



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

For The

Alaska Pacific Cod Commercial Fisheries (200 mile EEZ)

Applicant Group

Alaska Seafood Marketing Institute (ASMI)

April 2013

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I. Summary and Recommendations

Summary

The Alaska Seafood Marketing Institute (ASMI), on behalf of the Alaska Pacific cod commercial fisheries, has requested its assessment to the requirements of the United Nations Food and Agriculture Organisation (FAO) Code of Conduct for Responsible Fisheries (CCRF, 1995) based Responsible Fisheries Management (RFM) Certification Program.

The ASMI application was made in April 2010. After Validation Assessment was completed in March 2012, a full Assessment Team was formed to undertake the assessment and final certification determination was given on the 17th April 2013.

Alaska Pacific cod (*Gadus macrocephalus*) is the species of focus in this Assessment and Certification Report. The Pacific cod commercial fisheries employ bottom trawl gear, longline gear, pot gear and jig gear within Alaska jurisdiction (200 nautical miles EEZ) and are 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 FAO CCRF was presented to an ISO 65/EN45011 accredited Certification Body, Global Trust Certification, to be used as the Standard for the assessment of Alaska Fisheries. The conformance reference points from the published FAO CCRF (now referred to as Standard) were converted into the audit checklist criteria [FAO-Based RFM Conformance Criteria (Version 1.2, Sept 2011)] by the ISO 65/EN45011 Certification Body to ensure audit ability and feasibility for accreditation.

The FAO CCRF was initiated in 1991 by the FAO Committee on Fisheries and unanimously adopted on 31 October 1995 by the over 170 member Governments of the FAO Conference. The audit checklist criteria were cross-referenced back to the FAO CCRF Clauses. A further FAO document, the Guidelines on Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries (FAO 2005) was used to help contextualize and add clarity to the audit criteria. In addition the fishery minimum substantive requirements of the Ecolabelling guidelines were fully integrated in the conformance criteria. The FAO CCRF, Ecolabelling Guidelines and the FAO-Based RFM Conformance Criteria were submitted to a National Accreditation Board of the International Accreditation Forum for further cross reference and ISO 65/EN45011 accreditation validity.

This Full Assessment Report should be read in conjunction with the Certification Summary attached in Appendix 3 of this document.

The assessment was conducted according to the Global Trust procedures for FAO-Based RFM Certification using the FAO-Based Conformance Criteria (Version 1.2, September 2011). Whilst the FAO CCRF contains Articles with various focuses (e.g. post landing requirements, aquaculture), the core of the FAO-Based Conformance Criteria requirements focus on responsible fisheries management, including enhancement practices (but excluding full cycle aquaculture), up to the point of landing, with the main objective being the biological sustainability of the “stock under consideration”, with consideration for conservation, biodiversity and ecosystem integrity; and due regard to social responsibility and the economic viability of the fishery.

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

- 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**

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

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

Recommendations

Recommendation of the Assessment Team

The Assessment Team recommend that the management system of the applicant fishery, the U.S. Alaska Pacific cod commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fishery with bottom trawl gear, longline gear, pot gear and jig gear, within Alaska's 200 nm EEZ, is certified against the FAO-Based Responsible Fisheries Management Certification Program.

Peer Reviewer A's main summary and recommendation states:

The information presented in sections 1, 2 and 3 of the report provide sufficient information to support a broad understanding of the Pacific cod biology, stock structure and dynamics, stock assessment activities, fishing history and methods, main management entities and management systems in use by the Federal and State fisheries in Alaska. Both BSAI and GOA fisheries are managed under a structured and legally mandated system based upon and respecting International, National and local fishery laws. Management organizations participate in coastal area management and decision-making processes in support of sustainable use of living marine resources and the avoidance of conflict among users. The long-term management objectives for Alaska Pacific cod fisheries are explicitly translated into Fishery Management Plans (separate for the GOA and the BSAI) under the Magnuson Fishery Conservation Act and the Sustainable Fishery Act. Stocks of this species are successfully managed using effective data analysis system, which is based on information from commercial landings and transshipment reports, port and at-sea data collection by observers and data from fishery independent surveys. This information is obtained following the data collection program, which is probably one of the most extensive in the world. Stock assessment activities are appropriate and regular. Fishing's effects on the stocks and habitats of the Pacific cod in the BSAI and the GOA do not have impaired stocks' ability to sustain themselves at the MSY level. The fishery management plans define a series of target and limit reference points for Pacific cod and other groundfish that provide the framework to manage the fishable resources. These reference points are very conservative therefore making it highly unlikely that stocks will be fished beyond maximum production potential. Management actions and measures for the conservation of the Pacific cod stocks are based on the precautionary approach. The harvest control rules (OFL, ABC and respective mortality rates) become progressively precautionary with decreased available information, and catch options are automatically adjusted depending on the status of stocks and following a six-stage tier structure. These actions and measures are based upon verifiable evidence and advice from available scientific sources. Management measures, designed to maintain stocks at levels capable of producing maximum sustainable levels, are well defined. Fishing operations are to be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations. An effective legal and administrative framework is established and compliance ensured, through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction. Applicable sanctions for violations and illegal activities are of adequate severity to support compliance. Considerations on the Pacific cod fishery effects on the ecosystems of BSAI and GOA are based on best available science

and on a risk based management approach for determining most probable adverse impacts, which are appropriately assessed and effectively addressed.

I entirely support all the report scores of particular Clauses, apart from Clause 1.2, which on my opinion, can be also scored with high level of confidence in the evidence adequacy. Because of the aforesaid I recommend that all fisheries contained in the report (Federal and State) identified and operating in US Bering Sea and Gulf of Alaska with all described gear types are suitable for certification under the FAO Based RFM programme.

Peer Reviewer B's main summary and recommendation states:

While there is abundant evidence that the Alaska region Pacific cod fisheries are managed responsibly, the assessment report is not well written. Many sections of the report address general aspects of management and assessment of the groundfish fisheries off Alaska as a whole without specific focus on the Pacific cod fishery. In addition, some sections of the report fail to address the clauses they purport to address and in other instances, the assessment report fails to present evidence to support claims about performance with respect to clauses. The assessment report should do a better job of documenting exploitation rates for Pacific cod in the GOA, EBS, and AI and documenting that these exploitation rates are conservative in comparison to exploitation rates on other gadid stocks. The assessment report should describe the results of Management Strategy Evaluations of the Pacific cod fisheries and CIE reviews of the Pacific cod stock assessment models and what those results mean for assessment of the biological sustainability of the fishery.

This is a well-managed fishery but it is far from perfect. The assessment will be more credible if it is forthright in recognition of shortcomings of this fishery with respect to the assessment criteria. Basic shortcomings include the fact that the AI stock is distinct from the EBS stock but current management treats these two stocks as though they were a single stock. One consequence is that the AI stock has likely fallen below the B_{msy} proxy. This is undesirable from the perspective of the NPFMC's harvest control rules, but this also highlights how conservative those control rules are. A second clear shortcoming is that limited entry in the federal fishery has not eliminated excess capacity and entry is not limited in the State fishery. This suggests that the excess capacity will only get worse over time. A third shortcoming is that the GOA multispecies trawl fishery engages in topping-off on high-value bycatch species and discards additional catches of those species once the Maximum Retainable Allowance has been reached. A fourth shortcoming of the Pacific cod fisheries is that there has been very little research on the social or economic dimensions of these fisheries and communities that serve as bases of operation for the fishing vessels, their owners, and crew and the processing operations that handle the catches. While I would not care to minimize the undesirability of these shortcomings, I doubt that they will jeopardize a conclusion that this is a responsibly managed fishery.

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

Determination: The appointed members of the Global Trust Certification Committee met on April 17th 2013. After a detailed discussion, the Committee determined that the applicant fishery, the US Alaska Pacific cod commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fishery with bottom trawl gear, longline gear, pot gear and jig gear within Alaska's 200 nm EEZ, is certified against the FAO-Based Responsible Fisheries Management Certification Program.

II. Schedule of Key Assessment Activities

Assessment Activities	Date (s)
Application Date	April 2010
Initial Site Visit Consultation Meetings	June –July 2010
Initial Validation Assessment Report	March 2012
Appointment of Full Assessment Team	August 2012
On-site Witnessed Assessment and Consultation Meetings	September 2012
Draft Assessment Report	November-December 2012
External Peer Review	December-January 2012
Final Assessment Report	April 2013
Certification Review/Decision	17 th April 2013

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IV. Acronyms

ABC	Allowable Biological Catch
ACL	Annual Catch Limit
ADFG	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
AI	Aleutian Islands
AP	Advisory Panel
ASMI	Alaska Seafood Marketing Institute
AWT	Alaska Wildlife Troopers
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CAS	Catch Accounting System
CCRF	Code of Conduct for Responsible Fisheries
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
CIE	Center of Independent Expert
CPUE	Catch per Unit Effort
EBS	Eastern Bering Sea
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
FMA	Fisheries Monitoring and Analysis Division
FMP	Fishery Management Plan
GOA	Gulf of Alaska
GHL	Guideline Harvest Level
GHR	Guideline Harvest Range
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
IRFA	Initial Regulatory Flexibility Analysis
IR/IU	Improved Retention/Improved Utilization
LLP	License Limitation Program
MSA	Magnuson-Stevens Fisheries Management and Conservation Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
mt	Metric tons
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
NPRB	North Pacific Research Board
OFL	Overfishing Level
OLE	Office for Law Enforcement
OY	Optimum Yield
PA	Precautionary Approach

PSC	Prohibited Species Catch
RACE	Resource Assessment and Conservation Engineering
RAM	Restricted Access Management
REFM	Resource Ecology and Fisheries Management
RFM	Responsible Fisheries Management
RFA	Regulatory Flexibility Act
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

1. Introduction

The US Alaska Pacific cod commercial fisheries, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished with bottom trawl, longline, pot and jig gear, within Alaska's 200 nm EEZ, were assessed against the requirements of the FAO-Based RFM Conformance Criteria Version 1.2. The application was made by the Alaska Seafood Marketing Institute (ASMI) on behalf of Alaska Pacific cod commercial fisheries and participants, and was validated by Global Trust Certification Ltd.

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

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

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

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

These six major components are supported by 13 fundamental clauses which in turn are sustained by 122 sub-clauses. Collectively, these form the FAO-Based Conformance Criteria Version 1.2 against which a capture fishery applying for RFM assessment and certification is assessed.

The assessment comprised of application review, validation reporting, assessment planning, assessment and verification reporting, Peer Review and Certification Committee review and decision. Two site visits were made to the fishery during the assessment.

A summary of the consultation meetings is presented in [Section 5](#). Assessors comprised of both externally contracted fishery experts and Global Trust internal staff ([Appendix 1](#)). Peer Reviewers comprised of externally contracted fisheries experts ([Appendix 2](#)).

This report documents each step in the assessment process and the recommendation to the Certification Committee of Global Trust who presided over the certification decision, the 17th April 2013, according to the requirements of ISO/IEC Guide 65 accredited certification.

1.1 Recommendations of the Assessment Team

Recommendation of the Assessment Team

The Assessment Team recommend that the management system of the applicant fishery, US Alaska Pacific cod commercial fishery, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fishery with bottom trawl gear, longline gear, pot gear, jig gear within Alaska's 200 nm EEZ, is certified against the FAO-Based Responsible Fisheries Management Certification Program.

2. Fishery Applicant Details

Applicant Contact Information			
Organization/ Company Name:	Alaska Seafood Marketing Institute	Date:	April 2010
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Country:	USA		
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3. Background to the fishery

3.1. Species Biology

General description

Gadus macrocephalus (Tilesius, 1810), known as Pacific cod or grey cod and member of the Gadidae is moderately fast growing and relatively short-lived fish, with a maximum age of approximately 18 years, maximum length and weight of 147 cm and 25 kg for females and 141 cm and 20 kg for males. The head is relatively broad with an interorbital space between 18 to 25% of head length. The predorsal distance is more than about 33% of length and the anterior part of swimbladder presents 2 relatively short, horn-like extensions. The Pacific cod is dorsally brown to grey with spots or vermiculations, and ventrally paler.

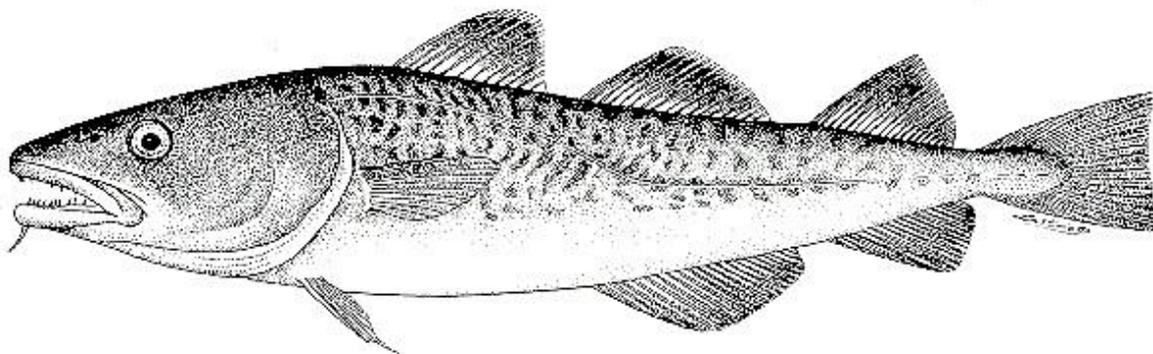


Figure 1. Pacific cod (*Gadus macrocephalus*), Cohen *et al* 1990 (FAO)

<http://www.fao.org/fishery/species/3011/en>

http://www.afsc.noaa.gov/Education/factsheets/10_Pcod_fs.pdf

Growth and Reproduction

Females reach 50% maturity at 4.4 years in the Gulf of Alaska and 4.9 years in the eastern Bering Sea (Stark, 2007). Total body length at 50% maturity was significantly smaller (503 mm) in the Gulf of Alaska (GOA) than in the eastern Bering Sea (580 mm). Similarly, Pacific cod females grow significantly faster in the Bering Sea (BS) than in the Gulf of Alaska. Males reach a smaller maximum length in the Gulf of Alaska than females; in contrast, Bering Sea males reach a similar maximum length as females.

Adults form spawning aggregations from January to May in the Bering Sea and Aleutian Islands (BSAI), where natural mortality is estimated at $M=0.34$, and where Pacific cod begin to recruit to the fisheries at age 3 and are 50% recruited by ages 4-5. In the GOA, spawning aggregations also form from January to May, but natural mortality is estimated at $M=0.38$ and 50% recruitment occurs at age 7. Females reach 50% maturity at 50 cm (4-5 years) and larger fish can produce more than 1 million eggs. Pacific cod eggs are demersal and adhesive. Eggs hatch in about 15 to 20 days.

Spawning takes place in the sublittoral-bathyal zone (40 to 290 m) near the bottom. Eggs sink to the bottom after fertilization and are somewhat adhesive. Optimal temperature for incubation is 3° to 6°C, optimal salinity is 13 to 23 parts per thousand (ppt), and optimal oxygen concentration is from 2 to 3 ppm to saturation. Little is known about the optimal substrate type for egg incubation. The distribution of Pacific cod larvae, which undergo metamorphosis at about 25 to 35 mm, is also poorly understood. Larvae are epipelagic, occurring primarily in the upper 45 m of the water column shortly after hatching, moving downward in the water column as they grow.
<http://www.fishbull.noaa.gov/1053/stark.pdf>

Migrations

Although Pacific cod is not considered to be a migratory species, individual adults have been found to move more than 1,000 km (NOAA 1990, Shimada and Kimura 1994). In the northern extent of the range, there exists a seasonal bathymetric movement from deep spawning areas of the outer shelf and upper slope in fall and winter to shallow middle-upper shelf feeding grounds in the spring and early summer (Dunn and Matarese 1987, Hart 1973, NOAA 1990, Shimada and Kimura 1994, Stepanenko 1995).

Larvae may be transported by tidal current to nursery areas (Garrison and Miller 1982). Juveniles are found in polyhaline to euhaline waters, whereas adults are found in marine waters. There is some evidence to suggest that the fish move to deeper water with growth (Hart 1973, NOAA 1990), but they are not found exclusively in deeper water (Brodeur et al. 1995, Palsson 1990).

<http://www.nwfsc.noaa.gov/publications/techmemos/tm44/pacificcod.htm>

Feeding Ecology

Larval feeding is poorly understood. It is known that at about 20 mm, larvae eat copepods (Hart 1973), but it is not known what they eat between yolk absorption and this size. Juveniles and adults are carnivorous, and feed at night (Allen and Smith 1988, Palsson 1990). Young juveniles in the Bering Sea eat copepods, small shrimps and amphipods, and switch to more crabs with increased size (Tokranov and Vinnikov 1991).

Adult Pacific cod have been described as euryphages because the main part of their diet is whatever prey species is most abundant (Kihara and Shimada 1988, Klovach et al. 1995). Klovach et al. (1995) found that 20-40 cm Pacific cod in the Bering Sea eat shrimp, mysids and amphipods; 40-50 cm Pacific cod eat crabs and amphipods; 50-70 cm Pacific cod prefer mainly sandlance; and 70+ cm Pacific cod consume almost exclusively walleye pollock when available.

Larval Pacific cod are eaten by pelagic fishes and sea birds. Juveniles are eaten by larger demersal fishes, including Pacific cod. Adults are preyed upon by toothed whales, Pacific halibut, salmon shark, and larger Pacific cod (Hart 1973, Love 1991, Stepanenko 1995, NOAA 1990, Palsson 1990). The closest competitor of Pacific cod for resources is the sablefish (Allen 1982).

<http://www.nwfsc.noaa.gov/publications/techmemos/tm44/pacificcod.htm>

Habitat and Distribution

Pacific cod are schooling fish found in the Eastern Bering Sea, the Aleutian Islands, and the Gulf of Alaska down to central California. Pacific cod are also found off the east coast of Japan from Tokyo

Bay to northern Hokkaido, on the west coast of Japan in the Sea of Japan, and off the coasts of the Sakhalin and Kurile Islands (Bakkala et al. 1984, Fredin 1985).

<http://www.nwfsc.noaa.gov/publications/techmemos/tm44/pacificcod.htm>

The groundfish management plans define 'Essential Fish Habitat' (EFH) for Alaska Pacific cod to be as follows:

Eggs: No EFH description determined for BSAI as Pacific cod eggs, which are demersal, are rarely encountered during surveys in the BSAI. In the GOA, EFH for Pacific cod eggs is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200m) and upper (200 to 500m but occurrence in depths greater than 300 m is fairly rare) slope wherever there are soft substrates consisting of mud and sand, as depicted in the Figure 2.

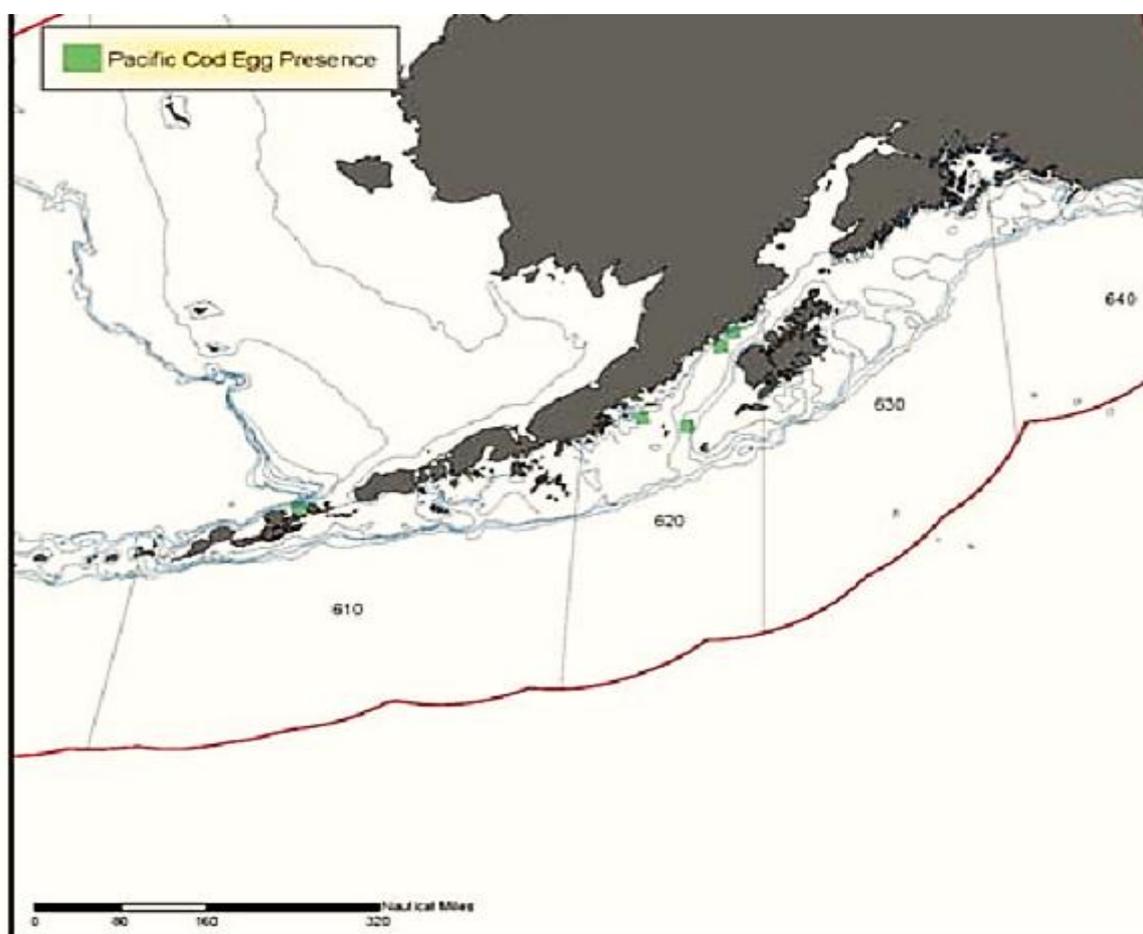


Figure 2. Map of the Pacific cod egg presence in the GOA.

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/EFH/EFH5yr_rev1209_appendix2.pdf

Larvae: EFH for larval Pacific cod in BSAI is the general distribution area for this life stage, located in epipelagic waters along the entire shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) wherever there are soft substrates consisting of mud and sand as depicted in Figure 3. In the GOA, EFH for larval Pacific cod is the general distribution area for this life stage, located in pelagic waters along the inner (0 to 50 m), and middle (50 to 100 m) shelf throughout the GOA wherever there are soft substrates consisting of mud and sand as depicted in Figure 4.

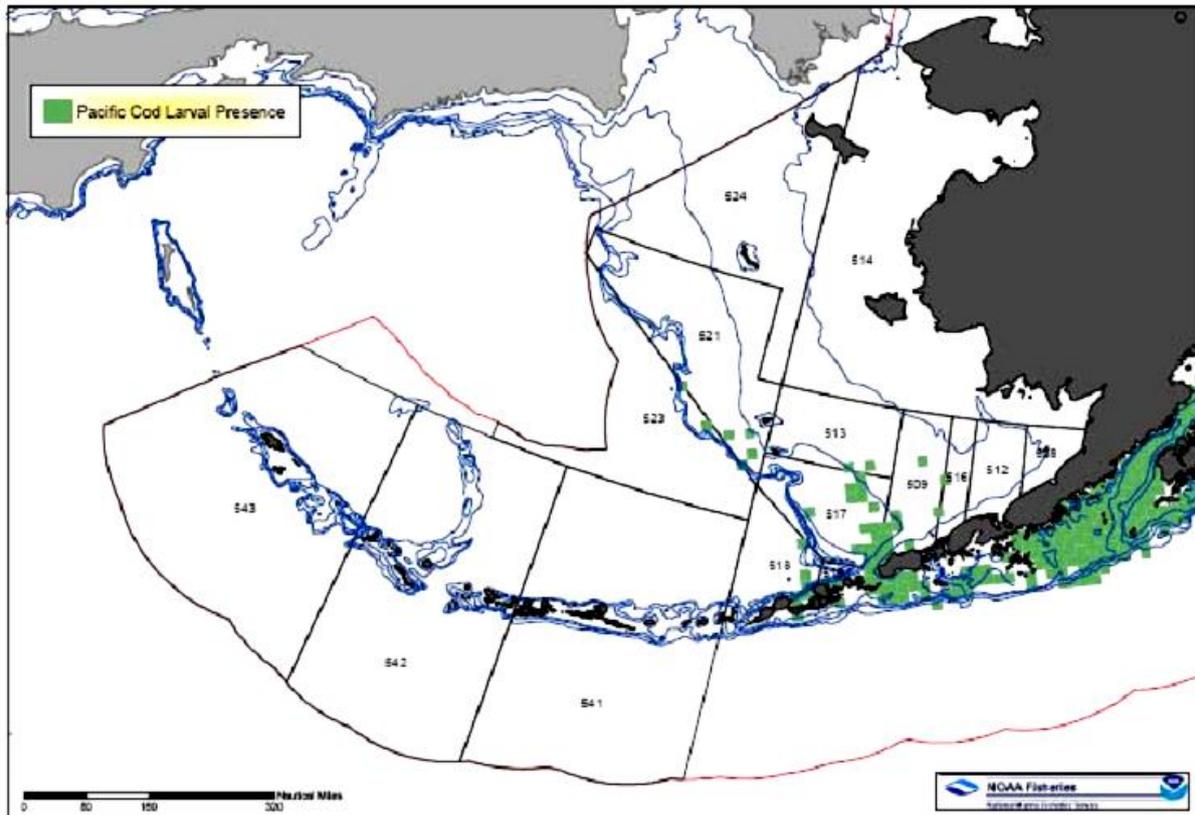


Figure 3. Map of the Pacific cod larval presence in the BSAI.

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/EFH/EFH_reviewAppendicies_210.pdf

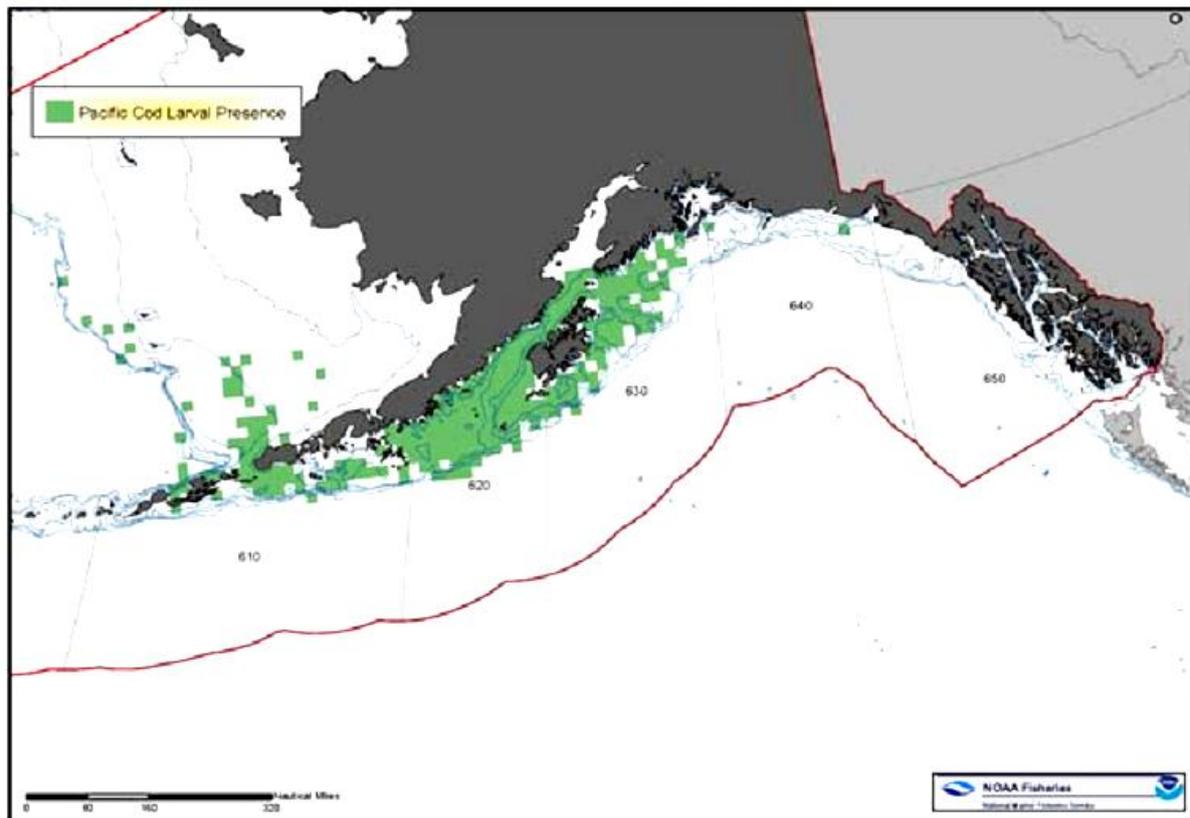


Figure 4. Map of the Pacific cod larval presence in the GOA.

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/EFH/EFH5yr_rev1209_appendix2.pdf

Early Juveniles: No EFH description determined. Insufficient information is available.

Late Juveniles: EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50m), middle (50 to 100m), and outer (100 to 200m) shelf wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand, as depicted in Figure 5 and Figure 6.

Adults: EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50m), middle (50 to 100m), and outer (100 to 200m) shelf wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel, as depicted in Figure 5 and Figure 6.

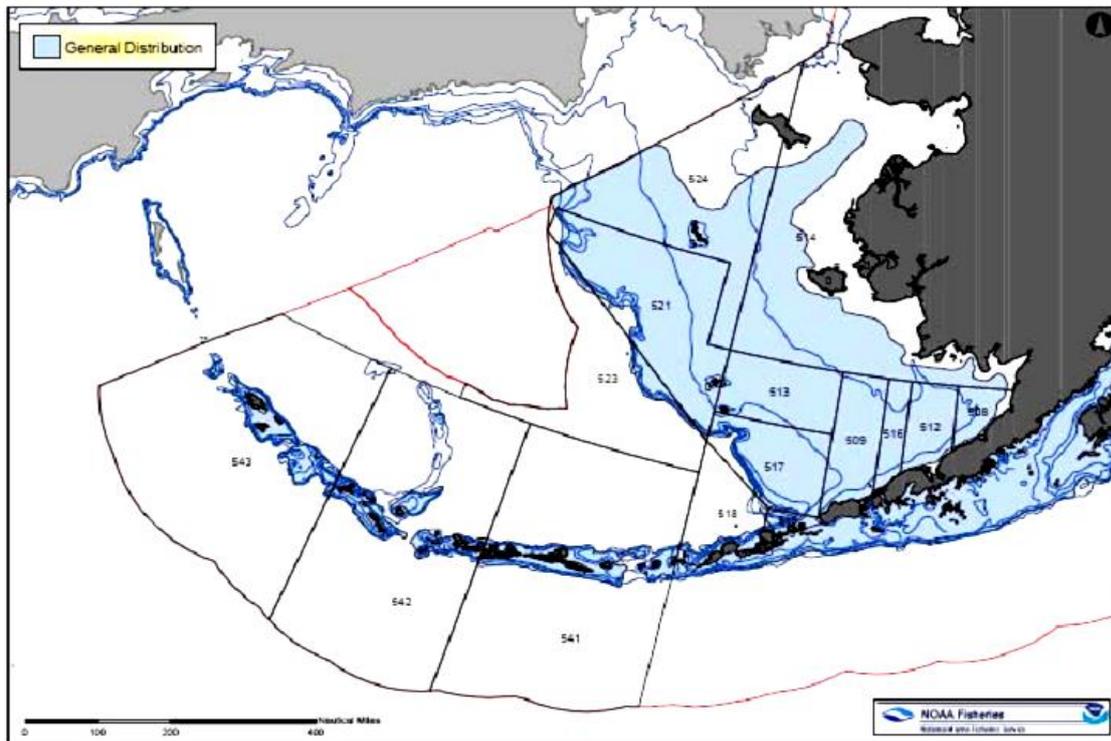


Figure 5. Map of the Pacific cod late juveniles/adult presence in the BSAI.

