic survey biomass estimate, 3) mirroring relative annual changes in harvest levels in federal waters of the Gulf of Alaska, and 4) applying the Tier 5 approach similar to that used by the NPFMC to establish the ABC for some groundfish species. Starting with the 2013 season, ADFG and the NPFMC Groundfish Plan Team agreed to calculate the PWS directed pollock trawl fishery GHL as 2.5% of the W/C/WYAK ABC. This percentage was the midpoint between the 2001-2010 average of GHL percent of W/C/WYAK ABC (2.44%) and the 1996 and 2012 level (2.55%). ADFG has reserved a percentage of the calculated GHL for a test fishery. Test fisheries were conducted in all years except

2006, 2008, 2012, and 2014, and revenues were used to fund PWS commercial fishery management, including groundfish stock assessment and in-season pollock catch sampling.

The State can also adopt regulations similar to those in place for the Federal fishery if those regulations are approved by the Board of Fisheries and meet State statute. An example of Federal fishery regulations that were concurrently adopted by the Board of Fisheries are the Steller sea lion protection measures implemented in 2001.
http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.management

D. Management Measures

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

FAO CCRF 7.1.1/7.1.2/7.1.6/7.4.1/7.6.1/7.6.9/12.3
FAO Eco 29.2/29.4/30

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating determination

The Magnuson Stevens Act is the federal legislation that defines how fisheries off the United States EEZ are to be managed. From this legislation and NPFMC objectives, the management system for the Alaska groundfish fisheries has developed into a complex suite of measures comprised of harvest controls—e.g., OY, TAC, ABC, OFL, ACL—effort controls (limited access, licenses, cooperatives), time and/or area closures (habitat protected areas, marine reserves), by-catch controls (PSC limits, Maximum Retainable Allowances (MRA), gear modifications, retention and utilization requirements), observers, monitoring and enforcement programs, social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions (SSL)). The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information.

Derivation and management of catch limits

The methodology used to derive annual quotas for each groundfish stock is considered in detail under clauses 7. Pollock TAC is apportioned spatially in PWS, and temporally in the EBS and GOA as seasonal allowances (A=roe season and B=non-roe season), and between components of the fleet (i.e. inshore and offshore allocations as incorporated in the AFA allocation). In the GOA pollock fishery, 20% of the TAC is set aside as a reserve, which can be apportioned to any component of the fishery at any time by the regional administrator.

Attainment of the pollock TAC in either region results in the closure of the directed pollock fishery in that region. Pollock may continue to be caught as bycatch in other fisheries as long as such bycatch is not considered to be detrimental to the pollock stock. See clause 7 for more detail.

Steller Sea lions

The management of pollock and some other groundfish stocks in the GOA and BSAI has been significantly influenced by concerns over the possible impact of the fisheries on rebuilding Steller sea lion populations. For the pollock fisheries, comparisons of seasonal fishery catch and pollock biomass distributions (from surveys) by area in the EBS led to the precautionary conclusion that the pollock fishery may have had disproportionately high seasonal harvest rates within Steller sea lion (SSL) critical habitat that could lead to reduced sea lion prey densities. Because SSL are designated as “endangered”, the precautionary aspects of ESA require limitations on fisheries to continue.

As a result, three types of measures were implemented in the pollock fisheries: 1) pollock fishery

exclusion zones around sea lion rookery or haulout sites; 2) phased-in reductions in the seasonal proportions of TAC that can be taken from critical habitat; and 3) additional seasonal TAC releases to disperse the fishery in time. At present, 210,350 km^2 (54%) of critical sea lion habitat is closed to the pollock fishery, with further restrictions on the proportion of annual pollock TAC which can be removed from the BSAI Steller sea lion Conservation Area (SCA).

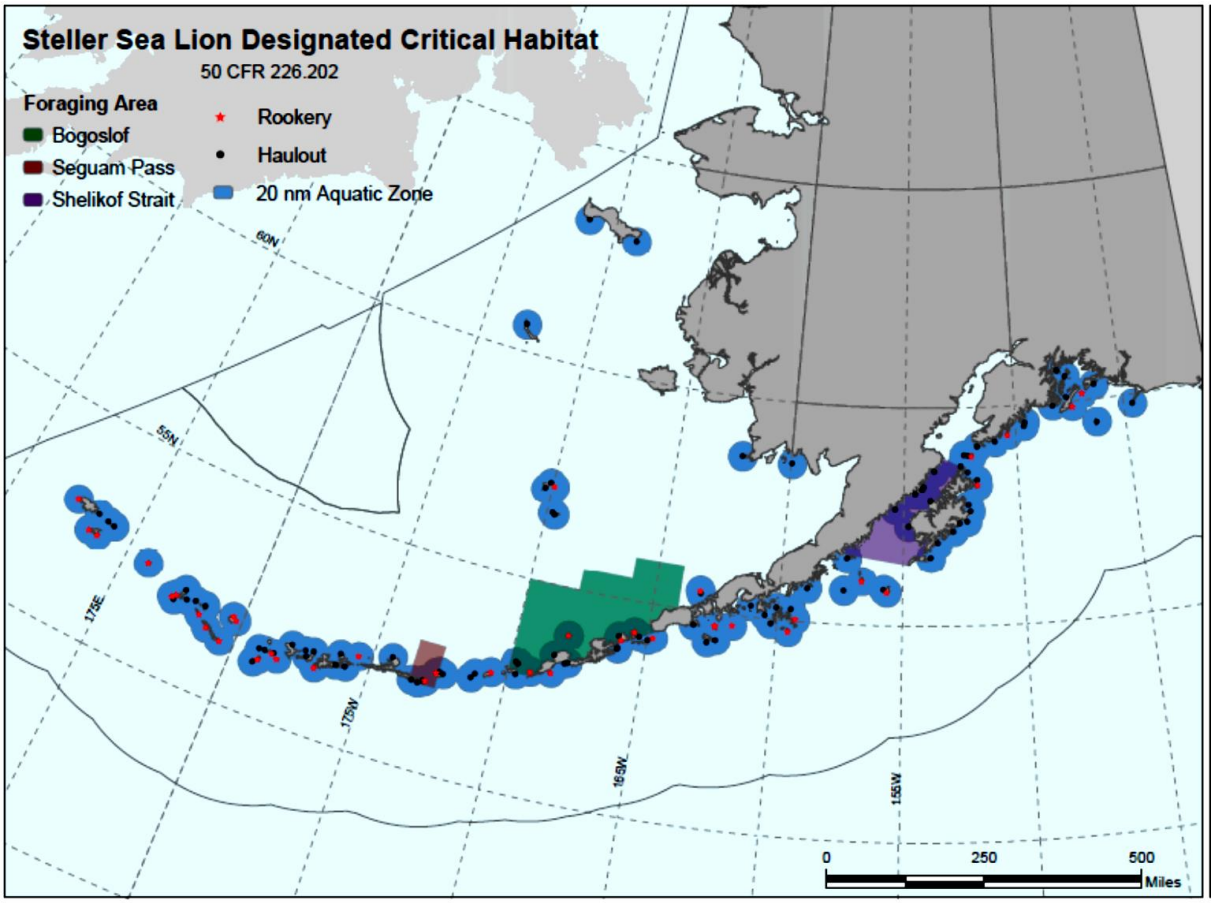


Figure 22. Steller Sea Lion Protection Areas from NOAA Alaska Region.

NMFS, in consultation with the NPFMC prepared a draft Environmental Impact Statement/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EIS/RIR/IRFA) to provide decision makers and the public with an evaluation of the environmental, social and economic effects of alternatives to the Steller sea lion protection measures for the BSAI Management Area groundfish fisheries, in particular the Atka mackerel, Pacific cod and pollock fisheries in the AI.

The western distinct population segment (WDPS) of Steller sea lions is listed as endangered under the Endangered Species Act, and the species population in the Aleutian Islands is declining. Atka mackerel, Pacific cod, and pollock are principal prey species for Steller sea lions in the Aleutian Islands.

2014 Steller Sea Lion Biological Opinion

Section 7 Consultation Biological Opinion – Authorization of Alaska groundfish fisheries under the Proposed Revised Steller Sea Lion Protection Measures, April 2014.

NOAA Fisheries stated that proposed changes to fishing restrictions in the Aleutian Islands are not likely to jeopardize the continued existence of the endangered western population of Steller sea lions or adversely modify Steller sea lion critical habitat, according to a biological opinion issued on April 2nd 2014 under the Endangered Species Act.
The agency estimates that the proposed fishery management changes would relieve roughly two-thirds of the economic burden imposed on Aleutian Islands' fishermen by sea lion protection measures that took effect in 2011. Fishermen could see new regulations in place by January 2015.

The agency's previous biological opinion on the effects of fisheries, issued in 2010, found that the ongoing groundfish fisheries in the western and central Aleutian Islands were likely to jeopardize the continued existence of Steller sea lions and adversely modify their critical habitat. This led NOAA Fisheries to develop a "Reasonable and Prudent Alternative" under the ESA, which closed the Atka mackerel and Pacific cod fisheries in the western Aleutians in 2011, and further restricted these fisheries in the central Aleutians.
The 2010 opinion underwent two external reviews—one commissioned by NOAA and undertaken by the Center for Independent Experts, and a second provided by the states of Alaska and Washington. NOAA Fisheries conducted several new analyses in response to the reviews, which are incorporated into the new 2014 opinion.
The new biological opinion was developed based on the best available scientific information and notes that considerable changes have occurred in the Aleutian Islands fisheries, coupled with new data and analyses that help give the agency a better picture of the potential for commercial fisheries to compete with sea lions for Pacific cod, Atka mackerel and pollock.
Beginning in 2014, NOAA and the North Pacific Fishery Management Council split the total allowable catch for Pacific cod between the Bering Sea fishing grounds and the Aleutian Islands, resulting in far less allowable Pacific cod harvest in the Aleutians. Additional changes that are being considered would limit the amount, timing and location of Atka mackerel, Pacific cod and pollock harvests inside Steller sea lion critical habitat in the Aleutians.
NOAA Fisheries remains concerned that large fishery harvests from important areas in the Aleutians over a short amount of time has the potential to deplete concentrations of fish that Steller sea lions depend upon. However, the proposed measures would limit and spread out the catch enough to meet the requirements of the Endangered Species Act, and are consistent with NOAA Fisheries' views on dispersing the harvest in space and time to avoid localized depletion of fish that are prey species for Steller sea lions.
NOAA Fisheries is completing an environmental impact statement on the new fishery management measures, and expects to implement the new regulations in January 2015.
http://alaskafisheries.noaa.gov/newsreleases/2014/ssl040214.htm

Salmon Bycatch BSAI

The Council took action in 2009 to recommend a new approach to managing Chinook salmon bycatch in the Bering Sea pollock fishery under Amendment 91. This new approach combines a limit

on the amount of Chinook salmon that may be caught incidentally with incentive plan agreements and performance standard to reduce bycatch. This program was designed to minimize bycatch to the extent practicable in all years, prevent bycatch from reaching the limit in most years, while providing the pollock fleet with the flexibility to harvest the total allowable catch. This program was implemented by NMFS for the 2011 fishery. Previously Chinook salmon bycatch had been managed in the Bering Sea through triggered time and area closures and most recently by a fleet-managed rolling hot spot (RHS) bycatch avoidance program.

The Council is currently developing a separate program for managing the bycatch of chum salmon in the Bering Sea Pollock fishery. The amendment analysis for Amendment 91, information on historical Chinook salmon bycatch trends, incentive plan agreements and other information on Chinook salmon bycatch management and monitoring can be found at the following link http://alaskafisheries.noaa.gov/sustainablefisheries/bycatch/default.htm.

C-5 Bering Sea Salmon Bycatch Council motion – June 7, 2014

In June 2014, the Council initiated an analysis of Chinook and chum salmon bycatch measures in the Bering Sea pollock fishery with the following purpose and need statement and alternatives:

The current chum salmon bycatch reduction program under Amendment 84 does not meet the Council's objectives to prioritize Chinook salmon bycatch avoidance, while preventing high chum salmon bycatch and focusing on avoidance of Alaska chum salmon stocks; and allow flexibility to harvest pollock in times and places that best support those goals. Incorporating chum salmon avoidance through the Incentive Plan Agreements (IPAs) should more effectively meet those objectives by allowing for the establishment of chum measures through a program that is sufficiently flexible to adapt to changing conditions quickly.

The current Chinook salmon bycatch reduction program under Amendment 91 was designed to minimize bycatch to the extent practicable in all years, under all conditions of salmon and pollock abundance. While Chinook salmon bycatch impact rates have been low under the program, there is evidence that improvements could be made to ensure the program is reducing Chinook salmon bycatch at low levels of salmon abundance. This could include measures to avoid salmon late in the year and to strengthen incentives across both seasons, either through revisions to the IPAs or regulations. Five non mutually exclusive alternative have been provided.

Currently, there is a formal requirement to use the existing Chinook excluder for fishing pollock in the January-March and September-October period.
http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chinook-salmon-bycatch/

Chum Salmon Bycatch BSAI

In October 2013 the C-6 (b) and (c) Bering Sea Salmon Bycatch motion of the NPFMC Management Council requested a discussion paper that evaluates the regulatory changes needed to incorporate

Bering Sea chum salmon bycatch avoidance into the Chinook salmon Incentive Plan Agreements (IPAs). The objectives of this action are to prioritize Chinook salmon bycatch avoidance, while preventing high chum salmon bycatch and focusing on avoidance of Alaska chum salmon stocks, and allowing flexibility to harvest pollock in times and places that best support those goals. The paper should include an evaluation of the necessary changes to the IPA objectives and reporting requirements in regulation, and identify both the effects of such a change and whether there are elements of a rolling hotspot system (RHS) that the Council should consider retaining or adding to the regulations that define IPA requirements (such as, institutionalizing fleet-wide information sharing; requiring an RHS within the IPA; establishing an adjustable floor on the base rate, etc).
The Council requested the discussion paper also evaluate possible measures to refine Chinook salmon bycatch controls in the Bering Sea pollock fisheries including:
1) Requiring modification of IPAs to include restrictions or penalties targeted at vessels that consistently have the highest Chinook salmon PSC rates relative to other vessels fishing at the same time.
2) Requiring use of salmon excluder devices at times of year in which Chinook salmon encounter rates are relatively high (regulatory or through IPAs).
3) Requiring a lower base rate beginning September 1 (regulatory or through IPAs).
4) Provisions to shorten the pollock season to end when pollock catch rates significantly decline and Chinook salmon PSC rates increase in October (regulatory or through IPAs).
5) Closing the fishery to a sector (or cooperative) if the sector's (or cooperative's) weekly Chinook salmon PSC rate exceeds a specified rate in September and/or October (regulatory or through IPAs).
6) Changing the accounting of the Chinook salmon PSC limit to begin with:
a. the start of the pollock B season (June 10) and continue through the A season of the subsequent year; b. October 1 and continue through September 30th of the subsequent year; and c. September 1 and continue through August 31st of the subsequent year.

This evaluation was directed to also include information on potential revisions to the annual reporting requirements, combined for chum and Chinook salmon measures, based on suggestions in the Council's October staff report, such as, frequency of excluder use, variability in individual vessel bycatch rates over the season and years, and numbers and rates of bycatch by month.
The Council requested that the AEQ and impact rate analysis be conducted on a regular basis, using updated genetic information and actual bycatch levels, and presented to the Council as a regular report. The Council also recommended that the observer program evaluate and implement ways to improve the sample size of Chinook salmon length data, to improve the confidence in estimates of salmon ages spatially and temporally for AEQ analyses.

The two following reports were prepared in 2014 in response the 2013 motion.

- AFA Chum ICA Report, April 2014
- Chum Salmon Genetics Report for 2012 Bycatch Samples, April 2014

http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chum-salmon-bycatch/

Salmon bycatch GOA

Pacific salmon are taken as bycatch in the GOA groundfish fisheries, in which they are considered prohibited. Although five species of salmon are caught in the fisheries, the Council has been concerned about Chinook salmon, as the species with the highest bycatch in recent years. Chinook salmon bycatch primarily occurs in trawl fisheries, in the central and western regulatory areas. Between 2003 and 2010, the pollock target fishery accounted for an average of three-quarters of intercepted Chinook salmon, while other, primarily nonpelagic, trawl fisheries for flatfish, rockfish, and Pacific cod accounted for the remainder. In 2011, the Council approved Chinook salmon prohibited species catch (PSC) limits for the GOA pollock fisheries in the central and western regulatory areas. Once these annual limits are reached, the pollock fishery in the respective regulatory area will be closed. The Council is also considering other, comprehensive management measures to address Chinook salmon bycatch in the GOA trawl fisheries.

In 2014, with C-7 Gulf of Alaska Trawl Bycatch Management Final motion dated December 12th the Council initiated analysis of the following alternatives and options for Gulf of Alaska trawl bycatch management, with the existing objectives and purpose and need statement.

ALTERNATIVE 1. No action. Existing management of the Central and Western Gulf of Alaska trawl fisheries under the License Limitation Program.

ALTERNATIVE 2. Gulf of Alaska Trawl Bycatch Management Program for the Western Gulf, Central Gulf and West Yakutat areas. The following elements apply to the program:

- Observer Coverage and Monitoring (i.e. 100% of trawl vessels monitoring);
- Sector eligibility (i.e. inshore and offshore);
- Allocated species (target, secondary, PSC species, halibut and chinook salmon);
- Sector allocations of target and secondary species;
- Sector allocations of PSC;
- Voluntary inshore cooperative structure;
- Voluntary catcher processor cooperative structure;
- Fishery dependent community stability (applies to inshore cooperatives);
- Transferability;
- Gear conversion;
- Limited access trawl fisheries (CV and CP);
- Sideboards;
- Program Review;
- Cost recovery and loan program.

http://www.npfmc.org/salmon-bycatch-overview/gulf-of-alaska-salmon-bycatch/

Salmon Excluder Device

For several years, the Bering Sea pollock industry has been working on developing a Chinook salmon excluder device for trawl gear, which allows salmon to escape from the trawl net underwater, while

retaining pollock. The success of such devices relies on the different swimming behavior of pollock and Chinook salmon. Through experimental fishery permits authorized by the Council and NOAA Fisheries, various iterations have been tested, and their voluntary use by pollock skippers is increasing.

Recently, the GOA pollock industry has too begun to consider how the Bering Sea Chinook salmon excluder might be adapted for the smaller GOA pollock fleet. An Exempted Fishing Permit was granted by NOAA for testing new salmon excluders and trails began in April, 2013. The design of the salmon excluder was inspired by previous work on salmon bycatch reduction in the Bering Sea pollock fishery. It creates selectivity of the two fish species by exploiting the salmon's superior swimming ability to move up and out of an escape opening, while the slower pollock are retained in the net. This design showed great success in the Bering Sea, where many boats continue to use the excluder. Adaptations of the design for use by the smaller Gulf of Alaska boats include a scaled down net size, altered water flow regime, lower vessel horsepower and tow speeds, and variable fish densities.