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/EFH/EFH_reviewAppendicies210.pdf

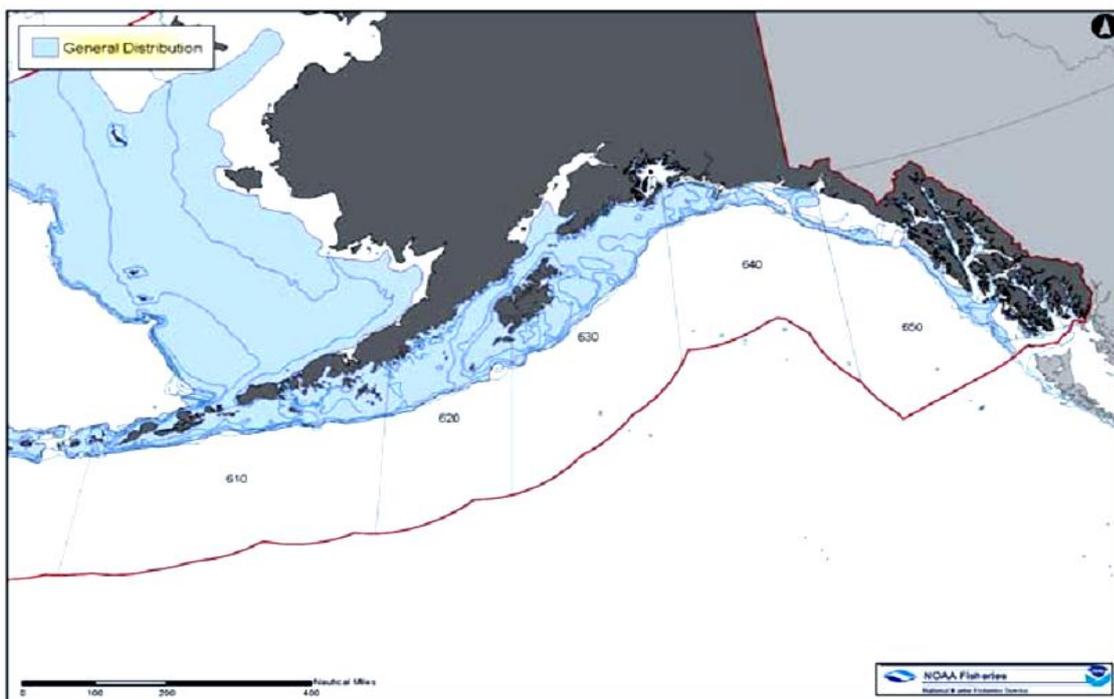


Figure 6. Map of the Pacific cod late juveniles/adults presence in the GOA.

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/EFH/EFH5yr_rev1209_appendix2.pdf

3.2. Fishery Location and Method

Distribution

Pacific cod are found in continental shelf and upper continental slope waters of the North Pacific Ocean from off Port Arthur, China in the northern Yellow Sea, north around the North Pacific Rim, into the Bering Sea as far north as the Chukchi Sea, and south along the North America coast to Santa Monica Bay, California (Pinkas 19 67, Hart 1973, Bakkala et al. 1984, Allen and Smith 1988, Love 1991, Stepanenko 1995, Westrheim 1996). Pacific cod are also found off the east coast of Japan from Tokyo Bay to northern Hokkaido, on the west coast of Japan in the Sea of Japan, and off the coasts of the Sakhalin and Kurile Islands (Bakkala et al. 1984, Fredin 1985) (Figure7).

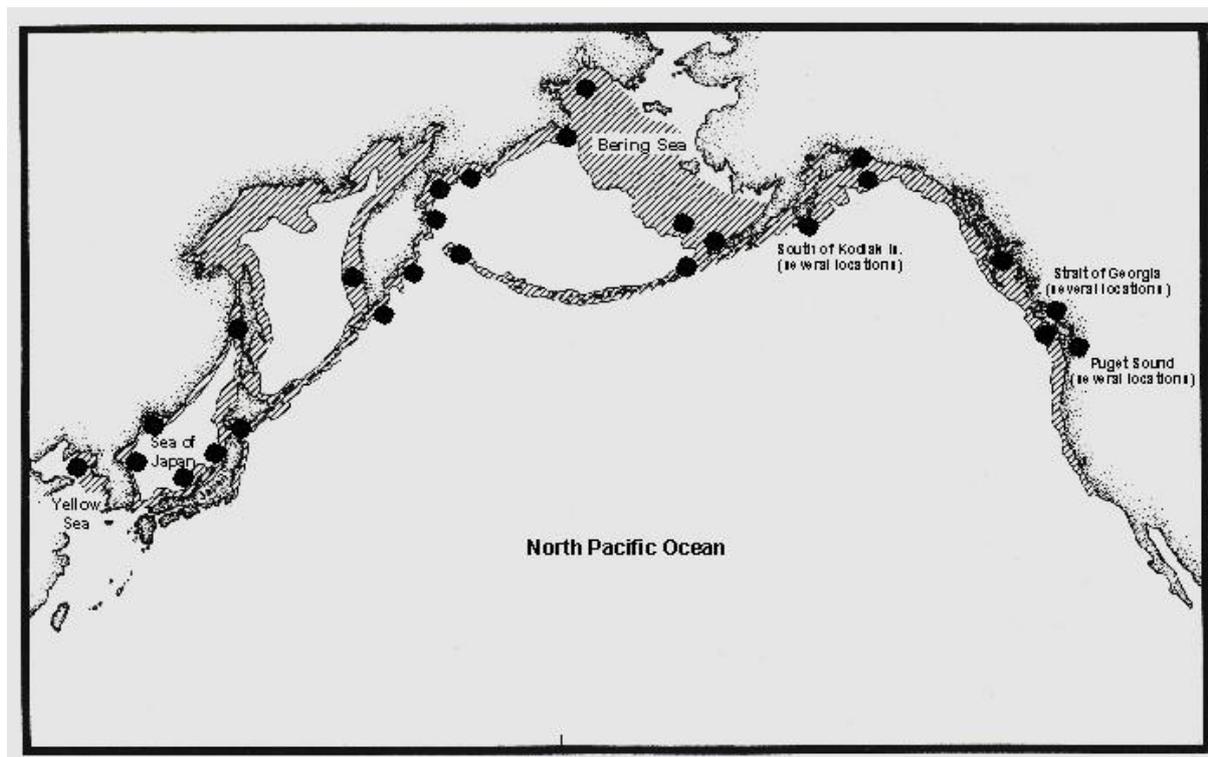


Figure 7. Geographic distribution (cross hatching) and major known spawning location (black dot) of Pacific cod. Modified from Bakkala et al. 1984.

<http://www.nwfsc.noaa.gov/publications/techmemos/tm44/pacificcod.htm>

Stock structure and management units

Isolation by distance (IBD) in North American coastal populations

The GOA and BSAI Pacific cod stocks are both considered and managed as different stocks and separate from other Pacific cod stocks further south along the west coast of North America and West across Russia and Asia. Recent scientific studies have revealed that three patterns relevant to management and conservation of Pacific cod were detected. First, a deep genetic subdivision was found between populations from Asia and North America. Second, a highly significant genetic isolation-by-distance (IBD) pattern was found among North American coastal samples (Washington State to the central Aleutian Islands). Dispersal estimates based upon the regression of genetic differentiation with geographic distance were below 100 km per generation over effective population densities of 10 – 10,000 individuals. Third, Pacific cod from a fjord-like estuary (Strait of Georgia, British Columbia) were clearly differentiated from coastal cod populations. This result showed that, like Atlantic cod, Pacific cod can form localized, mostly self-recruiting populations in fjord environments.

http://www.wsg.washington.edu/research/pdfs/reports/Hauser_RF147_PCSR.pdf

The results of a recent assessment of population structure in Pacific cod inferred from microsatellite DNA variation across much of its North American range demonstrate a clear isolation by distance (IBD) pattern, suggesting restricted gene flow, and thus a substantial amount of self-recruitment, among putative stock components at spatial scales relevant to current fisheries management and conservation practices. In particular, Pacific cod (like Atlantic cod) appear to form localised populations in fjord environments or where deep water barriers, such as submarine canyons, may limit adult dispersal. Genetic differentiation among coastal sites indicates the presence of a large stock complex along continental shelves and slopes, with gene flow sufficiently restricted to develop a significant IBD pattern. Tests of genic and genotypic heterogeneity, as well as estimates of F_{ST} and R_{ST} , consistently inferred significant genetic differentiation among populations at distances exceeding ~1700 km along this coastal continuum, a spatial scale comparable with detectable IBD in Atlantic cod (1600 km) in the western North Atlantic (Pogson et al. 2001). Samples from the coast of Washington State and British Columbia were distinct from those in Alaska and, to a lesser degree to each other. The IBD pattern among coastal locations across North America is one of the strongest relationships for a marine fish reported to date. Despite the potential for extensive adult movement, Pacific cod may not undertake directed migrations over their lifetime. Cod tagged in the Eastern Bering Sea exhibited high site fidelity, with 70% of recaptures occurring within 80 km (Shi et al. 2007). Studies in the Gulf of Alaska have shown that although some fish travelled in excess of 600 km, about 75% stayed within 25 km over considerable time periods (Cunningham et al 2009). <http://www.pmel.noaa.gov/foci/publications/2009/cunn0670.pdf>

In conclusion, the results of this study confirm the presence of a genetic discontinuity across the Bering Sea that represents a secondary contact zone between two major population groups isolated by mid-Pleistocene glaciation. Pleistocene ice-ages greatly influenced the historical abundances of Pacific cod, *Gadus macrocephalus*, in the North Pacific and its marginal seas. Canino et al. (2010) surveyed genetic variation at 11 microsatellite loci and mitochondrial (mt) DNA in samples from

twelve locations from the Sea of Japan to Washington State [1)East China Sea, Korea; 2)Sea of Okhotsk, Japan; 3)Near Islands, AK; 4)Central Aleutian Islands, AK; 5)Adak Island, AK; 6)Atka Island, AK; 7)Unimak Pass, AK; 8)Kodiak Island, AK; 9)Hecate Strait, BC Canada; 10)Coastal Washington, WA; 11)Strait of Georgia, WA; 12)Puget Sound, WA]. Both microsatellite (mean $H = 0.868$) and mtDNA haplotype (mean $h = 0.958$) diversities were large and did not show any geographical trends. Genetic differentiation between samples was significantly correlated with geographical distance between samples for both microsatellites ($F_{ST} = 0.028$, $r^2 = 0.33$) and mtDNA ($F_{ST} = 0.027$, $r^2 = 0.18$). Both marker classes showed a strong genetic discontinuity between northwestern and northeastern Pacific populations that likely represents groups previously isolated during glaciations that are now in secondary contact. Significant differences appeared between samples from the Sea of Japan and Okhotsk Sea that may reflect ice-age isolations in the northwest Pacific. In the northeast Pacific, a microsatellite and mtDNA partition was detected between coastal and Georgia Basin populations. The presence of two major coastal mtDNA lineages on either side of the Pacific Ocean basin implies at least two ice-age refugia and separate postglacial population expansions facilitated by different glacial histories. (<http://www.ncbi.nlm.nih.gov/pubmed/20819160>).

Regarding Pacific cod genetic difference between the Western and Eastern Bering Sea, A.V.Vinnikov in his PhD dissertation "Pacific cod of Western Kamchatka: biology, stock dynamics and fishery" (December 2008, in Russian, an extended abstract available at http://www.imb.dvo.ru/files/Autoreferat_Vinnikov.pdf) used data of electrophoresis on 28 protein systems (5 polymorphic loci) and demonstrated that the Pacific cod of the Russian Western Bering Sea together with that of Okhotsk Sea (his target study) and of both southern and northern Kurile Islands belong to the Asiatic genetic pool, is different from that of Pacific cod of North American waters.

Definitive stock structure analysis of Pacific cod in Alaska has not occurred, although separate Gulf of Alaska and Aleutian Islands (AI)/Eastern Bering Sea (EBS) stocks are recognized for management purposes (Westrheim 1996). Recent studies by Canino et al. (2005), Canino et al. (2010) and Spies (2011) provide various lines of evidence suggesting that Pacific cod in the EBS and AI should be viewed as separate stocks as they show evidence for genetic distinctiveness and lack of gene flow between the AI and EBS. The NPFMC plans to generate separate catch limit recommendations for the EBS and AI management areas for the 2014 fishing season.

<http://www.nwfsc.noaa.gov/publications/techmemos/tm44/pacificcod.htm>

<http://www.pmel.noaa.gov/foci/publications/2005/cani0552.pdf>

http://www.biocongroup.eu/PTDC-AAG-GLO-2261-2012/Previous_publications_files/Canino_MolEcol_2010.pdf

http://doc.nprb.org/web/08_prjs/817_Final%20report.pdf

www.adfg.alaska.gov/FedAidPDFs/FMR12-20.pdf

www.afsc.noaa.gov/refm/stocks/assessments.htm

Management units

Pacific cod fisheries are conducted in the GOA and the BSAI federal fisheries and state fisheries (Figure 8).

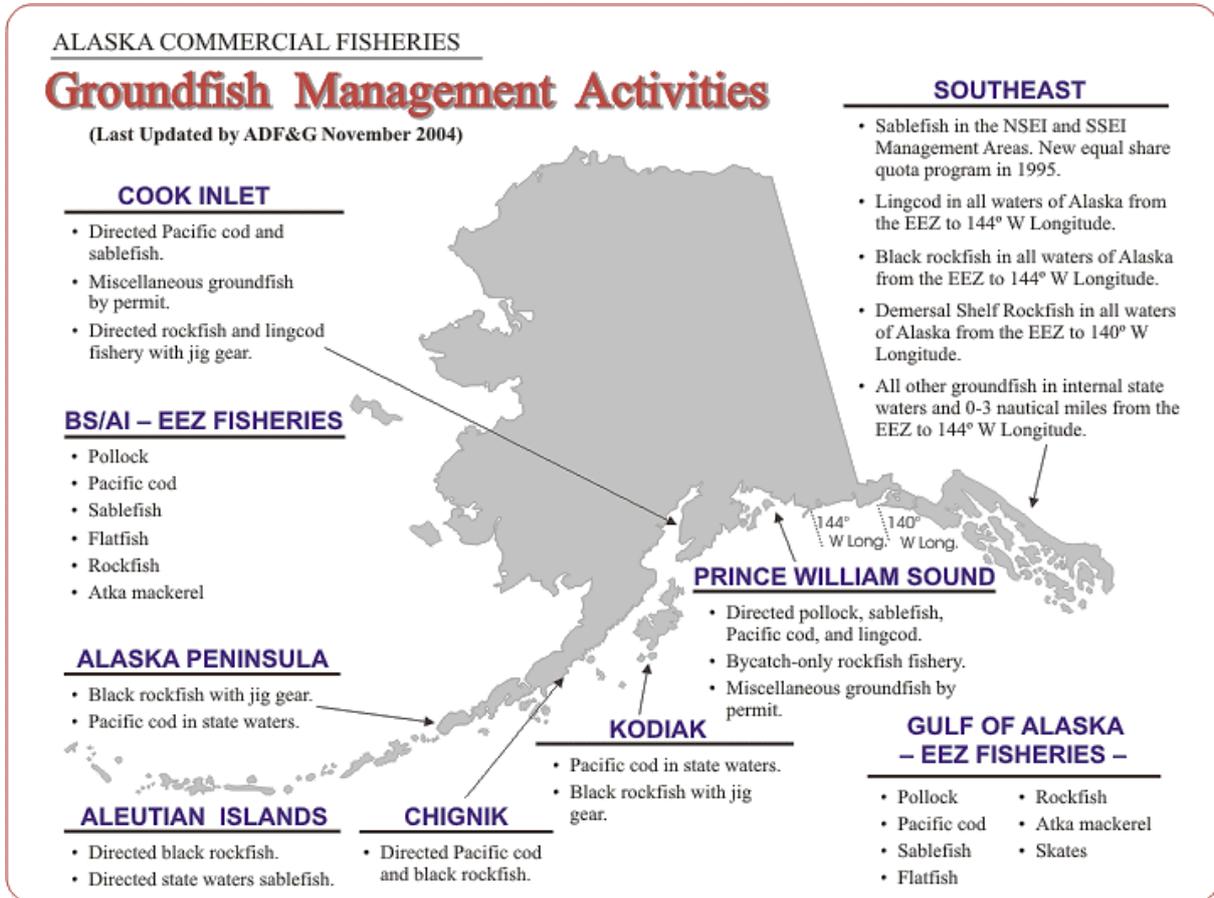


Figure 8. Map of location of major groundfish fisheries in the GOA and BSAI federal and state waters.

http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryGroundfish_groundfishmaps_management

Federal waters (3-200 nm)

Federal Alaska Pacific cod fisheries are managed as two stocks: one in the Bering Sea and Aleutian Islands and the other in the GOA. Each of these stocks is covered by a separate management plan, which describes the management area.

BSAI Pacific cod (Figure 9)

The federal BSAI management area encompasses the U.S. Exclusive Economic Zone (EEZ) of the Eastern Bering Sea and that portion of the North Pacific Ocean adjacent to the Aleutian Islands west of 170° W. longitude. The northern boundary of the Bering Sea is the Bering Strait, defined as a straight line from Cape Prince of Whales to Cape Dezhneva, Russia.

The management area is divided into two fishing areas, the Bering Sea subarea and the Aleutian Islands subarea. The Bering Sea subarea includes a defined area known as the Bogoslof District. For the purpose of spatially allocating total allowable catch, the Aleutian Islands subarea is divided into three districts, the eastern district (between 170° W. and 177° W. longitude), the central district (between 177° W. longitude and 177° E. longitude), and the western district (west of 177° E. longitude).

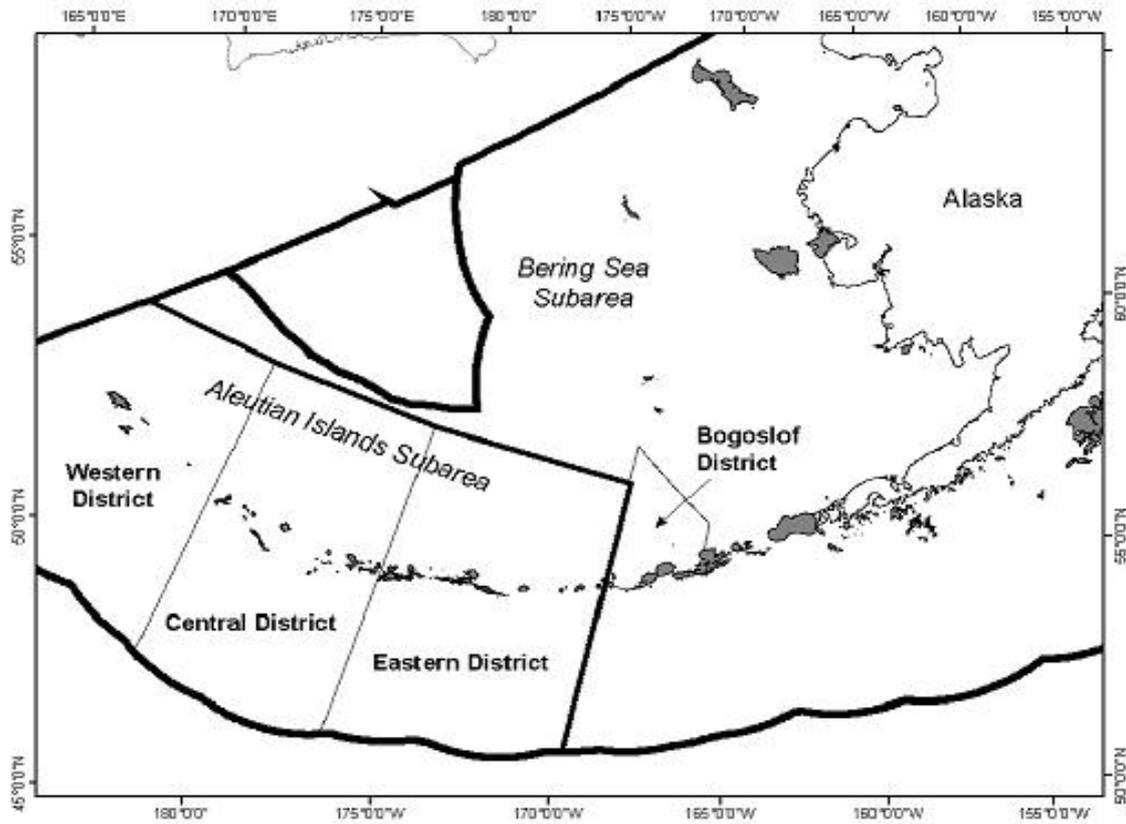


Figure 9. BSAI Pacific cod management area, with subareas and districts.

<http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf>

GOA Pacific cod (Figure 10)

The federal GOA management area encompasses the U.S. EEZ of the North Pacific Ocean, exclusive of the Bering Sea, between the eastern Aleutian Islands at 170° W. longitude and Dixon Entrance at 132°40' W. longitude. The management area is divided into the following regulatory areas: Western, Central, and Eastern. The Central regulatory area is divided into two districts: Chirikof and Kodiak. The Eastern regulatory area is also divided into two districts: West Yakutat and Southeast Outside.

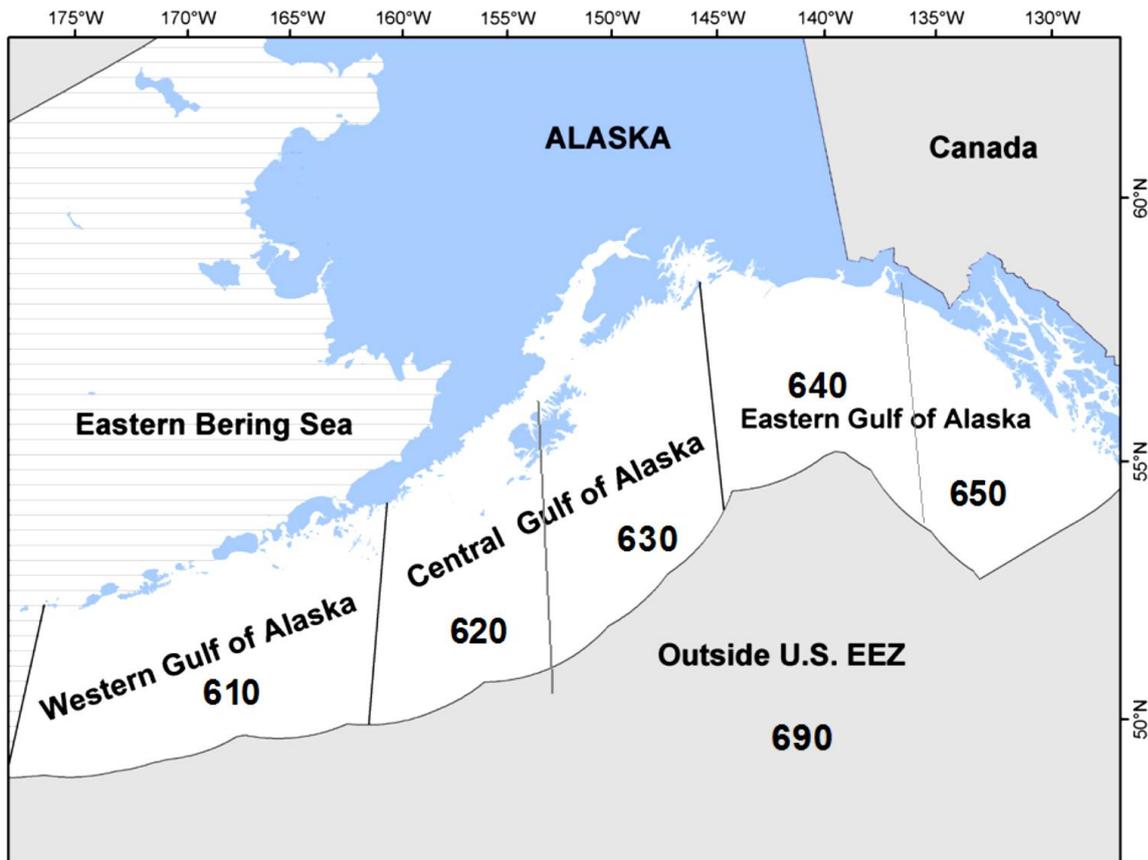


Figure 10. GOA Pacific cod management area, with subareas and districts.

<http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf>

State waters (0-3 nm)

In addition to the GOA and BSAI federal fisheries, Pacific cod fisheries are conducted in state waters in seven areas: Chignik, Kodiak, Aleutian Islands, Southern Alaska Peninsula, Southeast Alaska, Prince William Sound, and Cook Inlet (from Figure 11 to Figure 17).

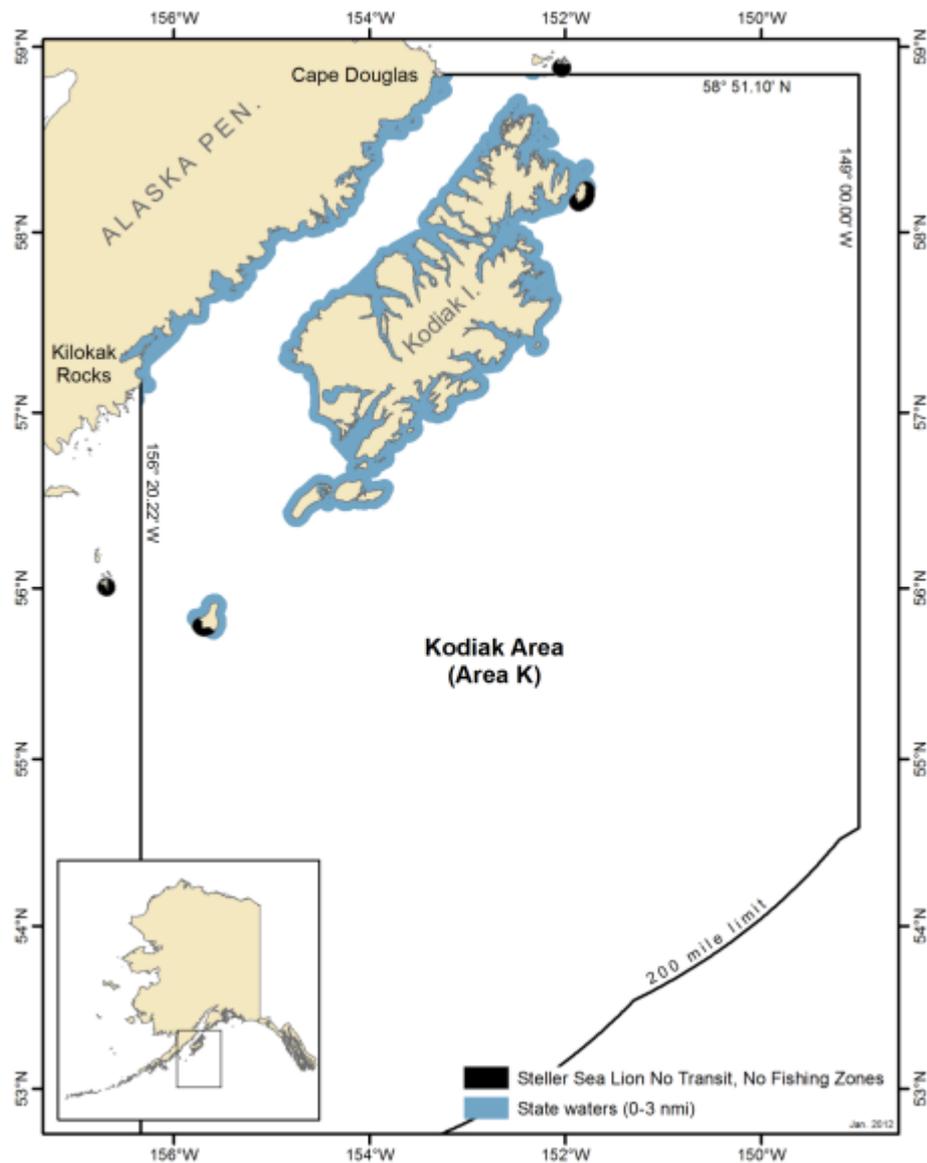


Figure 11. Kodiak state-managed Pacific cod fisheries area (blue) and closed zones (black).

<http://www.adfg.alaska.gov/FedAidpdfs/FMR11-69>

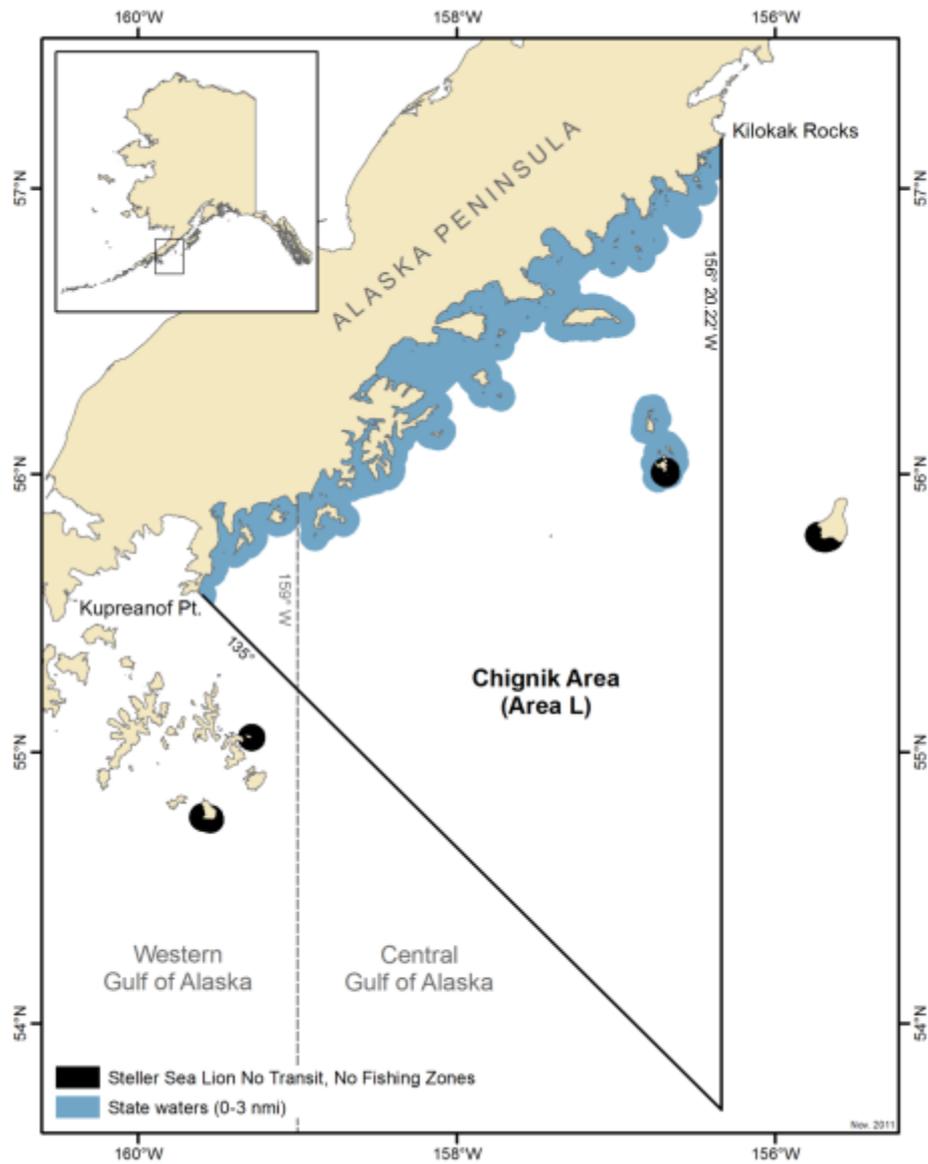


Figure 12. Chignik state-managed Pacific cod fisheries area (blue) and closed zones (black). <http://www.adfg.alaska.gov/FedAidpdfs/FMR11-64>

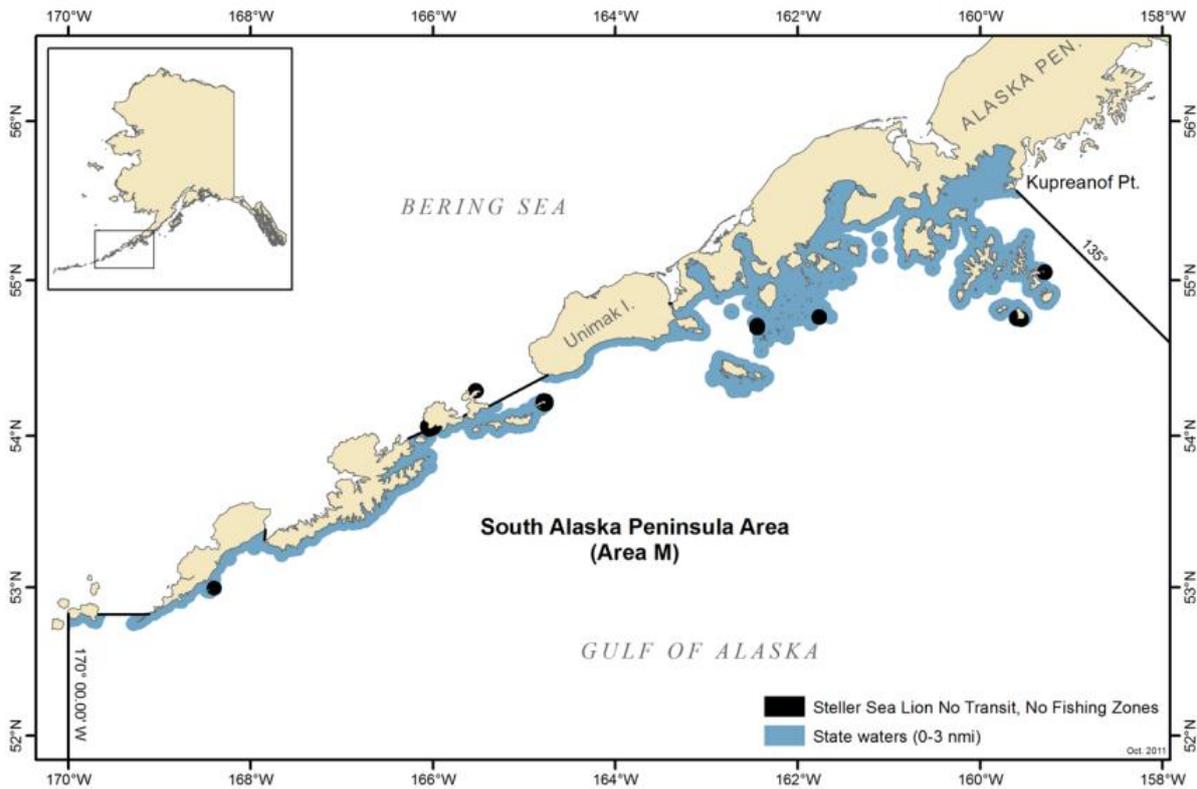


Figure 13. South Alaska Peninsula state-managed Pacific cod fisheries area (blue) and closed zones (black).

<http://www.adfg.alaska.gov/FedAidpdfs/FMR11-65.pdf>

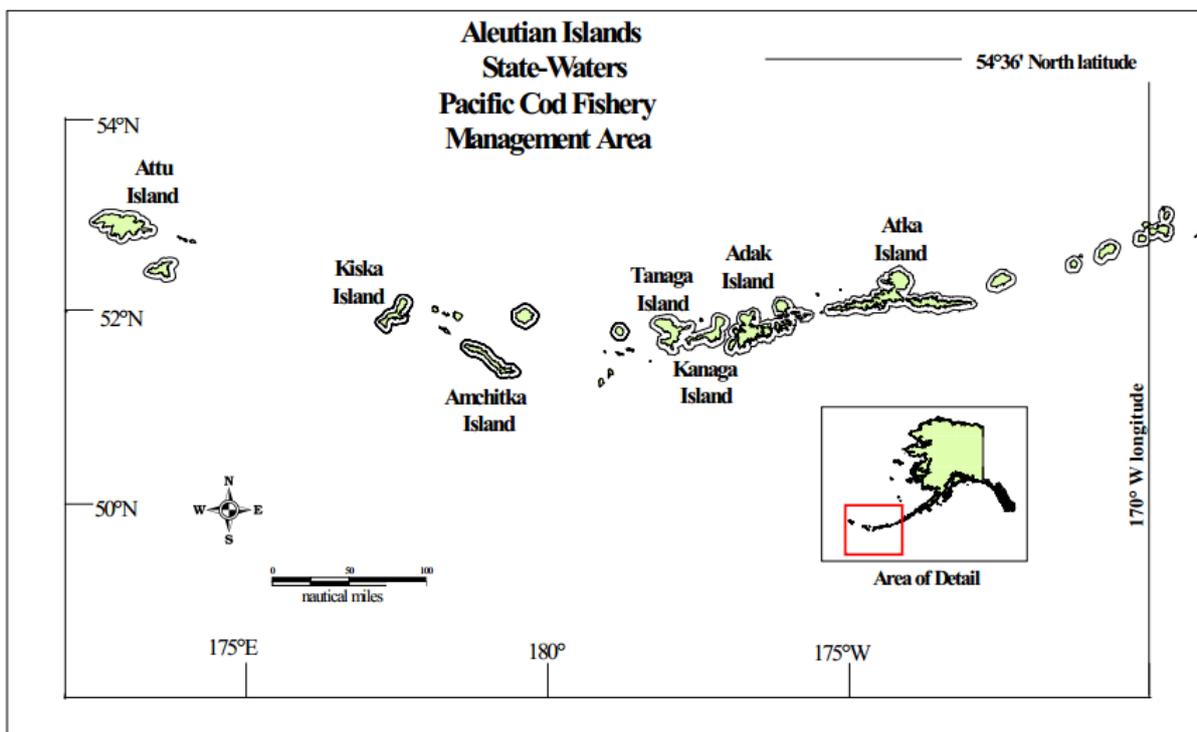


Figure 14. Aleutian Islands state-managed Pacific cod fisheries area.

<http://www.adfg.alaska.gov/FedAidpdfs/FMR11-63>

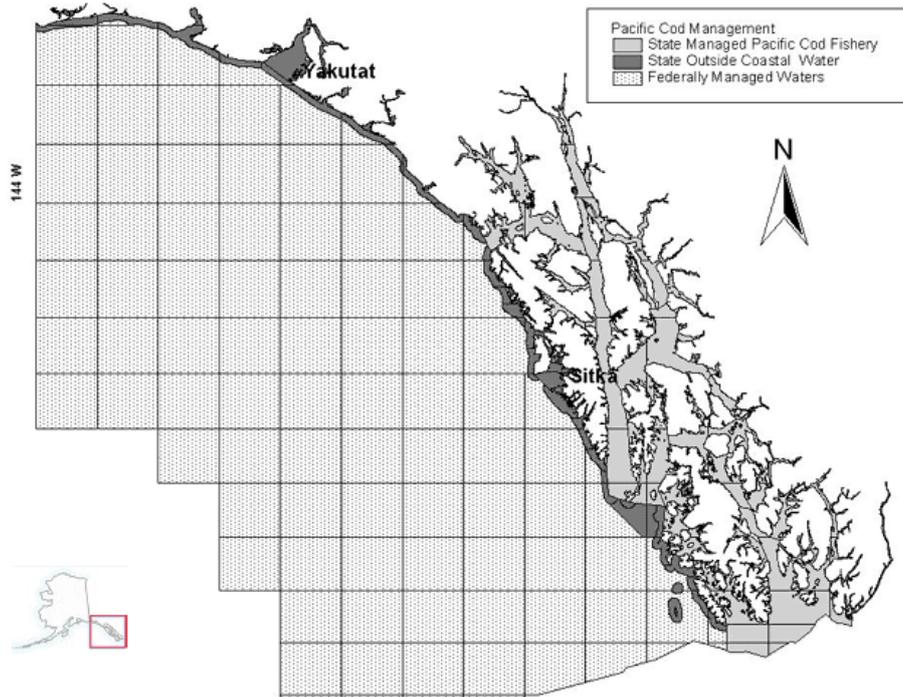


Figure 15. Southeast Alaska state-managed Pacific cod fisheries areas (light and dark grey).
http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.cod_jurisdiction_map

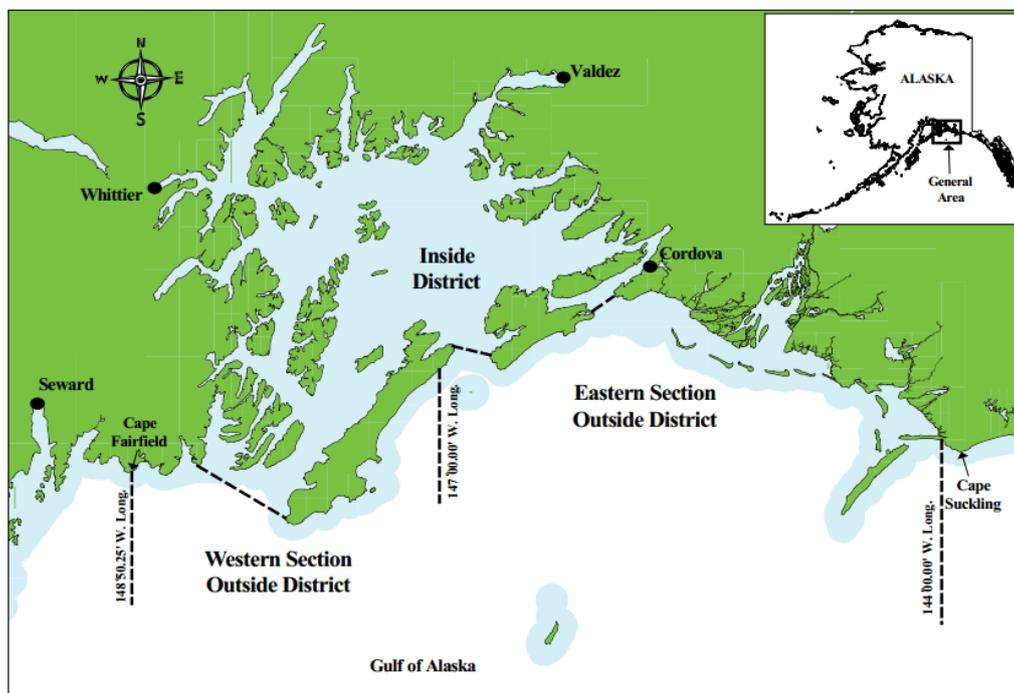


Figure 16. Prince William Sound state-managed Pacific cod fisheries areas (light blue).
<http://www.adfg.alaska.gov/FedAidPDFs/FMR11-47.pdf>

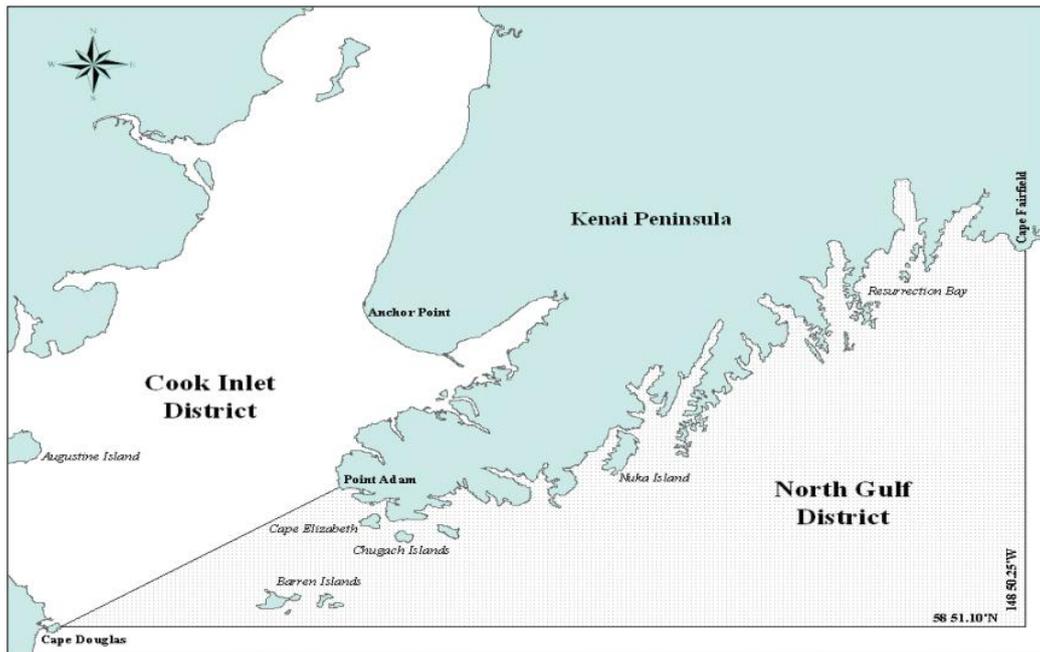


Figure 17. Cook Inlet state-managed Pacific cod fisheries area.

<http://www.adfg.alaska.gov/FedAidPDFs/FMR11-47.pdf>

Pacific cod federal, state and parallel fisheries

The Pacific cod fisheries are currently prosecuted under three distinct management structures: the federal, the state and the state-waters parallel fisheries. Federal fisheries occur in waters 3 to 200 nm offshore and are managed under the BSAI and GOA Fishery Management Plans for Groundfish. The state fisheries occur in waters 0 to 3 nm offshore and are managed through exclusive allocation under Guideline Harvest Level (GHL) calculated as a percentage of federal quotas. The State also opens its waters to allow fishermen to catch Pacific cod allocated to the federal TAC, a parallel fishery. State GHL fisheries are typically open when the federal and parallel fisheries are closed. (Figure 18).

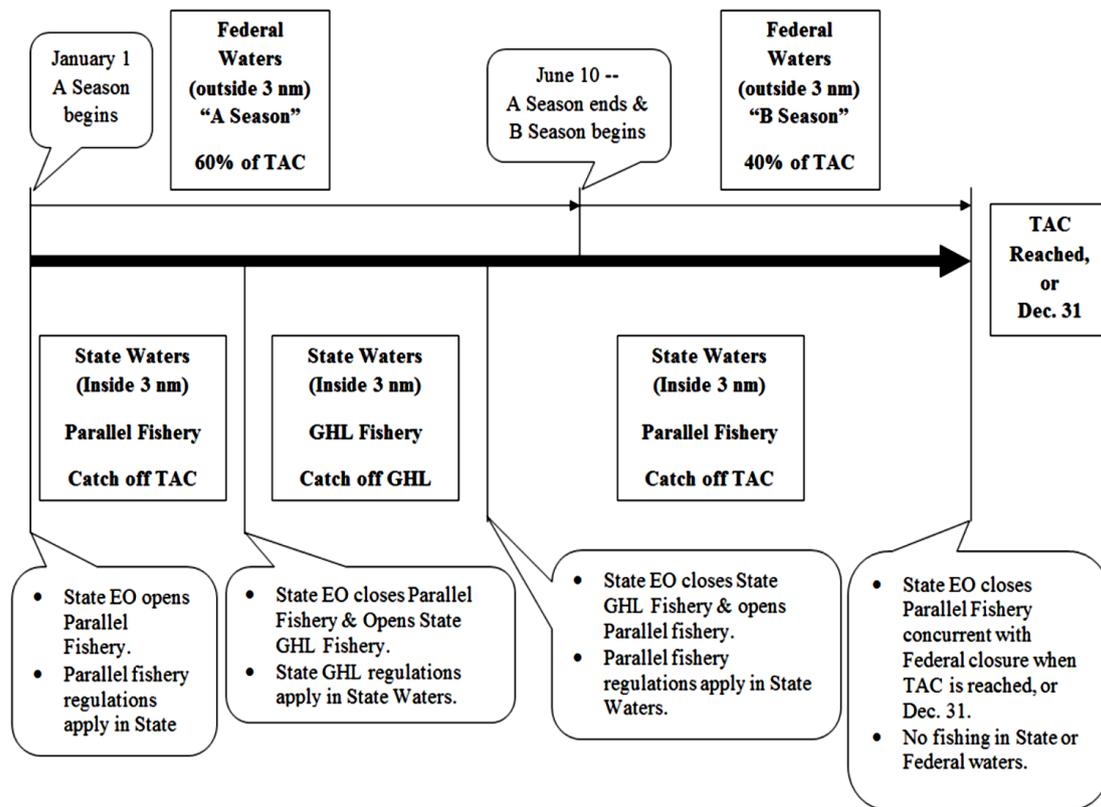
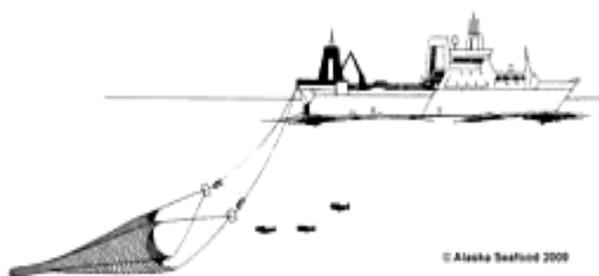


Figure 18. Schematic of federal and State Pacific cod Fishery Management http://alaskafisheries.noaa.gov/npfmc/PDFdocuments/catch_shares/Pcod/GOAPcodRevParallel312.pdf

Fishing Method

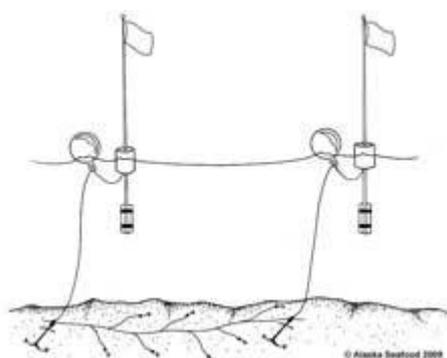
Trawl gear. Pacific cod in Alaska are caught and legally landed by trawlers using bottom trawl gear. A trawl is a large, bag-shaped net that is towed by a fishing vessel. The doors, because of the way they are built and rigged to the trawl, keep the mouth of the trawl open as it moves through the water. Pacific cod fisheries are prosecuted with bottom trawl typically having a headrope to footrope vertical distance rise of 1 fathoms to 5 fathoms. Net mesh gets smaller toward the intermediate and codend, with the codend typically having 5.5 to 8-inch stretched diamond mesh. Sweeps are



typically 45 fathoms and are made of combination rope or wire. BSAI vessels use elevating devices (bobbins) on their sweeps, and suitability trials are being carried out in the GOA. The sweeps significantly reduce gear and bottom habitat contact. Trawlers use sophisticated ultrasonic devices both for location of fish underwater and for species

identification. Upon locating a school of the desired species, the vessel trawls through the school and captures the fish. Electronic sensors tell the harvester exactly where the trawl is in relation to the fish and the ocean floor, while other sensors report how full the trawl becomes. The net is retrieved using huge winches and a power drum upon which the net is rolled as it is brought aboard.

Longline gear. Longliners catch bottomfish via a long line (“groundline”) that is laid on the bottom.

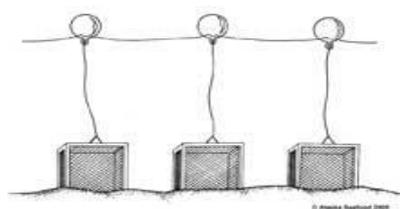


The freezer longline fleet fishes primarily for Pacific cod in the BSAI and the GOA with stationary lines, onto which baited hooks are attached by gangions. Catcher-processors use 9 mm to 11.5 mm groundline employed with 10” to 14” gangions, spaced 3.5’ to 4’ apart, and full circle hooks. Most vessels use swivel gear. The ends of each set are anchored and marked with buoys. The gear is normally set in a straight line, with most sets about 8 miles long. An 8 mile set would deploy 12,320 hooks. Often two or more sets are made in the same day, parallel to one another and ½-mile

to ¾-mile apart. The total soak time ranges from 4 to 20 hours. Groundfish longline catcher vessels fish Pacific cod in the GOA with stationary lines, onto which baited hooks are attached by gangions. Many of the catcher vessels use snap-on gear with gangions spaced at approximately 3’ to 4’ intervals. Squid is the preferred bait.

Pot gear

Pots used in cod fisheries are frequently modified crab pots, which are constructed with a steel bar

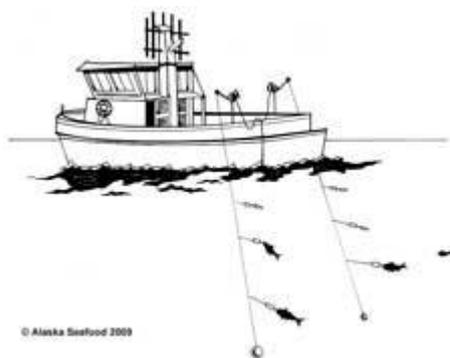


frame (1.25” diameter) and covered with tarred nylon mesh (3.5” stretched mesh). Pot sizes range from 5’ to 8’ square. Each pot has two tunnel openings on opposite sides, with plastic “finger” tunnels to retain the fish. An escape panel of untreated cotton must be sewn into the mesh. The pot is attached with a 6’ to 8’ bridle, generally constructed of 1”

diameter poly line. A 30’ to 60’ surge is attached to the bridle. Attached to the line is a plastic buoy,

with an auxiliary buoy attached on a tether line. Pots are set in areas where Pacific cod are aggregated, and retrieved once every 24 hours. Pots are baited with chopped herring placed in hanging bait buckets in the center of the pot. On most vessels, the pot is tipped into the sea with a pot launcher. The average size of a Pacific cod caught by a pot gear is 8 to 9 pounds.

Jig gear. The fleet targets Pacific cod with actively fished vertical lines, onto which baited hooks or surge tube jigs are attached. Hooks are dressed with colourful segments of rubber surgical tubing and/or baited with squid, herring, or strips of Atka mackerel. Gear components include a 4 lb to 10 lb jig weight, a 200 lb to 900 lb test monofilament mainline, and long shank 8/10 to 11/0 J-hooks or 12/0 to 14/0 circle hooks that are looped directly onto the leader. Vessels employ two or five jig machines per vessel. The vessels look for the concentration of Pacific cod and position their vessels to drift over the fish.



Machines drop the jig weight to the bottom (or higher in the water column) and move the jigs up and down slightly to induce the fish bite. Machines haul up the fish, which are then removed one by one.

Fleet structure

The federally managed fisheries of Alaska are prosecuted by a wide variety of fishing vessels. Vessels can be grouped into fleets based on their target species, gear type, licences, or eligibility for catch share programs. In 2010, there were 1,646 unique vessels fishing commercially in the Alaska federal fisheries, and the active size of the Pacific cod fleet is approximately 263 and 643 vessels in the BSAI and GOA, respectively (Lt Kenne, US Coast Guard, *pers. comm.* 07th March 2013). It's important to note that only a portion of these fleets targets only cod as their most important catch. For example in the BSAI, the majority of the catch is caught by longliners, then trawlers, then pot gear, with the minority by jiggers. In the GOA, especially during recent years, catches have almost been equal for trawl, longline and pot gear, with the minority caught by the jig fleet. The Aleutian Islands state fishery catches Pacific cod largely with trawlers, and then with pot and longline gear. The other state fisheries catch Pacific cod largely using pot gear with the minority employing jig gear.

Evidence

http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/whatkindofboat_cf.pdf

<http://www.ciaprochef.com/alaskaseafood/harvesting-whitefish.html>

<http://www.fakr.noaa.gov/npfmc/PDFdocuments/resources/FleetProfiles412.pdf>

3.3. Fisheries Management and Organization

Management entities (Figure 19)

The North Pacific Fishery Management Council

The NPFMC is one of eight regional councils established by the Magnuson Fishery Conservation and Management Act in 1976 [in short Magnuson-Stevens Act (MSA)] to oversee management of the nation's fisheries. The NPFMC recommends regulations to govern the directed Pacific cod fisheries in the Alaska's EEZ. NPFMC management measures for Pacific cod include seasonal and spatial allocation of Total Allowable Catch (TAC), time and area restrictions (i.e. protected/conservation areas), bycatch reduction programs, Prohibited Species Catch (PSC) Limits, reporting and observers requirements etc... In 1992 the Council created the Western Alaska Community Development Quota (CDQ) Program, to provide western Alaska communities an opportunity to participate in the BSAI fisheries. The CDQ Program allocates approximately 10.7% of all BSAI quotas for groundfish, prohibited species, halibut, and crab to eligible communities.

The National Marine Fisheries Service

The NOAA's NMFS is responsible for the management, conservation, and protection of living marine resources within the US EEZ. The NMFS Alaska Regional Office oversees fisheries in federal waters (3-200 nm) that produce about half the fish caught in US waters, with responsibilities covering 842,000 square nautical miles off Alaska. NOAA's Alaska Fisheries Science Center (AFSC) conducts stock assessment and biological studies. They also work closely with the NPFMC, and are responsible for developing, implementing, and enforcing regulations pertaining to management of the cod fisheries in US waters. In addition to biological studies, stock survey and stock assessment reports, NMFS is 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 Council. The U.S. Coast Guard partners the NMFS's Office for Law Enforcement (OLE) for effective monitoring, control and enforcement of fisheries regulations.

Alaska Department of Fish and Game

The Alaska Department of Fish and Game is a department within the government of Alaska. ADFG manages Alaska's fish, game, and aquatic plant resources. More specifically, they assess the state of their resources, conduct scientific studies aimed at conservation and management, implement regulations and manage harvests. The Board of Fisheries deals with resource allocation to users and the writing of regulation. In state waters (0-3 nm), Pacific cod fisheries are managed by the ADFG and the Alaska Board of Fisheries (BOF). There are seven state-managed Pacific cod regions: Kodiak, Chignik, South Alaska Peninsula, Aleutian Islands, Southeast Alaska, Prince William Sound, and Cook Inlet. Each area supports two distinct Pacific cod fisheries. The first fishery is managed concurrent to

the federal BSAI or GOA fishery, and is referred to as the parallel fishery. The parallel fishery (which occurs in state waters) is managed by adopting most NMFS rules and management actions, including seasons, and catch in this fishery is counted towards federal quotas. The second fishery in each area is referred to as the state-waters (or state-managed) fishery. The state-waters fishery is managed independently of the federal/parallel fishery by the ADFG under guidelines developed by the BOF.