Initial sea trials out of Kodiak, Alaska in April 2013, showed salmon escapement rates of over 20% and pollock retention rates as high as 99%, and there is hope for further improvement on these initially promising results. Researchers are continuing to work with captains to test the excluder under conditions truly representative of commercial fishing operations. They are looking for situations with a relatively high number of salmon and enough pollock to fully vet the results. Future sea trials are planned for the fall as well as the spring and fall of 2014. After seeing the success of the Bering Sea excluder, industry members are eager to see the project results. Potential economic impacts associated with a fishery shutdown would be significant and far reaching. The Alaskan pollock fishery lands almost 3 billion pounds of fish per year -- the largest fishery in the U.S. by weight -- valued at just under $375 million.

The industry is also working on an excluder capable of avoiding bycatch of chum salmon with a new “over and under” design. A 2012 exempted fishing permit (EFP) project report described the Over-Under (O-U) excluder design and some results from the initial trials. There is a final report under construction from an EFP that was conducted in 2014 which should be available for release in 2015 (Ed Richardson, At Sea Processor Association, pers. comm. 17 Dec. 2014)

http://www.alaskajournal.com/Alaska-Journal-of-Commerce/January-Issue-4-2013/Spring-test-set-for-Gulf-salmon-excluders/
http://alaskafisheries.noaa.gov/npfmc/PDFdocuments/MISC/EFPsalmon_excluder1112.pdf

Roe-stripping

Historically, the wasteful fishing practice of roe stripping by the offshore fleet produced ecosystem concerns created by the large volume of carcasses discarded at sea. Because the pollock fleets were continuing to grow, harvests were occurring faster and faster each year in a race for fish; resulting in compressed seasons and a high potential to exceed TAC, thereby increasing the likelihood of reduced spawning potential. Because of the waste and ecological concerns the NPFMC prohibited roe stripping. It further established a NPFMC policy of full utilization such that the pollock harvest is to be used for human consumption to the maximum extent possible. It also divided the pollock TAC into two seasonal allowances: roe-bearing (“A” season) and non-roe-bearing (“B” season). In the

GOA the TAC is separated into four equal quarterly allowances. The percentage of the TAC allocated to each regulatory area is based on survey fish distribution and abundance and set annually during the TAC specifications process.

Regulations at 50 CFR part 679.27 describe the Improved Retention/Improved Utilization (IR/IU) Program for pollock, Pacific cod, and Gulf of Alaska (GOA) shallow water flatfish. Regulations at 50 CFR part 679.5 describe recordkeeping and reporting (R&R) requirements. Any action intended to discard or release an IR/IU species prior to being brought on board the vessel is prohibited. This includes, but is not limited to bleeding codends and shaking or otherwise removing fish from longline gear.

Retention Rates for 2013

Table 23. BSAI and GOA report of Pollock discarded and retained (includes CDQ) in 2013.

	Retained + Discarded (mt)	Discarded (mt)
GOA	96,363	2,450
BSAI	1,273,766	5,480

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf
http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

Permits

The Alaska Region NMFS/RAM division requires that all vessels fishing or processing groundfish possess a federal fishing permit or a federal processing permit. The permit describes all pertinent information about the vessel and its' vessel fishing category, gear type and target fisheries. As a condition of these permits vessels must comply with all regulations described in the GOA and BSAI FMPs. This includes reporting and landings requirements (*e*landings and logbooks), carrying onboard observers or having shoreside observers at shore plants. This information is regularly up-dated and meets or exceeds the international standards and practices required to succinctly characterize the groundfish fisheries off Alaska.

The State of Alaska gathers similar information from all vessels fishing in state waters. However, Article VIII, Section 15 allows the State to limit entry into any fishery for purposes of resource conservation and to prevent economic distress among fishermen and those dependent upon them for a livelihood. Therefore, fishermen participating in state waters must hold approved entry permits (commercial fishing licenses/gear cards), and fish from licensed vessels. Licenses must be renewed annually with the Commercial Fisheries Entry Commission (CFEC) and comply with all state landing and reporting requirements.

Reporting

Groundfish harvest is documented and submitted via the Interagency Electronic Reporting System, *e*Landings. Upon completion of the off-load, all harvest, purchased, retained or discarded, must be

recorded on a fish ticket and submitted within seven days to the nearest ADFG office. Catcher-processors are required to submit daily production reports.

Observers

At the core of the North Pacific monitoring system is a comprehensive, industry-funded, on-board and onshore observer program, coupled with requirements for total weight measurement of most fish harvested. All vessels fishing for groundfish with a federal fishing permit in federal waters or in a State of Alaska parallel fishery, and all vessels fishing halibut and sablefish IFQ in federal or state waters, are included in the observer program and are required to carry one or more observers for at least a portion of their fishing time if selected. Observer requirements are based on vessel length, fishery and vessel type. Fishery observers perform multiple functions; they collect data on catch and bycatch quantity, composition, and biological characteristics, document fishery interactions with marine mammals and birds, and monitor compliance with federal fisheries regulations.

The new observer plan began operations in January, 2013, and makes provisions for the use of electronic monitoring technology as an alternative to sea going observers for certain vessel categories. EM technology is currently been trialed in some vessels. The restructured observer program, which mainly affected the GOA fisheries, due to the reduced average vessel size of the fleet when compared to the BSAI fleet, is now in its 3rd year of operations. More information on this topic has been provided under clause 4. Small catcher vessels in the GOA do not tend to sort their catch onboard for safety reasons. Instead, the catches are either pumped directly to other carriers or placed directly into the catcher vessel hold. The catches are then examined when landed at shore-side plants where there is 100% observer coverage.
http://alaskafisheries.noaa.gov/sustainablefisheries/observers/

In-season management

Federal waters

NMFS Alaska Region's In-season Management Branch determines the amount of an individual TAC necessary as incidental catch in other target fisheries. The target fishery is usually closed before reaching the TAC, allowing for bycatch in other fisheries up to the amount of TAC for a species. A directed fishery closure limits retention of a species to a portion of other species TACs open to directed fishing. That portion is called the maximum retainable amount (MRA). The MRA is expressed as a percentage of an alternate target fishery. If the ABC is taken and the trajectory of catch indicates the OFL may be approached, additional closures are imposed. To prevent overfishing, specific fisheries identified by gear and area that incur the greatest incidental catch are closed. Closures expand to other fisheries if the rate of take is not sufficiently slowed. A fishery may also be closed if a PSC limit is reached. Except for scientific purposes, Chinook salmon bycatch management, or the prohibited species donations program, prohibited species cannot be retained in groundfish fisheries. In the rare occurrence of a TAC being exceeded, the In-season Management Branch will evaluate the conditions that resulted in the overage and determine appropriate management actions that may be needed to prevent a reoccurrence.
https://alaskafisheries.noaa.gov/sustainablefisheries/inseason/harvestdiscussion.pdf

State waters

In 2014 the directed fishery for pollock in state waters opened on January 20th with an 8.57 million pound guideline harvest level (GHL). Participation required a pollock fishery registration. PWS Pollock Pelagic Trawl Management Plan requires in-season catch reports, logbooks, and accommodation of a department observer upon request. After the directed fishery closes, pollock must be retained up to the maximum allowable bycatch amount of 20% to other open directed groundfish fisheries, unless a directed fishery for Pacific cod is open and then all pollock must be retained. Pollock taken with jig gear in state-waters Pacific cod fishery may be retained.
http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/378425150.pdf

In-season management during the PWS state-waters pollock fishery is intensive, with close contact between the fleet and the manager and close attention to the 60% section harvest limit and bycatch limits. Management requirements include mandatory check-in and check-out procedures before fishing in or leasing a management section, as well as recording fishing information in logbooks. The majority of the fleet transits from Kodiak, which increases the lead time necessary to make management decisions. Trip limits of 300,000 lb. are established in regulation (5 AAC 28.073) and are an important management tool helping control the rate of harvest in the fishery. Vessels frequently achieve this harvest tip limit in less than 10 hours of fishing time, making this a fast-paced fishery.

Although bycatch in this fishery is low relative to other groundfish fisheries, bycatch rates have sometimes warranted management measures. The amount of bycatch is estimated by fishery participants and communicated to ADFG during the fishery. Although it is feasible to close the fishery when a bycatch cap is approached or has been met, full accounting of bycatch may not be available until after the closure when all fish ticket data are reviewed. Inseason estimates are often different than the actual bycatch reported on the fish tickets. Rockfish caught as bycatch during this fishery are accrued to the rockfish GHL of that bycatch only fishery because rockfish bycatch levels are a percentage of the directed harvest, as pollock GHL levels increase, rockfish bycatch in this fishery can be a significant proportion of the rockfish GHL. Examples of fishery closures due to bycatch limits being achieved include the following:

- In 2008, 38% of the 2008 GHL was harvested due to closure of the fishery when the rockfish bycatch cap was exceeded; the Hinchinbrook section was closed on March 7, and the remaining sections (Knight Island and Bainbridge) closed on March 17.
- In 2009, the fishery was closed before the GHL was achieved because both the miscellaneous finfish and rockfish bycatch caps were exceeded; the Hinchinbrook section was closed on February 11 and the remaining sections closed on March 21; 90% of the GHL was harvested.
- In 2014, the fishery closed before the GHL was achieved when the rockfish bycatch cap was exceeded; all sections were closed on January 27, and 61% of the GHL was harvested.

http://www.adfg.alaska.gov/fedaidpdfs/FMR14-42.pdf

Geographical closures & restrictions

A variety of regional restrictions are in place across the GOA and BSAI groundfish fisheries, either prohibiting fishing entirely or restricting the times and gear types permitted. Areas around Kodiak Island have been established to protect king crab stocks. The Sitka Pinnacles Marine Reserve encompasses an area totaling 2.5 square nautical miles off Cape Edgecumbe, where groundfish vessels are not permitted to fish or anchor. The Pribilof Islands Habitat Conservation Area is closed to all trawling year-round. The Chum Salmon Savings Area is closed to direct fishing for pollock with trawl gear from August 1 through August 31, unless the vessel directly fishing for pollock is operating under a salmon bycatch reduction inter-cooperative agreement. There are a number of no-trawl areas in both the GOA and BSAI, although many apply only to non-pelagic trawls or bottom-contact trawls. Figure 23 shows the year round closures in Alaskan waters.

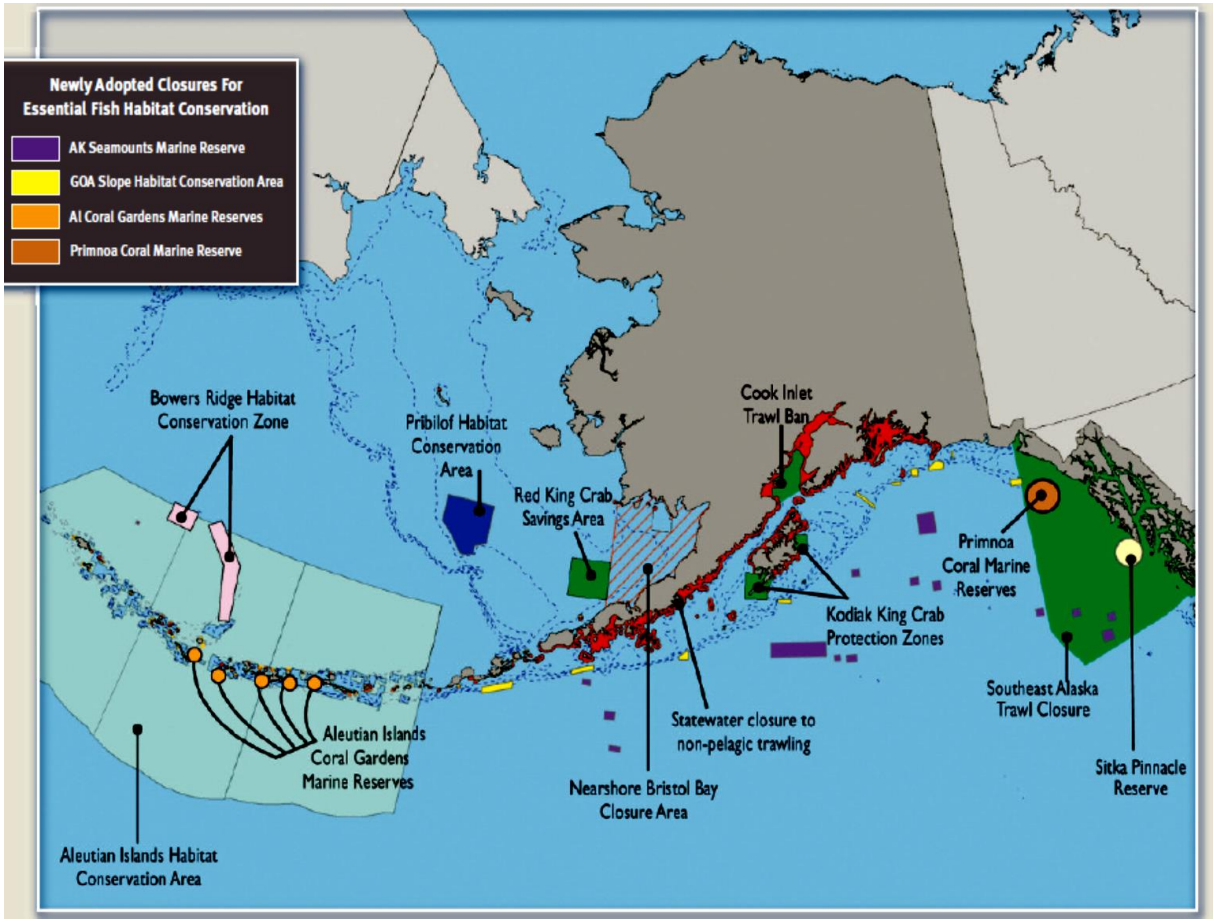


Figure 24. Year round area closures in Alaskan waters.
https://alaskaseafood.org/sustainability/pdf/Marine%20Protected%20Areas%20Brochure.pdf

Gear restrictions

The use of non-pelagic trawl gear in the BSAI and GOA pollock fisheries is prohibited to protect habitat and reduce bycatch of bottom dwelling species.

http://www.adfg.alaska.gov/static/license/fishing/pdfs/reporting_requirements.pdf
http://alaskafisheries.noaa.gov/regs/summary.htm

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

FAO CCRF 7.1.8/7.6.3/7.6.6/8.4.5/8.4.6/8.5.1/8.5.3/8.5.4/8.11.1/12.10
FAO Eco 29.2bis

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The rigorous process in place for over 30 years ensures that annual quotas are set at conservative, sustainable levels for all managed groundfish stocks. Model projections indicate that the pollock stocks in Alaska is neither overfished nor approaching an overfished condition. The Maximum Sustainable Yield (MSY), defined in the BSAI and GOA groundfish FMPs, is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions, fishery technological characteristics (e.g., gear selectivity), and distribution of catch among fleets. The MSY allows defining the reference points used to manage the groundfish fisheries such that TAC ≤ ABC <OFL.

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The rigorous process which has been in place for over 30 years ensures that annual quotas are set at conservative, sustainable levels for all managed groundfish stocks. The management system for the NPFMC groundfish fisheries is a complex suite of measures comprised of harvest controls, effort controls (limited access, licenses, cooperatives), time and/or area closures (i.e. gear closures, habitat protection measures, marine reserves), bycatch controls (Maximum Retainable Bycatch (MRB) amounts, PSC limits, retention and utilization requirements), monitoring and enforcement (observer program), social and economic protections, and rules responding to other constraints (e.g., regulations to protect Steller sea lions and to avoid seabird bycatch).

The Maximum Sustainable Yield (MSY) as defined by the groundfish fishery management plans is "the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions, fishery technological characteristics (e.g., gear selectivity), and distribution of catch among fleets." Each groundfish fishery has a defined OY range which is based primarily on historical MSY estimates, and which limits the total annual removals across all stocks. Additionally, an MSY or MSY-proxy is calculated annually for each individual stock within the groundfish complex, depending on the tier (and therefore information available) of the stock.

The EBS pollock stock is categorized as Tier 1a, meaning sufficient information is available to estimate B_{MSY}. The GOA pollock stock is categorized as Tier 3b, meaning that $B_{40\%}$ is used as a proxy for MSY. Each tier defines three harvest control rules, with the status of the stock in relation to the MSY or MSY-proxy determining which is used to generate the recommendations for OFL and ABC.

When the biomass of stocks in tiers 1-3 falls below B_{MSY} or the B_{MSY}-proxy, the harvest control rules result in a proportionally reduced OFL and ABC. If the biomass of a stock falls below 50% of B_{MSY} or the B_{MSY}-proxy, the harvest control rule sets OFL and ABC to 0. The 2014 stock assessments place the 2013 EBS stock biomass above B_{MSY} and the GOA biomass above the B_{MSY} proxy ($B_{40\%}$). Aleutian Islands and Bogoslof pollock are under tier 3b and 5 respectively. The catches for both stocks have been for several years significantly below OFL, and ABC recommendations (see details provided under Fundamental clause 4, 5 and 6).

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf
http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

The NPFMC has consistently adopted the annual OFL and acceptable biological catch (ABC) recommendations from its scientific and statistical committees (SSC) and set the total allowable catch (TAC) for each of its commercial groundfish stocks at or below the respective ABC. In 1999, the NPFMC prescribed that OFL should never exceed the amount that would be taken if the stock were fished at F_{MSY} (or a proxy for F_{MSY}), after Congress redefined the terms “overfishing” and “overfished” to mean a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce MSY on a continuing basis. The OFL can be set lower than catch at F_{MSY} at the discretion of the SSC. OFL can be then virtually defined as an upper limit reference point to constrain harvest rates.

http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf

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

FAO CCRF 8.1.7/8.1.10/8.2.4/8.4.5

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating determination

Alaska enhances through education and training programs the education and skills of fishers and, where appropriate, their professional qualifications. Records of fishers are maintained along with their qualifications.

The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional pollock crew members must pass. Training ranges from firefighting on a vessel, damage control, man- overboard, MARPOL, etc., and The Sitka-based Alaska Marine Safety Education Association alone has trained more than 10,000 fishermen in marine safety and survival through a Coast Guard-required class on emergency drills http://www.npfvoa.org/

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

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

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.
http://seagrant.uaf.edu/map/fisheries/

In addition, MAP conducts sessions of their Alaska Young Fishermen's Summit (AYFS). Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation, to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. The summit provides three days of training in the land-based aspects of

running a fishing operation: marketing, business management, the fisheries regulatory process, and the science impacting fisheries management, a visit to the Anchorage office of the Alaska Department of Fish & Game, where participants can meet with fisheries managers and researchers. https://seagrant.uaf.edu/map/workshops/2013/ayfs/

Finally, the Alaska Marine Safety Education Association (AMSEA) provides courses on small boating safety, drill conductor training, stability and damage control, ergonomics, dredger safety and survival at sea training. http://www.amsea.org/

In addition to the practical training necessary to enter the fishing industry, the NPFMC and Board of Fisheries meetings are public and the process involves extensive industry representation for input in the management process and the drafting of new regulation in a changing conservation environment. Through selected industry representation at these meetings, individual fishermen are kept up to date and remain aware of new requirements for fisheries as they arise throughout the year.

E. Implementation, Monitoring and Control

11. 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.