Six of the seven state-water fisheries are subject to an annual Guideline Harvest Level (GHL) calculated as a percentage of federal fishery quotas. The ADFG conducts trawl survey to assess crab and groundfish resources in Kodiak, Chignik, South Peninsula and Eastern Aleutian management districts. ADFG staff shares the information with NMFS assessment biologists at the NPFMC Groundfish Team meetings and the information is used by the assessment authors to determine removals for ACL. 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.fakr.noaa.gov/npfmc/index.html>

<http://www.fakr.noaa.gov/>

<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html>

<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html>

<http://www.nmfs.noaa.gov/ole/>

<http://www.dps.alaska.gov/awt/Marine.aspx>

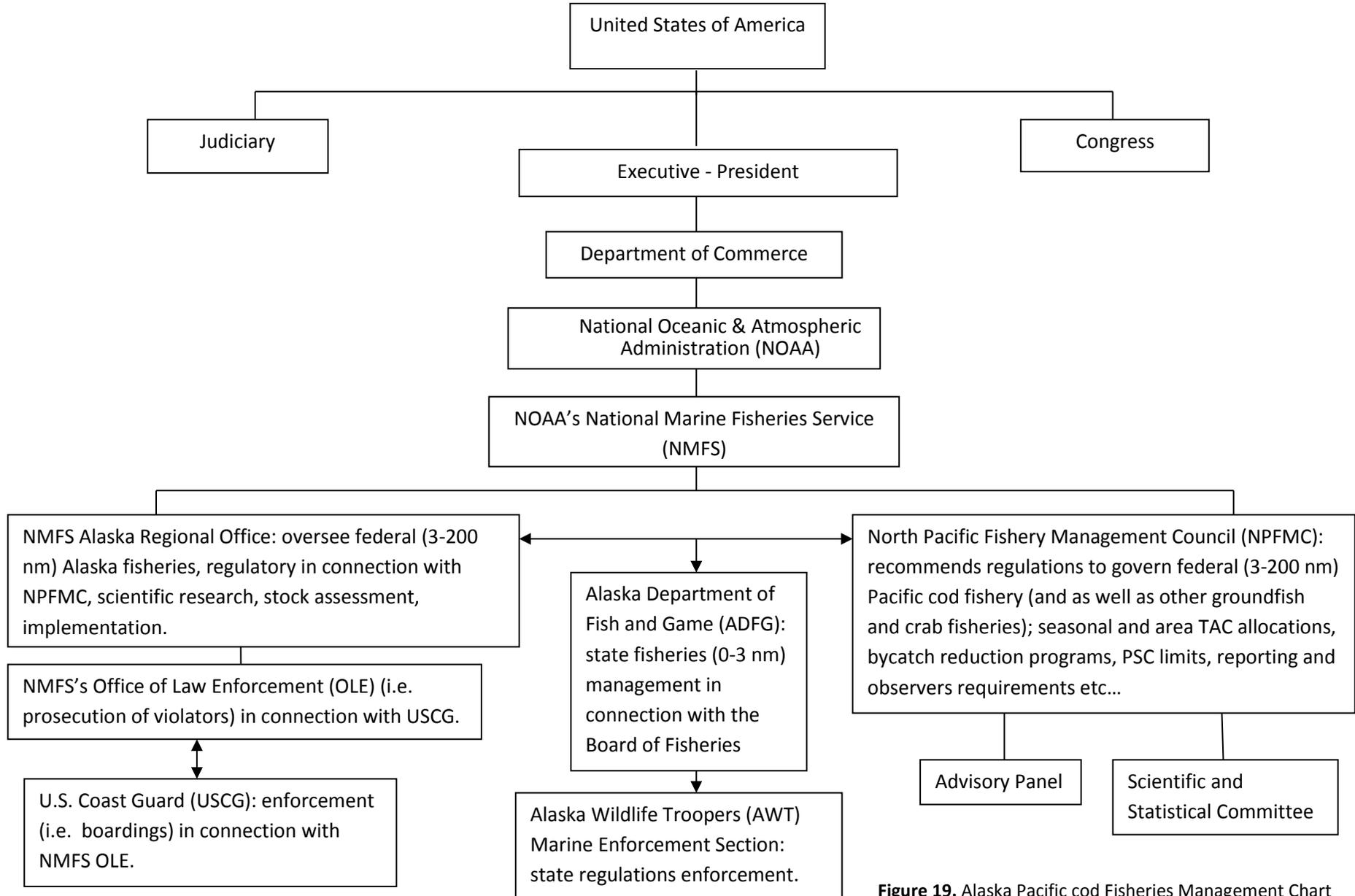


Figure 19. Alaska Pacific cod Fisheries Management Chart

Important dates relevant to Alaska Pacific cod management

1978. The GOA Groundfish Fishery Management Plan was implemented.

1982. The BSAI Groundfish Fishery Management Plan was implemented.

1990. Management measures were implemented to protect the Stellar Sea Lions.

1992. Inshore/Offshore Allocation was implemented. For Pacific cod, 90% of the GOA TAC is allocated inshore sector and 10% to the offshore sector.

1992. The NPFMC create the Western Alaska Community Development Quota (CDQ). The CDQ Program allocates a percentage of all BSAI quotas for groundfish to eligible communities.

1996. The NPFMC adopt a Licence Limitation Program (LLP) for Alaska groundfish and crab fleet. The LLP limits the number, size and specific operation of the vessels. The LLP was approved in 1997 and implemented in 2000.

1997. The State of Alaska began managing its own Pacific cod fisheries inside of 3 nm. State-water fisheries are subject to an annual Guideline Harvest Level (GHL) calculated as a percentage of federal fishery quotas.

1997. Seabird avoidance measures were implemented for Alaska groundfish fisheries (i.e. longline).

1998. The NPFMC approved requiring 100% retention (Improved Retention/Improved Utilization) of Pacific cod in all BSAI and GOA fisheries, beginning on the 1st January 1998.

1998. Trawl gear was prohibited in the East Yakutat/Southeast subareas.

2006. The Amendment 80 was adopted by the NPFMC. This action allocates several BSAI non-pollock trawl groundfish among trawl fishery sectors.

2007. Implementation of Amendment 85 in the BSAI: the remaining TAC (after 10.7% of the TAC is allocated to CDQ fishery) is allocated among sectors as follows: 1.4% to jig gear; 2% to hook and line/pot catcher vessels < 60', 0.2% to hook and line/pot catcher vessels > 60' LOA; 48.7% to hook and line catcher processors; 8.4% to pot catcher vessels > 60'; 1.5% to pot catcher processors; 2.3% to AFA trawl catcher processors; 13.4% to non-AFA trawl catcher processors; and 22.1% to trawl catcher vessels.

2009. The NPFMC passed Amendment 83, which will allocate Western and Central GOA Pacific cod TAC among gear and operation type, based on historic dependency and use by sector, and creates additional entry-level opportunities for jig vessels.

2011. Six of the seven state-water fisheries are subject to an annual Guideline Harvest Level (GHL) calculated as a percentage of federal fishery quotas. At present, the Kodiak GHL is set at 12.5% of the federal Central Gulf of Alaska (CGOA) ABC; the Chignik GHL is set at 8.75% of the federal CGOA ABC; the South Alaska Peninsula GHL is set at 25% of the federal Western Gulf of Alaska ABC; the Aleutian Islands GHL is set at 3% of the federal BSAI TAC; the Prince William Sound GHL is set at 25%

of the federal Eastern Gulf of Alaska (EGOA) ABC; and the Cook Inlet GHL is set at 3.75% of the total CGAO ABC. GHLs are allocated, by regulation, between gear types. The Southeast Alaska state-water fishery has been subject to a Guideline Harvest Range (GHR) of 750,000 – 1,250,000lb (340 – 567mt) since 1994.

The history of BSAI and GOA Pacific cod catch, TAC, ABC and OFL is presented in Tables 1 (a to e) and Table 2, respectively.

Table 1a. History of BSAI Pacific cod catch, TAC, ABC, and OFL. Catch for 2011 is through October 3. Source: NPFMC.

Year	Catch	TAC	ABC	OFL
1977	36,597	58,000	-	-
1978	45,838	70,500	-	-
1979	39,354	70,500	-	-
1980	51,649	70,700	148,000	-
1981	63,941	78,700	160,000	-
1982	69,501	78,700	168,000	-
1983	103,231	120,000	298,200	-
1984	133,084	210,000	291,300	-
1985	150,384	220,000	347,400	-
1986	142,511	229,000	249,300	-
1987	163,110	280,000	400,000	-
1988	208,236	200,000	385,300	-
1989	182,865	230,681	370,600	-
1990	179,608	227,000	417,000	-
1991	172,158	229,000	229,000	-
1992	206,129	182,000	182,000	188,000
1993	167,390	164,500	164,500	142,000
1994	196,572	191,000	191,000	228,000
1995	245,030	250,000	328,000	390,000
1996	240,590	270,000	305,000	420,000
1997	234,641	270,000	306,000	418,000
1998	195,645	210,000	210,000	336,000
1999	162,361	177,000	177,000	264,000
2000	191,056	193,000	193,000	240,000
2001	176,659	188,000	188,000	248,000
2002	197,353	200,000	223,000	294,000
2003	211,059	207,500	223,000	324,000
2004	212,161	215,500	223,000	350,000
2005	205,635	206,000	206,000	265,000
2006	193,017	194,000	194,000	230,000
2007	174,124	170,720	176,000	207,000
2008	170,661	170,720	176,000	154,000
2009	175,746	176,540	182,000	212,000
2010	171,857	168,780	174,000	205,000
2011	181,192	227,950	235,000	272,000

Table 1b. Summary of 1964-1980 catches (t) of Pacific cod in the EBS by fleet sector. Catches by gear are not available for these years. Catches may not include discards.

Eastern Bering Sea only:					
Year	Foreign	Joint Venture	Domestic	Total	
1964	13408	0	0	13408	
1965	14719	0	0	14719	
1966	18200	0	0	18200	
1967	32064	0	0	32064	
1968	57902	0	0	57902	
1969	50351	0	0	50351	
1970	70094	0	0	70094	
1971	43054	0	0	43054	
1972	42905	0	0	42905	
1973	53386	0	0	53386	
1974	62462	0	0	62462	
1975	51551	0	0	51551	
1976	50481	0	0	50481	
1977	33335	0	0	33335	
1978	42512	0	31	42543	
1979	32981	0	780	33761	
1980	35058	8370	2433	45861	

Table 1c. Summary of 1981-2011 catches (t) of Pacific cod in the EBS by fleet sector and gear type. All catches include discards. LLine = longline. Subt. = sector subtotal. Catches for 2011 are through October 3.

Eastern Bering Sea only:											
Year	Foreign			Joint Venture		Domestic Annual Processing					Total
	Trawl	LLine	Subt.	Trawl	Subt.	Trawl	LLine	Pot	Other	Subt.	
1981	30347	5851	36198	7410	7410	12884	1	0	14	12899	56507
1982	23037	3142	26179	9312	9312	23893	5	0	1715	25613	61104
1983	32790	6445	39235	9662	9662	45310	4	21	569	45904	94801
1984	30592	26642	57234	24382	24382	43274	8	0	205	43487	125103
1985	19596	36742	56338	35634	35634	51425	50	0	0	51475	143447
1986	13292	26563	39855	57827	57827	37646	48	62	167	37923	135605
1987	7718	47028	54746	47722	47722	46039	1395	1	0	47435	149903
1988	0	0	0	106592	106592	93706	2474	299	0	96479	203071
1989	0	0	0	44612	44612	119631	13935	145	0	133711	178323
1990	0	0	0	8078	8078	115493	47114	1382	0	163989	172067
1991	0	0	0	0	0	129393	77505	3343	0	210241	210241
1992	0	0	0	0	0	77261	79398	7512	33	164204	164204
1993	0	0	0	0	0	81763	49294	2098	2	133157	133157
1994	0	0	0	0	0	84932	78564	8037	730	172263	172263
1995	0	0	0	0	0	110958	97666	19275	599	228498	228498
1996	0	0	0	0	0	91912	88883	28006	267	209067	209067
1997	0	0	0	0	0	93925	117010	21493	173	232601	232601
1998	0	0	0	0	0	60781	84324	13233	192	158529	158529
1999	0	0	0	0	0	51903	81464	12400	100	145867	145867
2000	0	0	0	0	0	53817	81642	15849	68	151376	151376
2001	0	0	0	0	0	35657	90361	16472	52	142542	142542

2002	0	0	0	0	0	51067	100271	15052	166	166555	166555
2003	0	0	0	0	0	47132	95059	21959	155	164305	178600
2004	0	0	0	0	0	57794	108021	17242	231	183288	183288
2005	0	0	0	0	0	52604	113120	17104	108	182936	182936
2006	0	0	0	0	0	53209	96559	18957	81	168806	168806
2007	0	0	0	0	0	45673	77104	17222	82	140081	140079
2008	0	0	0	0	0	33493	88915	17366	19	139793	139604
2009	0	0	0	0	0	36956	96611	13586	13	147166	147166
2010	0	0	0	0	0	41152	81663	19655	388	142857	118618
2011	0	0	0	0	0	56900	87918	25376	505	170700	170700

Table 1d. Summary of 1964-1980 catches (t) of Pacific cod in the AI region by fleet sector. Catches by gear are not available for these years. Catches may not always include discard.

Aleutian Islands region only:				
Year	Foreign	Joint Venture	Domestic	Total
1964	241	0	0	241
1965	451	0	0	451
1966	154	0	0	154
1967	293	0	0	293
1968	289	0	0	289
1969	220	0	0	220
1970	283	0	0	283
1971	2078	0	0	2078
1972	435	0	0	435
1973	977	0	0	977
1974	1379	0	0	1379
1975	2838	0	0	2838
1976	4190	0	0	4190
1977	3262	0	0	3262
1978	3295	0	0	3295
1979	5593	0	0	5593
1980	5788	0	0	5788

Table 1e. Summary of 1981-2011 catches (t) of the Pacific cod in the AI region by fleet sector and gear type. All catches include discards. LLine = longline. Subt. = sector subtotal. Catches since 2006 include those from State-managed fishery. Catches for 2011 are through October 3.

Year	Foreign			Joint Venture		Domestic Annual Processing					Total
	Trawl	LLine	Subt.	Trawl	Subt.	Trawl	LLine	Pot	Other	Subt.	
1981	2680	235	2915	1749	1749	2744	26	0	0	2770	7434
1982	1520	476	1996	4280	4280	2121	0	0	0	2121	8397
1983	1869	402	2271	4700	4700	1459	0	0	0	1459	8430
1984	473	804	1277	6390	6390	314	0	0	0	314	7981
1985	10	829	839	5638	5638	460	0	0	0	460	6937
1986	5	0	5	6115	6115	784	1	1	0	786	6906
1987	0	0	0	10435	10435	2662	22	88	0	2772	13207
1988	0	0	0	3300	3300	1698	137	30	0	1865	5165
1989	0	0	0	6	6	4233	284	19	0	4536	4542
1990	0	0	0	0	0	6932	602	7	0	7541	7541

Year	Federal					State					Total
	Trawl	LLine	Pot	Other	Subt.	Trawl	LLine	Pot	Other	Subt.	
1991	3414	3203	3180	0	9798						9798
1992	14559	22108	6317	84	43068						43068
1993	17312	16860	0	33	34205						34205
1994	14383	7009	147	0	21539						21539
1995	10574	4935	1025	0	16534						16534
1996	21179	5819	4611	0	31609						31609
1997	17349	7151	575	89	25164						25164
1998	20531	13771	424	0	34726						34726
1999	16437	7874	3750	69	28130						28130
2000	20362	16183	3107	33	39685						39685
2001	15827	17817	544	19	34207						34207
2002	27929	2865	7	0	30801						30801
2003	31215	976	2	0	32193						32193
2004	25770	3103	0	0	28873						28873
2005	19613	3073	0	13	22699						22699
2006	16956	3128	401	8	20493	3106	455	156	0	3717	24210
2007	25725	4182	313	1	30221	2907	529	383	6	3824	34045
2008	19291	5471	1679	156	26597	2540	234	1634	53	4462	31059
2009	20284	5469	754	0	26507	537	279	1237	20	2074	28580
2010	16757	7638	727	0	25122	2113	77	1688	0	3878	29000
2011	9250	1194	1	0	10444	4	14	30	0	48	10492

Year	Catch	TAC	ABC	OFL
1980	35,345	60,000	-	-
1981	36,131	70,000	-	-
1982	29,465	60,000	-	-
1983	36,540	60,000	-	-
1984	23,898	60,000	-	-
1985	14,428	60,000	136,000	-
1986	25,012	75,000	125,000	-
1987	32,939	50,000	185,000*	-
1988	33,802	80,000	99,000	-
1989	43,293	71,200	71,200	-
1990	72,517	90,000	90,000	-
1991	76,328	77,900	77,900	-
1992	80,747	63,500	63,500	87,600
1993	56,488	56,700	56,700	78,100
1994	47,485	50,400	50,400	71,100
1995	68,985	69,200	69,200	126,000
1996	68,280	65,000	65,000	88,000
1997	77,018	69,115	81,500	180,000
1998	72,525	66,060	77,900	141,000
1999	81,785	67,835	84,400	134,000
2000	66,560	59,800	76,400	102,000
2001	51,542	52,110	67,800	91,200
2002	54,483	44,230	57,600	77,100
2003	52,579	40,540	52,800	70,100
2004	56,625	48,033	62,810	102,000
2005	47,585	44,433	58,100	86,200
2006	47,854	52,264	68,859	95,500
2007	51,462	52,264	68,859	97,600
2008	58,964	50,269	64,493	88,660
2009	52,920	41,807	55,300	66,000
2010	78,071	59,563	79,100	94,100
2011	80,692	65,100	86,800	102,600

Table 2. History of GOA Pacific cod catch (includes catch from State waters), TAC (does not include State GHL), ABC, and OFL. ABC was not used in management of GOA groundfish prior to 1986. Catch for 2011 is current through October 22. The values in the column labeled “TAC” corresponds to “optimum yield” for the years 1980-1986, “target quota” for the year 1987, and true TAC for the years 1988-2009. The ABC value listed for 1987 is the upper bound range. Source: NPFMC staff.

Evidence

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

<http://www.fakr.noaa.gov/sustainablefisheries/amds/80/default.htm>

<http://www.afsc.noaa.gov/REFM/docs/2011/BSA1pcod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf>

History of the fishery

From 1960s – early 1980s: Pacific cod have been fished on and off since the 19th century. The modern commercial fishery began during the early 1960s, when a Japanese longline fishery harvested BSAI Pacific cod for the frozen fish market. By the time that the Magnuson Fishery Conservation Act (MSA) went into effect in 1977, foreign catches of Pacific cod in the BSAI had consistently been in the 30,000 – 70,000 t range for a full decade, while foreign catches in the GOA were much smaller, on the order of 3,000 t per year.

Since 1990: Presently, Pacific cod are harvested by a multiple-gear fishery, including trawl, longline, pot, and jig components. From 1991 to 1999, trawl gear took more Pacific cod than any other gear type. On average during this period, trawl gear accounted for 52% of the catch, longline gear 37%, and pot gear 11%. From 2000 on, however, longline gear took more Pacific cod than any other gear type. On average from 2000-2006, trawl gear accounted for 37% of the catch, longline gear 46%, and pot gear 16% (Table 3 for the BSAI and Table 4 for the GOA areas).

Table 3. Summary of 1991-2011 catches (t) of Pacific cod in the EBS and AI by fleet sector and gear type. All catches include discards. LLine = longline. Subt. = sector subtotal. Catches since 2006 include those from State-managed fishery in the AI. Catches for 2011 are through October 3.

Bering Sea and Aleutian Islands region combined:											
Year	Federal					State					Total
	Trawl	LLine	Pot	Other	Subt.	Trawl	LLine	Pot	Other	Subt.	
1991	132808	80708	6523	0	220038						220038
1992	91820	101507	13829	117	207272						207272
1993	99075	66154	2098	35	167362						167362
1994	99315	85573	8184	730	193802						193802
1995	121532	102601	20300	599	245033						245033
1996	113091	94702	32617	267	240676						240676
1997	111275	124161	22068	262	257765						257765
1998	81312	98095	13657	192	193256						193256
1999	68341	89338	16150	169	173998						173998
2000	74179	97825	18956	101	191060						191060
2001	51484	108178	17016	71	176749						176749
2002	78996	103136	15058	166	197356						197356
2003	78346	96035	21961	156	196498						196498
2004	83564	111124	17242	231	212161						212161
2005	72217	116193	17104	121	205635						205635
2006	70166	99688	19358	89	189300	3106	455	156	0	3717	193017
2007	71398	81287	17534	83	170302	2907	529	383	6	3824	174126
2008	52784	94386	19045	176	166390	2540	234	1634	53	4462	170852
2009	57241	102080	14339	13	173672	537	279	1237	20	2074	175746
2010	57909	89301	20381	388	167979	2113	77	1688	0	3878	171857
2011	66150	89112	25377	505	181144	4	14	30	0	48	181192

Table 4. Summary of catches (t) of Pacific cod in the GOA since 1991 by management jurisdiction and gear type. All catches include discards. LLine = longline. Subt. = sector subtotal. Catches for 2011 are complete through October 22.

Year	Federal					State				Total
	Trawl	Longl.	Pot	Other	Subt.	Longl.	Pot	Other	Subt.	
1991	58,093	7,656	10,464	115	76,328	0	0	0	0	76,328
1992	54,593	15,675	10,154	325	80,747	0	0	0	0	80,747
1993	37,806	8,963	9,708	11	56,488	0	0	0	0	56,488
1994	31,447	6,778	9,161	100	47,485	0	0	0	0	47,485
1995	41,875	10,978	16,055	77	68,985	0	0	0	0	68,985
1996	45,991	10,196	12,040	53	68,280	0	0	0	0	68,280
1997	48,406	10,978	9,065	26	68,476	0	7,224	1,319	8,542	77,018
1998	41,570	10,012	10,510	29	62,121	0	9,088	1,316	10,404	72,525
1999	37,167	12,363	19,015	70	68,614	0	12,075	1,096	13,171	81,785
2000	25,458	11,667	17,351	54	54,529	0	10,388	1,643	12,031	66,560
2001	24,383	9,914	7,171	155	41,622	0	7,836	2,084	9,920	51,542
2002	19,810	14,666	7,694	176	42,346	0	10,423	1,714	12,137	54,483
2003	18,885	9,585	12,740	161	41,371	0	7,966	3,242	11,207	52,579
2004	17,513	10,380	14,965	400	43,258	0	10,602	2,765	13,367	56,625
2005	14,549	5,758	14,749	203	35,260	0	9,653	2,673	12,326	47,585
2006	13,131	10,274	14,795	118	38,319	0	8,890	646	9,536	47,854
2007	14,774	11,677	13,515	39	40,004	0	10,885	573	11,458	51,462
2008	20,309	12,367	11,220	62	43,959	0	13,438	1,568	15,005	58,964
2009	13,981	14,069	11,576	194	39,820	310	10,293	2,497	13,100	52,920
2010	21,791	16,673	20,114	426	59,004	373	14,604	4,090	19,067	78,071
2011	16,007	14,436	28,067	703	59,212	720	16,146	4,613	21,480	80,692

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPcod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf>

3.4. Stock assessment activities

Stock assessments are conducted annually for the GOA and BSAI Pacific cod in Alaskan waters. The assessments include current and historical data on catch biomass, catch size composition, catch age composition, and fishery independent (from bottom trawl surveys) indices of abundance and population age composition collected by the NMFS. Assessment outputs include historical estimates of population abundance, spawning stock biomass, recruitment, population age composition and fishing mortality. Catch projections are used to estimate future fishery yields under pre-agreed harvest rules in accordance with national standards, as well as to estimate the impact of these catches on the populations. The historical time series are used to evaluate the performance of the management regime in relation to management objectives.

Model characteristics

Bering Sea Aleutian Islands Pacific cod stock assessment

Stock Synthesis 1 (SS1, Methot 1986, 1990, 1998, 2000) was first applied to the Eastern Bering Sea (EBS) Pacific cod in the 1992 stock assessment (Thompson 1992). This first application used age-structured data. SS1 continued to be used, but based largely on length structured data since 2004 (Thompson and Dorn 2004). It should be emphasized that the model has always been intended to assess only the EBS portion of the BSAI stock. Conversion of model estimates of EBS biomass and catch to BSAI equivalents has traditionally been accomplished by application of an expansion factor based on the relative survey biomasses between EBS and AI. Many changes have been made or considered in the stock assessment model since the 2010 assessment (Thompson et al. 2010). Seven models were presented in 2011's preliminary assessment but Model 3b was selected as the final model by the Scientific and Statistical Committee (SSC). In the Model 3b the parameters governing variability in length were estimated internally, all size composition records were included in the log likelihood function, and the fit to the mean-size-at-age data was not included in the log likelihood function.

Natural mortality

Since 2007, the natural mortality rate M was estimated at 0.34 based on Equation 7 of Jensen (1996) and an age maturity of 4.9 years (Starks 2007).

Catchability

In the 2009 assessment (Thompson et al. 2009), catchability for the post-1981 trawl survey was estimated iteratively by matching the average (weight by numbers at length) of the product of catchability and selectivity for the 60-81 cm size range equal to point estimate of 0.47 obtained by Nichols et al. (2007). The resulting value of 0.77 was retained for the selected model.

Variability in estimated age

Variability in estimated age in SS is based on the standard deviation of estimated age. Weighted least squares regression has been used in the past several assessments to estimate a proportional

relationship between standard deviation and age. The regression was recomputed this year, yielding an estimated slope of 0.087, which gives a weighted R^2 of 0.92. This regression was used for the selected model.

Variability in length at age

In the selected Model 3b, the parameters governing variability in length at age were estimated conditionally.

Weight at length

Season-specific parameters governing the weight-at-length schedule were estimated in the 2010 assessment (based on data through 2008), giving the following values:

Season:	Jan-Feb	Mar-Apr	May-Jul	Aug-Oct	Nov-Dec
α :	3.741×10^{-6}	7.221×10^{-6}	9.406×10^{-6}	6.987×10^{-6}	4.356×10^{-6}
β :	3.296	3.122	3.054	3.134	3.253
Samples:	21,616	25,818	20,734	12,754	9,956

The above parameters were obtained for the selected model.

Maturity

In 2007, the accepted model has used an age-based schedule with intercept = 4.9 years and slope = - 0.965 (Stark 2007).

Parameters estimated conditionally

Parameters estimated conditionally in all models include the von Bertalanffy growth parameters, log mean recruitment before and since the 1976-1977 regime shift, annual recruitment deviations, initial fishing mortality, gear-season-and-block-specific fishery selectivity parameters, survey selectivity parameters, and annual deviations in ascending limb of the trawl survey selectivity schedule. In addition Model 3b estimates two parameters describing ageing bias as a linear function of age and two parameters describing the standard deviation of length at age as a linear function of length at age.

Likelihood components

All models include likelihood components for trawl survey relative abundance, fishery and survey size composition, survey age composition, survey mean size at age, recruitment, parameter deviations, and initial catch. In the selected model, the mean size at age component is given zero emphasis.

Initial exploration of alternative assessment models for Pacific cod in the Aleutian Islands

As mentioned above, harvest specifications for the combined BSAI unit have been extrapolated from the Pacific cod EBS model. But in light of recent genetic research and evidence that Pacific cod in the EBS and AI should be viewed as separate stocks, in 2010 the SSC requested that a separate assessment be prepared for Pacific cod in the AI. In response, the 2011 assessment contained a Tier 5 assessment of Pacific cod in the AI (Thompson and Lauth 2011). However, the December 2012 assessment contained an initial exploration of age-structure modeling for the AI Pacific cod. Two models were presented in the preliminary assessment, both estimated using Stock Synthesis (SS), and both based largely on last year's accepted model for the EBS Pacific cod (Thompson and Lauth 2011).

The natural mortality rate was fixed at 0.34 in both models, borrowing the accepted value in the EBS.

In both models, weight at length was assumed to follow the usual form $weight = a \times length^b$ and to be constant across the time series, with a and b estimated at 5.68×10^{-6} and 3.18, respectively, based on 8,126 samples collected between 1974 and 2011.

In addition to differences in the data between the AI and EBS, Model 1 differs from last year's accepted EBS model in the following respects:

- Each year consists of a single season instead of five.
- A single fishery is defined (with forced asymptotic selectivity) instead of nine season-and-gear-specific fisheries (with forced asymptotic selectivity for six of them).
- Fishery selectivity is constant over time instead of variable in multiple time blocks.
- The survey samples age 1 fish at true age 1.5 instead of 1.41667.
- Ageing bias is not estimated (no age data) instead of estimated.
- Survey catchability Q is tuned to match the value of 0.92 estimated by Nichols et al. (2007) for the AI survey net instead of the value of 0.47 for the EBS survey net.

Model 2 was chosen from a set of seven candidate models, all of which were identical to Model 1 except that they each allowed at least one of the three length-at-age parameters (length at age 1, $L1$; asymptotic length, $Linf$; and Brody's growth coefficient, K) to vary annually from 1977-2010, using multiplicative $devs$ with $\sigma = 0.1$. The seven candidate models with time-varying growth gave the following results, (" $\Delta(-\ln\text{Like})$ " represents the negative log likelihood relative to the model with the lowest negative log likelihood, and " $\Delta(\text{AIC})$ " represents the value of Akaike's information criterion relative to the model with the lowest AIC; note that, with respect to both of these measures, lower values are better):

Model	$L1\ devs$	$Linf\ devs$	$K\ devs$	Parameters	$\Delta(-\ln\text{Like})$	$\Delta(\text{AIC})$
A	yes	yes	yes	183	0.00	61.09
B	yes	yes	no	149	3.45	0.00
C	yes	no	yes	149	22.31	37.71
D	no	yes	yes	149	101.72	196.52
E	yes	no	no	115	83.10	91.28
F	no	yes	no	115	115.96	157.01
G	no	no	yes	115	147.73	220.55

The candidate model with the lowest value of AIC was chosen as Model 2. Model B has the lowest AIV overall, followed by Models C and A, respectively.

So Model B was chosen to constitute Model 2 in the preliminary assessment.

Both models used the same data file.

- Total catch data for the years 1977-2011, but with two errors 1) the catches do not include catches from the State-managed fishery in 2006-2011; and 2) the datum for 2003 does not include CDQ catches, which would add another 266 t to the reported amount. These errors will be corrected in the final assessment.
- Length frequency data for the years 1982-2010 from both the fishery and the trawl survey.
- Trawl survey abundance and biomass estimates for the years 1980-2010.

The following table summarizes the status of the stock as estimated by Models 1 and 2. "Estimate" is the point estimate, "St. Dev." is the standard deviation of the estimate, "SB(2011)" is female spawning biomass in 2011 (t), and "Bratio(2011)" is the ratio of SB(2011) to $B_{100\%}$.

Quantity	Model 1		Model 2	
	Estimate	St. Dev.	Estimate	St. Dev.
SB(2011)	26,444	6,451	28,171	7,603
Bratio(2011)	0.211	0.021	0.381	0.067

Although SB(2011) is only 7% higher under Model 2 than Model 1, Bratio(2011) is 81% higher under Model 2 than Model 1, implying quite a big difference in how stock status is estimated by these two models.

Figures 20-23 below show various time series as estimated by the two models. Figure 20 shows the time series of total (age 0+) biomass (t), where both models have similar endpoints. Figure 21 shows the time series of spawning biomass relative to $B_{100\%}$, where Model 2 estimates a higher relative spawning biomass than Model 1 most of the years. Figure 22 shows the time series of age 0 recruits (1000s), where Model 1 shows much higher variability than Model 2. Figure 23 shows the time series of relative spawning per recruit corresponding to the estimated fishing mortality rates, where the two models have similar endpoints.

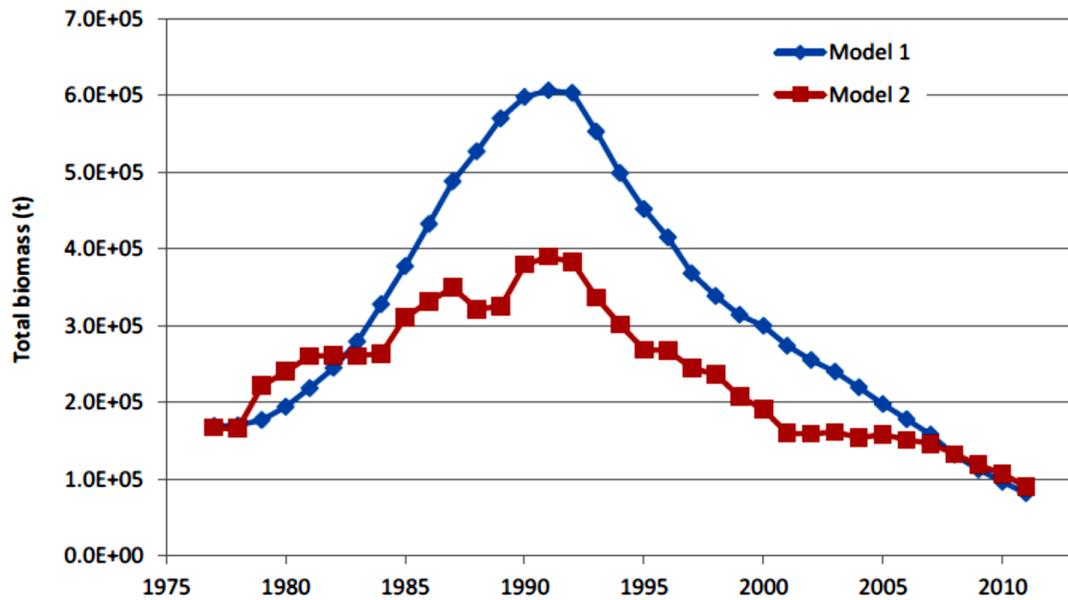


Figure 20. Time series of total (age 0+) biomass (t) as estimated by Models 1 and 2.

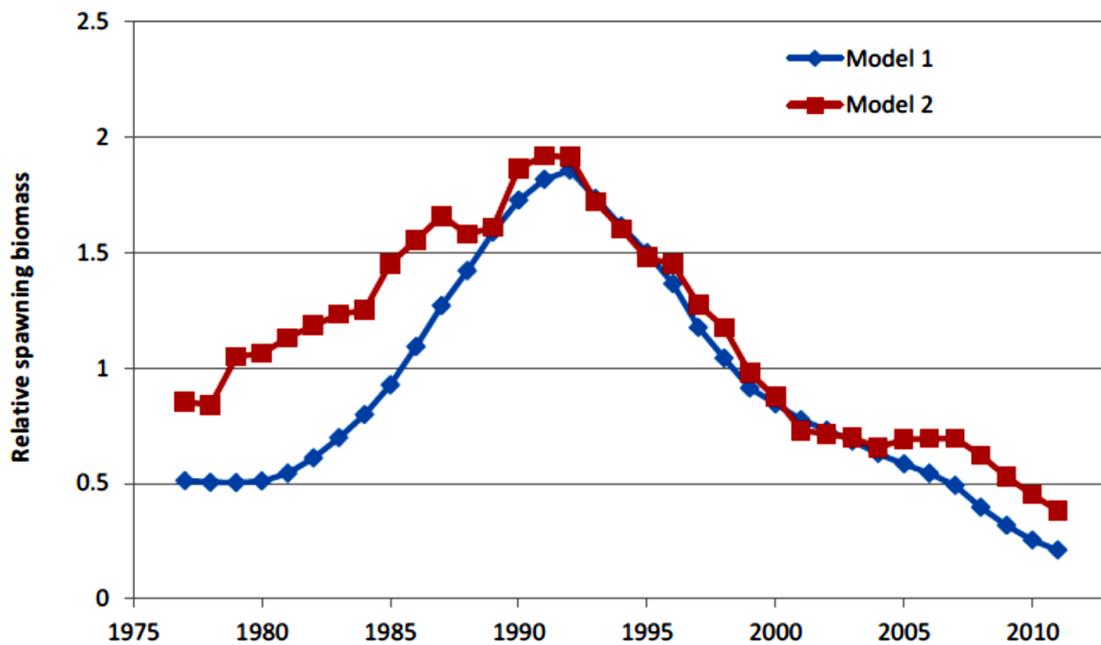


Figure 21. Time series of spawning biomass relative to $B_{100\%}$ as estimated by Models 1 and 2.

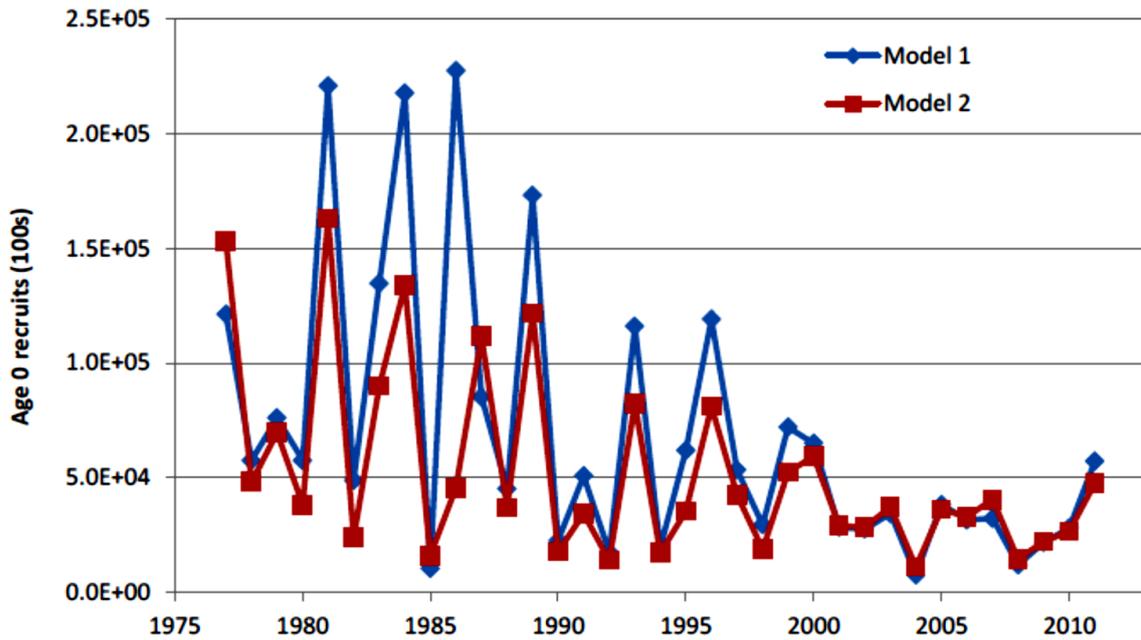


Figure 22. Time series of age 0 recruits (1000s) as estimated by Models 1 and 2.

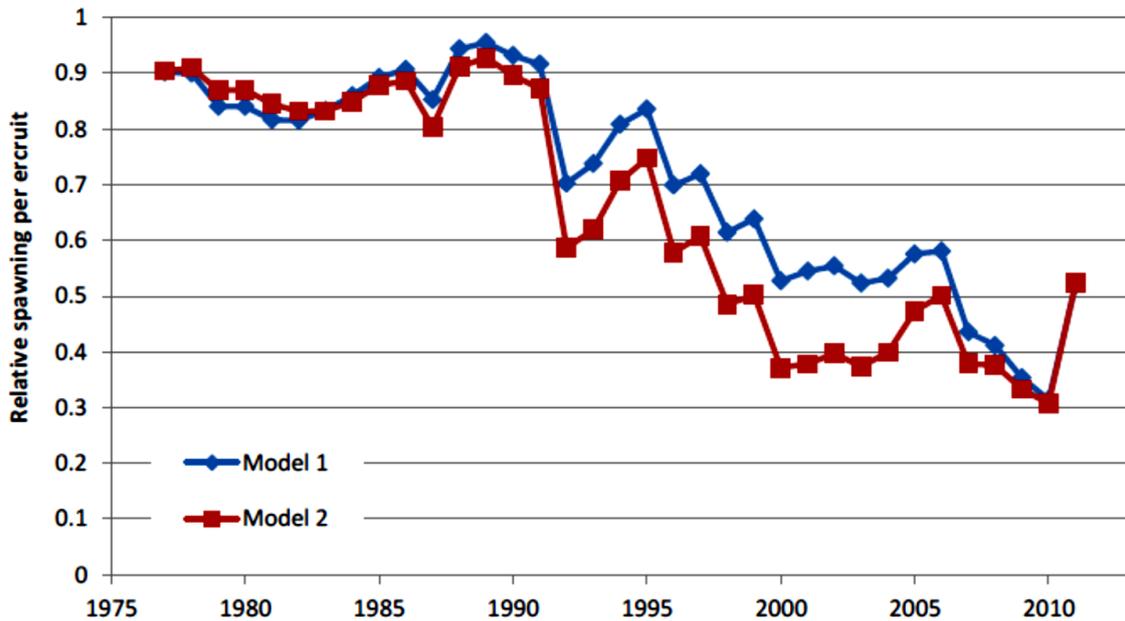


Figure 23. Time series of relative spawning per recruit (RSPR) corresponding to fishing mortality rates as estimated by Models 1 and 2 (higher fishing mortality corresponds to lower RSPR).

In conclusion, the initial exploration of age-structured modeling for Pacific cod in the AI indicates that model structure can have a large impact on the estimated status of the stock. Although this is characteristic of stock assessment modeling in general, it may also be a product of the degree to which the available data for Pacific cod in the AI are uninformative. Relative to Pacific cod in the EBS, Pacific cod in the AI have much larger survey coefficient of variation, much smaller length

composition sample sizes, and virtually no age data. The Plan Teams recommended the Alaska Fisheries Science Center to begin ageing data production for AI Pacific cod.

Both Model 1 and 2 show a sharp trend of decreasing of all the estimated amounts since the 1990's. Especially, the total (age 0+) biomass (Figure 20) and the relative spawning biomass (Figure 21) have the lowest values for the last two years. <http://www.afsc.noaa.gov/REFM/Docs/2012/BSAipcod.pdf>

These results indicated that the AI Pacific cod stock may be decreasing below MSY levels. This issue was raised as a minor non conformance in this FAO-Based RFM assessment. Details are available under Heading 9 "[Non conformances and corrective actions](#)".

The GOA Pacific cod stock assessment

Beginning with the 1994 SAFE report (Thompson and Zenger 1994), a model using the SS1 assessment program (Methot 1986, 1990, 1998, 2000) and based largely on length-structured data formed the primary analytical tool used to assess the GOA Pacific cod stock.

Many changes have been made or considered in the stock assessment model since the 2010 assessment (Thompson et al. 2010). Seven models were presented in 2011's preliminary assessment but Model 3b was selected as the final model by the Scientific and Statistical Committee (SSC). In the Model 3b the parameters governing variability in length were estimated internally, all size composition records were included in the log likelihood function, and the fit to the mean-size-at-age data was not included in the log likelihood function, selectivity and catchability in the 27-trawl survey were both forced to be constant over time, and catchability deviations in the sub-27 survey were given normal priors with mean = 0 and standard deviation = 0.46.

Natural mortality

Since 2007, the GOA assessment adopted a natural mortality M of 0.38. The new value was based on Equation 7 of Jensen (1996) and ages at 50% maturity reported by Stark (2007).

Catchability

In the 2009 assessment (Thompson et al. 2009), catchability for the post-1993 27-trawl survey was estimated iteratively by matching the average (weight by numbers at length) of the product of catchability and selectivity for the 60-81 cm size range equal to point estimate of 0.92 obtained by Nichols et al. (2007). The resulting value of 1.04 was retained for the selected model.

Variability in estimated age

Variability in estimated age in SS is based on the standard deviation of estimated age. Weighted least squares regression has been used in the past several assessments to estimate a proportional relationship between standard deviation and age. The regression was recomputed this year, yielding an estimated slope of 0.072, which gives a weighted R^2 of 0.88. This regression was used for the selected model.

Variability in length at age

In the selected Model 3b, the parameters governing variability in length at age were estimated conditionally.

Weight at length

Season-specific parameters governing the weight-at-length schedule were estimated in the 2010 assessment (based on data through 2008), giving the following values:

Season:	Jan-Feb	Mar-Apr	May-Aug	Sep-Oct	Nov-Dec
α :	8.799×10^{-6}	8.013×10^{-6}	1.147×10^{-5}	1.791×10^{-5}	7.196×10^{-6}
β :	3.084	3.088	2.990	2.893	3.120
Samples:	36,566	29,753	6,950	9,352	2,957

The above parameters were obtained for the selected model.

Maturity

In 2007, the accepted model has used an age-based schedule with intercept = 4.3 years and slope = -1.963 (Stark 2007).

Parameters estimated conditionally

Parameters estimated conditionally in all models include the von Bertalanffy growth parameters, log mean recruitment before and since the 1976-1977 regime shift, annual recruitment deviations, initial fishing mortality, gear-season-and-block-specific fishery selectivity parameters, survey selectivity parameters, and annual deviations in ascending limb of the trawl survey selectivity schedule. In addition Model 3b estimates two parameters describing ageing bias as a linear function of age and two parameters describing the standard deviation of length at age as a linear function of length at age.

Likelihood components

All models include likelihood components for trawl survey relative abundance, fishery and survey size composition, survey age composition, survey mean size at age, recruitment, parameter deviations, and initial catch. In the selected model, the mean size at age component is given zero emphasis.

State waters

There is currently no Pacific cod stock assessment model in the state waters but ADFG shares the trawl survey data with the federal scientists for inclusion in the calculation of ACL removals. Guidelines Harvest Levels in State fisheries are set as a portion of the federal TACs as calculated in the BSAI and GOA areas.

Assessment results

The principal results of the BSAI and GOA Pacific cod assessment are presented in Table 5 and Table 6, respectively.

The age 0 + biomass consist of the biomass of all fish aged 0 years or greater in January of a given year. The spawning biomass consists of the biomass of all spawning females in a given year.

Amendment 56 to the BSAI and the GOA Groundfish Fishery Management Plan defines the “overfishing level” OFL, the fishing mortality rate used to set OFL (F_{OFL}), the maximum permissible ABC, and the fishing mortality rate used to set the maximum permissible ABC (F_{ABC}). Because the reliable estimates of reference points related to the Maximum Sustainable Yield (MSY) are currently not available but reliable estimates of reference points related to spawning per recruit are available, Pacific cod in the BSAI and the GOA have generally been managed under the Tier 3 of the Amendment 56. Tier 3 uses the following reference points: $B_{40\%}$ equal to 40% of the equilibrium spawning biomass that would be obtained in the absence of fishing; $F_{35\%}$ equal to fishing mortality rate that reduces the equilibrium level of spawning per recruit to 35% of the level that would be obtained in the absence of fishing; and $F_{40\%}$ equal to the fishing mortality rate that reduces the equilibrium level of spawning per recruit to 40% of the level that would be obtained in the absence of fishing.

The BSAI and GOA Pacific cod stocks are not overfished and are not approaching an overfishing condition.

Table 5. Principal results of the BSAI Pacific cod assessment based on the selected Model 3b (biomass and catch are in units of t).

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2011	2012	2012	2013
M (natural mortality rate)	0.34	0.34	0.34	0.34
Tier	3b	3a	3a	3a
Projected total (age 0+) biomass (t)	1,560,000	1,750,000	1,690,000	1,720,000
Female spawning biomass (t)				
Projected	358,000	389,000	410,000	437,000
$B_{100\%}$	961,000	961,000	889,000	889,000
$B_{40\%}$	384,000	384,000	355,000	355,000
$B_{35\%}$	336,000	336,000	311,000	311,000
F_{OFL}	0.29	0.31	0.36	0.36
$maxF_{ABC}$	0.25	0.26	0.30	0.30
F_{ABC}	0.25	0.26	0.30	0.30
OFL (t)	272,000	329,000	369,000	374,000
maxABC (t)	235,000	281,000	314,000	319,000
ABC (t)	235,000	281,000	314,000	319,000
Status	As determined last year for:		As determined this year for:	
	2009	2010	2010	2011
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Table 6. Principal results of the GOA Pacific cod assessment based on the selected Model 3b (biomass and catch are in units of t).

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2011	2012	2012	2013
<i>M</i> (natural mortality rate)	0.38	0.38	0.38	0.38
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	428,000	401,300	521,000	530,000
Female spawning biomass (t)				
Projected	124,100	111,900	121,000	127,000
$B_{100\%}$	256,300	256,300	261,000	261,000
$B_{40\%}$	102,500	102,500	104,000	104,000
$B_{35\%}$	89,700	89,700	91,400	91,400
F_{OFL}	0.51	0.51	0.53	0.53
$maxF_{ABC}$	0.42	0.42	0.44	0.44
F_{ABC}	0.42	0.42	0.44	0.44
OFL (t)	102,600	92,300	104,000	108,000
maxABC (t)	86,800	78,200	87,600	91,000
ABC (t)	86,800	78,200	87,600	91,000
Status	As determined last year for:		As determined this year for:	
	2009	2010	2010	2011
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2011/BSA1pcod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf>

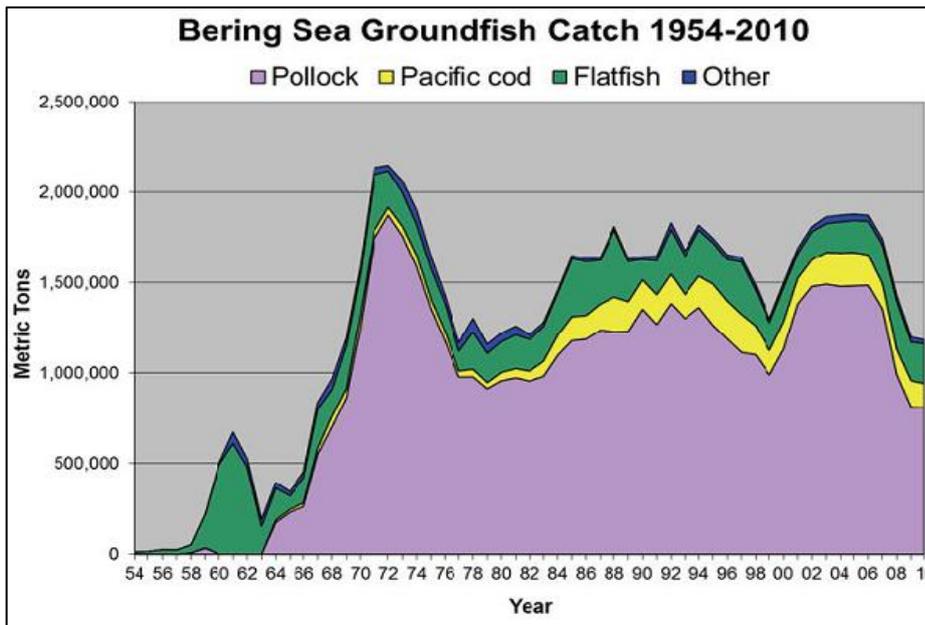
www.afsc.noaa.gov/refm/stocks/plan_team/EBSPcod.pdf

3.5. Historic Biomass and Removals in the Pacific cod Fishery

Historic biomass

Bering Sea Aleutian Islands

The BSAI Pacific cod were taken by Japanese longline and trawl fisheries beginning in the early 1960s. Vessels from the USSR entered the fishery in 1971. Japanese and Russian fisheries harvested



around 50,000 mt annually in the 1970s. Joint ventures became more prevalent in the early 1980s until they were entirely phased out by the domestic fleet a few years later. Catches have remained fairly stable since 1988, averaging 193,000 mt annually (Figure 24 and Figure 25).

Figure 24. Bering Sea groundfish catch from 1954 to 2010.

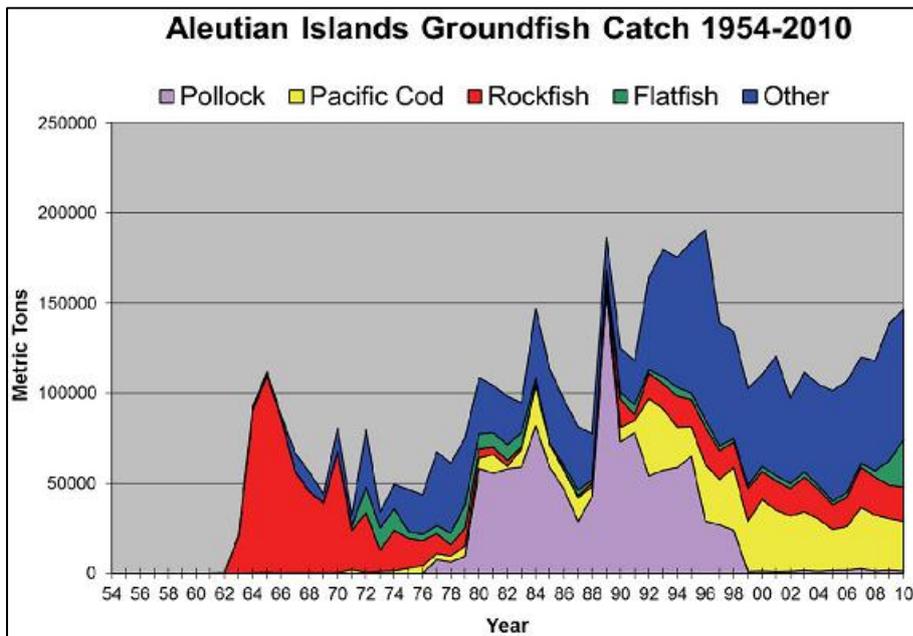


Figure 25. Aleutian Island groundfish catch from 1954 to 2010.

In the BSAI, from 1980 through 2011, TAC averaged about 83% of ABC (ABC was not specified prior to 1980), and from 1980 through 2011 aggregate commercial catch averaged about 90% of TAC. In

10 of these 32 years (31%), TAC equaled ABC exactly, and in 7 of these 32 years (22%), catch exceeded TAC (by an average of 4%). For nearly the past 15 years, the ABC was reduced to reflect the anticipated harvest in state waters. This yielded a federal TAC that accounted for the state water harvest (see Clause 7.1) at the time the annual TAC was set. In two of the years in which overages occurred (2007 and 2010), TAC was reduced by 3% to account for a small state-managed fishery (similar reductions have been made in all years since 2006); thus, while the combined Federal and State catch exceeded the Federal TAC in 2007 and 2010 by about 2%, the overall target catch (Federal TAC plus State GHL) was not exceeded. Total catch has been less than OFL in every year since 1994 (Table 1a).

Gulf of Alaska

The GOA Pacific cod were harvested by foreign fleets targeting higher-values species during the 1970s. By 1976, catches increased to 6,800 mt, and the foreign fisheries peaked in 1981 at 35,000 mt. A small joint venture fishery existed through 1988, averaging about 1,400 mt annually. The domestic fishery increased through 1986 and tripled its catch in 1987 to a catch of nearly 31,000 mt. The GOA Pacific cod fishery was fully harvested by domestic vessels in 1987 (Figure 26).

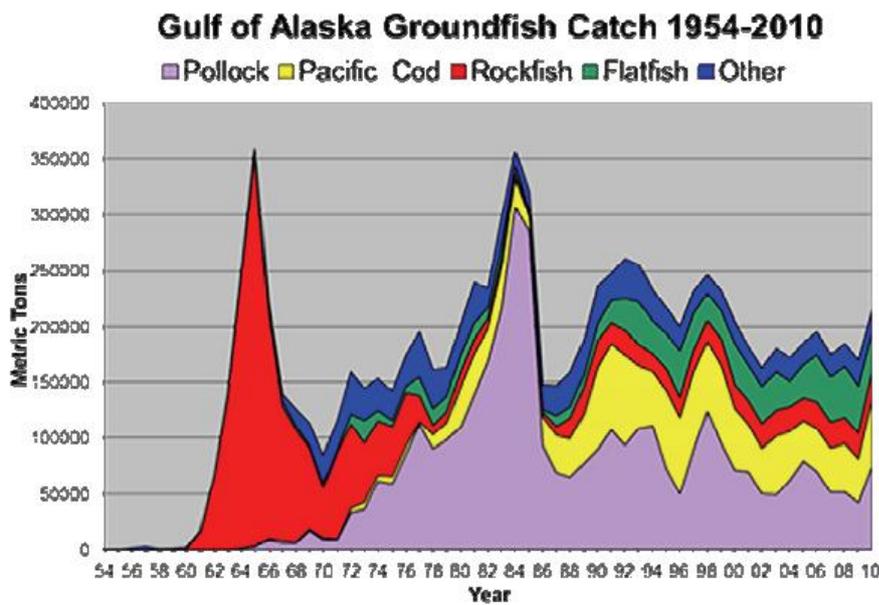


Figure 26. Gulf of Alaska groundfish catch from 1954 to 2010.

For the first year of management under the MSA (1977), the catch limit for GOA Pacific cod was established at slightly less than the 1976 total reported landings. During the period 1978-1981, catch limits varied between 34,800 and 70,000 t, settling at 60,000 t in 1982. Prior to 1981, these limits were assigned for “fishing years” rather than calendar years. In 1981 the catch limit was raised temporarily to 70,000 t and the fishing year was extended until December 31 to allow for a smooth transition to management based on calendar years, after which the catch limit returned to 60,000 t until 1986, when ABC began to be set on an annual basis. From 1986 (the first year in which an ABC was set) through 1996, TAC averaged about 83% of ABC and catch averaged about 81% of TAC. In 8 of those 11 years, TAC equaled ABC exactly. In 2 of those 11 years (1992 and 1996), catch exceeded TAC (Table 2).

Evidence

http://www.fakr.noaa.gov/npfmc/PDFdocuments/resources/Species_Profiles2011.pdf

<http://www.afsc.noaa.gov/REFM/docs/2011/BSApcod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf>

<http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section081.htm>

Incidental catch in the Pacific cod fishery

The BSAI Pacific cod fishery

Incidental catches of non target species in each year 2003-2011 are shown in the Table 7. In terms of average catch over the time series, only giant grenadiers, Scyphozoa jellyfish and sea stars account for more than 200 t per year.

Table 7. Incidental catch (t) of non target species in the BSAI Pacific cod fisheries, 2003-2011.

Species/group	2003	2004	2005	2006	2007	2008	2009	2010	2011
Benthic urochordata	14	4	11	5	1	2	0	10	34
Birds	5	5	6	5	6	4	8	3	3
Bivalves	19	17	6	7	4	11	10	3	9
Brittle star unidentified	1	1	0	1	1	0	0	0	1
Capelin		0			0	0		0	0
Corals bryozoans	26	14	14	13	18	13	14	12	7
Dark rockfish						3	4	4	0
Eelpouts	48	36	42	17	18	7	2	3	3
Eulachon		0	0	0	0	0		0	0
Giant grenadier	2	15	144	195	126	158	213	515	1,067
Greenlings	7	3	2	6	1	1	0	1	0
Grenadier	285	238	193	50	94	15	2	116	10
Gunnels		0	0		0				
Hermit crab unidentified	6	4	2	2	2	1	1	1	1
Invertebrate unidentified	19	6	3	31	22	5	12	45	46
Lanternfishes (myctophidae)		0							
Misc crabs	9	5	5	17	29	6	2	6	3
Misc crustaceans	0	0	1	1	1	0	0	0	0
Misc fish	260	244	225	109	114	54	63	58	92
Misc inverts (worms etc)	0	0	0	0	0	0	0	0	0
Other osmerids	0	0	0	0	0		0	0	0
Pacific sand lance	0	0	0	0	0	0		0	0
Pandalid shrimp	0	0	0	0	0	0	0	0	0
Polychaete unidentified	0	0	0	0	0	0	0	0	0
Scypho jellies	669	710	401	67	113	42	87	42	180
Sea anemone unidentified	92	114	114	87	38	49	119	85	123
Sea pens whips	6	12	30	16	7	9	35	23	24
Sea star	448	429	446	323	244	189	164	154	148
Snails	27	21	13	17	16	20	28	18	18
Sponge unidentified	31	31	32	39	21	6	24	14	13
Stichaeidae	0	0	0	0	0	0	0	0	0
Urchins dollars cucumbers	12	12	13	5	14	3	2	2	4

A short-tailed albatross (listed as endangered under the US Endangered Species Act in 2000) was incidentally caught and killed on a BS Pacific cod fishing hook in late October 2011.

The GOA Pacific cod fishery

Incidental catches of GOA non target species in each year 2003-2011 are shown in Table 8. In terms of average catch over the time series, sea stars account for more than 200 t per year.

Table 8. Incidental catch (t) of non target species in the GOA Pacific cod fisheries, 2003-2011.

Species/group	2003	2004	2005	2006	2007	2008	2009	2010	2011
Benthic urochordata		0		0	0	1	3	0	0
Birds	0	0	0	1	0	1	0	0	0
Bivalves	1	0	1	2	1	2	4	3	6
Brittle star unidentified	0	0	0	0	0	0	0	0	2
Capelin						0			
Corals bryozoans	0	0	0	0	0	0	2	0	1
Dark rockfish						0	3	12	1
Eelpouts	0	0	0	0		0	0	0	0
Eulachon	0		0	2	0	0		1	
Giant grenadier				22	79	31	51	138	76
Greenlings	3	6	1	4	1	7	1	1	1
Grenadier	5	0		1		66	7	0	4
Gunnels						0			
Hermit crab unidentified	1	0	0	1	2	3	4	2	1
Invertebrate unidentified	1	4	0	13	2	1	0	1	8
Misc crabs	1	0	2	1	7	2	2	3	2
Misc crustaceans		0					0		0
Misc fish	86	136	152	176	539	210	99	87	127
Misc inverts (worms etc)				0	0		0		
Other osmerids		0			0	0			
Pacific sand lance		0		0			0		0
Pandalid shrimp			0		0	0	0	0	
Scypho jellies	9	2	1	5	0	0	0	11	1
Sea anemone unidentified	1	2	1	0	5	6	6	7	9
Sea pens whips	0	0	0	3	1		3	3	1
Sea star	468	1009	937	703	301	314	470	868	675
Snails	5	1	5	3	1	1	2	1	1
Sponge unidentified	0	1	1	1	0	1	2	0	0
Stichaeidae	0		0				2		0
Surf smelt			0						
Urchins dollars cucumbers	1	1	1	1	3	1	1	1	2

In addition, the GOA Pacific cod fisheries caught 27% of the total incidental catch of the spiny dogfish (Table 9) and 37% of the total incidental catch of the Pacific sleeper shark (Table 10). Spiny dogfish (*Squalus suckleyi*) is listed under the IUCN Red list as “Vulnerable”. Fisheries and population trend data indicate that the southern part of the Northeast Pacific stock has also declined through overfishing, but stocks appear stable off Alaska.

<http://www.iucnredlist.org/apps/redlist/details/61413/0>

Table 9. Estimated catch (tons) of spiny dogfish in the GOA by fishery, 1990-1996 catch estimated by pseudo-blend estimation procedure (Gaichas et al. 1999). 1997-2001 catch estimated with NMFS new pseudo blend estimation procedure (Gaichas 2002). Years 2003-2010 from NMFS AKRO using the improved pseudo blend estimation procedure. Catch by target fishery and species are not available for 2002. Spiny dogfish do not occur in the Atka mackerel fishery. Bycatch in the halibut fisheries has been estimated by NMFS AKRO since 2003, but is based only on landed sharks and does not include discarded catch.