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

FAO Eco 29.5

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating determination

The Alaska pollock fishery fleet uses enforcement measures including vessel monitoring systems (VMS) on board vessels, USCG boardings and inspection activities. The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce fisheries laws and regulations. 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). State regulations are enforced by the Alaska Wildlife Troopers (AWT).

Vessel Monitoring Systems (VMS)

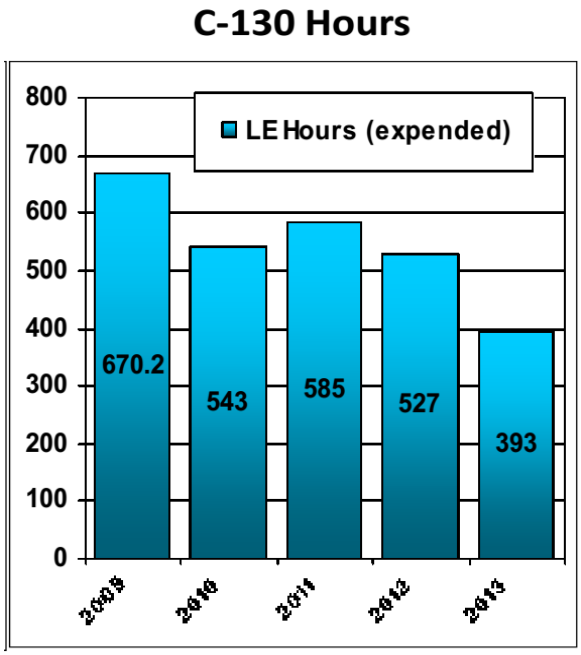
VMS in Alaska is a relatively simple system involving a tamperproof VMS unit, set to report a vessel identification and location to the NOAA Fisheries Office of Law Enforcement (OLE) at fixed 30-minute intervals. Although some groundfish-targeting vessels are not, vessels participating in the directed pollock fishery are required to have VMS onboard. In October 2012, the Enforcement Committee noted that having VMS data substantially improves efficiency in both investigating and litigating enforcement violation cases.

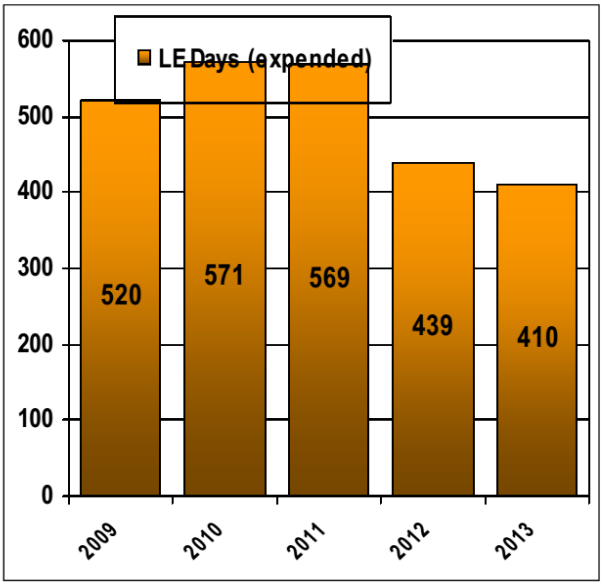
In December of 2012 an expanded discussion paper was presented to the Council, and the NPFMC stated that while there is uncertainty regarding whether a major change to (or expansion of) VMS requirements is necessary in the North Pacific, there is interest in reviewing the current state of the North Pacific VMS requirements.
http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/VMSdiscusPaper1112.pdf

USCG and OLE

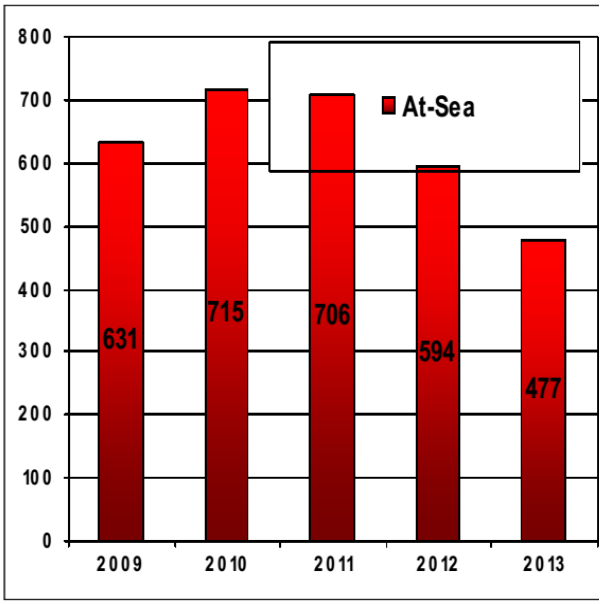
The U.S. Coast Guard (USCG) is the lead federal maritime law enforcement agency for enforcing national and international law on the high-seas, outer continental shelf and inward from the U.S. Exclusive Economic Zone (EEZ) to inland waters. The USCG also patrols US waters to reduce foreign poaching, and inspects fishing vessels for compliance with safety requirements. The 4 figures below are taken from the USCG Year in review report to the Council. They represent major cutter Aircraft (C130) usage as well as the boardings and violations effected in the groundfish and crab fisheries of the BSAI and GOA during 2013.

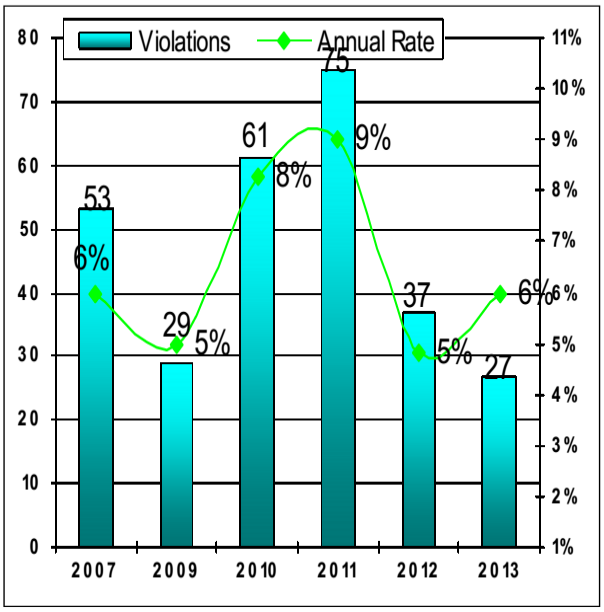
USCG Aircraft and Cutter Usage





USCG boardings and violations detected





Overall Violations

9 – Fishing in a prohibited area
5 – Logbook violations
4 – Missing or no fisheries permit
3 – Failure to respond to LE Assets
3 – Boarding Ladder
1 – Failure to use Seabird Avoidance Gear

1 – Illegal subsistence halibut gear
1 – Illegal halibut processing

http://www.npfmc.org/summary-reports/ (USCG year in review report)

NMFS OLE
NOAA Office of Law Enforcement Special Agents and Enforcement Officers perform a variety of tasks associated with the protection and conservation of Alaska's living marine resources. In order to enforce these laws, OLE special agents and enforcement officers conduct investigations and use OLE patrol vessels to board vessels fishing at sea, and conduct additional patrols on land, in the air and at sea in conjunction with other local, state and Federal (e.g. USCG) agencies.

In any given year, OLE Agents and Officers spend an average 10,000-11,000 hours conducting patrols and investigations, and an additional 10,000-11,000 hours on outreach activities. The OLE maintains 19 patrol boats around the country to conduct a variety of patrols including Protected Resources Enforcement Team (PRET) boardings, protection of National Marine Sanctuaries and various undercover operations.

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).

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

http://www.nmfs.noaa.gov/ole/index.html

Alaska Division: NMFS OLE 2013 Enforcement Priorities, Magnuson-Stevens Act

Magnuson-Stevens Act

High Priority

- Observer assault, harassment, or interference violations;
- Felony and major civil cases involving significant damage to the resource or the integrity of management schemes;
- Commercialization of sport-caught or subsistence halibut;
- Maritime Boundary Line incursions by foreign fishing or transport vessels;
- Outreach and education.

Medium Priority

- Misdemeanor and civil cases involving observer coverage violations;
- Closed Area/VMS Violations, ongoing;

- Commercial vessel incursions into closure areas or other Marine Protected Areas;
- Recordkeeping and reporting violations that impact data consistency or integrity;
- Violations involving lesser damage to the resource or the integrity of management schemes

Low Priority

- Catch reporting and trip limits;
- Noncompliance with trip and cumulative limits and record keeping requirements for landings of federally managed marine species, and specifically catch share programs.
- Gear violations;
- Deployment of unlawful gear utilized in commercial fisheries under NOAA's jurisdiction.
- Lesser permit violations

Endangered Species Act and Marine Mammal Protection Act

High Priority

- Violations wherein responsible subject and species are identifiable;
- Lethal takes, Level A harassment with the potential to injure marine mammal stock;
- Species of interest are Cook Inlet beluga, other whale species, northern fur seal, or Steller sea lion;
- Any violation involving injury or potential injury to people, such as a vessel-whale collision;
- Outreach and Education

Medium Priority

- Non-lethal takes, Level B harassment with the potential to disturb a marine mammal stock in the wild by causing a disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering;
- Species is threatened rather than endangered

Low Priority

- Violations wherein responsible subject is not identifiable;
- Injured or dead animal cannot be located;
- Objective evidence is not obtainable;
- Takes of individual marine mammal species that appear consistent with legal harvest by Alaska Natives.

http://www.nmfs.noaa.gov/ole/docs/2013/ole-division-priorities-2013-final.pdf

Alaska Wildlife Troopers

The Alaska Department of Public Safety, Division of Alaska Wildlife Troopers is responsible for protecting fishery resources within 3 miles of shore, including the PWS state-managed pollock fishery. The patrol and enforcement of these waters is entrusted to the Marine Enforcement Section (MES) of the Alaska Wildlife Troopers, which utilizes 17 vessels that range in size from 25 to 156 feet. Additionally, ADFG staff is deputized as peace officers and have statutory authority (16.05.150) to enforce fishing regulations.
http://dps.alaska.gov/AWT/marine.aspx

At each of the five annual NPFMC meetings, representatives of the USCG, OLE, NMFS, ADFG and AWT meet in an Enforcement Meeting where enforcement concerns with plan amendments are discussed and materials relating to those concerns are prepared for the Council. During staff reports

to the NPFMC the USCG and the OLE present information about vessel boardings and enforcement violations by the fishing industry that occurred since the last NPFMC meeting.

2013 Notable (federal) Violations and Settlements

During the time period July 1, 2013, through December 31, 2013 NOAA charged 8 civil administrative cases in Alaska (http://www.gc.noaa.gov/documents/2013/enforce_Feb_020122014.pdf).

In October 2014 American Seafoods has agreed to pay $1.75 million to settle three cases involving National Oceanic and Atmospheric Administration (NOAA) allegations of inaccurate catch accounting equipment. The cases charged that personnel aboard American Seafoods' catcher-processor vessels American Dynasty, Ocean Rover and Northern Eagle violated the Magnuson Stevens Act and the American Fisheries Act by causing the flow scales to weigh inaccurately. The cases related to events that occurred during 2007, 2008, 2011 and 2012 in the Alaska pollock fishery. After being made aware of the allegations, American Seafoods said it enhanced flow scale compliance measures by adding and improving placement of monitoring cameras; implementing new testing protocols; conducting independent, third-party audits; creating a compliance reporting hotline, and improving personnel training.
http://www.undercurrentnews.com/2014/10/14/american-seafoods-agrees-to-1-75m-settlement-in-noaa-flow-scale-cases/

Furthermore, as of November 22, 2014 OLE Enforcement Officers issued summary settlements totalling more than $14,700 to the operators of seven fishing vessels for pollock trip limit overages.
http://www.nmfs.noaa.gov/ole/newsroom/enforcement-actions.html

NOAA issued a briefing to the NPFMC for the June 2013 Council meeting outlining a proposal to revise the regulations concerning the use and approval of scales for weighing catch at-sea. The use of at-sea scales can provide very precise and potentially accurate estimates of catch. These estimates are especially useful in catch share fisheries where catch accounting methods must be verifiable. At-sea scales have proven to be reliable and are now used to account for the vast majority of catch by catcher-processors fishing off Alaska. However, recent concerns about fraud and tampering with the flow scale call into question the overall accuracy of the approach and indicates that catch estimates based on scale weights could systematically underestimate harvest in those fisheries dependent on scale weights for catch accounting unless these concerns are addressed. Further, since NMFS first implemented weighing requirements for some catcher processors in 1998, the program has grown dramatically; scale technologies have evolved; and NMFS has developed greater expertise with at-sea scales. NOAA affirmed that a suite of modifications to the at-sea scales program would likely reduce the potential for fraud, improve catch accounting accuracy, and bring regulations up to date with recent changes in technology.
http://alaskafisheries.noaa.gov/npfmc/PDFdocuments/MISC/FlowScale513.pdf

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

FAO CCRF 7.7.2/8.2.7

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating determination

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 Alaska Wildlife troopers enforce state water regulations with a number of statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation*.

The Magnuson-Stevens Act provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy).

(1) Issuance of a citation (a type of warning), usually at the scene of the offense (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 Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the Magnuson-Stevens Act treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator.

Magnuson Stevens Act Penalty Matrix

	Level of Intent			
Harm to the Resource or Regulatory Program, Offense Level	A Unintentional	B Negligent	C Reckless	D Willful
I	Written warning-$1,000	Written warning-$1,500	Written warning-$2,000	Written warning-$2,500
II	Written warning-$2,000	$2,000-$5,000	$5,000-$10,000	$10,000-$15,000
III	$2,000-$5,000	$5,000-$10,000	$10,000-$15,000	$15,000-$25,000

IV	$5,000-$15,000	$15,000-$25,000	$25,000-$50,000 and permit sanction of 10-20 days*	$50,000-$80,000 and permit sanction of 20-60 days*
V	$15,000-$25,000	$25,000-$50,000 and permit sanction of 10-20 days*	$50,000- $80,000 and permit sanction of 20-60 days*	$60,000- $100,000 and permit sanction of 60-180 days*
VI	$25,000-$50,000	$50,000-$80,000 and permit sanction of 20-60 days*	$60,000-$100,000 and permit sanction of 60-180 days*	$100,000-statutory maximum and permit sanction of 1 year-permit revocation*

http://www.nmfs.noaa.gov/sfa/reg_svcs/Councils/ccc_2011/Tab%20L%20-%20Enforcement%20Issues/Enforcement%20Issues.pdf

On March 16, 2011, NOAA issued a new Penalty Policy that provided guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. In that Policy, the NOAA General Counsel's Office committed to periodic review of the Penalty Policy to consider revisions or modifications as appropriate. The July 2014 revised version of the Penalty Policy is a result of that review.

The purpose of the 2014 Policy is to ensure that: (1) civil administrative penalties and permit sanctions are assessed in accordance with the laws that NOAA enforces in a fair and consistent manner; (2) penalties and permit sanctions are appropriate for the gravity of the violation; (3) penalties and permit sanctions are sufficient to deter both individual violators and the regulated community as a whole from committing violations; (4) economic incentives for noncompliance are eliminated; and (5) compliance is expeditiously achieved and maintained to protect natural resources.

Under the new revised Policy, NOAA expects to continue to promote consistency at a national level, provide greater predictability for the regulated community and the public, maintain transparency in enforcement, and more effectively protect natural resources. The effective date of this Policy was July 1, 2014. This Policy supersedes all previous guidance regarding the assessment of penalties or permit sanctions, and all previous penalty and permit sanction schedules issued by the NOAA Office of the General Counsel. Currently pending cases charged under the March 16, 2011 Penalty Policy, will continue to be governed by that Policy until those cases have been finally adjudicated.
While the overall approach to this revised Penalty Policy remains largely the same, notable changes to the previous Penalty Policy issued on March 16, 2011 include:

(1) Addition of more detail in some penalty schedules to better describe the most commonly occurring violations;
(2) Clearer distinctions among multiple-level violations to ensure consistent application of the Penalty Policy;
(3) Revision of the treatment of prior violations so that prior adjudicated violations older than 5 years are no longer considered an aggravating factor;
(4) Ensuring consistent application of the Penalty Policy to recreational offenses by replacing the commercial/recreational distinction as a penalty adjustment factor with the additional Level I and II

penalties that capture recreational violations;
(5) Creating a new penalty adjustment for "such other matters as justice may require" by combining the "Activity After Violation" factor with new considerations.

The new 2014 revised Policy provides guidance for the NOAA Office of the General Counsel, but does not, nor is it intended to, create a right or benefit, substantive or procedural, enforceable at law or in equity, in any person or company. The basis for penalties calculated under this Policy, however, will be included in charging documents filed by the Agency. Further, although this Policy provides guidance regarding the assessment of proposed penalties and permit sanctions, NOAA retains discretion to assess the full range of penalties authorized by statute in any particular case.

For significant violations, the NOAA attorney may recommend charges under NOAA's civil administrative process (*see* 15 C.F.R. Part 904), through issuance of a Notice of Violation and Assessment of a penalty (NOVA), Notice of Permit Sanction (NOPS), Notice of Intent to Deny Permit (NIDP), or some combination thereof. Alternatively, the NOAA attorney may recommend that there is a violation of a criminal provision that is sufficiently significant to warrant referral to a U.S. Attorney's office for criminal prosecution.

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

The Alaska Region Summary Settlement and fix-it schedule is available at this page http://www.gc.noaa.gov/enforce-office3.html under the Alaska region tab.

The Alaska Wildlife troopers enforce state water regulations. Here below are presented some of the statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation.

AS 16.05.165. Form and issuance of citations
AS 16.05.170 Power to execute warrant
AS 16.05.180 Power to search without warrant
AS 16.05.190 Seizure and disposition of equipment
AS 16.05.195 Forfeiture of equipment
AS 16.05.332 Wildlife Violator Compact
AS.16.05.410 Revocation of license
AS 16.05.710 Suspension of Commercial License and Entry Permit
AS 16.05.722 Strict liability commercial fishing penalties
AS 16.05.723 Misdemeanor commercial fishing penalties
AS 16.05.896 Penalty for causing material damage
AS 16.05.901 Penalty for violations of AS 16.05.871 – AS 16.05.896.
AS 16.05.030 Penalty for violation of 16.10.010-16.10.050
AS 16.10.090 Penalty for violation of AS 16.10.090
AS 16.10.220 Penalty for violation of AS 16.10-200-16.1-.210
AS 16.10.790 Fines

AS 16.40.290 Penalty
AS 16.43.960 Commission revocation or suspension of permits
AS 16.43.970 Penalties

These are under Alaska Statutes Title 16 (laws); Alaska Administrative Code Title 5 (regulations).
http://www.legis.state.ak.us/basis/aac.asp#TitleTable

Finally, the cooperation of citizens and industry is cultivated through programs such as AWT's Fish & Wildlife Safeguard program, which encourages the reporting of violations, and "leverages" the range of enforcers.