Fishery	Pollock	Pacific Cod	Flatfish	Rockfish	Halibut	Sablefish	Grand Total	Year % of Total 97-11
1990	57.6	36.0	13.5	1.8		59.0	170.9	
1991	29.3	52.6	16.2	16.4		26.2	141.2	
1992	84.4	50.5	116.0	22.4		40.7	320.6	
1993	137	10.1	138.5	2.4		95.3	383.4	
1994	22	16.9	83.4	2.5		35.4	160.2	
1995	2.8	28.1	24.1	18.4		50.7	140.6	
1996	2.9	15.3	182.6	19.8		79.5	336.9	
1997	2.8	57.6	137.2	326.2		133.7	657.5	8%
1998	4.9	727.2	69.0	3.1		59.6	864.9	10%
1999	8.6	160.2	56.6	4.8		83.4	313.6	4%
2000	18.7	29.4	66.3	146.6		136.6	397.6	5%
2001	11.6	172.8	162.5	25.1		122.1	494.0	6%
2002	-	-	-	-	-	-	-	
2003	6.1	43.6	166.0	35.5	6.6	17.3	275.0	3%
2004	9.2	19.6	15.5	2.3	13.4	123.2	183.2	2%
2005	15.2	27.9	50.1	2.8	17.3	329.3	442.7	6%
2006	50.0	113.2	122.9	2.0	713.2	147.4	1,148.6	14%
2007	47.6	250.2	151.4	6.2	210.5	165.6	831.4	10%
2008	59.6	289.6	87.3	4.8	0.5	91.1	533.0	7%
2009	17.6	113.7	204.8	7.0	603.2	80.7	1,027.1	13%
2010	19.8	118.1	164.0	3.5	21.4	70.8	397.7	5%
2011	1.5	20.0	46.8	0.7	69.1	248.9	387.1	5%
Fishery % of Total	3%	27%	19%	7%	21%	23%		

Table 10. Estimated catch (tons) of Pacific sleeper shark in the GOA by fishery, 1990-1996 catch estimated by pseudo-blend estimation procedure (Gaichas et al. 1999). 1997-2001 catch estimated with NMFS new pseudo blend estimation procedure (Gaichas 2002). Years 2003-2010 from NMFS AKRO using the improved pseudo blend estimation procedure. Catch by target fishery and species are not available for 2002. Bycatch in the halibut fisheries has been estimated by NMFS AKRO since 2003, but is based only on landed sharks and does not include discarded catch.

Fishery	Pollock	Pacific Cod	Flatfish	Rockfish	Atka Mackerel	Halibut	Sablefish	Grand Total	Year % of Total 97-11
1990	2.9	9.9	0.4	4.3	0		2.2	19.7	
1991	27.2	2.8	3.1	0	0		16.2	49.4	
1992	1.1	27.4	2.7	0	0		6.4	37.6	
1993	156.5	21.8	1	0	0		35.5	214.8	
1994	79.6	16.6	0.8	1.3	0		21.2	119.5	
1995	16.9	13.7	20.7	0.1	0		11.6	63	
1996	14.5	11.9	12.1	0	0.2		26.4	65.9	
1997	22.3	59.3	46	0.9	0		7.5	135.9	4%
1998	32.4	19.6	10.1	0.2	0		11.3	74	2%
1999	34.1	505.8	6	3	0		8.7	557.7	17%
2000	178.4	376.8	35.9	0.3	0		16.7	608.2	18%
2001	145.9	65.8	6.3	0.7	0		30.3	249	7%
2002	-	-	-	-	-		-	-	
2003	50.3	56.3	93.0	0.3	0.0	59.1	9.2	268.1	8%
2004	168.9	25.5	73.7	0.8	0.0	8.4	4.2	281.3	8%
2005	196.0	133.8	129.6	0.2	0.0	2.2	18.9	480.7	14%
2006	153.5	13.5	60.4	0.4	0.0	0.8	23.1	251.7	7%
2007	58.9	9.1	222.7	0.0	0.0	3.7	0.7	295.1	8%
2008	47.5	13.2	2.0	1.1	0.0	0.0	0.7	64.6	2%
2009	30.2	4.3	14.5	0.3	0.0	0.0	0.2	49.5	1%
2010	149.6	2.0	7.9	0.0	0.0	0.0	0.4	159.8	5%
2011	2.7	3.9	9.9	2.1	0.0	0.0	4.3	22.9	1%
Fishery % of Total	36%	37%	21%	0%	0%	2%	4%		

There are currently no directed commercial fisheries for shark species in federally or state managed waters of the BSAI and the GOA, and most incidental catch is not retained. Spiny dogfish are allowed as retained incidental catch in some state managed fisheries, and salmon sharks are targeted by some sport fishermen in Alaska state waters. There is no evidence to suggest that overfishing is occurring for any shark species in the BSAI and the GOA because the OFL has not been exceeded.

Total shark catch in 2011 was 417 t in the GOA and 128 t in the BSAI as of October 11, 2011.

Recommendations in the GOA sharks SAFE report recommend that the shark complex be managed with spiny dogfish as a Tier 5 species ($OFL = FOFL (0.097) * 3$ yr average biomass, $ABC = 0.75 * OFL$) and the remaining sharks (Pacific sleeper shark, salmon shark and other sharks) as Tier 6 species ($OFL =$ average catch 1997-2007, $ABC = 0.75 * OFL$). The recommended ABC is 5,766 t and OFL is 7,688 t for the spiny dogfish.

The shark complex (Pacific sleeper shark, spiny dogfish, salmon shark and other/unidentified sharks) in the Bering Sea and Aleutian Island (BSAI) are a Tier 6 complex, with OFL based on maximum historical catch between the years 1997 – 2007 (ABC is 75% of OFL). Changes in the Catch Accounting System did not result in new estimates of maximum historical catch and thus did not

change the proposed ABC/OFL. For 2011 the same ABC and OFL as in last year's assessment are recommended: ABC = 1,020 t and OFL = 1,360 t.

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2011/GOAshark.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/BSAIshark.pdf>

<http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2011.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/ecosystem.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/BSAIpcod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf>

3.6. Economic Value of the Pacific cod Fishery

The Pacific cod fishery is important to the economy of coastal Alaska communities. The CDQ program has been successfully contributing to fisheries infrastructure in western Alaska by funding docks, harbors, vessel acquisition and the construction of seafood processing facilities. The CDQ program has allowed CDQ groups to acquire equity ownership interests in the groundfish that provide additional revenues to fund local in-region economic development projects, and education and training programs. After pollock, cod it is the 2nd largest groundfish fishery in Alaska. The Pacific cod catch in 2010 accounted for 250,300 Mt or 16% of the total 2010 groundfish catch in Alaska, up about 9% from a year earlier (Figure 27). In 2010, ex-vessel value of Pacific cod catch in the BSAI was \$94.4 million and in the GOA was \$43.8 million. The state cod fisheries allow several communities throughout the GOA, not allowed participating in federal fisheries, to benefit from the harvest of this stock. The total ex-vessel value of Pacific cod in Alaska was \$138.3 million in 2010 (Figure 28).

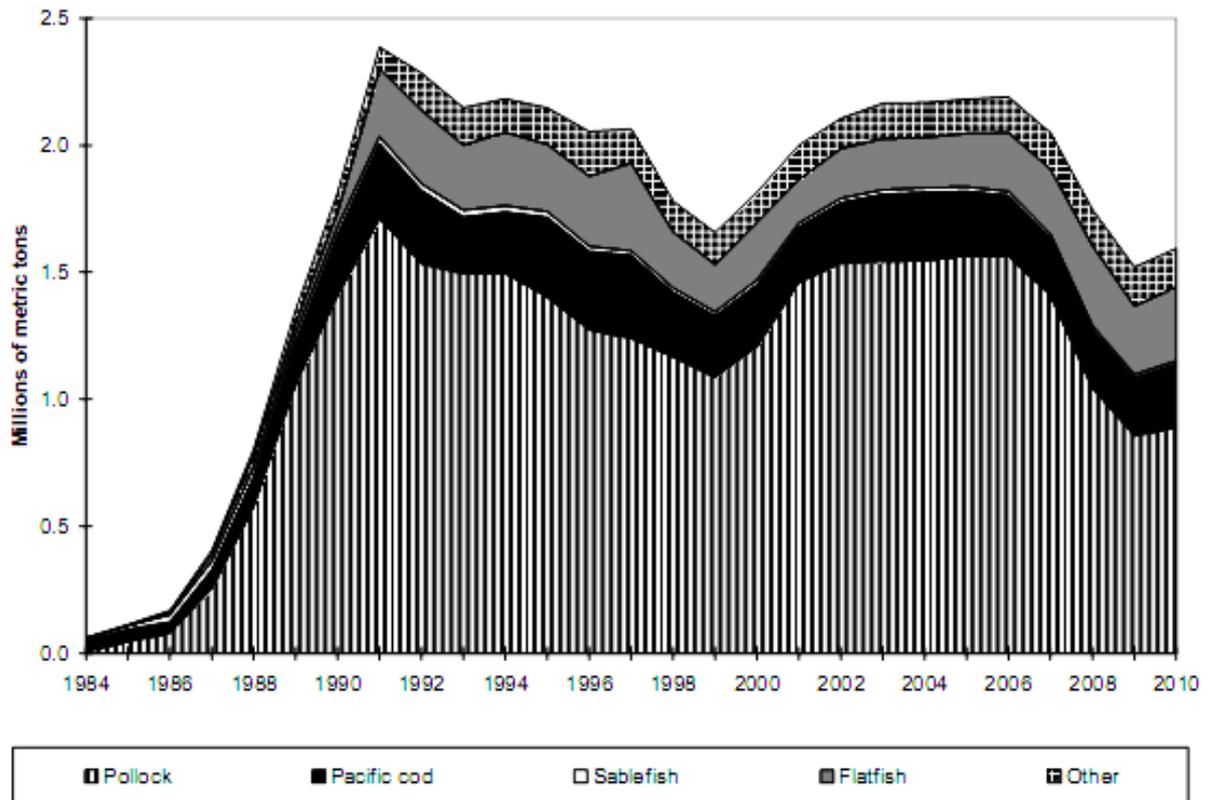


Figure 27. Groundfish catch in the domestic commercial fisheries off Alaska by species, 1984-2010.

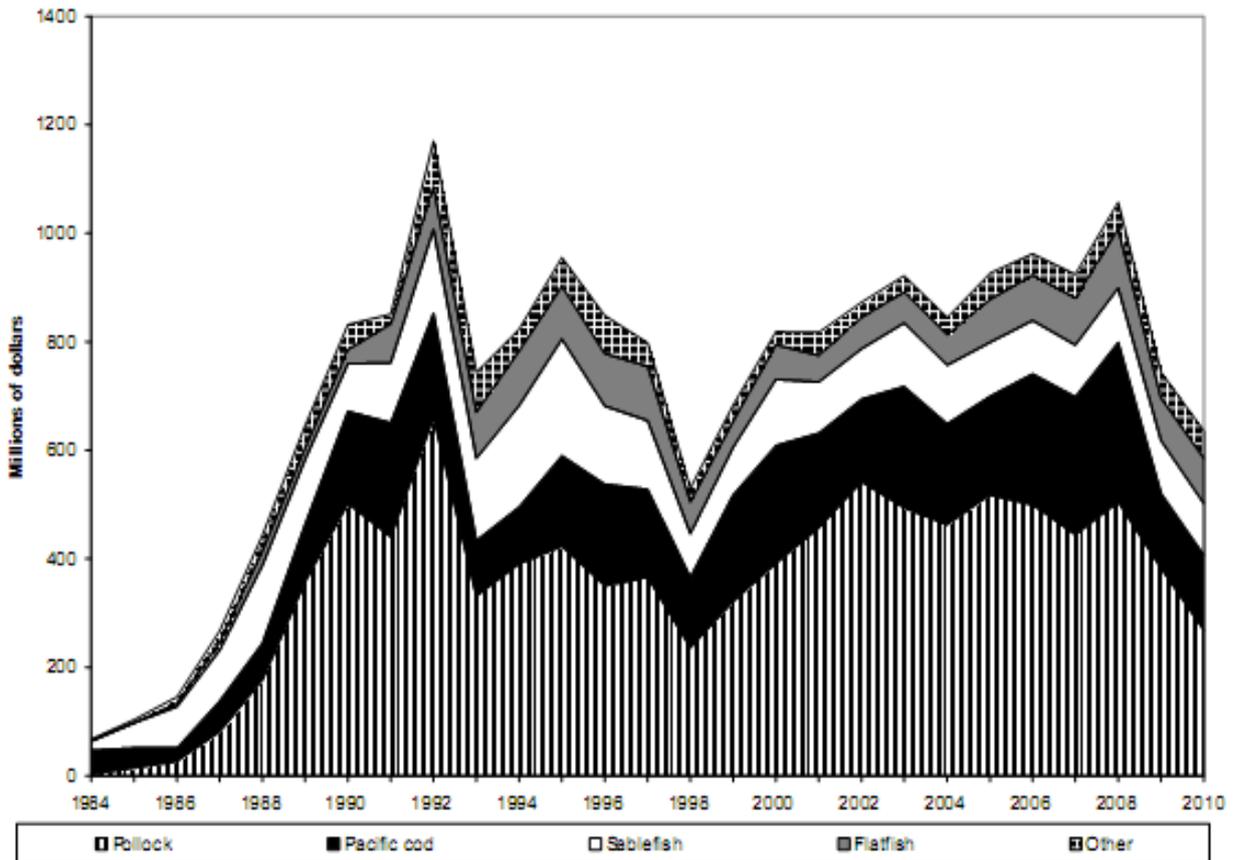


Figure 28. Real ex-vessel value of the groundfish catch in the domestic commercial fisheries off Alaska species, 1994-2010 (base year 2010). Estimates include federal and state fisheries of Alaska.

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2010/economic.pdf>

4. Proposed Units of Assessment

The proposed *Units of Assessment* submitted at the time of Application were reviewed with respect to their appropriateness for undertaking a full assessment. The assessors have reviewed the proposed units of assessment with respect to the application of management functions across all jurisdictions and an examination of the characteristics of each of the management regions to assess the similarities and potential differences during a full assessment of the Alaska Pacific cod fisheries.

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

Unit of Certification			
U.S. ALASKA Pacific Cod Commercial Fisheries			
Fish Species (Common & Scientific Name)	Geographical Location of Fishery	Gear Type	Principal Management Authority
Pacific cod (<i>Gadus macrocephalus</i>)	<i>Gulf of Alaska</i> and <i>Bering Sea & Aleutian Islands</i>	Bottom trawl, Longline, Pot, and Jig gear.	National Marine Fisheries Service (NMFS) North Pacific Fishery Management Council (NPFMC) Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)

5. Site Meetings

5.1. Initial Consultation Meetings

The objectives of the initial consultation meetings were to support information gathering and understanding of the role, functions and activities of the fishery management organizations responsible for US Alaska Pacific cod resources and to further investigate the approach that a full assessment might undertake with respect to the Unit of Certification and the Assessment Units that are proposed.

Consultation meetings were planned based on an initial review identifying the key management organizations and participants. The initial consultation meetings were not designed to be inclusive of all organizations and representatives of the Alaska Pacific cod fisheries. However, the consultation plan was designed to strategically capture sufficient information to ensure understanding and confidence with respect to validation reporting.

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

- The provision of an overview of the FAO-based assessment and certification process to management organizations and fishery representative organizations,
- Responding to any questions and comments raised at this initial stage in the assessment. An overview of the key criteria of the FAO Code of Conduct for Responsible Fisheries, and minimum substantive requirements for ecolabelling of fisheries (FAO Guidelines for the Ecolabelling of Fisheries and Fishery Products) was presented.

All consultation meetings were conducted by Dave Garforth, Lead Assessor. Randy Rice, ASMI Seafood Technical Program Director was also present at some meetings as representative of the fishery applicant representative organization.

Overview of Meeting Plan:

The validation meetings were held between the 28st June to 2nd July 2010, in Juneau, Alaska and in Seattle, Washington.

Summary of Consultation Meetings:

Each meeting served as the primary purpose to introduce the Certification Body, Global Trust, and provide an overview of the FAO-Based RFM assessment approach and process. Key timelines for assessments and the specifics of the proposed assessment and certification units were presented. Immediate questions and concerns expressed by management and participatory organizations were addressed and some key areas which will form part of the full assessment were also addressed. Consultation meetings are intended to provide a briefing of the certification process and link to management organizations for the purposes of carrying out the fishery assessments and to support the next step in the assessment, the planning of full assessments for the fisheries in application.

The following summary Table 11 provides the background to each organization met, and a description of the specific key items discussed.

Table 11: Summary of Consultation Meetings

Date	Organization	Staff Represented	Overview/Key Items
28 th June 2010	United Fishermen of Alaska, 211 4 TH St. Suite 110 Juneau AK 99801-1172 (meeting took place at ASMI Juneau office)	Mark Vinsel, Executive Director GT: Dave Garforth – Lead Assessor.	United Fishermen of Alaska (UFA) is an umbrella association representing 37 Alaska commercial fishing organizations from fisheries throughout Alaska and its offshore waters. Their mission is to promote and protect the common interest of Alaska’s commercial fishing industry, as a vital component of Alaska’s social and economic well-being. Core functions include; providing a legislative presence for members, act as a forum for communication within the fishing industry, maintain a state wide trade organization with staffed office and provide Public relations and educational programs on behalf of members.
28 th June 2010	Alaska Department of Public Safety, Division of Alaska Wildlife Troopers, 2760 Sherwood Lane, Suite 1A PO Box 111201, Juneau AK 99811-1201	Lt. Steven Hall GT: Dave Garforth – Lead Assessor.	Alaska Wildlife Troopers (AWT) is a Division of Alaska Department of Public Safety with responsibility for the protection of Alaska fisheries within State waters. The Division’s resources and strategy for monitoring fishery activity and enforcement purposes in state waters, and interaction with other agencies (ADFG, NMFS, US Coast Guard, Board of Fisheries) were discussed.
28 th June 2010	U.S. Department of Commerce, National Oceanic & Atmospheric Administration, National Marine Fisheries Service, Alaska Region PO Box 21668; 709 W 9 th St Juneau AK. 99802-1668	Robert (“Doug”) Mecum, Deputy Regional Administrator, Alaska Region GT: Dave Garforth – Lead Assessor.	NOAA National Marine Fisheries Service (NMFS, also called NOAA Fisheries) is responsible for the management, conservation, and protection of living marine resources within the U.S. Exclusive Economic Zone. The Alaska Region of NOAA Fisheries oversees fisheries that produce about half the fish caught in US waters, with responsibilities covering 842,000 square nautical miles off Alaska. NMFS works with the fishery management councils and commissions to develop and implement management regulations and also for the conservation of wildlife such as marine mammals and habitat conservation. The meeting provided an opportunity to discuss the assessment approach and outline the various steps in the assessment process.

<p>28th June 2010</p>	<p>Alaska Department of Fish and Game, Division of Commercial Fisheries PO Box 115526 1255 W 8th St. Juneau AK 99811-5526</p>	<p>Eric Volk, Chief of Research for Anadromous Fisheries Sue Aspelund, Deputy Director Denby Lloyd, Commissioner (present for introductions) GT: Dave Garforth – Lead Assessor.</p>	<p>ADFG’s mission is to protect, maintain, and improve the fish, game, and aquatic plant resources of the state, and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle.</p> <p>Their main role is to conserve and develop the fishery resources of the state. This involves setting seasons, catch limits, management methods and means for the state’s subsistence, commercial, sport, guided sport, and personal use fisheries, and it also involves setting policy and direction for the management of the state’s fishery resources. The board is charged with making allocative decisions, and the department is responsible for management based on those decisions.</p> <p>The meeting provided an opportunity to present the key features of the assessment process, discuss the broad mission and responsibility of ADFG.</p>
<p>29th June 2010</p>	<p>U.S. Department of Homeland Security, Coast Guard, District 17 P.O Box 25517, Juneau, AK 99802-5517</p>	<p>Cpt. Michael Cerne GT: Dave Garforth – Lead Assessor.</p>	<p>The United States Coast Guard is a military, multi-mission, maritime service within the Department of Homeland Security. Its core roles are to protect the public, the environment, and U.S. economic and security interests in any maritime region in which those interests may be at risk, including international waters and America's coasts, ports, and inland waterways.</p> <p>Protect America's maritime borders from all intrusions by: preventing illegal fishing; and suppressing violations of federal law in the maritime arena.</p> <p>The US Coast Guard is responsible for fishery law enforcement beyond the 3 mile zone. Operations are combined with both State and other federal resources. The US Coast Guard shares intelligence and seacraft (often include AWT staff) with the other agencies involved in MCS (Monitoring, Control and Surveillance), including, NMFS and ADFG. Duties include Alaska Pacific cod fishery regulations enforcement.</p> <p>US Coast Guard also attends the fishery conferences and meetings of the principal management agencies, NPFMC where understanding and contribution through advice on the practical implementation of management proposals and regulations can be transferred</p>

			<p>to support effective enforcement-based activities.</p> <p>During the visit, attendance at the daily, morning briefing for staff and a visit to the surveillance control center also took place, discussions on US Coast Guard responsibilities for the 5 year strategic fishery plan and resources for monitoring, control and enforcement for all Alaska state fisheries including Alaska Pacific cod fisheries.</p>
2 nd July 2010	<p>U.S. Department of Commerce, National Oceanic & Atmospheric Administration, National Marine Fisheries Service,</p> <p>Alaska Fishery Science Center, 7600 Sand Point Way NE. Seattle WA. 98115</p>	<p>Dr. Bill Karp, Deputy Director for Science and Research</p> <p>GT: Dave Garforth – Lead Assessor.</p>	<p>The Alaska Fisheries Science Center is the research branch of the National Oceanic and Atmospheric Administration's National Marine Fisheries Service responsible for research on living marine resources in the coastal oceans off Alaska and off parts of the west coast of the United States. The mission of the Alaska Fisheries Science Center is to generate the scientific information and analysis necessary for the conservation, management, and utilization of the region's living marine resources. The Center provides scientific data and analysis and technical advice to the NMFS Alaska Regional Office, North Pacific Fishery Management Council, Alaskan coastal subsistence communities, and U.S. representatives participating in international fishery and marine mammal negotiations and to the fishing industry and its constituents. The Center also coordinates fisheries habitat and marine mammal research, with other Federal and state agencies, academic institutions, and foreign nations. Among other items, fishery stock surveys and assessments, observer programs, and Stock Assessment and Fishery Evaluation (SAFE) reports are routinely produced.</p>
2 nd July 2010	<p>Trident Seafoods Corp. 5303 Shilshole Ave NW</p> <p>Seattle, WA</p> <p>98107-4000</p>	<p>Joe Logan, Corporate QA</p> <p>GT: Dave Garforth – Lead Assessor.</p>	<p>Trident Seafoods is a vertically integrated harvester, processor and marketer of seafood from Alaska, the Pacific Northwest and around the world. Founded in 1973, they are a privately held, American owned corporation operating offshore processors and shore-side plants throughout Alaska and the Pacific Northwest. The Trident trawl catcher processor fleet is comprised of 3 vessels ranging in size from 270 to 300 ft. These vessels operate in the Bering Sea, Aleutian Islands, Washington and Oregon with the majority of the harvesting operations taking place in the Bering Sea with the primary target species for these vessels being Pollock and flatfish which are targeted in the spring and fall. Discussions centered upon assessment approach and requirements for both fisheries and supply chains (Chain of Custody).</p>

<p>2nd July 2010</p>	<p>Pacific Seafood Processors Assn 199 W. Emerson Place Suite 205 Seattle WA 98119</p>	<p>Glenn Reed, President GT: Dave Garforth – Lead Assessor.</p>	<p>PSPA is a non-profit trade organization established in 1914 to address issues of concern to member seafood companies including both at sea processors and shore based processors. Current Corporate members include: Alaska General Seafoods, Alyeska Seafoods, Inc., Golden Alaska Seafoods, LLC, North Pacific Seafoods, Inc., Peter Pan Seafoods, Inc., Phoenix Processor Limited Partnership, Trident Seafoods, Inc. and UniSea Inc., Westward Seafoods, Inc. PSPA members produce and market products from salmon, crab, halibut, cod, pollock and a variety of other seafood species. These products are marketed domestically and around the globe. Key points of discussion focused on the assessment approach, the definition of non conformances and the merits of eco-labelling in the supply chain.</p>
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5.2. On-Site Witnessed Assessment and Consultation Meetings

On-site visits for full assessment purposes took place in September 2012. These were additional visits to the initial consultation meetings reported in the previous section. There are two types of on-site assessment activities; meetings with fishery management organizations to discuss various aspects of the assessment and witnessed assessment, which takes the form of witnessing specific management processes and functions, such as publically accessible NPFMC meetings where possible.

The schedule of on-site activities is provided in Table 12 below with a summary of the activity, meeting and discussion. Meetings were used to document information that either confirmed, clarified or substantiated aspects of the assessment and provided an opportunity for organizations to contribute and clarify information to support the assessment.

Table 12. Summary of onsite meetings for Alaska Pacific cod, September 2012.

Date	Organization	Staff Represented	Overview/Key Items
17 th Sept. 2012	United Fishermen of Alaska (meeting took place at ASMI Juneau office).	Mark Vinsel, Executive Director. GT: Vito Romito - Assessor, Dave Garforth –Lead Assessor.	<p>United Fishermen of Alaska (UFA) is an umbrella association representing 37 Alaska commercial fishing organizations from fisheries throughout Alaska and its offshore waters. Their mission is to promote and protect the common interest of Alaska’s commercial fishing industry, as a vital component of Alaska’s social and economic well-being. Core functions include; providing a legislative presence for members, act as a forum for communication within the fishing industry, maintain a state wide trade organization with staffed office and provide Public relations and educational programs on behalf of members.</p> <p>Points discussed: Unit of certification; very small SEAK cod bait fishery; Community Development Quota in Western Alaska; Coastal community Coalition in the GOA; Kodiak Jig fishery open access; Alaska Coastal Management Plan defeated 61 to 39; participation of UFA in NEPA process (Kensington mine Juneau); CFEC permitting for State waters; Alaska Longline Fisheries Association (bycatch hotspot program); Fisheries Conservation Network; National Pollutant Discharge Elimination System (NPDES) permit program; Vessel Monitoring Systems; Alaska Groundfish Databank.</p>
19 th Sept 2012.	Alaska Department of Public Safety, Division of Alaska Wildlife Troopers, 2760 Sherwood Lane, Suite 1A PO Box 111201, Juneau AK 99811-1201	Lt. Steven Hall GT: Vito Romito - Assessor, Dave Garforth –Lead Assessor.	<p>Alaska Wildlife Troopers (AWT) is a Division of Alaska Department of Public Safety with responsibility for the protection of Alaska fisheries within State waters. The Division’s resources and strategy for monitoring fishery activity and enforcement purposes and interaction with other agencies (ADFG, NMFS, US Coast Guard, Board of Fisheries) were discussed. Points discussed: unit of certification; cod harvest catch regulations; SEAK cod bait fishery; type of violations; AWT stations and responsibility; P.cod BOF proposal of changes in regulations; State fisheries administrative penalties; penalty sections in statutes (16.05.723); federal administrative penalties and court system; dockside sampling by ADFG; parallel fisheries system (temporal rather than spatial); permits revoking system; CFEC issuance and revoking of permits).</p>

<p>18th Sept. 2012.</p>	<p>Alaska Department of Fish and Game, Division of Commercial Fisheries PO Box 115526 1255 W 8th St. Juneau AK 99811-5526</p>	<p>Sue Aspelund - Deputy Director; Scott Kelly - SEAK (Region I) Regional Supervisor; Forrest Bowers - SEAK Region regional Management Coordinator (Shellfish/Groundfish); Sherry Dressel - SEAK Region Biometrician III; Kristen Green - SEAK Region groundfish project leader; Tim Baker – Central Region (Region II) Regional Management coordinator – Lower Cook Inlet, Upper Cook Inlet, and Groundfish/Shellfish; Elisa Russ – Acting Central Region Groundfish and Shellfish Management biologist; Maria Wessel – Prince William Sound groundfish and Shellfish Assistant Management biologist; Mark Stichert – Westward Region (Region IV) Kodiak,</p>	<p>ADFG’s mission is to protect, maintain, and improve the fish, game, and aquatic plant resources of the state, and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle. They manage the Pacific cod state fisheries in Prince William Sound, Cook Inlet, Kodiak, Chignik, South Alaska Peninsula, and Aleutian Islands.</p> <p>Their main role is to conserve and develop the fishery resources of the state. This involves stock assessment activities, setting seasons, catch limits, management methods and means for the state’s subsistence, commercial, sport, guided sport, and personal use fisheries, and it also involves setting policy and direction for the management of the state’s fishery resources. The Board of Fisheries (BOF) is charged with making allocative decisions, and the department is responsible for management based on those decisions.</p> <p>Points discussed: Unit of certification; apportionment of state catches as a percentage of the federal TAC, based on abundance; federal survey coverage of survey and state waters; combined ABC for Aleutian Islands (AI) and Bering Sea (BS); catch accounting system; parallel fisheries accrue to federal TAC; State adoption of federal regulations in parallel fisheries and furthering of State regulations; socio-economic studies and allocation function of the BOF; State GHL debited from federal TAC; fishery management plans available for all state and federal fisheries; State fisheries access; exclusive area requirements of vessels; fisheries regulations regarding trawl and pot gear usage in State waters; setting and percentages of bycatch limits; identification of critical habitat areas in State waters; fish tickets; regulation about discards; bycatch in PWS longline vessels; no trawl cod fishery in State waters; difference between crab and groundfish pots; biodegradable twines and escape mechanisms in State waters; A,B,C seasons and Stellar Sea Lion measures; no minimum landing size, largely regulated by market forces; fast paced fishery minimizing potential high-grading issues; spatial segregation of juvenile and adult cod; dockside sampling measuring weight, length, maturity (opportunistic and random), metrics collected by State similar to federal to allow integration; bait used in cod fisheries (herring, mackerel and octopus); minimal violations for cod; statewide policy for ecosystem protection; stellar sea lions closures; State management of endangered species.</p>
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		<p>Chignik and Alaska Peninsula Shellfish/Groundfish Area Manager.</p> <p>GT: Vito Romito - Assessor, Dave Garforth - Lead Assessor.</p>	
<p>21st Sept. 2012.</p>	<p>Groundfish Forum/ Alaska Seafood Cooperative.</p> <p>4241 21st Avenue W., Suite 302 Seattle, WA 98199, U.S.A.</p>	<p>Groundfish Forum: Lori Swanson – Executive Director; John Gauvin – Resource Economist</p> <p>Alaska Seafood Cooperative: Jason Anderson - Coop Manager</p> <p>GT: Vito Romito - Assessor, Dave Garforth - Lead Assessor.</p>	<p>Formed in 2008, the Alaska Seafood Cooperative (AKSC), formerly the Best Use Cooperative, is a group of “catcher processor” fishing companies interested in working to improve the management of Bering Sea flatfish and other non-pollock groundfish fisheries. Working with federal scientists, the AKSC has almost entirely eliminated its impact on the seafloor and bottom-dwelling marine species. The Alaska Seafood Cooperative fleet is leading the way under a new federal “catch share” program that allocates fixed amounts of Pacific cod, yellowfin sole, rock sole, Pacific ocean perch and Atka mackerel to the Cooperative. In return the fleet agreed to increase the amount of fish retained, to reduce bycatch and to promote sustainable fishing practices. The Groundfish Forum is a trade association that currently represents 5 trawl companies that fish for flatfish such as rock sole, yellowfin sole, flathead sole, as well as Atka mackerel and Pacific cod in the Bering Sea and Gulf of Alaska. These companies own the majority of the H&G (“Head & Gut”) vessels in the North Pacific. The Groundfish Forum was formed in 1996 to craft meaningful solutions to problems such as discards, incidental catches, and impact on habitat. Groundfish Forum’s mission is to inform state and local government officials of the contributions made by the H&G fleet to the economies of Alaska and the Pacific Northwest. Groundfish Forum has also recognized the importance of resource conservation and continues to keep an open approach to working with regulators, government officials, and the public in order to keep our industry economically viable in the years to come.</p> <p>Points discussed: Unit of Certification: cod fleet structure; other target species; AKSC gets the</p>