At each of the five annual Council meetings, representatives of the USCG, OLE, NMFS, ADFG and AWT meet in an Enforcement Meeting where enforcement concerns with plan amendments are discussed and materials relating to those concerns are prepared for the Council. During staff reports to the Council the USCG and the OLE present information about vessel boardings and enforcement violations by the fishing industry that occurred since the last Council meeting.

50CFR600.740 Enforcement policy
http://dps.alaska.gov/awt/mission.aspx

F. Serious Impacts of the Fishery on the Ecosystem

13. 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.

FAO CCRF 7.2.3/8.4.7/8.4.8/12.11

Eco 29.3/31

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating determination

The NPFMC, NOAA/NMFS, and other institutions interested in the North Pacific conduct assessments and research on environmental factors affecting pollock and associated species and their habitats. Findings and conclusions are published in SAFE documents, annual Ecosystem Considerations documents, and other research reports. The SAFE documents for BSAI and GOA pollock summarize ecosystem considerations for the stocks. They include sections for ***1)*** *Ecosystem effects on the stock; and* ***2)*** *Effects of the pollock fishery on the ecosystem. SAFE reports also describe results of first-order trophic interactions for pollock from the ECOPATH model, an ecosystem modelling software package. Ecosystem modelling is used to provide an indication of the role of pollock within the food web, and broader ecosystem variables such as climate are reported upon annually in a region-encompassing ecosystem considerations analysis. Two significant ecosystem concerns in relation to the pollock fishery are its possible indirect effects on Steller sea lions, and the quantity of salmon bycatch. Both of these issues are addressed directly in the SAFE assessments, and management measures by State and Federal management agencies are in place to attempt and minimize their severity. Biomass of other pollock predators appears to be stable or increasing in recent years. Habitat interactions of this fishery are not considered significant.*

Ecosystem research

Tens of millions of dollars on research essential to NPFMC management has occurred over the past decade to understand the Bering Sea and Gulf of Alaska ecosystems and how these systems play a dynamic role in pollock stock status. Major research projects like the Bering Sea Integrated Ecosystem Research Program (BSIERP) and the GOA Integrated Ecosystem Research Program (GOAIERP) have provided and are providing, among many others, significant insight into these major North Pacific Integrated Ecosystem Research Plans and research findings that are presented annually at the North Pacific Science Symposium.

GOAIERP

The GOA Integrated Ecosystem Research Program is a $17.6 million Gulf of Alaska ecosystem study that examines the physical and biological mechanisms that determine the survival of juvenile groundfish in the eastern and western GOA. From 2010 to 2014, oceanographers, fisheries biologists and modelers looked at the gauntlet faced by commercially important groundfish, specifically walleye pollock, Pacific cod, Pacific ocean perch, sablefish and arrowtooth flounder, during their first year of life as they are transported from offshore areas where they are spawned to near shore

nursery areas. The study includes two field years (2011 and 2013) followed by one synthesis year (http://www.nprb.org/gulf-of-alaska-project/detailed-results-findings/).

BEST - BSIERP

The scientific foundations of the BEST- BSIERP partnership were formed by a blending of two large programs: the "Bering Ecosystem Study" funded by the National Science Foundation; and the "Bering Sea Integrated Ecosystem Research Program", funded by the North Pacific Research Board. The NSF-BEST program focuses on understanding the impacts of changing sea-ice conditions on the chemical, physical, and biological characteristics of the ecosystem and human resource use activities. BSIERP focuses on understanding key processes regulating the production, distribution and abundance of marine organisms in the Bering Sea, especially marine mammals, seabirds, and fish, and how they may respond to natural and human-induced influences, particularly those related to climate change and its economic and sociological impacts (http://www.nprb.org/bering-sea-project/detailed-results-findings/).

SAFE report, Ecosystem section

NPFMC and NOAA/NMFS conduct assessments and research on environmental factors as affected by the commercial pollock fisheries and associated species and their habitats. Findings and conclusions are published in the Ecosystem section of the SAFE documents, annual Ecosystem Considerations documents, and the various other research reports. The SAFE reports include sections for 1) Ecosystem effects on the stock; and 2) Effects of the pollock fishery on the ecosystem. SAFE reports also describe results of first-order trophic interactions for pollock from the ECOPATH model, an ecosystem modelling software package.

The Resource Ecology and Ecosystem Management (REEM) group at the Alaska Fishery Science Center (AFSC) provides up-to-date ecosystem information and assessments in annual Ecosystem Considerations documents, found under the groundfish stock assessment reports page (http://www.afsc.noaa.gov/REFM/docs/2014/ecosystem.pdf).

NOAA also supports the Fisheries and the Environment (FATE) program to ensure the sustainable use of US fishery resources under a changing climate. The focus of FATE is on the development, evaluation, and distribution of leading ecological and performance indicators.
http://access.afsc.noaa.gov/reem/ecoweb/
http://fate.nmfs.noaa.gov/

Gulf of Alaska Ecosystem considerations

Prey of pollock

Pollock trophic interactions occur primarily in the pelagic pathway in the food web, which leads from phytoplankton through various categories of zooplankton to planktivorous fish species such as capelin and sandlance, and the primary prey of pollock are euphausiids. Pollock also consume shrimp, which are more associated with the benthic pathway, and make up approximately 18% of age 2+ pollock diet. All ages of GOA pollock are primarily zooplanktivorous during the summer

growing season. While there is an ontogenetic shift in diet from copepods to larger zooplankton (primarily euphausiids) and fish, cannibalism is not as prevalent in the Gulf of Alaska as in the Eastern Bering Sea, and fish consumption is low even for large pollock.

In 2012, NPRB funded a project developing a euphausiid biomass time series for the central Gulf of Alaska continental shelf to understand fish-zooplankton interactions and ecosystem conditions. Information about year-to-year changes in the abundance and distribution of euphausiids would be useful for assessments of both commercial fish stocks and ecosystem conditions, but these data are scant. In the eastern Bering Sea, a time series of euphausiid biomass was recently developed using data from acoustic-trawl surveys of walleye pollock that are regularly conducted by NOAA Fisheries, Alaska Fisheries Science Center. These data have allowed new insights into feeding conditions for walleye pollock, into how predation along with climate may influence the abundance of euphausiids, and into variability in the amount of large crustacean zooplankton prey available for the fish, birds, and mammals at higher trophic levels. This project will research and develop this approach using data collected during biennial acoustic-trawl surveys in the central Gulf of Alaska, create a new euphausiid time series for use in stock and ecosystem assessments, and compare the temporal and spatial variability in abundance of zooplanktivorous fishes and euphausiids in two contrasting high-latitude ecosystems, the Gulf of Alaska and the eastern Bering Sea. The project began in January of 2113 and is funded through 2016.

http://project.nprb.org/view.jsp?id=9a0b9aed-bcc9-4d82-88f2-c09da2c74c47

Predators of pollock

Aside from long-recognized decline in Steller sea lion abundance, the major predators of pollock in the Gulf of Alaska are stable to increasing, in some cases notably so since the 1980s (Figure 25). However, top-down control seems to have increased on age 3+ pollock in recent years, perhaps as predators have attempted to maintain constant pollock consumption during a period of declining abundance.

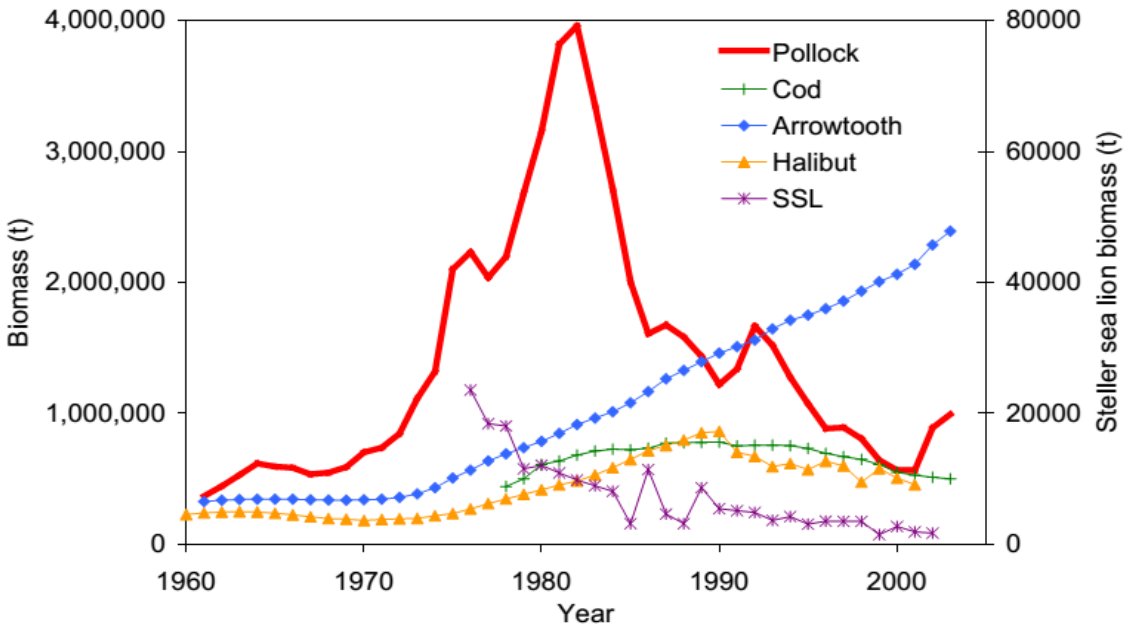


Figure 25. Historical trends in GOA walleye pollock, Pacific cod, Pacific halibut, arrowtooth flounder, and Steller Sea Lions, from stock assessment data. From the 2014 GOA pollock SAFE report.

Ecosystem modelling

To examine the relative role of pollock natural versus fishing mortality within the GOA ecosystem, a set of simulations were run using the ECOPATH model. Following the method outlined in Aydin et al. (2005), 20,000 model ecosystems were drawn from distributions of input parameters; these parameter sets were subjected to a selection/rejection criteria of species persistence resulting in approximately 500 ecosystems with non-degenerate parameters. These models, which did not begin in an equilibrium state, were projected forward using ECOSIM algorithms until equilibrium conditions were reached. For each group within the model, a perturbation experiment was run in all acceptable ecosystems by reducing the species survival (increasing mortality) by 10%, or by reducing gear effort by 10%, and reporting the percent change in equilibrium of all other species or fisheries catches. The resulting changes were reported as ranges across the generated ecosystems, with 50% and 95% confidence intervals representing the distribution of percent change in equilibrium states for each perturbation.

The model results indicate that the largest effects of declining adult pollock survival would be declines in halibut and Steller sea lion biomass. Declines in juvenile survival would have a range of effects, including halibut and Steller sea lions, but also releasing a range of competitors for zooplankton including rockfish and shrimp. The pollock trawl itself has a lesser effect throughout the ecosystem (recall that fishing mortality is small in proportion to predation mortality for pollock); the strongest modeled effects are not on competitors for prey but on incidentally caught species, with the strongest effects being on sharks.

In contrast, predation by groundfish is not as constrained geographically, and captures are likely to occur when the predator swims upwards from the bottom. Changes in the vertical distribution of pollock may tend to favor one mode of foraging over another. For example, if pollock move deeper in the water column due to surface warming, foraging groundfish might obtain an advantage over surface foragers. Alternatively, pollock may respond adaptively to predation risks from groundfish or surface foragers by changing its position in the water column.

Of species affecting pollock, arrowtooth have the largest impact on adult pollock, while bottom-up processes (phytoplankton and zooplankton) have the largest impact on juvenile pollock. It is interesting to note that the link between juvenile and adult pollock is extremely uncertain (wide error bars) within these models.
Finally, of the four major predators of pollock, all are affected by bottom-up forcing; Steller sea lions, Pacific cod, and Pacific halibut are all affected by pollock perturbations, while pollock effects on arrowtooth are much more minor.

Finally, it is apparent that the potential for competition between Steller sea lions and arrowtooth flounder is underappreciated. Arrowtooth flounder consume both the primary prey of Steller sea lions (pollock), and alternate pelagic prey also utilized by Steller sea lions (capelin, herring, sandlance, salmon). Arrowtooth predation on pollock occurs at a smaller size than pollock targeted by Steller sea lions. The arrowtooth flounder population is nearly unexploited, is increasing in

abundance, may be increasing it's per unit consumption of pollock, and shows no evidence of density-dependent growth. And lastly, since 1976 there has been a strong inverse correlation between arrowtooth flounder and Steller sea lion abundance that is at least consistent with competition between these species.
http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

GOA Bycatch data

Incidental catch in the Gulf of Alaska directed pollock fishery is low. For tows classified as pollock targets in the Gulf of Alaska between 2009 and 2013, on average about 95% of the catch by weight of FMP species consisted of pollock (Table 24). Nominal pollock targets are defined by the dominance of pollock in the catch, and may include tows where other species were targeted, but pollock were caught instead. The most common managed species in the incidental catch are arrowtooth flounder, Pacific cod, flathead sole, Pacific ocean perch, squid, and shallow-water flatfish.

The most common non-target species are eulachon and other osmerids, miscellaneous fish, and jellyfish. Bycatch estimates for prohibited species over the period 2009-2013 are given in Table 25. Chinook salmon are the most important prohibited species caught as bycatch in the pollock fishery. The spike in Chinook salmon bycatch in 2010 led the Council to adopt management measures to reduce Chinook salmon bycatch, including a cap of 25,000 Chinook salmon bycatch in directed pollock fishery. Estimated Chinook salmon bycatch since 2010 has been less than half of the 2010 spike.

Table 24. Incidental catch (t) of FMP species (upper table) and non-target species (bottom table) in the walleye pollock directed fishery in the Gulf of Alaska in 2009-2013. Species are ordered according to the cumulative catch during the period. Incidental catch estimates include both retained and discarded catch. (2014 GOA SAFE Report).

Managed species/species group	*2009*	*2010*	*2011*	*2012*	*2013*
Pollock	39334.5	73032.9	77297.5	99643.9	91436.2
Arrowtooth Flounder	761.0	2066.8	2008.5	1328.6	1764.2
Pacific Cod	552.6	1497.2	1500.5	1267.0	1041.7
Flathead Sole	215.7	359.9	217.3	189.5	381.4
GOA Shallow Water Flatfish	17.0	78.5	289.4	171.2	182.8
Squid	320.9	129.0	208.8	6.7	346.6
Pacific Ocean Perch	36.1	96.6	172.3	294.5	426.9
GOA Rex Sole	35.5	60.3	90.0	48.8	151.1
GOA Skate, Big	33.8	47.1	92.6	47.8	211.9
Shark, pacific sleeper	31.1	155.6	3.6	3.8	15.5
Shark, salmon	6.9	103.7	5.7	53.2	3.9
GOA Shortraker Rockfish	26.2	9.4	24.4	21.8	22.6
GOA Rougheye Rockfish	12.9	30.5	34.5	21.2	8.9
Shark, spiny dogfish	17.9	19.8	16.5	19.2	11.3
Sculpin	5.0	5.9	76.0	14.3	46.8

GOA Skate, Longnose	35.1	9.8	35.0	9.0	25.2
Northern Rockfish	11.7	2.2	13.7	60.9	5.6
Sablefish	0.1	1.3	32.5	6.7	12.6
GOA Pelagic Shelf Rockfish	1.5	5.8	19.1	4.1	6.5
GOA Deep Water Flatfish	2.4	2.9	14.6	3.0	12.8
Shark, Other	10.4	3.7	1.1	3.7	1.0
Skate, Other	2.6	7.0	1.9	5.5	23.9
GOA Skate, Other	2.6	7.0	1.9	5.5	23.9
Other Rockfish	0.2	0.4	6.8	0.8	0.8
Octopus	0.1	0.8	2.3	0.4	0.3
GOA Thornyhead Rockfish	0.1	0.1	1.8	0.5	0.6
Atka Mackerel	0.0	0.4	0.1	0.3	0.4
Percent non-pollock	*5.2%*	*6.0%*	*5.9%*	*3.5%*	*4.9%*

Non target species/species group	*2009*	*2010*	*2011*	*2012*	*2013*
Eulachon	214.61	227.22	308.87	193.76	28.31
Other osmerids	146.29	6.78	78.59	88.59	12.46
Misc fish	42.05	42.44	43.49	49.89	384.76
Jellyfish	11.30	121.72	7.67	132.45	38.36
Giant Grenadier	26.30	1.93	108.99	15.75	67.56
Grenadier	0.00	9.21	7.94	70.89	0.00
Sea star	0.00	4.64	3.64	0.74	5.34
Capelin	0.01	0.00	7.94	0.02	0.02
Pandalid shrimp	0.17	1.12	0.12	0.07	0.01
Sea anemone unidentified	0.00	0.47	0.54	0.00	0.32
Snails	0.01	0.00	0.06	0.01	0.55
Stichaeidae	0.00	0.08	0.00	0.07	0.63
Benthic urochordata	0.00	0.00	0.09	0.02	0.35
Eelpouts	0.13	0.09	0.00	0.01	0.21
Bivalves	0.00	0.06	0.04	0.00	0.27
Hermit crab unidentified	0.00	0.09	0.00	0.14	0.00
Misc crabs	0.00	0.01	0.11	0.00	0.00
Sea urchins, sand dollars, sea cucumbers	0.00	0.00	0.00	0.00	0.01
Sponge unidentified	0.00	0.00	0.00	0.00	0.04
Invertebrate unidentified	0.00	0.00	0.00	0.00	0.04

Table 25. Bycatch of prohibited species for trawls where pollock was the predominant species in the catch in the Gulf of Alaska during 2009-2013. Herring and halibut bycatch is reported in metric tons, while crab and salmon are reported in number of fish.

Species/species group	*2009*	*2010*	*2011*	*2012*	*2013*
Bairdi Tanner Crab (nos.)	6,612	120	10,151	729	7,993
Blue King Crab (nos.)	0	0	0	0	0
Chinook Salmon (nos.)	3,188	44,862	14,781	18,880	13,513
Golden (Brown) King Crab (nos.)	0	0	0	0	0
Halibut (t)	63.4	48.3	191.2	94.6	257.7
Herring (t)	8.1	0.9	10.7	1.3	10.6
Non-Chinook Salmon (nos.)	317	752	1247	283	752
Opilio Tanner (Snow) Crab (nos.)	0	0	0	0	0
Red King Crab (nos.)	0	0	0	0	6

http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf

Data below are also presented on the key bycatch species in the state managed Prince William Sound fishery.

Table 26. Prince William Sound directed pollock fishery harvest and bycatch by species or species group, 1995-2014.

		Reported bycatch [a,b]											
		Rockfish		Salmon		Shark		Squid		Misc.		Total bycatch	
Year	Pollock harvest	lb	%	lb	%	lb	%	lb	%	lb	%	lb	%
1995	6,325,575	67	0.00%	76	0.00%	378	0.01%	1,346	0.02%	5,135	0.08%	7,002	0.11%
1996	3,265,552	0	0.00%	0	0.00%	2,724	0.08%	437	0.01%	3,836	0.12%	6,997	0.21%
1997	4,319,707	12	0.00%	42	0.00%	648	0.02%	17,016	0.39%	2,076	0.05%	19,794	0.46%
1998	4,013,725	10	0.00%	285	0.01%	7,825	0.19%	21,663	0.54%	11,909	0.30%	41,692	1.04%
1999	4,673,074	260	0.01%	2,088	0.04%	14,022	0.30%	5,968	0.13%	2,727	0.06%	25,065	0.54%
2000	2,256,504	1,368	0.06%	535	0.02%	2,024	0.09%	5,487	0.24%	974	0.04%	10,388	0.46%
2001	3,128,036	4,031	0.13%	372	0.01%	4,061	0.13%	30,499	0.98%	1,594	0.05%	40,557	1.30%
2002	2,364,143	28,993	1.23%	1,262	0.05%	52,480	2.22%	179,933	7.61%	3,431	0.15%	266,099	11.26%
2003	2,421,772	3,824	0.16%	189	0.01%	7,254	0.30%	20,417	0.84%	8,319	0.34%	40,003	1.65%
2004	1,928,458	2,086	0.11%	151	0.01%	3,148	0.16%	10,890	0.56%	3,848	0.20%	20,123	1.04%
2005	1,677,157	8,289	0.49%	775	0.05%	11,483	0.68%	6,044	0.36%	9,841	0.59%	36,432	2.17%
2006	3,486,499	11,303	0.32%	635	0.02%	3,461	0.10%	31,813	0.91%	17,846	0.51%	65,058	1.87%
2007	2,339,978	10,262	0.44%	836	0.04%	2,650	0.11%	11,155	0.48%	2,233	0.10%	27,136	1.16%
2008	1,395,933	20,790	1.49%	48	0.00%	1,550	0.11%	30,619	2.19%	1,066	0.08%	54,073	3.87%
2009	3,249,441	21,093	0.65%	142	0.00%	19,101	0.59%	15,747	0.48%	14,115	0.43%	70,199	2.16%
2010	3,662,919	3,594	0.10%	223	0.01%	3,133	0.09%	17,052	0.47%	21,854	0.60%	45,856	1.25%
2011	3,377,325	5,290	0.16%	50	0.00%	411	0.01%	15,006	0.44%	2,410	0.07%	23,167	0.69%
2012	5,785,295	16,904	0.29%	1,431	0.02%	1,810	0.03%	8,123	0.14%	12,682	0.22%	40,950	0.71%
2013	5,779,241	27,824	0.48%	61	0.00%	3,230	0.06%	86,116	1.49%	3,401	0.06%	120,632	2.09%
2014	5,220,121	67,446	1.29%	260	0.00%	526	0.01%	171,946	3.29%	24,322	0.47%	264,500	5.07%

[a] Includes discards at sea.
[b] Test fish not included.

http://www.adfg.alaska.gov/fedaidpdfs/FMR14-42.pdf
http://alaskafisheries.noaa.gov/frules/79fr12890.pdf

Eastern Bering Sea pollock Ecosystem considerations

In general, a number of key issues for ecosystem conservation and management can be highlighted. These include: preventing overfishing; avoiding habitat degradation; minimizing incidental bycatch (via multi-species analyses of technical interactions); controlling the level of discards; and considering multi-species trophic interactions relative to harvest policies. For the case of pollock in the Eastern Bering Sea, the NPFMC and NMFS continue to manage the fishery on the basis of these issues in addition to the single-species harvest approach. The prevention of overfishing is clearly set out as the main guideline for management. Habitat degradation has been minimized in the pollock fishery by converting the industry to pelagic-gear only. Bycatch in the pollock fleet is closely monitored by the NMFS observer program and managed on that basis. Discard rates of many species have been reduced in this fishery and efforts to minimize bycatch continue.

In comparisons of the Western Bering Sea (WBS) with the Eastern Bering Sea using mass-balance foodweb models based on 1980-85 summer diet data, Aydin et al. (2002) found that the production in these two systems is quite different. On a per-unit-area measure, the western Bering Sea has higher productivity than the EBS. Also, the pathways of this productivity are different with much of

the energy flowing through epifaunal species (e.g., sea urchins and brittlestars) in the WBS whereas for the EBS, crab and flatfish species play a similar role. In both regions, the keystone species in 1980-85 were pollock and Pacific cod. This study showed that the food web estimated for the EBS ecosystem appears to be relatively mature due to the large number of interconnections among species. In a more recent study based on 1990-93 diet data (see Appendix 1 of the Ecosystem Considerations chapter for methods), pollock remain in a central role in the ecosystem. The diet of pollock is similar between adults and juveniles with the exception that adults become more piscivorous (with consumption of pollock by adult pollock representing their third largest prey item). In terms of magnitude, pollock cannibalism may account for 2.5 million t to nearly 5 million t of pollock consumed (based on uncertainties in diet percentage and total consumption rate; Jurado-Molina et al. 2005).

Regarding specific small-scale ecosystems of the EBS, Ciannelli et al. (2004a, 2004b) presented an application of an ecosystem model scaled to data available around the Pribilof Islands region. They applied bioenergetics and foraging theory to characterize the spatial extent of this ecosystem. They compared energy balance, from a food web model relevant to the foraging range of northern fur seals and found that a range of 100 nautical mile radius encloses the area of highest energy balance representing about 50% of the observed foraging range for lactating fur seals. This has led to a hypothesis that fur seals depend on areas outside the energetic balance region. This study develops a method for evaluating the shape and extent of a key ecosystem in the EBS (i.e., the Pribilof Islands). Furthermore, the overlap of the pollock fishery and northern fur seal foraging habitat (see Sterling and Ream 2004, Zeppelin and Ream 2006) will require careful monitoring and evaluation.
A brief summary of these two perspectives (ecosystem effects on pollock stock and pollock fishery effects on ecosystem) is given in Table 27. Unlike the food-web models discussed above, examining predators and prey in isolation may overly simplify relationships. This table serves to highlight the main connections and the status of understanding or lack thereof.

Table 27. Analysis of ecosystem considerations for BSAI pollock and the pollock fishery.

Indicator	Observation	Interpretation	Evaluation
Ecosystem effects on EBS pollock			
Prey availability or abundance trends			
Zooplankton	Stomach contents, AT and ichthyoplankton surveys, changes mean wt-at-age	Data improving, indication of increases from 2004-2009 and subsequent decreasees (for euphausiids in 2012 and 2014)	Variable abundance—indicates important recruitment (for prey)
Predator population trends			
Marine mammals	Fur seals declining, Steller sea lions increasing slightly	Possibly lower mortality on pollock	Probably no concern
Birds	Stable, some increasing some decreasing	Affects young-of-year mortality	Probably no concern
Fish (Pollock, Pacific cod, halibut)	Stable to increasing	Possible increases to pollock mortality	
Changes in habitat quality			
Temperature regime	Cold years pollock distribution towards NW on average	Likely to affect surveyed stock	Some concern, the distribution of pollock availability to different surveys may change systematically
Winter-spring environmental conditions	Affects pre-recruit survival	Probably a number of factors	Causes natural variability
Production	Fairly stable nutrient flow from upwelled BS Basin	Inter-annual variability low	No concern

Fishery effects on ecosystem			
	Fishery contribution to bycatch		
Prohibited species	Stable, heavily monitored	Likely to be safe	No concern
Forage (including herring, Atka mackerel, cod, and pollock)	Stable, heavily monitored	Likely to be safe	No concern
HAPC biota	Likely minor impact	Likely to be safe	No concern
Marine mammals and birds	Very minor direct-take	Safe	No concern
Sensitive non-target species	Likely minor impact	Data limited, likely to be safe	No concern
Fishery concentration in space and time	Generally more diffuse	Mixed potential impact (fur seals vs Steller sea lions)	Possible concern
Fishery effects on amount of large size target fish	Depends on highly variable year-class strength	Natural fluctuation	Probably no concern
Fishery contribution to discards and offal production	Decreasing	Improving, but data limited	Possible concern
Fishery effects on age-at-maturity and fecundity	Maturity study (gonad collection) underway	NA	Possible concern

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf

Ecosystem effects on the EBS pollock stock

The pollock stock condition appears to have benefitted substantially from the recent conditions in the EBS. The conditions on the shelf during 2008 apparently affected conditions for age-0 northern rock sole due to cold conditions and apparently unfavorable currents that retain them into the over-summer nursery areas (Cooper et al. 2014). It may be that such conditions favor pollock recruitment. Hollowed et al. (2012) provided an extensive review of habitat and density for age-0 and age-1 pollock based on extensive survey data. They noted that during cold years, age-0 pollock were distributed primarily in the outer domain in waters greater than 1ºC and during warm years, age-0 pollock were distributed mostly in the middle domain. This temperature relationship, along with interactions with available food in early-life stages, appears to have important implications for pollock recruitment success (Coyle et al. 2011). Euphausiids, principally *Thysanoessa inermisand*, *T. raschii*, are among the most important prey items for pollock in the Bering Sea (Livingston, 1991; Lang etal., 2000; Brodeur et al., 2002; Cianelli et al., 2004; Lang et al., 2005). In the 2009 SAFE report, an analysis of MACE AT survey backscatter as an index of euphausiid abundance on the Bering Sea shelf was presented. In 2010 and this year the index was updated and spatial distributions and trends were evaluated using methods described in De Robertis et al. (2010) and Ressler et al. (2012). This information is presented in the Ecosystem Consideration chapter and indicates declines observed in both the 2012 and 2014 surveys relative to the 2009 peak. It is noteworthy that this index shows a peak abundance in 2009 which may have contributed to the survival of the 2008 year class of EBS pollock.

EBS pollock fishery effects on the ecosystem

The catch of other target species in the pollock fishery represent less than 1% of the total pollock catch. Incidental catch of Pacific cod has increased since 1999 but remains below the 1997 levels. The incidental catch of flatfish was variable over time and has increased, particularly for yellowfin sole. Proportionately, the incidental catch has decreased since the overall levels of pollock catch have increased. In fact, the bycatch of pollock in other target fisheries is more than double the bycatch of target species in the pollock fishery.

Table 28. Bycatch estimates (t) of other target species caught in the BSAI directed pollock fishery, 1997-2012 based on then NMFS Alaska Regional Office reports from observers (2014 data are preliminary).

	Pacific Cod	Flathead Sole	Rock Sole	Yellowfin Sole	Arrowtooth Flounder	Pacific Ocean Perch	Atka Mackerel	Sablefish	Greenland Turbot	Alaska Plaice	Skates	Squid	Sharks	Sculpin	All other	Total
1997	8,262	2,350	1,522	606	985	428	83	2	123	1					879	15,241
1998	6,559	2,118	779	1,762	1,762	682	91	2	178	14					805	14,751
1999	3,220	1,885	1,058	350	273	121	161	7	30	3					249	7,357
2000	3,432	2,510	2,688	1,466	979	22	2	12	52	147					306	11,615
2001	3,878	2,199	1,673	594	529	574	41	21	68	14					505	10,098
2002	5,925	1,843	1,885	768	606	544	221	34	70	50					267	12,214
2003	5,968	1,706	1,419	210	618	935	762	48	40	7	571	1,226	294	81	327	14,213
2004	6,437	2,009	2,554	841	557	394	1,053	17	18	8	841	977	187	150	436	16,477
2005	7,413	2,319	1,125	63	651	653	678	11	31	45	732	1,150	169	131	490	15,661
2006	7,291	2,837	1,361	256	1,089	736	789	9	65	11	1,308	1,399	512	169	620	18,450
2007	5,630	4,203	510	86	2,795	625	315	12	107	3	1,287	1,169	245	190	726	17,902
2008	6,965	4,288	2,123	516	1,711	336	15	5	85	49	2,756	1,452	144	281	438	21,164
2009	7,878	4,602	7,602	271	2,203	114	25	3	44	176	3,856	209	100	292	305	27,682
2010	6,987	4,309	2,330	1,057	1,502	231	57	2	26	126	1,886	277	26	258	375	19,448
2011	9,998	4,846	8,463	1,095	1,599	660	894	1	29	74	2,342	178	65	315	590	31,150
2012	10,047	3,957	6,819	1,452	735	713	263	1	53	129	2,017	495	55	286	512	27,534
2013	8,944	3,142	6,360	2,072	958	611	70	0	21	147	1,756	117	43	221	242	24,703
2014	5,193	2,537	4,380	1,927	756	1,295	117	1	41	322	811	1,478	75	189	495	19,617

Since the pollock fishery is primarily pelagic in nature, the bycatch of non-target species is small relative to the magnitude of the fishery. Jellyfish represent the largest component of the bycatch of non-target species and had averaged around 5-6 thousand tons per year but more than doubled this year with catches exceeding 13 thousand t. The data on non-target species shows a high degree of inter-annual variability, which reflects the spatial variability of the fishery and high observation error. This variability may reduce the ability to detect significant trends for bycatch species.

Table 29. Bycatch estimates (t) of non-target species caught in the BSAI directed pollock fishery, 1997-2002 based on observer data, 2003-2014 based on observer data as processed through the catch accounting system (NMFS Regional Office, Juneau, Alaska).

Group	1997	1998	1999	2000	2001	2002
Jellyfish	6,632	6,129	6,176	9,361	3,095	1,530
Squid	1,487	1,210	474	379	1,776	1,708
Skates	348	406	376	598	628	870
Misc Fish	207	134	156	236	156	134
Sculpins	109	188	67	185	199	199
Sleeper shark	105	74	77	104	206	149
Smelts	19.5	30.2	38.7	48.7	72.5	15.3
Grenadiers	19.7	34.9	79.4	33.2	11.6	6.5
Salmon shark	6.6	15.2	24.7	19.5	22.5	27.5
Starfish	6.5	57.7	6.8	6.2	12.8	17.4
Shark	15.6	45.4	10.3	0.1	2.3	2.3
Benthic inverts.	2.5	26.3	7.4	1.7	0.6	2.1
Sponges	0.8	21	2.4	0.2	2.1	0.3
Octopus	1	4.7	0.4	0.8	4.8	8.1
Crabs	1	8.2	0.8	0.5	1.8	1.5
Anemone	2.6	1.8	0.3	5.8	0.1	0.6
Tunicate	0.1	1.5	1.5	0.4	3.7	3.8
Unident. inverts	0.2	2.9	0.1	4.4	0.1	0.2
Echinoderms	0.8	2.6	0.1	0	0.2	0.1
Seapen/whip	0.1	0.2	0.5	0.9	1.5	2.1
Other	0.8	2.9	1.1	0.8	1.2	3.7

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Scypho jellies	5,644	6,590	5,196	2,716	2,398	4,183	8,115	2,661	8,893	3,878	6,117	13,886
Misc fish	101.3	89.8	157.9	154.1	202.9	120.2	135.1	173.0	325.8	163.0	151.0	50.1
Sea star	89.4	7.2	9.5	11.3	5.3	18.7	9.8	13.2	37.5	8.1	14.8	30.1
Eulachon	2.5	19.3	9.2	93.6	100.8	2.4	5.3	0.7	3.3	1.7	0.8	2.4
Eelpouts	7.0	0.7	1.3	21.0	118.7	8.9	4.3	2.1	1.3	1.3	1.8	8.1
osmerids	7.5	2.0	3.4	5.8	37.5	2.0	0.1	0.1	0.3	0.2	0.2	0.5
Sea pens	0.6	1.0	1.7	2.0	4.0	1.1	2.6	3.1	2.9	3.9	2.3	4.0
Sponge	0.1	0.0	0.0	0.0	1.4	0.2	0.5	4.9	3.9	0.5	6.6	2.5
Snails	1.3	1.0	6.9	0.2	0.5	1.9	1.5	1.4	1.4	1.5	1.1	1.7
Lanternfishes	0.3	0.1	0.6	9.6	5.8	1.5	0.4	0.0	0.0	0.1	0.0	0.0
Sea anemone	0.4	0.4	0.3	0.6	0.3	0.9	1.3	2.4	2.0	1.7	2.4	2.0
Brittle star	0.3	0.0	0.0	2.6	0.2	3.6	0.1	0.3	0.2	0.1	0.1	2.3
urochordata	0.0	0.0	0.5	0.0	0.0	0.8	0.7	3.1	0.9	0.1	1.9	1.1
Invertebrate	0.0	0.1	0.1	0.2	0.8	0.3	0.3	1.0	0.7	2.2	0.2	0.6
Misc crabs	0.7	0.0	0.3	0.1	1.3	0.6	0.2	0.1	0.3	0.2	0.6	0.4
All other	0.3	0.7	3.5	3.9	5.1	2.1	1.9	2.0	1.8	0.6	0.8	1.7

A high number of non-Chinook salmon (nearly all made up of chum salmon) was observed in 2014 (about 13% above the 2003-2013 average) after the low level observed in 2012. Chinook salmon bycatch in 2014 was low (36% of the 2003-2014 mean value) and consistent with the magnitude of bycatch since the implementation of Amendment 91 in 2011 (2014 was 92% of the 2011-2014 mean). Ianelli and Stram (2014) provide estimates of the bycatch impact on Chinook salmon runs to the coastal west Alaska region and found that the peak bycatch levels exceeded 7% of the total run return. Since 2011, the impact has been estimated to be below 2%.

Table 30. Bycatch estimates of prohibited species caught in the BSAI directed pollock fishery, 1997-2012 based on then AKFIN (NMFS Regional Office) reports from observers. Herring and halibut units are in t, all others represent numbers of individuals caught. Data for 2014 are preliminary.

Year	Bairdi Crab	Blue King Crab	Chinook Salmon	Golden King Crab	Halibut catch	Halibut Mort	Herring	Non-Chinook Salmon	Opilio Crab	Other King Crab	Red King Crab
1991	1,398,112		40,906		2,159,774		3,159,252	28,951	4,380,025	33,431	17,777
1992	1,501,801		35,950		2,221,417		647,013	40,274	4,570,741	20,387	43,874
1993	1,649,104		38,516		1,326,119		527,497	242,191	738,260	1,926	58,140
1994	371,238		33,136		963,417	689	1,626,561	92,672	811,758	514	42,361
1995	153,995		14,984		492,283	398	904,899	19,264	206,654	941	4,646
1996	89,416		55,623		382,071	321	1,241,853	77,236	63,398	215	5,934
1997	17,248		44,909		260,761	203	1,134,544	65,988	216,152	393	137
1998	57,042		51,322		353,210	278	800,753	64,042	123,405	5,093	14,287
1999	2,397		10,381		153,970	125	799,550	44,610	15,830	7	91
2000	1,485		4,242		110,456	91	482,751	56,867	6,481	121	0
2001	5,061		30,937		265,907	200	225,277	53,904	5,653	5,139	106
2002	2,113		32,402		199,299	168	108,584	77,178	2,698	194	17
2003	733	9	43,021		113,493	96	909,216	180,782	609		52
2004	1,189	4	51,700	2	108,623	93	1,104,136	440,475	743		27
2005	659	0	67,362	1	146,727	113	610,123	704,587	2,300		0
2006	1,657	0	82,750	3	156,510	122	435,558	306,047	2,909		203
2007	1,522	0	122,255	3	360,261	292	353,518	93,201	3,220		8
2008	8,839	8	21,398	33	424,351	334	127,805	15,555	9,428		576
2009	6,120	20	12,743	0	588,227	458	64,952	46,893	7,428		1,137
2010	13,589	29	9,831	0	356,652	274	351,378	13,797	9,431		1,009
2011	10,319	20	25,499	0	508,606	382	377,220	193,555	6,332		577
2012	5,413	0	11,344	0	474,800	386	2,352,551	22,390	6,106		344
2013	12,149	34	13,108	147	347,403	268	958,969	125,525	8,549		316
2014			15,020		191,011	160		219,092			

http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf

BSAI Chinook and chum salmon management

The Council took action in 2009 to recommend a new approach to managing Chinook salmon bycatch in the Bering Sea pollock fishery under Amendment 91. This new approach combines a limit on the amount of Chinook salmon that may be caught incidentally with incentive plan agreements and performance standard to reduce bycatch. This program was designed to minimize bycatch to the extent practicable in all years, prevent bycatch from reaching the limit in most years, while providing the pollock fleet with the flexibility to harvest the total allowable catch. This program was implemented by NMFS for the 2011 fishery. Previously Chinook salmon bycatch had been managed in the Bering Sea through triggered time and area closures and most recently by a fleet-managed rolling hot spot (RHS) bycatch avoidance program. The Council is currently developing a separate program for managing the bycatch of chum salmon in the Bering Sea Pollock fishery. The amendment analysis for Amendment 91, information on historical Chinook salmon bycatch trends, incentive plan agreements and other information on Chinook salmon bycatch management and monitoring can be found at http://alaskafisheries.noaa.gov/sustainablefisheries/bycatch/default.htm.