			<p>quota and distributes it between vessels and keeps them accountable; allocation of cod under amendment 85; observer coverage; catcher processors mainly target flatfish, high level observer coverage; in the GOA mainly shallow water flatfish fishery catches cod as bycatch; halibut and crab PSC; issues of cod bycatch has driven improvements in the flatfish fishery; BSAI fleet; Essential Fish Habitats effects of fishing and recovery; trawling effects on epifauna in BSAI and GOA; not significant effects in large scale; small scale impact is relative moderate; little towing time in fleet; AI and BSAI footprint; modifications to trawl gear to decrease habitats effects; major environmental analysis on trawl modifications and bottom effects; modification are legal requirements for flatfish but also used for cod; reduction of halibut bycatch by halibut excluder device; rationalization of BSAI trawl fleet sector under amendment 80 of BSAI FMP; increased retention of fish under the Groundfish Retention Program; cod full retention; gear modification used in GOA and BSAI.</p>
<p>20th Sept. 2012.</p>	<p>North Pacific Fisheries Management Council. 605 West 4th, Suite 306, Anchorage, AK, U.S.A.</p>	<p>Chris Oliver – Director; David Witherell – Deputy Director; Jane DiCosimo – Senior Plan Team coordinator.</p> <p>GT: Vito Romito - Assessor, Dave Garforth - Lead Assessor.</p>	<p>The North Pacific Fishery Management Council (NPFMC) is one of eight regional councils (www.fisherycouncils.org) established by the Magnuson Fishery Conservation and Management Act in 1976 (which has been renamed the Magnuson-Stevens Fishery Conservation and Management Act) to oversee management of the nation's fisheries. With jurisdiction over the million square mile Exclusive Economic Zone (EEZ) off Alaska, the Council has primary responsibility for groundfish management in the Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands (BSAI), including cod, pollock, flatfish, mackerel, sablefish, and rockfish species harvested mainly by trawlers, hook and line longliners and pot fishermen. The Council also makes allocative and limited entry decisions for halibut, though the U.S. - Canada International Pacific Halibut Commission (IPHC) is responsible for conservation of halibut. Other large Alaska fisheries such as salmon, crab and herring are managed primarily by the State of Alaska.</p> <p>Points discussed: stellar Sea Lion (SSL) biological opinion and recent CIE review; SSL measures; octopus bycatch in cod fishery (pot gear); SEAK cod fishery (bait fishery) accounted for in stock assessment; Pacific cod structure in Alaska; Separate stock assessment report for Aleutian</p>

			<p>Islands (AI) cod in development; stock in AI seems to be declining; EBS model is expanded into AI; stellar sea lion protection measures in the AI close a large amount of the AI to cod fishing; BOF and Council inter-agency meetings; NPFMC acceptance of electronic comments; total catch accounting, databases in continual development; AFKIN catch accounting and observer program; almost 100% coverage in Bering Sea cod vessels but less in the GOA as vessel are generally smaller; new requirements for increased observer coverage in GOA vessels due to restructured groundfish observer program and 2013 implementation; economic SAFE; closed access federal fisheries in GOA and the BSAI; reduction of halibut PSC; halibut bycatch is probably the most limiting factor in the P. cod fishery; salmon bycatch counted and discarded by observer; discussions for a salmon bycatch cap in the GOA cod fishery; habitat interactions of trawl cod fleet; habitats of particular concern; skate egg nurseries potential closures; Bristol Bay red king crab habitat spawning areas fishing effects (Council review in February 2013); CIE review for survey methodology groundfish trawl survey; CIE review of stock assessment models for cod; NMFS survey, fishery SAFE and ecosystem SAFE; BSIERP ecosystem modeling; improvement of uncertainty measures in cod; bottom trawl sweeps modifications; salmon and halibut excluder devices; circle hooks, scare lines, line shooters requirements for longline vessels; SSL closures maps; VMS compulsory on cod vessels.</p>
<p>14th Sept. 2012</p>	<p>Alaska Seafood Marketing Institute, 150 Nickerson Street Suite 310 Seattle, WA, U.S.A.</p>	<p>Randy Rice – Seafood Technical Program Director. GT: Vito Romito - Assessor, Dave Garforth - Lead Assessor.</p>	<p>The Alaska Seafood Marketing Institute is the client for the FAO RFM Alaska Pacific cod assessment. ASMI is a public-private partnership between the State of Alaska and the Alaska seafood industry established to foster economic development of a renewable natural resource. ASMI is playing a key role in the repositioning of Alaska’s seafood industry as a competitive market-driven food production industry. Its work to boost the value of Alaska’s seafood product portfolio is accomplished through partnerships with retail grocers, foodservice distributors, restaurant chains, foodservice operators, universities, culinary schools, and the media. It conducts consumer campaigns, public relations and advertising activities, and aligns with industry efforts for maximum effectiveness. ASMI also functions as a brand manager of the Alaska Seafood family of brands.</p> <p>Points Discussed: Unit of Certification; federal and state fisheries.</p>

6. Assessment Outcome Summary

This section provides a summary of the outcome of evidence that has been evaluated by the Assessment Team for the conformance of US Alaska Pacific cod fisheries to the FAO-Based RFM Conformance Criteria. The summary information is presented for each of the fundamental clauses (1 to 13) that form the FAO-Based RFM Conformance Criteria. These are divided into the 6 key components of responsible fisheries management (A-F).

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

Section 7 documents the more detailed outcomes of the evidence that has been reviewed, evaluated and presented for each of the individual supporting clauses of the FAO-Based Conformance Criteria. Please note that the evidence provided for some clauses may be repetitious due to the overlapping nature of the FAO-Based Conformance Criteria clauses and relative requirements.

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.**

The primary layer of governance for the Alaska Pacific cod fisheries is dictated by the Magnuson Stevens Act (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 (FMP) must be consistent. Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, an FMP and any necessary amendments, for each fishery under its authority that requires conservation and management actions, i.e. the annual setting of OFL/ABC/TAC/ACL. While the State of Alaska mostly adopts complimentary regulations, even imposing an annual State Emergency Order that adopts federal Regulations in most management areas, state regulations are used to manage 0-3 nm & inside waters (areas not subject to MSA).

The federal Fishery Management Plans (FMPs), more specifically, 1) the GOA Groundfish FMP, and 2) the BSAI Groundfish FMP govern the management of the Pacific cod federal fisheries. In federal waters (3-200 nm), Alaska Pacific cod fisheries are managed by the NPFMC and the NMFS Alaska Region. The NPFMC submits their recommendations/plans to the NMFS for review, approval, and implementation. The 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, NMFS Alaska Regional Office conducts biological studies, stock survey and stock assessment reports. The US Coast Guard (USCG) is responsible for enforcing these FMPs at sea, in conjunction with NMFS enforcement ashore. Also, the USCG enforce 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.

In state waters (0-3 nm), Alaska Pacific cod fisheries are managed by the ADFG and the Alaska Board of Fisheries (BOF). There are seven state-managed Pacific cod regions: Kodiak, Chignik, South Alaska Peninsula, Aleutian Islands, Southeast Alaska, Prince William Sound, and Cook Inlet. Each area, apart from Southeast Alaska, supports two distinct Pacific cod fisheries. The first fishery is managed concurrent to the federal BSAI or GOA fishery, and is referred to as the parallel fishery. The parallel fishery is managed by the State adopting most of the NMFS rules and management actions (5 AAC 28.087), including seasons, and catch in this fishery is counted towards federal quotas. The second fishery in each area is referred to as the state-waters (or state-managed) fishery. The state-waters fishery is managed independently of the federal/parallel fishery by the ADFG under guidelines developed by the BOF (Guiding principles for groundfish fishery regulations 5 AAC 28.089 and BOF groundfish FMP 5 AAC 28.081). Six of the seven state-water fisheries are subject to an annual Guideline Harvest Level (GHL) calculated as a percentage of federal fishery quotas. The Alaska Wildlife Troopers enforce fishery state waters regulations from 0-3 nm. More than 90% of Alaska Pacific cod is harvested in the federal BSAI and GOA fisheries, and is therefore studied, managed, and enforced under the federal Groundfish FMPs.

Current management measures consider the whole stock biological unit (i.e. structure and composition contributing to its resilience over its entire area of distribution, the area through which the species migrates during its life cycle and other biological characteristics of the stock). Recent studies on genetic structure of Pacific cod in the North Pacific Ocean demonstrate a clear isolation by distance (IBD) pattern, suggesting restricted gene flow, and thus a substantial amount of self-recruitment, among putative stock components at spatial scales relevant to current fisheries management and conservation practices (e.g. EBS, AI and GOA). Samples from the coast of Washington State and British Columbia were distinct from those in Alaska and, to a lesser degree to each other. Also, these samples were significantly different from those of China, Korea and Japan indicating a deep genetic subdivision between populations from Asia and North America. Moreover, the empirical evidence for discrete stocks of Pacific cod between the Russian and US EEZs (Eastern/Western Bering Sea) is also available.

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.

The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes, a socio-economic and biological/environmental impact assessment of various proposed scenarios, before the path of action is decided. This occurs whenever resources under their management may be affected by other developments and each time they create, renew or amend regulations. 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 significant 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 can be and are accounted for.

The state is a cooperating agency in the NEPA process for federal actions, so that gives the State of Alaska a seat at the table for federal actions. This includes decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users.

Overall, the NEPA process, existing agencies and processes (e.g. ADFG, the Alaska Department of Environmental Conservation, the Department of Natural Resources (DNR), US Fish and Wildlife Service, the Alaska National Interest Lands Conservation Act, the DNR's Office of Project Management and Permitting and Bureau of Ocean Energy Management), and the existing intimate and routine cooperation between federal and state agencies managing Alaska's coastal resources (living and non-living) is capable of planning and managing coastal developments in a transparent, organized and sustainable way, that minimizes environmental issues while taking into account the socio-economic aspects, needs and interests of the various stakeholders of the coastal zone.

The Alaska Board of Fisheries (BOF) main role is to conserve and develop the fishery resources of the state. The board is charged with making allocative decisions, and ADFG is responsible for management based on those decisions. The BOF meets four to six times per year in communities around the state to consider proposed changes to fisheries regulations around the state. Advisory committees are the local "grass roots" groups that meet to discuss fish and wildlife issues and to provide recommendations to the boards. There are 82 committees throughout the state each with expertise in a particular local area. This process ensures that the local communities' customary uses and practices are considered.

The NPFMC system was designed so that fisheries management decisions were made at the regional level to allow input from affected stakeholders which assures that the rights of coastal communities and their historic access to the fishery is included in the decision process. NPFMC meetings are open, and public testimony - both written and oral - is taken on each and every issue prior to deliberations and final decisions. Public comments are also taken at all Advisory Panel and Scientific and Statistical Committee meetings. Each NPFMC decision is made by recorded vote in public forum after public comment. Final decisions then go to NMFS for a second review, public comment, and final approval. Decisions must conform to the MSA, the NEPA, Endangered Species Act, Marine Mammal Protection Act, and other applicable law including several executive orders. The NPFMC meets five times each year, usually in February, April, June, October and December, with three of the meetings held in Anchorage, one in a fishing community in Alaska and one either in Portland or Seattle. Most NPFMC meetings take seven days, with the AP and SSC usually following the same agenda and meeting two days earlier

The BOF and the NPFMC have signed a joint protocol agreement to help coordinate compatible and sustainable management of fisheries within each organization's jurisdiction. A committee was formed, the Joint Protocol Committee, which includes three members from each group that meets at least once a year to identify and discuss issues of mutual interest. The entire BOF and NPFMC

meet jointly once a year to consider proposals, committee recommendations, the analyses, and other topics of mutual concern. The joint meeting is typically held in Anchorage in February, depending upon council and board meeting schedules.

The Community Development Quota (CDQ) Program is a federal fisheries program that involves 65 communities within a fifty-mile radius of the Bering Sea coastline who participate in the BSAI crab and groundfish fisheries and are allocated 10% of the harvest privileges for the species, including Pacific cod.

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

Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. The GOA and BSAI Groundfish FMPs, under which Pacific cod in the federal waters of Alaska is managed, define nine management and policy objectives that are reviewed annually. These 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, 9) Improve Data Quality, Monitoring and Enforcement. The national standards and management objectives defined in GOA and BSAI FMPs provide adequate evidence to demonstrate the existence of long-term objectives clearly stated in management plans. Management measures detailed in the two Groundfish FMPs include quotas, allocated by region and by gear type; permit requirements, seasonal restrictions and closures, geographical restrictions and closed areas, gear restrictions, prohibited species requirements, retention and utilization requirements, recordkeeping and reporting requirements, and observer requirements.

Each of the state-managed Pacific cod fisheries is subject to an annually-published FMP. These FMPs include details of Guideline Harvest Levels, gear restrictions, seasonal restrictions, vessel restrictions that limit and control access, buoy marking, pot storage and landing requirements, permissible bycatch proportions and reporting requirements. (5 AAC 28.081.) Gulf of Alaska Pacific Cod Management Plans sets the regulations for the directed state Pacific cod fishery. This section applies to the management plans for Pacific cod as set out for the Prince William Sound Area (5 AAC 28.267), Cook Inlet Area (5 AAC 28.367), Kodiak Area (5 AAC 28.467), Chignik Area (5 AAC 28.537), Aleutian Islands Area (5 AAC 28.647) and the South Alaska Peninsula Area (5 AAC 28.577).

B. Science and Stock Assessment Activities

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

The annual age-based assessment used to determine stock status and harvest recommendations for BSAI and GOA Pacific cod uses data collected from commercial landings and transshipment reports, port and at-sea observer sex, length and age data from fishery independent surveys in the EBS, the AI and the GOA. The Resource Assessment and Conservation Engineering Division (RACE) of the Alaskan Fisheries Science Center (AFSC) are responsible for federally managed fisheries (3-200 nm) while the ADFG undertake coastal surveys and gather and collect data from state managed fisheries (0-3 nm). It is noted that the overall data collection program is probably one of the most extensive in the world. At-sea (processor and catcher-processor vessels) are legally required to report commercial and non-commercial catch data on a daily basis, while catch and auxiliary information from a very extensive observer program, in many cases covering 100% of the fleet activity (e.g. in the EBS) is also transmitted on a daily basis. Landings data from shore based processing facilities are also transmitted on a daily basis and the processing facilities subject to a high level of observer coverage, in many cases amounting to 100% coverage. For all operations under Federal jurisdiction, all US vessels catching Pacific cod within the US EEZ, land based and stationary floating processor and factory (motherships) receiving catches of Pacific Cod are legally obliged to maintain accurate records of all transactions. Landing data are routinely cross checked for overall accuracy, and verified during US Coast Guard and Alaska Wildlife Troopers boardings.

The Fisheries Monitoring and Analysis Division (FMA) of the NMFS monitor groundfish fishing activities in the US EEZ. FMA is responsible for the biological sampling of commercial fishery catches, estimation of catch and bycatch mortality, and analysis of fishery-dependent survey data. The Division is responsible for training and oversight of at-sea observers who collect catch data onboard fishing vessels and at onshore processing plants. Data and analysis are provided to the Sustainable Fisheries Division of the Alaska Regional Office for the monitoring of quota uptake and for stock assessment, ecosystem investigations and research programs.

To facilitate reporting of commercial catch from both state and federally managed fisheries, data from a wide range of sources is gathered in the Catch Accounting System (CAS), a multi-agency (NMFS, IPHC and ADFG) system that centrally collates landings data from shore based processing and landings operations as well as retained catch observations from individual vessels. The CAS system also provides a centralized data platform for the collation of catch (landings and discards) data from the extensive observer program.

Data gathered under the auspices of the North Pacific Groundfish Observer Programme (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. As well as providing demographic data for scientific purposes, the observer programme is also used extensively in- and post-season management. Daily reports are electronically transmitted via the CAS system. This "real-time" data is used as the basis to trigger area as well as fisheries closures e.g. if maximum catch allocations of target or Prohibited Species

are caught. Financing of the NPGOP is based on a cost recovery formula where individual vessel operators must pay the daily observer costs as a condition of licence. The level of coverage is variable between area, gear type and vessel length category. In general, coverage of catch and landings by vessels >125' is 100%, irrespective of gear category or area. Based on the annual observer data from 2004 to 2007, coverage is generally greater in the Aleutian Islands (95%) and the Bering Sea (86%), while coverage in the Central GOA (35%), Eastern GOA (47%) and Western GOA (31%) is lower. Although, by international standards this is a very high coverage rate. Starting January 1st 2013, the restructured observer program changed substantially to remedy the potential sources of bias, as identified in the "old" program. As well as increased observer coverage on all vessels >40' (vessels <40' are exempted for the first year) and the introduction of full coverage in fleets previously subject partial coverage criteria, vessels remaining within the partial coverage grouping are selected based on a random draw system with a mandatory obligation to carry an observer.

The NOAA biennial GOA groundfish survey data is used for the assessment for Pacific cod in the GOA. All three surveys (EBS, AI and GOA) collect demographic data (length and age) as well as stomach content data for potential use in multi-species assessment models. The annual EBS survey program follows systematic stratified design with two geographic strata: NW (arctic area) and SE (sub-arctic area) three depth strata (inner shelf < 50 m; mid-shelf between 50 and 200 m; and outer shelf > 200 m). On average 376 survey stations are completed annually in the EBS survey, with tow duration of 30 minutes at a speed of 3 knots. The nominal survey abundance index is standardized with the area swept. The GOA survey follows the same stratification as the EBS survey, a random stratified survey design. The survey is biennial, with the NOAA survey schedule alternating each year between the GOA and the AI survey area. For each survey year, on average 825 stations surveyed by three boats in the GOA, and 420 stations surveyed by two boats in the AI.

In terms of socio-economic data collection, the Regulatory Flexibility Act (RFA) requires agencies (NPFMC, ADFG) to consider the impact of their rules (Fishery Management Plans, Fishing Regulations) on small entities (fishermen communities) and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities. Economic analyses are also required to varying degrees under the MSA, the NEPA, the Endangered Species Act, and other applicable laws.

NOAA's Resource Ecology and Fisheries Management (REFM) Division produces an annual Economic Status Report of the Groundfish fisheries in Alaska. The figures and tables in the report provide 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 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. In addition, broader macro-economic external factors, such as exchange rates, consumer trends in seafood consumption, seafood imports, had impact on of pricing, volume, supply and demand.

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.

The Resource Assessment and Conservation Engineering (RACE) Division comprises scientists from a wide range of disciplines whose function is to conduct quantitative fishery surveys and related ecological and oceanographic research to describe the distribution and abundance of commercially important fish and crab stocks in the region, and to investigate ways to reduce bycatch, bycatch mortality and the effects of fishing on habitat. Information derived from both regular surveys and associated research are analyzed by AFSC stock assessment scientists and supplied to fishery management agencies and to the commercial fishing industry. The Resource Ecology and Fisheries Management (REFM) Division conducts research and data collection to support an ecosystem approach to management of fish and crab resources. More than twenty-five groundfish and crab stock assessments are developed annually and used to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. The Fisheries Monitoring and Analysis Division (FMA) monitors groundfish fishing activities and conducts research associated with sampling commercial fishery catches and estimation of catch and bycatch mortality, and analysis of fishery-dependent data.

The three surveys (EBS, AI and GOA) collect demographic data (length and age) as well as stomach content data for potential use in multi-species assessment models. The EBS survey is conducted annually, while the GOA and the AI surveys are conducted biannually, alternating with each other.

Stock Assessment and Fishery Evaluation (SAFE) Reports are produced annually for Pacific cod in the BSAI and GOA Regions. These reports contain all the details of the assessments including data collected and used, and stock assessment models trialed.

Beginning with the 1994 GOA SAFE report a model using the Stock Synthesis 1 (SS1) assessment program and based largely on length-structured data formed the primary analytical tool used to assess the GOA Pacific cod stock. Similarly, SS1 was first applied to the EBS Pacific cod in the 1992 stock assessment. This first application used age-structured data and SS1 continued to be used, but based largely on length structured data since 2004. It should be emphasized that the model has always been intended to assess only the EBS portion of the BSAI stock. Conversion of model estimates of EBS biomass and catch to BSAI equivalents has traditionally been accomplished by application of an expansion factor based on the relative survey biomasses between EBS and AI. The AI stock is quantified by inflating and extrapolating the results of the EBS assessment and the last available biomass ratios from each surveys used to scale up the assessment of the EBS stock to the BSAI area. Sub-samples of length and age taken from the survey are used for assessments. There is significant progress in the development of an age-disaggregated assessment for the Aleutian Islands Pacific cod, with independent adoption of OFL, ABC and TAC recommendations planned for the 2014 fishing season.

The adequacy and appropriateness of the stock assessments are ensured by extensive peer review. For BSAI and GOA groundfish assessments, the review process begins with an internal review of assessments by the AFSC. Following that review, assessments are reviewed annually by the groundfish plan teams who provide comments to the assessment authors on revisions to the assessment as well as to make recommendations to the SSC regarding OFL and ABC levels for each stock. The majority of the plan team members have expertise in stock assessment and fisheries

biology with some additional members bringing in expertise in fishery management, in-season catch accounting, seabirds, marine mammals, and economics. The assessments as well as the plan team recommendations are then subsequently reviewed by the SSC who make the final OFL and ABC recommendations to the NPFMC. The SSC may modify the recommendations from the Plan Team based upon additional considerations. The Council sets TAC at or below the ABC recommendations of the SSC.

The AFSC periodically requests a more comprehensive review of groundfish stock assessments by the Center of Independent Experts (CIE). These reviews are intended to lay a broader groundwork for improving the stock assessments outside the annual assessment cycle. Three external reviewers from the CIE were contracted to review assessments of BSAI and GOA Pacific cod in 2011. The terms of reference covered several aspects of the assessments including the use of fishery dependent and fishery independent data, gaps in modeling, accounting for assessment uncertainties, ageing issues, variation in survey trawl catchability. NMFS responded to the review and incorporated it into the 2012 assessment cycle.

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 target. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.**

The BSAI and GOA groundfish fishery management plans management plans define a series of target and limit reference points for Pacific cod and other groundfish covered by these plans. Each SAFE report describes the current fishing mortality rate, stock biomass relative to target and limit reference points. Both management plans specify the Overfishing Limits (OFL) and the Fishing mortality rate (F_{OFL}) used to set OFL, Acceptable Biological Catch (ABC) and the fishing mortality rate (F_{ABC}) used to set ABC, the determination of each being dependent on the knowledge base for each stock. The overall objectives of the management plans are to prevent overfishing and to optimize the yield from the fishery through the promotion of conservative harvest levels while considering differing levels of uncertainty. The management plan classifies each stock based on a tier system (Tiers 1-6), with Tier 1 having the greatest level of information on stock status and fishing mortality relative to MSY considerations. In general terms the harvest control rules become progressively precautionary with increasing tier classification and catch options are automatically adjusted depending on the status of stocks relative to B_{msy} or the biomass $B_{x\%}$ corresponding to the percentage of the equilibrium spawning biomass that would be obtained in the absence of fishing (tier 1-2; 3). For Pacific cod, there are no reliable estimates of MSY, but reliable estimates of reference points relative to spawning per recruit are: $B_{40\%}$ which equates to 40% of the equilibrium spawning biomass that would be obtained in the absence of fishing and $F_{35\%}/F_{40\%}$ - the fishing mortality rate that reduces the equilibrium level of spawning per recruit to 35%/40% of the level that would be obtained in the absence of any fishing. This places both BSAI and GOA Pacific cod into Tier 3. Both stocks are above their target reference point B_{40} .

The combined BSAI Pacific cod unit has been extrapolated from the Pacific cod EBS model. In light of recent evidence that Pacific cod in the EBS and AI should be viewed as separate stocks, in 2010 the SSC requested that a separate assessment be prepared for Pacific cod in the AI. In response, the 2011 assessment contained an initial exploration of age-structure modeling for the AI Pacific cod. The initial exploration of age-structured modeling for Pacific cod in the AI indicates a sharp trend of decreasing of all the estimated amounts since the 1990's. Especially, the total (age 0+) biomass and the relative spawning biomass have the lowest values for the last two years. The relative spawning biomass could be approaching the limit reference point ($B_{17.5\%}$). Therefore the current approach of setting a single ABC for the entire BSAI area raises potentially serious conservation concerns for Pacific cod in the AI. This issue was identified as a non conformance against requirements 6.1.3 of the conformance criteria.

6.1.3 Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the level of fishing permitted shall be commensurate with the current state of the fishery resources.

A corrective action plan was provided to the assessment team in April 2013, responding to the issued non conformance. This provided reference to a discussion paper available at the Council website (April 2013) relating to the EBS - AI Pacific cod split that provided substantiation to the corrective action plan provided. The evidence reported that 'given the heightened conservation concern', the SSC intends to set separate ABC/OFL for EBS Pacific cod and AI Pacific cod for the 2014 fishing season based on the best available information at that time, regardless of whether the age-structured model is adequate for stock status determinations. SSC recommendation advised the Council to initiate preparation of any background supporting documents such as a supplemental NEPA document that may be required for specification of separate ABCs/OFLs in 2014. The assessment team will verify the adoption of separate OFL/ABC/TAC at the December 2013 Council meeting and re-evaluate this issue accordingly.

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.

The precautionary approach is applied widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment. The FAO Guidelines for the Precautionary Approach (PA) (FAO 1995) advocate a comprehensive management process that includes data collection, monitoring, research, enforcement, and review, prior identification of desirable (target) and undesirable (limit) outcomes, and measures in place to avoid and correct undesirable outcomes, the action to be taken when specified deviations from operational targets are observed and an effective management plan. Lastly, the FAO guidelines advocate that the absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species as well as non-target species and their environment. The overall management for the Pacific cod in Alaska comprises all the elements as specified above in the FAO guidelines for the PA.

Absence of adequate scientific information is not used as a reason for postponing or failing to take conservation and management measures. The BSAI and GOA Pacific cod stocks are managed under a tier system rule based on stock knowledge. Status determination criteria for groundfish stocks are annually calculated using a six-tier system that accommodates varying levels of uncertainty of information. The six-tier system incorporates new scientific information and provides a mechanism to continually improve the status determination criteria as new information becomes available. The lower the tier, the less conservative the determination of OFL/ABC and ACL are. This is because more conservative determinations are at the higher tier levels (where less stock information is available). This system is intrinsically precautionary in nature and the results involve catches always lower than the overfishing level. Stock assessment results indicate that the BSAI and GOA Pacific cod stock biomass is above B40 and that the stocks are neither overfished nor undergoing overfishing.

Another limit reference point used in managing groundfish in the BSAI and GOA is the optimum yield (OY). The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within a given range. The upper range for BSAI is 2.0 million Mt while for the GOA is 800 thousand Mt, acting as an ecosystem cap. In practice, only the upper OY limit in the BSAI has been a factor in altering and limiting harvests. In addition, for groundfish species identified as key prey of Steller sea lions (i.e., walleye pollock, Pacific cod, and Atka mackerel), directed fishing is prohibited in the event that the spawning biomass of such a species is projected in the stock assessment to fall below B20% in the coming year.

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.**

Alaska Pacific cod commercial fisheries are managed according to a modern management plan that attempts to balance long-term sustainability of the resources with optimum utilization. Conservation and management measures are outlined in the BSAI and GOA FMPs for Groundfish. Along with yearly stock assessment surveys and reports (SAFEs), evaluation of the fisheries stock status, determination of OFL (consistent with MSY), ABC, ACL and TAC accounting for scientific uncertainty and ability and precision in catch control. Part of the assessment procedure is an extensive ecosystem assessment that shows development towards ecosystem-based management.

Management measures in the FMPs include (i) permit and participation, (ii) authorized gear, (iii) time and area, and catch restrictions, (iv) measures that allow flexible management authority, (v) designate monitoring and reporting requirements for the fisheries, and (vi) describe the schedule and procedures for review of the FMP or FMP component.

For every change/amendment or new development affecting fisheries management and therefore modifying the FMPs, there is an evaluation of alternative conservation and management measures, including considerations of their cost effectiveness and social impact. The Regulatory Flexibility Act (RFA) requires agencies to consider the impact of their rules (Fishery Management Plans, Fishing

Regulations) on small entities (fishermen communities) and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities.

In addition to the federal FMPs, regulations for the state-managed fisheries are set out in annual region-specific FMPs (regulations for parallel fisheries in state waters are generally identical to federal regulations). The board uses the biological and socio-economic information provided by ADFG, public comment received from inside and outside the state, as well as guidance from the Alaska Department of Public Safety and the Alaska Department of Law when creating regulations that are sound and enforceable. These exist for Kodiak, South Alaska Peninsula, Chignik, the Aleutian Islands, Cook Inlet and Prince William Sound. The state fisheries are managed by allocation of a portion of the federal TAC to the state fishery (depending on biomass abundance in the various areas). Overall, state managed fisheries removals are eventually accounted for in the federal ACL requirements.

The BSAI cod fishery is a limited entry fishery (i.e. non AFA catcher trawlers, "amendment 80" trawl fleet, jiggers, CP and CV longliners, pot vessels). The GOA groundfish fisheries are among the few remaining limited access (not rationalized) fisheries in Alaska.