The Council is currently considering new measures to manage non-Chinook (chum) salmon bycatch in the Bering Sea pollock fishery. Previously bycatch has been managed using time and area closures based upon historical bycatch trends. Currently the fleet is exempt from the chum salmon savings area closure provided it participates in a rolling hot spot (RHS) program which uses real-time data to move the fleet off areas of high bycatch weekly. The alternatives under consideration by the Council include new time and area closures, hard caps and RHS regulations.

On June 7th 2014 the Council initiated through the C-5 Bering Sea Salmon Bycatch motion an analysis of Chinook and chum salmon bycatch measures in the Bering Sea pollock fishery with the following purpose and need statement and alternatives:

The current chum salmon bycatch reduction program under Am 84 does not meet the Council's objectives to prioritize Chinook salmon bycatch avoidance, while preventing high chum salmon bycatch and focusing on avoidance of Alaska chum salmon stocks; and allow flexibility to harvest pollock in times and places that best support those goals. Incorporating chum salmon avoidance through the Incentive Plan Agreements (IPAs) should more effectively meet those objectives by allowing for the establishment of chum measures through a program that is sufficiently flexible to adapt to changing conditions quickly.

Chinook salmon are an extremely important resource to Alaskans who depend on local fisheries for their sustenance and livelihood. Multiple years of historically low Chinook salmon abundance have resulted in significant restrictions for subsistence users in western Alaska and failure to achieve conservation objectives. The current Chinook salmon bycatch reduction program under Am 91 was designed to minimize bycatch to the extent practicable in all years, under all conditions of salmon and pollock abundance. While Chinook salmon bycatch impact rates have been low under the program, there is evidence that improvements could be made to ensure the program is reducing Chinook salmon bycatch at low levels of salmon abundance. This could include measures to avoid salmon late in the year and to strengthen incentives across both seasons, either through revisions to the IPAs or regulations.

Alternatives: (Note: action alternatives are not mutually exclusive.)

Alternative 1. No action.

Alternative 2. Remove BSAI Am. 84 regulations and incorporate chum salmon avoidance into the Am 91 Incentive Plan Agreements. Revise regulations at 50 CFR 679.21(c)(13) to include associated reporting requirements for chum salmon. Revise regulations at 50 CFR 679.21(c)(12)(iii)(B)(3) to include chum salmon bycatch avoidance as follows:

(3) Description of the incentive plan.
The IPA must contain a written description of the following:

(i) The incentive(s) that will be implemented under the IPA for the operator of each vessel participating in the IPA to avoid Chinook salmon and chum salmon bycatch under any condition of pollock and Chinook salmon abundance in all years;

(ii) The incentive(s) to avoid chum salmon should not increase Chinook salmon bycatch;

(iii) The rewards for avoiding Chinook salmon, penalties for failure to avoid Chinook salmon at the vessel level, or both;

(iv) How the incentive measures in the IPA are expected to promote reductions in a vessel's Chinook salmon and chum salmon bycatch rates relative to what would have occurred in absence of the incentive program;

(v) How the incentive measures in the IPA promote Chinook salmon savings and chum salmon savings in any condition of pollock abundance or Chinook salmon abundance in a manner that is expected to influence operational decisions by vessel operators to avoid Chinook salmon and chum salmon; and

(vi) How the IPA ensures that the operator of each vessel governed by the IPA will manage that vessel's his or her Chinook salmon bycatch to keep total bycatch below the performance standard described in paragraph (f)(6) of this section for the sector in which the vessel participates.; and

(vii) How the IPA ensures that the operator of each vessel governed by the IPA will manage that vessel's chum salmon bycatch to avoid areas and times where the chum salmon are likely to return to Western Alaska.

Alternative 3. Revise Federal regulations to require that IPAs include the following provisions:

Option 1. Restrictions or penalties targeted at vessels that consistently have significantly higher Chinook salmon PSC rates relative to other vessels fishing at the same time. Include a requirement to enter a fishery-wide in-season PSC data sharing agreement.

Option 2. Required use of salmon excluder devices, with recognition of contingencies.

Suboption: Required use of salmon excluder devices, with recognition of contingencies, from Jan 20 – March 31, and Sept 1 until the end of the B season.

Option 3. A rolling hotspot program that operates throughout the entire A and B seasons.

Option 4. Salmon savings credits last for a maximum of three years for savings credit based IPAs.

Option 5. Restrictions or performance criteria used to ensure that Chinook salmon PSC bycatch rates in the month of October are not significantly higher than those achieved in the preceding months.

Alternative 4. Revise the Bering Sea pollock fishery seasons:

Option 1. Change the start date of the Bering Sea pollock B season to June 1.

Option 2. Shorten the Bering Sea pollock fishery to end on [sub-options: September 15, October 1 or October 15].

Alternative 5. Revise Federal regulations to lower the performance standard under Am 91 in years of low Chinook salmon abundance per the options below. Low abundance is defined as ≤500,000 Chinook salmon, based on the total Chinook salmon run size index of the coastal WAK aggregate stock grouping in a [option: year or average of two years]. Sectors that exceed the applicable performance standard, in 3 out of 7 years, would be held to their proportion of the hard cap of 47,591 in perpetuity.

Option 1. 25% reduction (36,693)
Option 2. 60% reduction (19,036)

Suboption: Apply the reduction [25% or 60%] to the B season portion of the performance standard only.

Analysts were also directed to provide data and considerations to inform an approach to differentially apply the seasonal adjustments under Alt 4 and the reduction in the performance standard among the CV, CP, and MS sectors under Alternative 5. Analysts were also asked to describe potential methods for addressing the time lag between the population's vulnerability to marine fishery bycatch and the population statistics in the trigger, and to develop and include recommended changes to Federal reporting requirements that would be necessary to evaluate the effectiveness of any of the alternatives.

(http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chinook-salmon-bycatch/ specifically C-5 Bering Sea Salmon Bycatch Council motion – June 7, 2014)

Further to this, John Gauvin requested for a new exempted fishing permit (EFP) to continue research on salmon bycatch reduction devices in December 2014.

The purpose and objectives of the EFP are as follow:

The application requested that the Alaska Region of the National Marine Fisheries Service (NMFS) issue another exempted fishing permit (EFP) to assist the Bering Sea pollock industry's continuing efforts to develop salmon excluders. Since 2003, research to develop and test salmon excluders in the Bering Sea has been conducted by the applicant under the direction of the North Pacific Fisheries Research Foundation (NPFRF). Dr. Craig Rose of the Alaska Fishery Science Center and Mr. John Gruver of United Catcher Boats Association have collaborated in this work and will continue to do so under this permit.

The two focus areas for this new EFP come out of the findings from EFP 11-01 which provides a detailed assessment of productive areas of focus for further excluder development. These are: 1) Refinements and tuning to the O/U excluder to increase chum escapement and 2) Improvement of Chinook escapement rates with use of the O/U excluder. These areas for improvement have some overlap for the two salmon species and both objectives were high priorities for Bering Sea pollock fishermen who provided feedback at the conclusion of EFP 12-01.

The stage of excluder development for the Bering Sea is that a workable "flapper-style" excluder for Chinook is in wide use in the pollock fishery. Based on data from several field tests, if rigged according to the specifications described in the EFP final report, this device achieves Chinook escapement rates of 20-40%. At the same time, the pollock escapement rate is well under one percent by weight. These results are based on systematic testing methods employing recapture nets in 2011-2012.

Specific to chum bycatch reduction, the new excluder design which allows escapement at the top and bottom of the net did reduce chum bycatch considerably more than previous devices. This over and under (O/U) excluder tested in the fall of 2012 resulted in chum escapement of approximately 20% along with low pollock escapement rates. This was encouraging but the applicant reported was improvement likely attainable with systematic adjustments to that excluder.

In summary, considerable headway has been made on excluders for the Bering Sea pollock fishery but additional improvement is extremely desirable. Under the management constraints and incentive programs, fishermen continue to need better tools in their bycatch-management toolbox and further development of salmon excluders is extremely important according to input from fishermen received during NPFRF's outreach efforts.

(http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chinook-salmon-bycatch/ see specifically the BS Trawl Salmon Excluder EFP: Application)

GOA salmon bycatch management

Pacific salmon are taken as bycatch in the GOA groundfish fisheries, in which they are considered prohibited. Although five species of salmon are caught in the fisheries, the Council has been concerned about Chinook salmon, as the species with the highest bycatch in recent years. Chinook salmon bycatch primarily occurs in trawl fisheries, in the central and western regulatory areas. Between 2003 and 2010, the pollock target fishery accounted for an average of three-quarters of intercepted Chinook salmon, while other, primarily nonpelagic, trawl fisheries for flatfish, rockfish, and Pacific cod accounted for the remainder.
In 2011, the Council approved Chinook salmon prohibited species catch (PSC) limits for the GOA pollock fisheries in the central and western regulatory areas. Once these annual limits are reached, the pollock fishery in the respective regulatory area will be closed. The Council is also considering other, comprehensive management measures to address Chinook salmon bycatch in the GOA trawl fisheries.

In 2014, with C-7 Gulf of Alaska Trawl Bycatch Management Final motion dated December 12th the Council initiated analysis of the following alternatives and options for Gulf of Alaska trawl bycatch management, with the existing objectives and purpose and need statement.

ALTERNATIVE 1. No action. Existing management of the Central and Western Gulf of Alaska trawl fisheries under the License Limitation Program.

ALTERNATIVE 2. Gulf of Alaska Trawl Bycatch Management Program for the Western Gulf, Central Gulf and West Yakutat areas. The following elements apply to the program:

- Observer Coverage and Monitoring (i.e. 100% of trawl vessels monitoring);
- Sector eligibility (i.e. inshore and offshore);
- Allocated species (target, secondary, PSC species, halibut and chinook salmon);

- Sector allocations of target and secondary species;
- Sector allocations of PSC;
- Voluntary inshore cooperative structure;
- Voluntary catcher processor cooperative structure;
- Fishery dependent community stability (applies to inshore cooperatives);
- Transferability;
- Gear conversion;
- Limited access trawl fisheries (CV and CP);
- Sideboards;
- Program Review;
- Cost recovery and loan program.

http://www.npfmc.org/salmon-bycatch-overview/gulf-of-alaska-salmon-bycatch/

2014 Steller Sea Lion Biological Opinion

Section 7 Consultation Biological Opinion – Authorization of Alaska groundfish fisheries under the Proposed Revised Steller Sea Lion Protection Measures, April 2014.

NOAA Fisheries stated that proposed changes to fishing restrictions in the Aleutian Islands are not likely to jeopardize the continued existence of the endangered western population of Steller sea lions or adversely modify Steller sea lion critical habitat, according to a biological opinion issued on April 2nd 2014 under the Endangered Species Act.
The agency estimates that the proposed fishery management changes would relieve roughly two-thirds of the economic burden imposed on Aleutian Islands' fishermen by sea lion protection measures that took effect in 2011. Fishermen could see new regulations in place by January 2015.

The agency's previous biological opinion on the effects of fisheries, issued in 2010, found that the ongoing groundfish fisheries in the western and central Aleutian Islands were likely to jeopardize the continued existence of Steller sea lions and adversely modify their critical habitat. This led NOAA Fisheries to develop a "Reasonable and Prudent Alternative" under the ESA, which closed the Atka mackerel and Pacific cod fisheries in the western Aleutians in 2011, and further restricted these fisheries in the central Aleutians.
The 2010 opinion underwent two external reviews—one commissioned by NOAA and undertaken by the Center for Independent Experts, and a second provided by the states of Alaska and Washington. NOAA Fisheries conducted several new analyses in response to the reviews, which are incorporated into the new 2014 opinion. The new biological opinion was developed based on the best available scientific information and notes that considerable changes have occurred in the Aleutian Islands fisheries, coupled with new data and analyses that help give the agency a better picture of the potential for commercial fisheries to compete with sea lions for Pacific cod, Atka mackerel and pollock. Beginning in 2014, NOAA and the North Pacific Fishery Management Council split the total allowable catch for Pacific cod between the Bering Sea fishing grounds and the Aleutian Islands, resulting in far less allowable Pacific cod harvest in the Aleutians. Additional changes that are being considered would limit the amount, timing and location of Atka mackerel, Pacific cod and pollock harvests inside Steller sea lion critical habitat in the Aleutians.

NOAA Fisheries remains concerned that large fishery harvests from important areas in the Aleutians over a short amount of time has the potential to deplete concentrations of fish that Steller sea lions depend upon. However, the proposed measures would limit and spread out the catch enough to meet the requirements of the Endangered Species Act, and are consistent with NOAA Fisheries' views on dispersing the harvest in space and time to avoid localized depletion of fish that are prey species for Steller sea lions. NOAA Fisheries is completing an environmental impact statement on the new fishery management measures, and expects to implement the new regulations in January 2015.
http://alaskafisheries.noaa.gov/newsreleases/2014/ssl040214.htm

Bering Sea Canyons of the BSAI

Some of the largest submarine canyons in the world incise the eastern Bering Sea shelf break, including Bering, Pribilof, Zhemchug, Pervenets and Navarin canyons. In 2012, the NPFMC received testimony from environmental organizations to protect coral, sponge and other benthic habitat of fish and crab species in two of these canyons (Pribilof and Zhemchug). In response to this testimony, the NPFMC requested that the NOAA AFSC analyze the distribution of fishes and benthic invertebrates and the vulnerability of their habitat to fishing activities. AFSC compiled data from the eastern Bering Sea that included trawl survey data on fish and invertebrate distributions and observations of ocean conditions and benthic habitat. These data were analyzed using multivariate techniques to determine if the two canyons are distinguishable from the adjacent continental slope. The potential for fishing effects on coral and sponge was assessed with spatial modeling of historical fishing effort, coral and sponge distributions and an index of their vulnerability to physical damage. Pribilof and Zhemchug canyons do show some distinguishing physical characteristics from the adjacent slope such as lower oxygen and pH and higher turbidity, but none based on biological characteristics (i.e., fish, coral and sponge distributions). These analyses imply that Pribilof and Zhemchug canyons are not biologically unique. Instead the major variables structuring the communities of fish and invertebrates on the eastern Bering Sea slope appear to be depth and latitude rather than submarine canyons. Corals were predicted to occur predominantly along the eastern Bering Sea slope, whereas sea whips were predicted to occur predominantly along the outer continental shelf. Sponges were mixed, with about two-thirds of their habitat predicted for the outer shelf and the remainder for the slope. One unique feature of the focal canyons is that about one third of the coral habitat predicted for the eastern Bering Sea slope occurs in Pribilof Canyon, an area that comprises only about 10% of the total slope area. Although apparently concentrated there, the average density of coral for Pribilof Canyon (0.28 colonies m^{-2}) is much less than the density for the Aleutian Islands (1.23 colonies m^{-2}). The physical and biological characteristics of Zhemchug and Pribilof canyons are spatially heterogeneous; coral habitat was more common in some sections of Pribilof Canyon. Higher vulnerability indices were found both within and between canyons and were not unique to Pribilof and Zhemchug canyons. Pelagic trawl, longline and pot gear but not bottom trawl gear overlapped some coral and sponge habitats of the slope including canyons. Substantial overlap does not explain whether effects of fishing were light, medium or high, just that effects likely were greater in overlap areas compared to other areas. Further, the effect for the pelagic trawl fishery will depend on how often and where fishing occurs on bottom habitats.
http://alaskafisheries.noaa.gov/npfmc/PDFdocuments/conservation_issues/BSHC/BeringSeaCanyons_a_513.pdf

In response to the study, in June 2013, the NPFMC drafted a motion regarding Bering Sea canyon areas to identify and validate where necessary areas of coral concentrations for possible management measures occur, for the conservation and management of deep sea corals in Pribilof and Zhemchug canyons.

C9 Bering Sea Canyons Motion – North Pacific Fishery Management Council April 13, 2014

The purpose of the Bering Sea Canyons Motion adopted in 2014 is to determine whether and how the NPFMC should recommend amendment of the BSAI Groundfish and Crab FMPs to protect known, significant concentrations of deep-sea corals in the Pribilof Canyon and the adjacent slope from fishing impacts under the appropriate authorities of the MSA. This action may identify discrete areas of significant abundance of deep sea corals in, and directly adjacent to, the Pribilof canyon, assess the potential for fishing impacts on the identified area or areas of significant coral abundance, evaluate the historical and current patterns of fishing effort and fish removals in and adjacent to the Pribilof Canyon, consider the types of management measures that would be appropriate to conserve discrete areas of significant coral abundance while minimizing impacts on established fishing activity, and identify the appropriate authority under which the Council may take action.

The North Pacific Fishery Management Council has taken significant steps to protect coral and coral habitats in the Aleutian Islands and Gulf of Alaska. Recent models and data have shown that Pribilof Canyon and some areas along the Bering Sea slope may also contain deep sea coral. Results of surveys planned for summer 2014 should further refine the understanding of coral occurrence within the canyons and slope habitats, and this information will be useful in refining alternatives developed in response to this purpose and need. There is historical fishing activity that occurs within and around the Pribilof Canyon. Deep sea corals may be important habitat for several commercially important fish species managed by the Council, and may provide important ecosystem services for the maintenance of healthy Bering Sea ecosystems. Consistent with the Council's adopted policy for incorporating the Ecosystem Approach to fisheries management and the authorities of the MSA, the Council intends to initiate action to investigate where and how to protect coral in the Pribilof Canyon and directly adjacent slope (http://www.npfmc.org/bering-sea-canyons/).

AI Pollock Ecosystem considerations

Prey availability/abundance trends

Adult walleye pollock in the Aleutian Islands consume a variety of prey, primarily large zooplankton, copepods, and myctophids. No time series of information is available on Aleutian Islands for large zooplankton, copepod, or myctophid abundance.

Predator population trends

The abundance trend of Aleutian Islands Pacific cod is decreasing, and the trend for Aleutian Islands arrowtooth flounder is relatively stable. Northern fur seals and Steller sea lions west of 178°W longitude are showing declines, while Steller sea lions east of 178°W longitude have shown some slight increases. Declining trends in predator abundance could lead to possible decreases in walleye pollock mortality. The population trends of seabirds are mixed, some increases, some decreases, and others stable. Seabird population trends could affect young-of-the-year mortality.

Changes in habitat quality

Water temperature in the Aleutian Islands is variable among survey years particularly for bottom depth at the preferred depth range of pollock. The 2012 Aleutian Islands summer bottom temperatures indicated that water temperatures were substantially cooler than the 2004-2010 surveys (Lowe et. al. 2012). Bottom temperatures could possibly affect fish distribution. The 2014 AI bottom trawl survey shows a swing of bottom and surface temperature values to above the means for the entire time series (1991-2014) and similar to the 2004-2010 bottom temperatures.

AI pollock fishery effects on the ecosystem

AI pollock fishery contribution to bycatch

Prior to 1998, levels of bycatch in the pollock fishery of prohibited species, forage, HAPC biota, marine mammals and birds, and other sensitive non-target species was very low compared to other fisheries in the region. The AI pollock fishery opening in 2005 was limited to only four hauls, within these four hauls the bycatch level of Pacific Ocean perch (POP) was very high (~50%). In addition to the lack of commercially harvestable levels of pollock, the high levels of POP bycatch convinced fishers to discontinue the fishery in 2005. Pacific ocean perch was the most substantial bycatch species and made up 3% of the catch in 2006 and 11% in 2007. The 2008 directed pollock fishery had an observed bycatch rate of 1% with 97% of this being POP. In 2009 there was no observer coverage of the directed fishery and in 2010 there was less than 1% bycatch in the directed fishery which caught less than 50 tons of pollock. There was no directed pollock fishery in the Aleutians in 2011 through 2013.

Concentration of AI pollock catches in time and space

Since no EFP is proposed for 2014 there is expected to only be a very limited fishery in 2014, if any at all. The only shore-based plant capable of processing the Aleutian Islands' pollock catch in Adak is currently not configured to do so and no pollock processing is expected there in 2014.

AI pollock fishery effects on amount of large size walleye pollock

The AI pollock fishery in the Aleutian Islands was closed between 1999 and 2005. There was only a very limited fishery in 2005 (< 200t), 2006 (932 t), 2007 (1,300 t), 2008 (382 t), 2009 (400 t), 2010 (50 t), 2011 (0 t), 2012 (0 t), 2013 (0 t), and 2014 (0 t). Year to year differences observed in the previous decade cannot be attributed to the fishery and must be attributed to natural fluctuations in recruitment. Fishers have indicated that the larger pollock in the Aleutian Islands will be targeted. But the low level of fishing mortality is not expected to greatly affect the size distribution of pollock in the AI.

AI pollock fishery contribution to discards and offal production

The 2015 Aleutian Islands pollock fishery, if pursued, is expected to be conducted by catcher vessels delivering unsorted catch to the processing plant in Adak, and therefore very little discard or offal production is expected from this fishery. Currently the plant is out of operation and therefore no fishery is expected.

AI Pollock fishery effects on AI pollock age-at-maturity and fecundity

The effects of the fishery on the age-at-maturity and fecundity of AI pollock are unknown. No studies

on AI pollock age-at-maturity or fecundity have been conducted. Studies are needed to determine if there have been changes over time and whether changes could be attributed to the fishery. Little impact is expected if the fishery continues to be conducted in the limited capacity it has been over recent years.

Table 31. Ecosystem effects on AI walleye pollock.

Indicator	Observation	Interpretation	Evaluation
Prey availability or abundance trends			
Zooplankton	**Stomach contents, ichthyoplankton surveys**	None	Unknown
Predator population trends			
Marine mammals	**Fur seals declining, Steller sea lions increasing slightly in central, decreasing in West.**	Possibly lower mortality on walleye pollock	No concern
Birds	**Stable, some increasing some decreasing**	May affect young-of-year mortality	Unknown
Fish (Pacific cod, arrowtooth flounder)	**Pacific cod—decreasing, arrowtooth--stable**	Possible decreases to walleye pollock mortality	No concern
Changes in habitat quality			
Temperature regime	**The 2012 AI summer bottom temperature was colder than average**	Cooling could affect apparent distribution.	Unknown

***The AI walleye pollock* effects on ecosystem**			
Indicator	**Observation**	Interpretation	Evaluation
Fishery contribution to bycatch			
Prohibited species	**Expected to be heavily monitored**	Likely to be a minor contribution to mortality	No concern
Forage (including herring, Atka mackerel, cod, and pollock)	**Expected to be heavily monitored.**	Bycatch levels should be low.	Unknown
HAPC biota (seapens/whips, corals, sponges, anemones)	**Very low bycatch levels of seapens/whips, sponge and coral catches expected in the pelagic fishery**	Bycatch levels and destruction of benthic habitat expected to be minor given the pelagic fishery.	No concern
Marine mammals and birds	**Very minor direct-take expected**	Likely to be very minor contribution to mortality	No concern
Sensitive non-target species	**Expected to be heavily monitored**	Unknown given that this fishery was closed between 1999 and 2005. The 2006 AICASS had 3% POP bycatch, the only significant bycatch. The 2005-2009 fishery had high bycatch of POP, but bycatch of other species was very low in fishery prior to 1999.	No concern
Other non-target species	**Very little bycatch.**	Unknown	No concern
Fishery concentration in space and time	**Newly opened areas should spread the fishery out more than under previous SSL protection measures.**	Depending on concentration of pollock outside of critical habitat could have an effect.	Possible concern
Fishery effects on amount of large size target fish	**Depends on highly variable year-class strength**	Natural fluctuation	Possible Concern
Fishery contribution to discards and offal production	**Offal production—unknown. 2015 fishery not expected to be significant.**	Unknown	Unknown
Fishery effects on age-at-maturity and fecundity	**Unknown**	Unknown	Unknown

http://www.afsc.noaa.gov/REFM/Docs/2014/AIpollock.pdf

Bogoslof pollock ecosystem considerations

In general, a number of key issues for ecosystem conservation and management can be highlighted. These include:

- Preventing overfishing;
- Avoiding habitat degradation;
- Minimizing incidental bycatch (via multi-species analyses of technical interactions);
- Controlling the level of discards; and
- Considering multi-species trophic interactions relative to harvest policies.

For the case of pollock, the NPFMC and NMFS continue to manage the fishery on the basis of these issues in addition to the single-species harvest approach. The prevention of overfishing is clearly set out as a main guideline for management. Habitat degradation has been minimized in the pollock fishery by converting the industry to pelagic-gear only. Bycatch in the pollock fleet is closely monitored by the NMFS observer program, and individual species caught incidentally are managed on that basis. Discarding rates have been greatly reduced in this fishery and multi-species interactions is an ongoing research project within NMFS with extensive food-habit studies and simulation analyses to evaluate a number of "what if" scenarios with multi-species interactions.

As reported in Loughlin and Miller (1989) pups of Northern fur seals, *Callorhinus ursinus*, were first observed on Bogoslof Island in 1980. By 1988 the population had grown at a rate of 57% per year to over 400 individuals, including 80+ pups, 159 adult females, 22 territorial males, and 188 sub-adult males. They noted that the rookery is in the same location where solitary male fur seals were seen in 1976 and 1979 and is adjacent to a large northern sea lion rookery. On July 22, 2005 NMFS surveys resulted in counts of 1,123 adult males, a substantial increase over this time period (L. Fritz, AFSC, SAFE author pers. comm.). The estimated number of Northern fur seal pups born on Bogoslof Island increased from 5,096 (SE = 33) to 12,631 (SE = 335) (Angliss and Allen, 2007). This suggests that conditions in the ecosystem have changed and appear to favor Northern fur seals. The extent that this is due to environmental conditions is unknown. However, pollock abundance may play only a small role since during peak abundance levels, the Northern fur seal abundance was at very low levels. Also, pollock are most concentrated in this region during winter months when Northern fur seals have migrated to more southern areas.
http://www.afsc.noaa.gov/REFM/Docs/2014/BOGpollock.pdf

Habitat effects of the fishery

To incorporate the regulatory guidelines for review and revision of essential fish habitat (EFH) FMP components, the NPFMC will conduct a complete review of all the EFH components of each FMP once every 5 years and will amend those EFH components as appropriate to include new information. Additionally, the NPFMC may use the FMP amendment cycle every three years to solicit proposals for habitat areas of particular concern and/or conservation and enhancement measures to minimize the potential adverse effects from fishing. Those proposals that the NPFMC endorses would be implemented through FMP amendments. In 2010, during the last EFH review, the pelagic trawl pollock fishery was determined to not have significant essential fish habitat impacts on spawning and breeding, feeding or growth to maturity of pollock with the negative effects determined to be either minimal or temporary. http://www.fakr.noaa.gov/habitat/efh/review/appx1.pdf

Work has already begun on the 2015 5-year review with the idea of increasing the accuracy of EFH data and maps and should be ready for review on the next FAO RFM AK Pollock Surveillance Assessment.

Endangered, Threatened, Protected species

Over the last 12 months, the assessment team has found no significant interactions occurring between endangered species and the pollock fishery, including whales, Steller sea lions or seabirds. Steller sea lion health and relationship to the pollock, Pacific cod and Atka mackerel prey species is continually been monitored. Federal management actions are also in a continuous state of flux. More details have been provided above.

Broader ecosystem considerations

The AFSC also produces an annual ecosystem considerations report as an appendix to the SAFE reports and covering all Alaskan groundfish fisheries.

The 2014 Ecosystem SAFE summarizes the following information for fishing and fisheries trends.

Alaska-wide

- With the Arctic FMP closure included, almost 65% of the U.S. EEZ of Alaska is closed to bottom trawling.
- At present, no BSAI or GOA groundfish stock or stock complex is subjected to overfishing, and no BSAI or GOA groundfish stock or stock complex is considered to be overfished or to be approaching an overfished condition.
- The total catch of non-target species groups in commercial groundfish fisheries has been highest in the EBS, compared with the AI and GOA. Scyphozoan jelly catches in the GOA are an order of magnitude lower than the EBS and three orders of magnitude lower in the AI. Catches of HAPC biota are intermediate in the AI and lowest in the GOA. The catches of assorted invertebrates in the GOA are an order of magnitude lower than the EBS, and are lowest in the AI.
- Catch of HAPC biota and assorted invertebrates in 2013 were the highest in the time series.
- The 2013 estimated numbers of bycaught seabirds in groundfish fisheries are the lowest since bycatch estimates began in 1993.
- There seems to be a generally decreasing trend in seabird bycatch since the new estimation procedures began in 2007, indicating no immediate management concern other than continuing the goal of decreased seabird bycatch.
- The pattern of changes in the total number of vessels harvesting groundfish and the number of vessels using hook and line gear have been very similar since 1994. Numbers have generally decreased since 1994 but have remained relatively stable in the last 5 years (2009-2013). The total number of vessels was 1,518 in 1994 and 936 in 2012. The number of vessels using trawl gear decreased from 257 in 1994 to 177 in 2012.

Bering Sea

- The maximum potential area of seafloor disturbed by trawling remained relatively stable in

the 2000s, decreased in 2009-2010 but in 2012 returned to levels seen in the early 2000s. In 2013, the estimated area was 94,975 km^2.

- Since 1993, discard rates of managed groundfish species in federally-managed Alaskan groundfish fisheries have generally declined in the trawl pollock and non-pollock fisheries in the Bering Sea/Aleutian Islands (BSAI). Discard rates in the BSAI fixed gear sector fell from around 20% in 1993 to 12% in 1996, and since then have generally fluctuated between 10% and 14%.
- Trends in total non-target catch in the groundfish fisheries have varied in the EBS. The catch of Scyphozoan jellyfish has fluctuated over the last ten years with peaks in 2009, 2011, and 2013. HAPC biota catch decreased from 2003 to 2007 and has been generally steady since. Sea anemones comprised the majority of the catch.

Aleutian Islands

- Since 1993, discard rates of managed groundfish species in federally-managed Alaskan groundfish fisheries have generally declined in the trawl pollock and non-pollock fisheries in the Bering Sea/Aleutian Islands (BSAI). Discard rates in the BSAI fixed gear sector fell from around 20% in 1993 to 12% in 1996, and since then have generally fluctuated between 10% and 14%.
- Trends in total non-target catch in the groundfish fisheries have varied in the AI. The catch of Scyphozoan jellyfish has been variable and shows no apparent trend over time. HAPC biota and assorted invertebrate catches reached new peaks in 2013.

Gulf of Alaska

- Discarded tons of groundfish have remained relatively stable in the past few years with the exception of fixed gear, in which discard rates jumped from 6% to 21% in 2013. Improved observer coverage on vessels less than 60' long and on vessels targeting IFQ halibut may account for the increase.
- Assorted invertebrates comprise the majority of non-target catch in groundfish fisheries in the GOA. Catches of Schyphozoan jellies have alternated annually between above and below-average since 2007. Catches of HAPC biota and assorted invertebrates have varied little since 2003.

http://www.afsc.noaa.gov/REFM/Docs/2014/ecosystem.pdf

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

FAO CCRF 9.1.2/9.1.3/9.1.4/9.1.5/9.3.1/9.3.5

Evidence adequacy rating:

☐ **High** ☐ **Medium** ☐ **Low**

Clause 14 is not applicable for this fishery.

8. Performance specific to agreed corrective action plans

Not Applicable. No non conformances are active for this fishery.

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

Not applicable, no new non conformances have been issued.

10. Future Surveillance Actions

The assessment team will review the following during the 2015 surveillance assessment: 1) Review of potential re-instatement of the Alaska Coastal Management Plan and 2) Developments, coverage and data produced by the restructured observer program.

11. Client signed acceptance of the action plan

Not applicable.

12. Recommendation and Determination

Following this third surveillance assessment, finalized in January 2015, the assessment team recommends that continued Certification under the FAO-Based Responsible Fisheries Management Certification Program is maintained for the management system of the applicant fishery, the Alaska pollock, *Gadus chalcogrammus,* (formerly *Theragra chalcogramma*) commercial fisheries employing pelagic trawl gear within Alaska jurisdiction (200 nautical miles EEZ) and subjected to federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

13. References

A. Al-Humaidhi; D. Culpo, C. Donovan and R. Easton. 2014. Draft report Alaska Track 1: Review of the 2014 Spring Season. Pacific States Marine Fisheries Commission; 205 SE Spokane Street, Suite 100, Portland OR 97202.	http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/Observer/EM/PSMFC_EMProgram.pdf
ADEC. 2014. Homepage. Department of Environmental Conservation, P.O. Box 111800, 410 Willoughby Ave., Ste. 303, Juneau, AK 99811-1800. Accessed Nov 2014.	http://dec.alaska.gov/
ADFG. 2014 Walleye Pollock (Theragra chalcogramma) Management webpage. Alaska Department of Fish and Game P.O. Box 115526; 1255 W. 8th Street Juneau, AK 99811-5526	http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.management
ADFG. 2014. Commercial Fisheries Reporting Requirements. Alaska Department of Fish and Game P.O. Box 115526; 1255 W. 8th Street Juneau, AK 99811-5526	http://www.adfg.alaska.gov/static/license/fishing/pdfs/reporting_requirements.pdf
ADFG. 2014. FISHERY UPDATE 2014 CENTRAL REGION GROUNDFISH FISHERIES OUTLOOK. Alaska Department of Fish and Game P.O. Box 115526; 1255 W. 8th Street Juneau, AK 99811-5526	http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/378425150.pdf
AFSC. 2013. Observer Sampling Manual. Fisheries Monitoring and Analysis Division. North Pacific Groundfish Observer Program. Alaska Fisheries Science Center. 7600 Sand Point Wave. N.E. Seattle. Washington. 98115	http://www.afsc.noaa.gov/FMA/Manual_pages/MANUAL_pdfs/manual2013.pdf
AFSC. 2014. Economic and Social Sciences Research Program Webpage. Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce; 7600 Sand Point Way. N.E. Seattle. Washington. 98115	http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php
AFSC. 2014. Economic and Social Sciences Research Program Webpage. Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce; 7600 Sand Point Way. N.E. Seattle. Washington. 98115	http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php
ALASKA JOURNAL OF COMMERCE. 2013. Spring test set for Gulf salmon excluders. Alaska Journal of Commerce 301 Arctic Slope Ave., Suite 350 Anchorage, AK 99518	http://www.alaskajournal.com/Alaska-Journal-of-Commerce/Contact-Us/
Alaska State Legislature. 2014. Alaska Statutes Title 16 (laws); Alaska Administrative Code Title 5 (regulations)	http://www.legis.state.ak.us/basis/aac.asp#TitleTable
AMSEA. 2014. ALASKA MARINE SAFETY EDUCATION ASSOCIATION HOMEPAGE. 2924 Halibut Point Road ~ Sitka, AK 99835	http://www.amsea.org/#!Happy-Holidays-from-AMSEA/ck6b/4B5EA797-4DF1-4BF1-A4C5-AFBF93E438F7
ASMI. 2012. Marine Protected Areas Brochure. Alaska Seafood Marketing Institute. Seattle WA, U.S.A.	http://ebooks.alaskaseafood.org/marine_protected_areas_brochure/

AVTEC. 2014. Alaska Maritime Training Center. AVTEC - Alaska's Institute of Technology; Department of Labor and Workforce Development Seward Campus: P.O. Box 889 ~ 809 2nd Avenue ~ Seward, Alaska 99664	http://www.avtec.edu/amtc-cost.aspx
AWT. 2014. Division of Alaska Wildlife Troopers Mission. 5700 E Tudor Road, Anchorage, AK 99507.	http://dps.alaska.gov/AWT/mission.aspx
AWT. 2014. Marine Enforcement Section webpage. 5700 E Tudor Road, Anchorage, AK 99507	http://dps.alaska.gov/awt/Marine.aspx
Barbeaux, S., J. Ianelli, W. Palsson. 2013. Aleutian Islands walleye pollock SAFE. In: Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions. North Pac. Fish. Mgmt. Council, P.O. Box 103136, Anchorage, AK 99510., Section 1A	http://www.afsc.noaa.gov/REFM/Docs/2013/AIpollock.pdf
Barbeaux, S., J. Ianelli, W. Palsson. 2014. Aleutian Islands walleye pollock SAFE. In: Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions. North Pac. Fish. Mgmt. Council, P.O. Box 103136, Anchorage, AK 99510., Section 1A	http://www.afsc.noaa.gov/REFM/Docs/2014/AIpollock.pdf
DNR. 2014. Flowchart Cook Inlet Offshore Oil & Gas Exploration Permit Application & Approval Process. Department of Natural Resources, 550 W. 7th Ave, Suite 1260, Anchorage, AK 99501-3557. Accessed Nov 2014.	http://dog.dnr.alaska.gov/Permitting/Documents/Arcadis/Arcadis_Flowchart_CookInletOffshore_Draft.pdf
DNR. 2014. Homepage. Department of Natural Resources, 550 W. 7th Ave, Suite 1260, Anchorage, AK 99501-3557. Accessed Nov 2014.	http://dnr.alaska.gov/
Dorn M., Aydin K., Jones D., Palsson W. and Spalinger K. 2013. Assessment of the walleye pollock stock in the Gulf of Alaska. In Stock Assessment and Fishery Evaluation Report for Groundfish Resources of the Gulf of Alaska. North Pacific Fishery Management Council, P.O. Box 103136, Anchorage, AK 99510. North Pacific Fisheries Management Council, Anchorage, AK.	http://www.afsc.noaa.gov/REFM/Docs/2013/GOApollock.pdf
Dorn M., Aydin K., Jones D., Palsson W. and Spalinger K. 2014. Assessment of the walleye pollock stock in the Gulf of Alaska. In Stock Assessment and Fishery Evaluation Report for Groundfish Resources of the Gulf of Alaska. North Pacific Fishery Management Council, P.O. Box 103136, Anchorage, AK 99510. North Pacific Fisheries Management Council, Anchorage, AK.	http://www.afsc.noaa.gov/REFM/Docs/2014/GOApollock.pdf
Enforcement Programs and Operations. National Marine Fisheries Service, Alaska Region; National Oceanic and Atmospheric Administration.	http://www.nmfs.noaa.gov/sfa/reg_svcs/Councils/ccc_2011/Tab%20L%20-%20Enforcement%20Issues/Enforcement%20Issues.pdf
FATE. 2014. Alaska Marine Ecosystem Considerations Home.	http://access.afsc.noaa.gov/reem/ecoweb/

Fissel et al. 2014. STOCK ASSESSMENT AND FISHERY EVALUATION REPORT FOR THE GROUNDFISH FISHERIES OF THE GULF OF ALASKA AND BERING SEA/ALEUTIAN ISLANDS AREA: ECONOMIC STATUS OF THE GROUNDFISH FISHERIES OFF ALASKA, 2013. Economic and Social Sciences Research Program Resource Ecology and Fisheries Management Division Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration; 7600 Sand Point Way N.E. Seattle, Washington 98115-6349	http://www.afsc.noaa.gov/refm/docs/2013/economic.pdf
Himes-Cornell, A., C. Package, and A. Durland. 2011. Improving community profiles for the North Pacific fisheries. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-230, 85 p.	http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf
Honkalehto, T., P. H. Ressler, S. C. Stienessen, Z. Berkowitz, R. H. Towler, A. L. McCarthy, and R. R. Lauth. 2014. Acoustic Vessel-of-Opportunity (AVO) index for midwater Bering Sea walleye pollock, 2012-2013. AFSC Processed Rep. 2014-04, 19 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115.	http://www.afsc.noaa.gov/publications/procrpt/pr2014-04.pdf
Ianelli, J. N., Barbeaux S. J., McKelvey D. and Honkalehto T. 2013. 1.B. Assessment of walleye pollock in the Bogoslof Island Region. In: Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions. North Pac. Fish. Mgmt. Council, Anchorage, AK	http://www.afsc.noaa.gov/REFM/Docs/2013/BOGpollock.pdf
Ianelli, J. N., Barbeaux S. J., McKelvey D. and Honkalehto T. 2014. 1.B. Assessment of walleye pollock in the Bogoslof Island Region. In: Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions. North Pac. Fish. Mgmt. Council, Anchorage, AK	http://www.afsc.noaa.gov/REFM/Docs/2014/BOGpollock.pdf
Ianelli, J.N., T. Honkalehto, S. Barbeaux, S. Kotwicki, K. Aydin, and N. Williamson, 2013. Assessment of the walleye pollock stock in the Eastern Bering Sea. In Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions for 2013. North Pacific Fishery Management Council, Anchorage, AK.	http://www.afsc.noaa.gov/REFM/docs/2013/EBSpollock.pdf
Ianelli, J.N., T. Honkalehto, S. Barbeaux, S. Kotwicki, K. Aydin, and N. Williamson, 2014. Assessment of the walleye pollock stock in the Eastern Bering Sea. In Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions for 2014. North Pacific Fishery Management Council, Anchorage, AK.	http://www.afsc.noaa.gov/REFM/Docs/2014/EBSpollock.pdf
Livingston P., Thompson G., Turnock J., Aydin K., Conners L., Spencer P., and Ormseth O. 2013. Designing and Implementing Annual Catch Limits for North Pacific Groundfish and Crab Stocks. Alaska Fisheries Science Center, National Marine Fisheries Service National Oceanic and Atmospheric Administration, Department of Commerce 7600 Sand Point Way N.E., Building 4 Seattle, Washington 98115	http://access.afsc.noaa.gov/pubs/posters/pdfs/pLivingston02_gf-crab-catch-limits.pdf

Loefflad, M. R., F. R. Wallace, J. Mondragon, J. Watson, and G. A. Harrington. 2014. Strategic plan for electronic monitoring and electronic reporting in the North Pacific. U.S. Dep. Commer., NOAA Mech. Memo. NMFS-AFSC-276, 52 p.	http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-276.pdf
MAP. 2014. Marine Advisory Program, Fisheries. Alaska Sea Grant College Program, PO Box 755040, Fairbanks, Alaska, 99775-5040	http://seagrant.uaf.edu/map/fisheries/
NMFS (National Marine Fisheries Service). 2014. North Pacific Groundfish and Halibut Observer Program 2013 Annual Report. National Oceanic and Atmospheric Administration, 709 West 9th Street. Juneau, Alaska 99802.	http://alaskafisheries.noaa.gov/sustainablefisheries/observers/annualrpt2013.pdf
NMFS. 1996. Magnuson-Stevens Fishery Conservation and Management Act. Public Law 94-265, As amended through October 11, 1996. NOAA's National Marine Fisheries Service; 1315 East-West Highway Silver Spring, MD 20910	http://www.nmfs.noaa.gov/sfa/magact/
NMFS. 2014. Bering Sea Aleutian Islands Catch Report (includes CDQ) Through: 27-DEC-2014, Alaska Region, Sustainable Fisheries Catch Accounting. NOAA's National Marine Fisheries Service , 709 West 9th Street. Juneau, Alaska 99802.	http://alaskafisheries.noaa.gov/2014/car110_bsai_with_cdq.pdf
NMFS. 2014. Chinook Salmon Bycatch Management. Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce; 7600 Sand Point Way. N.E. Seattle. Washington. 98115	http://alaskafisheries.noaa.gov/sustainablefisheries/bycatch/default.htm
NMFS. 2014. Fisheries Home; Law Enforcement. PO Box 21767 709 W. 9th Street, Room M09C Juneau, AK 99802-1767	http://www.nmfs.noaa.gov/ole/index.html
NMFS. 2014. Gulf of Alaska Catch Report Through: 27-DEC-2014, Alaska Region, Sustainable Fisheries Catch Accounting. NOAA's National Marine Fisheries Service , 709 West 9th Street. Juneau, Alaska 99802.	http://alaskafisheries.noaa.gov/2014/car110_goa.pdf
NMFS. 2014. NOAA Fisheries Alaska Federal Fisheries Management - Sustainable Fisheries Division Homepage. National Marine Fisheries Service Alaska Regional Office PO Box 21668 Juneau, Alaska 99802-1668	http://alaskafisheries.noaa.gov/sustainablefisheries/default.htm
NMFS. 2014. Section 7 Consultation Biological Opinion – Authorization of Alaska groundfish fisheries under the Proposed Revised Steller Sea Lion Protection Measures, April 2014. National Marine Fisheries Service Alaska Regional Office PO Box 21668; Juneau, Alaska 99802-1668	http://alaskafisheries.noaa.gov/newsreleases/2014/ssl040214.htm
NOAA Fisheries. 2014. Enforcement Actions Weekly Highlights— November 22, 2014. National Marine Fisheries Service, Alaska Region; National Oceanic and Atmospheric Administration.	http://www.nmfs.noaa.gov/aboutus/contactus.html
NOAA Fisheries. 2014. NEWS RELEASE April 2, 2014. NOAA Fisheries concludes 'no jeopardy' to Steller sea lions from proposed fishery management changes in the Aleutian Islands. Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce; 7600 Sand Point Way. N.E. Seattle. Washington. 98115	http://alaskafisheries.noaa.gov/newsreleases/2014/ssl040214.htm

NOAA. 2011. Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions; NOAA Office of the General Counsel – Enforcement Section. National Marine Fisheries Service, Alaska Region; National Oceanic and Atmospheric Administration. 7600 Sand Point Way. N.E. Seattle. Washington. 98115	http://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf
NOAA. 2013. Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Mutual Fisheries Relations. NOAA's National Marine Fisheries Service; 1315 East-West Highway Silver Spring, MD 20910	http://www.nmfs.noaa.gov/ia/slider_stories/2013/04/agreement.pdf
NOAA. 2013. Agreement Between the Government of the United States of America and the Government of the Union Of Soviet Socialist Republics on Mutual Fisheries Relations (Basic Instrument For The U.S.-Russia Intergovernmental Consultative Committee -- ICC). NOAA's National Marine Fisheries Service; 1315 East-West Highway Silver Spring, MD 20910	http://www.nmfs.noaa.gov/ia/bilateral/docs/US-Russia_ICC_IA_Book.pdf
NOAA. 2013. Fisheries Home, International Affairs, Strengthening U.S.-Russia Cooperation on Fisheries. NOAA's National Marine Fisheries Service; 1315 East-West Highway Silver Spring, MD 20910	http://www.nmfs.noaa.gov/ia/slider_stories/2013/04/us_russia.html
NOAA. 2013. NOAA's Office of Law Enforcement; Division Enforcement Priorities for 2013. National Marine Fisheries Service, Alaska Region; National Oceanic and Atmospheric Administration.	http://www.nmfs.noaa.gov/ole/docs/2013/ole-division-priorities-2013-final.pdf
NOAA. 2014. Federal Register. 50 CFR Part 679 Fisheries of the Exclusive Economic Zone Off Alaska; Gulf of Alaska; Final 2014 and 2015 Harvest Specifications for Groundfish; Final Rule. Department of Commerce. U.S.A.	http://alaskafisheries.noaa.gov/frules/79fr12890.pdf
NOAA. 2014. NOAA Office of the General Counsel, Enforcement Section Enforcement Actions July 1, 2013, through December 31, 2013. National Marine Fisheries Service, Alaska Region; National Oceanic and Atmospheric Administration.	http://www.gc.noaa.gov/documents/2013/enforce_Feb_020122014.pdf
NOAA. 2014. NOAA's Office of General Counsel; Penalty Policy and Schedules. Alaska Settlement Schedules. NOAA Office of General Counsel	http://www.gc.noaa.gov/enforce-office3.html
NOAA. 2014. Welcome to the Office of Science and Technology. National Marine Fisheries Service, Alaska Region; National Oceanic and Atmospheric Administration.	http://www.st.nmfs.noaa.gov/
NPFMC. 2014. Bering Sea Canyons. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/bering-sea-canyons/
NPFMC. 2014. Bering Sea Chinook Salmon Bycatch. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chinook-salmon-bycatch/
NPFMC. 2014. Bering Sea Chum Salmon Bycatch. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chum-salmon-bycatch/

NPFMC. 2014. C-5 Bering Sea Salmon Bycatch Council motion – June 7, 2014. North Pacific Fishery Management Council, P.O. Box 103136, Anchorage, AK 99510. North Pacific Fisheries Management Council, Anchorage, AK.	http://www.npfmc.org/salmon-bycatch-overview/bering-sea-chinook-salmon-bycatch/
NPFMC. 2014. C9 Bering Sea Canyons Motion – North Pacific Fishery Management Council April 13, 2014. North Pacific Fishery Management Council, P.O. Box 103136, Anchorage, AK 99510. North Pacific Fisheries Management Council, Anchorage, AK.	http://www.npfmc.org/bering-sea-canyons/
NPFMC. 2014. Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
NPFMC. 2014. Fishery Management Plan for Groundfish of the Gulf of Alaska Management Area. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf
NPFMC. 2014. Gulf of Alaska Salmon Bycatch. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/salmon-bycatch-overview/gulf-of-alaska-salmon-bycatch/
NPFMC. 2014. Homepage. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/
NPFMC. 2014. Observer Program page. C1 Observer ADP Council Motion – FINAL 10/9/14. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.npfmc.org/observer-program/
NPFMC. 2014. STOCK ASSESSMENT AND FISHERY EVALUATION REPORT FOR THE GROUNDFISH RESOURCES OF THE BERING SEA/ALEUTIAN ISLANDS REGIONS BSAI INTRO December 2014. North Pacific Fishery Management Council. 605 West 4th, Suite 306, Anchorage, Alaska 99501-2252.	http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIintro.pdf
NPFVOA. 2014. NPFVOA Vessel Safety Program. North Pacific Fishing Vessel Owners' Association 1900 West Emerson, Suite 101 Seattle, WA 98119	http://npfvoa.org/
NPRB. 2014. Bering Sea Project Findings. 1007 W 3rd Avenue, Suite 100 Anchorage, Alaska 99501	http://www.nprb.org/bering-sea-project/detailed-results-findings/
NPRB. 2014. Gulf of Alaska Project Findings. 1007 W 3rd Avenue, Suite 100 Anchorage, Alaska 99501	http://www.nprb.org/gulf-of-alaska-project/detailed-results-findings/
OPMP. 2014. Alaska National Interest Lands Conservation Act (ANILCA) Homepage. Office of Project Management and Permitting; 550 West 7th Avenue, Suite 1430; Anchorage, AK 99501-3579.	http://dnr.alaska.gov/commis/opmp/anilca/#
OPMP. 2014. Alaska National Interest Lands Conservation Act (ANILCA) Homepage. Office of Project Management and Permitting; 550 West 7th Avenue, Suite 1430; Anchorage, AK 99501-3579.	http://dnr.alaska.gov/commis/opmp/anilca/#

OPMP. 2014. OPMP Homepage. Office of Project Management and Permitting; 550 West 7th Avenue, Suite 1430; Anchorage, AK 99501-3579.	http://dnr.alaska.gov/commis/opmp/
S. Zador (Ed.).2014. Ecosystem Considerations for 2013. Appendix C of the BSAI/GOA Stock Assessment and Fishery Evaluation Report. Technical report, North Pacific Fishery Management Council, 605 W. 4th Ave., Suite 306, Anchorage, AK 99501.	http://www.afsc.noaa.gov/REFM/Docs/2013/ecosystem.pdf
SEAGRANT. 2014. Alaska Young Fishermen's Summit. Marine Advisory Program main office 1007 West 3rd Ave, Suite 100; Anchorage, AK 99501.	https://seagrant.uaf.edu/map/workshops/2013/ayfs/
State of Alaska. Title 5 . Fish and Game Chapter 28. Transportation, Possession and Release of Live Fish; Aquatic Farming Section 263. Prince William Sound Pollock Pelagic Trawl Management Plan. Made available by Touch N' Go Systems, Inc., and the Law Offices of James B. Gottstein	http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section263.htm
Title 5 . Fish and Game. Chapter 28 . Transportation, Possession and Release of Live Fish; Aquatic Farming; Section 89. 5 AAC 28.089. Guiding principles for groundfish fishery regulations	http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section089.htm
Undercurrentnews. 2014. American Seafoods agrees to $1.75m settlement in NOAA flow scale cases. Undercurrent News Limited, E1 Business Centre, Unit 204, 7 Whitechapel Road, London E1 1DU, UK	http://www.undercurrentnews.com/2014/10/14/american-seafoods-agrees-to-1-75m-settlement-in-noaa-flow-scale-cases/
USCG. 2013. 2013 End of Year report to the NPFMC. United States Coast Guard.	http://www.npfmc.org/summary-reports/
USCG. 2014. USCG District 17 Homepage. United States Coast Guard. US COAST GUARD 2703 MARTIN LUTHER KING JR AVE SE WASHINGTON DC 20593-7000.	http://www.uscg.mil/d17/
USFWS. 2014. Homepage. U.S. Fish and Wildlife Service. Accessed Nov 2014.	http://www.fws.gov/help/about_us.html
Wessel, M., J. Rumble, K.J. Goldman, E.Russ, M.Byerly, and C. Russ. 2014. Prince William Sound Registration Area E groundfish fisheries management report, 2009-2013. Alaska Department of Fish and Game, Fishery Management Report No. 14-42, Anchorage.	http://www.adfg.alaska.gov/fedaidpdfs/FMR14-42.pdf
Woodby, D., D. Carlile, S. Siddeek, F. Funk, J. H. Clark, and L. Hulbert. 2005. Commercial Fisheries of Alaska. Alaska Department of Fish and Game, Special Publication No. 05-09, Anchorage.	http://www.adfg.alaska.gov/FedAidPDFs/sp05-09.pdf

Appendix 1

Assessment Team Details

Jeff Fargo, Assessor

Jeff Fargo holds a BSc from Simon Fraser University in British Columbia, Canada. He worked as a research biologist for Fisheries and Oceans Canada at the Pacific Biological Station in Nanaimo, Canada from 1978 until his retirement in 2011. He was head of the Groundfish Research Section from 2001 until his retirement. During that tenure he was responsible for directing research and stock assessment activities for groundfish species in the Pacific Region and management of the Section budget and program organization. He was editor of the Canadian Stock Assessment Secretariat Annual Groundfish Stock Assessment Document for 10 years and has over 70 publications dealing with flatfish and groundfish research and stock assessment. He has presented his research results at International Symposia and collaborated with research scientists in Europe and North America.

Dr. Geraldine Criquet, Assessor

Géraldine Criquet holds a PhD in Marine Ecology (École Pratique des Hautes Études, France) which focused on coral reef fisheries management, Marine Protected Areas and fish ecology. She has also been involved during 2 years in stock assessments of pelagic resources in the Biscay Gulf, collaborating with IFREMER. She worked 2 years for the Institut de Recherche pour le Développement (IRD) at Reunion Island for studying fish target species growth and connectivity between fish populations in the Indian Ocean using otolith analysis. She served as Consultant for FAO on a Mediterranean Fisheries Program (COPEMED) and developed and implemented during 2 years a monitoring program of catches and fishing effort in the Marine Natural Reserve of Cerbère-Banyuls (France). Geraldine has joined Global trust Certification in August 2012 as Fisheries Assessment Officer and is involved in FAO RFM and MSC fisheries assessments.

Vito Ciccia Romito, Lead Assessor

Vito Ciccia Romito holds a BSc in Ecology and an MSc in Tropical Coastal Management (Newcastle University, United Kingdom). His BSc studies focused on bycatch, discards, benthic impact of commercial fishing gear and relative technical solutions, after which he spent a year in Tanzania as a Marine Research officer at Mafia Island Marine Park carrying out biodiversity assessments and monitoring studies of coral reef, mangrove and seagrass ecosystems. Subsequently, for his MSc, he 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. Since 2010, 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, cod and flatfish fisheries as well as the Icelandic cod, saithe, haddock and redfish fisheries. Vito is also a lead, third party IRCA approved auditor.