In the BSAI, after subtraction of the CDQ allowance for Western Alaska communities, the remaining TAC is allocated 1.4% for vessels using jig gear, 2.3% for catcher processors using trawl gear listed in Section 208(e)(1)-(20) of the AFA, 13.4% for catcher processors using trawl gear as defined in Section 219(a)(7) of the Consolidated Appropriations Act, 2005 (P.L. 108-447), 22.1% for catcher vessels using trawl gear, 48.7% for catcher processors using hook-and-line gear, 0.2% for catcher vessels $\geq 60'$ LOA using hook-and-line gear, 1.5% for catcher processors using pot gear, 8.4% for catcher vessels $\geq 60'$ LOA using pot gear, and 2.0% for catcher vessels $< 60'$ LOA that use either hook-and-line gear or pot gear. Allocations may be seasonally apportioned.

TACs in the GOA are apportioned by regulatory area, and by district for some stocks. Areas or districts may also be managed together. For the Central and Western areas Pacific cod TAC is allocated 90% to the inshore sector and 10% to the offshore sector only for the Gulf of Alaska. TAC is then allocated to the harvest sectors (catcher vessels and catcher processors using trawl, pot, hook-and-line, and jig gear). The Western and Central GOA harvest sector allocations superseded the inshore and offshore processing sector allocations. No trawling is allowed in the Eastern GOA, so harvest is restricted to fixed gear and jig.

The 50 C.F.R. § 679.27 Improved Retention/Improved Utilization Programme has been approved in 1997 requiring 100% retention of pollock and Pacific cod in all BSAI and GOA federal fisheries beginning on January 1, 1998. State regulations to extend these requirements to onshore processing plants have also been implemented. The regulation was modified in an amendment(s) published April 6, 2006, in 71 FR 17381; effective January 20, 2008. Also, in State waters, when a directed season is open for Pacific cod or pollock, regulations for improved retention and improved utilization (IR/IU) of groundfish (5 AAC 28.070 & 5 AAC 28.075) require that all captured Pacific cod or pollock be retained by the fisherman and accepted by a buyer. Similarly, all Pacific cod or pollock harvested must be retained up to the maximum retainable bycatch amounts when a bycatch season is open for these species.

Trawl sweeps modifications that 1) decrease significantly habitat interaction of trawl gear and 2)

reduce the bycatch of crabs, and mortality rates of crabs that slip under the gear without being caught, have been implemented in the BSAI in 2011 and the Council has allowed in December 2012 for trials to be conducted in the GOA Region during 2013 and 2014. Longline gear is regulated as for seabird avoidance measures (e.g. use of streamer lines, sink baited hooks, circle hooks, line shooters, lining tubes, night settings etc.). False tunnel modifications for pot gear allow a higher catch of cod and a considerable decreased bycatch of tanner crab (otherwise the highest bycatch species in cod pots), and biodegradable escape mechanisms are required to minimize bycatch associated with so-called ghost fishing of lost gear. No fish size limits are implemented for Pacific cod because there is a depth separation between young and adult cod. Market forces assure that fishermen target adult cod as it fetches a higher price per pound.

Regulations implementing the FMP include conservation measures that temporally and spatially limit fishing effort around areas important to marine mammals. NMFS uses Steller sea lion protection measures (SSLPM) to ensure the groundfish fisheries off Alaska are not likely to jeopardize the continued existence of the western population of Steller sea lions or adversely modify their critical habitat. The management measures disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts.

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

The Pacific cod stocks in Alaska are not depleted or threatened with depletion. Presently and as projected for 2013 stock biomass levels are well above B35% in both management areas.

NPFMC and BOF guidelines, state and federal regulations and MSA with its National Standards all define to management agencies what must be done if a stock becomes depressed. The US Congress established new statutory requirements under the MSA in 2006 to end and prevent overfishing by the use of annual catch limits (ACLs) and accountability measures. These new requirements were implemented in 2010 for all stocks subject to overfishing and in 2011 for all stocks not subject to overfishing. A new provision of the MSA requires that the respective scientific and statistical committees (SSC) of the eight fishery management councils determine scientific benchmarks, while the councils continue to recommend quotas subject to these scientific benchmarks. This separation of authorities represents a major step forward in trying to eliminate overfishing and to enhance recovery of overfished stocks nation-wide.

Assuming that catch is measured accurately, ACLs provide a transparent measure of the effectiveness of management practices to prevent overfishing. They cannot exceed the fishing level determined by the SSC, but catch thresholds can also be established that trigger accountability measures to prevent overfishing. Accountability measures might include: (1) seasonal, area, and gear allocations; (2) bycatch limits; (3) closed areas; (4) gear restrictions; (5) limited entry; (6) catch shares; (7) in-season fishery closures; and (8) observer and vessel monitoring requirements. Accountability measures allow close monitoring of overall catch levels, as well as seasonal and area apportionments. They might close designated areas, or fisheries, if bycatch limits for prohibited species are attained. They also allow monitoring of any endangered or threatened mammals or seabirds and provide a database for evaluating likely consequences of future management actions.

The NPFMC has consistently adopted the annual OFL and acceptable biological catch (ABC) recommendations from its SSC and set the total allowable catch (TAC) for each of its commercial groundfish stocks at or below the respective ABC. The NPFMC first defined OFL in 1991 as a catch limit that never should be exceeded. The NPFMC adopted more conservative definitions of OFL in 1996 and again in 1999, to comply with revised national guidelines. In 1999, the NPFMC prescribed that OFL should never exceed the amount that would be taken if the stock were fished at FMSY (or a proxy for FMSY), 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 could be set lower than catch at FMSY at the discretion of the SSC. OFL can be then virtually defined as an upper limit reference point.

In 1996, the NPFMC capped the rate of fishing mortality used to calculate ABC by the rate used to calculate OFL. These rates were prescribed through a set of six tiers defining more and more conservative catch levels as the tiers increased. Harvest rates used to establish ABCs were reduced at low stock size levels, thereby allowing rebuilding of depleted stocks. If the biomass of any stock falls below BMSY, or a proxy for BMSY, the fishing mortality is reduced relative to the stock status.

Both target and non-target species are regularly assessed and bycatch limits and PSC caps are in place to control impacts. Also, Essential Fish Habitat (EFH), as defined in MSA, are described and evaluated to assure that fishing impacts are not more than minimal or more than temporary. Some areas have been closed to protect dependent species; this includes SSL protection areas around rookeries and haulouts (10 & 20 nm closures).

During the last EFH review in 2010 it has been shown that fishing effects on the habitat of Pacific cod in the BSAI and GOA do not appear to have impaired either stock’s ability to sustain itself at or near the MSY level. When weighted by the proportions of habitat types used by Pacific cod, the long-term effect indices are low, particularly those of the habitat features most likely to be important to Pacific cod (infaunal and epifaunal prey). The fishery appears to have had minimal effects on the distribution of adult Pacific cod. Effects of fishing on weight at length, while statistically significant in some cases, are uniformly small and sometimes positive. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.

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

The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional 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. 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. Also, 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. MAP also conducts sessions of their Alaska Young Fishermen's Summit. Each Summit is an intense course in all aspects of Alaska fisheries, from fisheries management & regulation (e.g. MSA), to seafood marketing. The 2012 AYFS was held February 13th and 14th in Juneau, AK. The two-day conference aimed at providing crucial training and networking opportunities for fishermen entering the business or wishing to take a leadership role in their industry. The event took advantage of the Juneau location by introducing participants to the legislative process, and introducing the fish caucus of the legislature to the issues and concerns of Alaska's emerging fishermen. In addition to this, MAP provides training and technical assistance to fishermen and seafood processors in Western Alaska. A number of training courses and workshops were developed in cooperation with local communities and CDQ groups. Additional education is provided by the Fishery Industrial Technology Center, in Kodiak, Alaska.

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.

Effective mechanisms are established for fisheries monitoring, surveillance, control and enforcement measures including, an observer program (although it is designed for biological data collection rather than enforcement), inspection schemes such as US Coast Guard (USCG) boardings, dockside landing inspections and vessel monitoring systems, to ensure compliance with the conservation and management measures for the Pacific cod fishery.

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce federal fisheries laws and regulations, especially 50CFR679. 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.

On January 8, 2002, an emergency interim rule (67 FR 956) was issued by NMFS to implement Steller sea lion protection measures. All vessels using pot, hook-and-line or trawl gear in the directed

fisheries for pollock, Pacific cod or Atka mackerel are now required [Section 679.7(a)(18)] to have an operable vessel monitoring system (VMS) on board. This requirement is necessary to monitor fishing restrictions in Steller sea lion protection and forage areas. Also, when the vessels are fishing Pacific cod in the state parallel fishery, they would use their VMS as directed by their federal fishing permit.

Pacific cod in the GOA and BSAI is targeted by many different gear types including bottom trawl, longline, pot, and jig gear. In the GOA the active size of these fleets is approximately 643 vessels, and the Coast Guard attempts to board approximately 52 vessels each year. From fiscal year 2008 through the end of fiscal year 2012, the Coast Guard conducted 291 boardings on Gulf of Alaska Pacific cod vessels, noting 25 violations on 19 vessels resulting in a detected violation rate for this fleet of 6.53%. Significant violations include failure to meet observer coverage rates as required, failure to use seabird avoidance gear, closed area incursions, illegal retention or unsafe release of bycatch species, and failure to use VMS as required.

In the BSAI, the active size of these fleets is approximately 263 vessels, and the Coast Guard attempts to board approximately 48 vessels each year. From fiscal year 2008 through the end of fiscal year 2012, the Coast Guard conducted 160 boardings on Bering Sea Pacific cod vessels, noting 31 violations on 25 vessels resulting in a detected violation rate for this fleet of 15.63%. Significant violations noted below include MRA bycatch overages, failure to meet observer coverage rates as required, IR/IU violations, and not using VMS.

The Alaska Wildlife Troopers enforce regulations for the state Pacific cod fisheries. Additionally, ADFG field staff is properly trained and deputized and can, if required, enforce regulations and make arrests.

No foreign fleet is allowed to fish in the Alaska's EEZ. Every fishing vessel targeting Pacific cod in Alaska is required to have a federal or state permit. The permit programs are managed by the Restricted Access Management (RAM) federal division and by the Commercial Fisheries Entry Commission for state waters.

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

In Alaska waters, enforcement policy section 50CFR600.740 states:

(a) The MSA provides four basic enforcement remedies for violations, in ascending order of severity, as follows: (1) Issuance of a citation (a type of warning), usually at the scene of the offense (see 15 CFR part 904, subpart E). (2) Assessment by the Administrator of a civil money penalty. (3) For certain violations, judicial forfeiture action against the vessel and its catch. (4) Criminal prosecution of the owner or operator for some offenses. It shall be the policy of NMFS to enforce vigorously and equitably the provisions of the MSA by utilizing that form or combination of authorized remedies best suited in a particular case to this end.

(b) Processing a case under one remedial form usually means that other remedies are inappropriate in that case. However, further investigation or later review may indicate the case to be either more

or less serious than initially considered, or may otherwise reveal that the penalty first pursued is inadequate to serve the purposes of the MSA. Under such circumstances, the Agency may pursue other remedies either in lieu of or in addition to the action originally taken. Forfeiture of the illegal catch does not fall within this general rule and is considered in most cases as only the initial step in remedying a violation by removing the ill-gotten gains of the offense.

(c) If a fishing vessel for which a permit has been issued under the MSA is used in the commission of an offense prohibited by section 307 of the MSA, NOAA may impose permit sanctions, whether or not civil or criminal action has been undertaken against the vessel or its owner or operator. In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator.

The “Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions” issued by NOAA Office of the General Counsel – Enforcement and Litigation on March 16, 2011, provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The purpose of this 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 this Policy, NOAA expects to improve consistency at a national level, provide greater predictability for the regulated community and the public, improve transparency in enforcement, and more effectively protect natural resources. 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.

The Marine Division of AWT and the State of Alaska Department of Law pursue a very aggressive enforcement policy. The Marine Division of AWT and the State of Alaska Department of Law pursue a very aggressive enforcement policy. They attend the BOF and are integral into the process for regulation formulation and legislation, analogous to the USCG attendance and input in the NPFMC process. AWT has Statutory / Regulatory legislation pertaining to their authority enabling them to fine, imprison, and confiscate equipment for violations and restrict an individual’s right to fish if convicted of a violation. These include AS 16 Fish & Game, 5AAC Fish & Game, 20 AAC Commercial Fishing, AS 11 Criminal, AS 46 Environment, AS 44 State Government, AS 02 Aeronautics, AS 18 Health & Safety. A State violation is a criminal violation (strict liability).

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.**

The Final Programmatic Supplemental Environmental Impact Statement is an extensive review of the Alaska Groundfish Fisheries (PSEIS) (NMFS 2004). It provides information about effects of Alaska's groundfish fisheries on the ecosystem and effects of the ecosystem on the groundfish fisheries.

The North Pacific Research Board (NPRB) was created by Congress in 1997 to conduct research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean with a priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs. While the NPRB has invested millions of dollars on obtaining this objective, they have also developed two special projects that seek to understand the integrated ecosystems of the BSAI and GOA. For the Gulf of Alaska Integrated Ecosystem Research Program, more than 40 scientists from 11 institutions are taking part in the \$17.6 million Gulf of Alaska ecosystem study that looks at the physical and biological mechanisms that determine the survival of juvenile groundfish in the eastern and western Gulf of Alaska. The study includes two field years (2011 and 2013) followed by one synthesis year.

For the Bering Sea, a large multiyear ecosystem project is moving towards completion. It consists of two large projects that will be integrated. One funded by the National Science Foundation (NSF's BEST program is the Bering Ecosystem Study, a multi-year study (2007-2010)). The other funded by NPRB (BSIERP, is the Bering Sea Integrated Ecosystem Research Program (2008-2012)). The overlapping goals of these projects led to a partnership that brings together some \$52 million worth of ecosystem research over six years, including important contributions by NOAA and the US Fish & Wildlife Service. From 2007 to 2012, NPRB, NSF, and project partners are combining talented scientists and resources for three years of field research on the eastern Bering Sea Shelf, followed by two more years for analysis and reporting.

The NMFS and the NPFMC, and other institutions interested in the North Pacific conduct assessments and research on environmental factors on cod and associated species and their habitats. Findings and conclusions are published in SAFE document, annual Ecosystem SAFE documents and other reports. SAFE documents for BSAI and GOA Pacific cod summarize ecosystem considerations for the stocks.

A primary ecosystem phenomenon affecting the Pacific cod stock seems to be the occurrence of periodic "regime shifts" in which central tendencies of key variables in the physical environment change on a scale spanning several years to a few decades. One well documented example of such regime shift occurred in 1977, and shifts occurring in 1989 and 1999 have also been suggested. An attempt was made to estimate the change in median recruitment of BSAI and GOA Pacific cod associated with the 1977 regime shift.

The prey and predators of Pacific cod have been described and reviewed extensively. The composition of Pacific cod prey varies to some extent by time and area. In terms of percent

occurrence, some of the most important items in the diet of Pacific cod in the BSAI and GOA have been polychaetes, amphipods, and crangonid shrimp. In terms of numbers of individual organisms consumed, some of the most important dietary items have been euphausiids, miscellaneous fishes, and amphipods. In terms of weight of organisms consumed, some of the most important dietary items have been walleye pollock, fishery offal, yellowfin sole, and crustaceans. Small Pacific cod feed mostly on invertebrates, while large Pacific cod are mainly piscivorous. Predators of Pacific cod include Pacific cod, halibut, salmon shark, northern fur seals, Steller sea lions, harbor porpoises, various whale species, and tufted puffin. Major trends in the most important prey or predator species could be expected to affect the dynamics of Pacific cod to some extent.

Gear modifications have been implemented in the BSAI and are being tested in the GOA to lift the sweep off the seafloor and hence limit detrimental effects on the seafloor. Research has demonstrated that elevated sweeps can reduce unobserved mortality of crab from interacting with the trawl sweeps. Additionally there are several regulations in place towards seabird avoidance for vessels fishing with hook-and-line gear. Further gear-related measures include (i) biodegradable panels required for pot gear, to minimize bycatch associated with so-called ghost fishing of lost gear (5 AAC 39.145 *Escape Mechanism for Shellfish and Bottomfish Pots*) and (ii) tunnel openings for pot gear are limited in size (tunnel eye openings must be 36 inches in perimeter or less) to reduce incidental catch of halibut and crabs. Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species. Detailed bycatch reduction programs are in place for species impacted by the fishery such as crab, halibut, seabirds, as well as measures to allow sufficient cod resources for Steller sea lions predation. Sea stars and giant grenadier made up the significant part of bycatch in the BSAI and the GOA in 2010. Also, with the development of the groundfish fisheries, regulations were implemented to limit bycatch of halibut, so as to minimize impacts on the domestic halibut fisheries. Interception of juvenile halibut (~30 cm and greater) often occurs in trawl fisheries targeting other groundfish species (such as rock sole, pollock, yellowfin sole, and Pacific cod). Incidental catch of halibut also occurs in groundfish hook and line and pot fisheries. Halibut is a PSC species which limits severely the Pacific cod fishery (i.e. when PSC cap is reached the fishery is closed). Regulations require that all halibut caught incidentally must be discarded.

The Alaska Fisheries Science Center's Fishery Monitoring and Analysis Division supports the world's largest seabird bycatch monitoring effort through the North Pacific Groundfish Observer Program. Between 36,000 and 39,000 coverage days are completed each year in the Alaskan groundfish fisheries (longline, pot, pelagic trawl, and non-pelagic trawl), and data are provided for analysis of seabird bycatch. The AFSC has been producing estimates of seabird bycatch in Alaskan groundfish fisheries since the late 1990s. Estimates were produced covering the period 1993 to 2006 and are available in detail in the 2009 Ecosystem Chapter of the Stock Assessment and Fishery Evaluation Report. Updates can be found in the 2012 Ecosystem SAFE report. The AFSC has recently redesigned their approach to the production of annual estimates and are working on reports that will be available in the future that note seabird bycatch numbers, rates, fishing effort, species composition, and other important information.

In 2011, a groundfish fishery observer reported to their in-season advisor that they had recovered a short-tailed albatross (*Phoebastria albatrus*) (listed as endangered under the US Endangered Species

Act in 2000) while monitoring gear retrieval on a Bering Sea freezer longline vessel fishing for Pacific cod. The AFSC immediately reported this take to the U.S. Fish and Wildlife Service and also informed interested parties in NOAA, the fishing industry, and environmental non-government organizations. The Short-tailed Albatross Biological Opinion for the longline fleet allows for 4 observed birds in a two-year period. This is based on observed birds, whether within or outside of the actual sample period, and is not based on the extrapolated numbers. A new 2-year period began on 16 September 2011, making this the first take in the current period. The vessel was using paired streamer lines and had not observed any short-tailed albatross in the area prior to the take event.

The GOA Pacific cod fisheries caught 27% of the total (e.g. Alaska) incidental catch of the spiny dogfish and 37% of the total incidental catch of the Pacific sleeper shark. Spiny dogfish (*Squalus suckleyi*) is listed under the IUCN Red list as "Vulnerable". Fisheries and population trend data indicate that the southern part of the Northeast Pacific stock has also declined through overfishing, but stocks appear stable off Alaska. There are currently no directed commercial fisheries for shark species in federally or state managed waters of the BSAI and the GOA, and most incidental catch is not retained. Spiny dogfish are allowed as retained incidental catch in some state managed fisheries, and salmon sharks are targeted by some sport fishermen in Alaska state waters. There is no evidence to suggest that overfishing is occurring for any shark species in the BSAI and the GOA because the OFL has not been exceeded.

Pacific cod is one of the four most important prey items of Steller sea lions. Furthermore, the size ranges of Pacific cod harvested by the fisheries and consumed by Steller sea lions overlap, and the fishery operates to some extent in the same geographic areas used by Steller sea lion as foraging grounds. The Fisheries Interaction Team of the Alaska Fisheries Science Center has been engaged in research to determine the effectiveness of recent management measures designed to mitigate the impacts of the Pacific cod fisheries (among others) on Steller sea lions.

Fishing's effects on the habitat of Pacific cod in the BSAI and the GOA do not appear to have impaired either stock's ability to sustain itself at or near the MSY level. When weighted by the proportions of habitat types used by Pacific cod, the long-term effect indices are low, particularly those of the habitats features most likely to be important to Pacific cod (infaunal and epifaunal prey). The fishery appears to have minimal effects on the distribution of adult Pacific cod. Effects of fishing on weight at length, while statistically significant in some cases, are uniformly small and sometimes positive. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.

6.1. Conformity statement

The Assessment Team recommend that the management system of the applicant fishery, US Alaska pollock commercial fisheries, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fishery with pelagic trawl gear [and other gear types (bottom trawl, jig, longline, pot) that can legally land by-caught pollock] within Alaska's 200 nm EEZ, are certified against the FAO-Based Responsible Fisheries Management Certification Program.

6.2. Future Surveillance Actions

To maintain certification, surveillance assessments are carried out on an annual basis with a full re-assessment taking place for the fifth anniversary of certification. The surveillance assessment will be carried out as outlined for Global Trust Certification quality procedure.

The Alaska Pacific cod commercial fisheries achieved high conformity against all but one of the clauses of the FAO-Based RFM Conformance Criteria.

A **medium rating resulting in a minor non-conformance** has been issued under supporting Clause 6.1.3. The issue identified relates to Bering Sea/Aleutian Islands cod split, and has been addressed by a corrective action plan issued by the client providing recent information from the NPFMC supporting the current work in support of, and the upcoming closure of this issue (December 2013). More details are available under [Section 9](#) of this report and evidence for scoring is provided under Supporting Clause 6.1.3.

In December 2013, Global Trust Assessment team will review the actions taken for the adoption of Aleutian Islands Pacific cod independent OFL and ABC determinations and make a new determination for Clause 6.1.3. Failure to adopt independent harvest recommendations for the EBS and AI or lack of harvest control regulations in the AI could result in the aggravation of the minor non conformances here raised and withdrawal of the FAO RFM certificate.

7. FAO-Based RFM Conformance Criteria Assessment Outcome

A. The Fisheries Management System

<p>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.</p> <p style="text-align: right;"><i>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</i></p> <p style="text-align: right;"><i>FAO Eco 28</i></p>						
Confidence Ratings	Low	0 out of 17	Medium	0 out of 17	High	9 out of 17

<p>Clause:</p> <p>1.1 There shall be an effective legal and administrative framework established at the local and national level appropriate, for fishery resource conservation and management.</p> <p style="text-align: right;"><i>FAO CCRF 7.7.1</i></p> <p style="text-align: right;"><i>FAO Eco 28</i></p>		
<p>Evidence adequacy rating:</p> <p style="text-align: center;"> <input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low </p>		
Clause	Evidence	
1.1	<p>Rating determination</p> <p><i>There is an effective legal (MSA, FMPs) and administrative framework (NMFS/NPFMC – ADFG/BOF) established at the local and national level (state/federal) appropriate for fishery resource conservation and management.</i></p> <p>The primary layer of governance for the Alaska Pacific cod fisheries is dictated by the MSA. The main agencies involved in Pacific cod 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 (FMP) must be consistent. Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, an FMP and any necessary amendments, for each fishery under its authority that requires conservation and management actions, i.e. the annual setting of ABC/TAC/ACL. While the State of Alaska mostly adopts complimentary regulations, even imposing an annual State Emergency Order that</p>	

	<p>adopts federal Regulations in most management areas, state regulations are used to manage 0-3 nm & inside waters (areas not subject to MSA).</p> <p>The federal FMPs, more specifically, 1) the GOA Groundfish FMP, and 2) the BSAI Groundfish FMP govern the management of the Pacific cod federal fisheries. In federal waters (3-200 nm), Alaska Pacific cod fisheries are managed by the NPFMC and the NMFS Alaska Region. The NPFMC is one of eight regional councils established by the MSA to oversee management of the nation's fisheries. With jurisdiction over the million square mile EEZ off Alaska, the NPFMC has primary responsibility for groundfish management in the GOA and BSAI, including Pacific cod, pollock, flatfish, Atka mackerel, sablefish, and (offshore) rockfish. These species are 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. 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, NMFS Alaska Regional Office conducts biological studies, stock survey and stock assessment reports. NOAA Fisheries 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 USCG is responsible for enforcing these FMPs at sea, in conjunction with NMFS enforcement ashore. Also, the USCG enforce 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.</p> <p>In state waters (0-3 nm), Alaska Pacific cod fisheries are managed by the ADFG and the Alaska Board of Fisheries (BOF). There are seven state-managed Pacific cod regions: Kodiak, Chignik, South Alaska Peninsula, Aleutian Islands, Southeast Alaska, Prince William Sound, and Cook Inlet. Each area supports two distinct Pacific cod fisheries. The first fishery is managed concurrent to the federal BSAI or GOA fishery, and is referred to as the parallel fishery.</p> <p>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. Although the state cannot require vessels fishing inside state waters during the Federal fishery to hold a federal permit, it usually adopts regulations similar to those in place for the federal fishery if those regulations are approved by the Board of Fisheries and meet state statute. The parallel fishery is managed by the state adopting most of the NMFS rules and management actions (5 AAC 28.087), including seasons, and catch in this fishery is counted towards federal quotas. The second fishery in each area is referred to as the state-waters (or state-managed) fishery. The state-waters fishery is managed</p>	
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independently of the federal/parallel fishery by the ADFG under guidelines developed by the BOF (Guiding principles for groundfish fishery regulations 5 AAC 28.089 and BOF groundfish FMP 5 AAC 28.081).

Six of the seven state-water fisheries are subject to an annual Guideline Harvest Level (GHL) calculated as a percentage of federal fishery quotas. At present, the Kodiak GHL is set at 12.5% of the federal Central Gulf of Alaska (CGOA) ABC; the Chignik GHL is set at 8.75% of the federal CGOA ABC; the South Alaska Peninsula GHL is set at 25% of the federal Western Gulf of Alaska ABC; the Aleutian Islands GHL is set at 3% of the federal BSAI TAC; the Prince William Sound GHL is set at 25% of the federal Eastern Gulf of Alaska (EGOA) ABC; and the Cook Inlet GHL is set at 3.75% of the total CGAO ABC. GHLs are allocated, by regulation, between gear types. The Southeast Alaska state-water fishery has been subject to a Guideline Harvest Range (GHR) of 750,000 – 1,250,000 lb (340 – 567 mt) since 1994.

The vast majority of Alaska Pacific cod is harvested in the federal BSAI and GOA fisheries, and is therefore studied, managed, and enforced under the federal GFMPs. In 2011 federal fisheries quotas were as follows:

- **GOA TAC:** 65,100 mt
- **BSAI TAC:** 227,950 mt
- **Total federal TAC =** 293,050 mt

2011 State fisheries quotas:

- **Kodiak GHL:** 6,727 mt
- **Chignik GHL:** 4,708 mt
- **South Alaska Peninsula GHL:** 7,593 mt
- **Aleutian Islands GHL:** 7,050 mt
- **Southeast GHR*:** 567 mt
- **Prince William Sound GHL:** 651 mt
- **Cook Inlet GHL:** 2,010 mt
- **Total state GHL =** 29,306 mt

*The value stated here is the upper boundary of the Southeast Guideline Harvest Range.

Thus state fisheries quotas were around 9.1% of the total Pacific cod quota in 2011.

Evidence

<http://www.nmfs.noaa.gov/sfa/magact/mag1.html#s2>
<http://www.fakr.noaa.gov/npfmc/>
<http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryGroundfish.main>
<http://www.uscg.mil/hq/cg5/cg531/LMR.asp>
<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html>
<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html>
<http://www.dps.alaska.gov/awt/Marine.aspx>
<http://www.touchngo.com/IglcNtr/akstats/aac/title05/chapter028.htm>

Clause:	
1.2	Management measures shall take into account the whole stock unit over its entire area of stock distribution.
1.2.1	The area through which the species migrates during its life cycle shall be considered by the management system.
1.2.2	The biological unity and other biological characteristics of the stock shall be considered within the management system.
	<i>FAO ECO 30.3</i>
1.2.3	All fishery removals and mortality of the target stock(s) shall be considered by management.
1.2.4	Previously-agreed management measures established and applied in the same region shall be taken into account by management.
	<i>FAO CCRF 7.3.1</i>

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
1.2	<p>Rating determination</p> <p><i>Management measures take into account the whole stock unit over its entire area of stock distribution. Recent studies on genetic structure of Pacific cod in the North Pacific Ocean demonstrate a clear isolation by distance (IBD) pattern, suggesting restricted gene flow, and thus a substantial amount of self-recruitment, among putative stock components at spatial scales relevant to current fisheries management and conservation practices. Samples from the coast of Washington State and British Columbia were distinct from those in Alaska and, to a lesser degree to each other. Also, these samples were significantly different from those of China, Korea and Japan indicating a deep genetic subdivision between populations from Asia and North America. Moreover, the empirical evidence for discrete stocks of Pacific cod between the Russian and US EEZs (Eastern/Western Bering Sea) is also available.</i></p> <p>GOA and BSAI Pacific cod management</p> <p>NMFS conducts stock assessment and biological studies in the EEZ off Alaska on FMP species. The AFSC in Seattle and the Kodiak Fisheries Research Center (KFRC) generate the scientific information and analysis necessary for the conservation, management, and utilization of the region's groundfish resources. The State of Alaska conducts similar assessments in its waters; information is shared with federal scientists. With this</p>

information, the NPFMC and NMFS produce annual Stock Assessment & Fishery Evaluation (SAFE) reports for each fishery under federal jurisdiction, including Alaska Pacific cod. There are two SAFEs for Alaska Pacific cod – one for the fishery in the GOA, and the other for the BSAI fishery. A small portion of the Pacific cod stock is harvested under State of Alaska jurisdiction. Both state and federal assessment biologists meet at the NPFMC Plan Team meetings and share assessment information and harvest strategies to assure conservation management over the entire stock distribution. The GOA and BSAI Pacific cod stocks are both considered and managed as different stocks and separate from other Pacific stocks further south along the west coast of North America and West across Russia and Asia.

www.adfg.alaska.gov/FedAidPDFs/FMR12-20.pdf

www.afsc.noaa.gov/refm/stocks/assessments.htm

Isolation by distance (IBD) in North American coastal populations

Three patterns relevant to management and conservation of Pacific cod are known to exist. First, a deep genetic subdivision was found between populations from Asia and North America. Second, a highly significant genetic isolation-by-distance (IBD) pattern was found among North American coastal samples (Washington State to the central Aleutian Islands). Dispersal estimates based upon the regression of genetic differentiation with geographic distance were below 100 km per generation over effective population densities of 10 – 10,000 individuals. Third, Pacific cod from a fjord-like estuary (Strait of Georgia, British Columbia) were clearly differentiated from coastal cod populations. This result showed that, like Atlantic cod, Pacific cod can form localized, mostly self-recruiting populations in fjord environments. The Eastern Gulf of Alaska is closed to trawl fishing and the catch of Pacific cod in Southeast Alaska is minimal (upper range 567 mt). The likely overlap and exploitation of Pacific cod stocks bordering with British Columbia is very likely small and insignificant.

http://www.wsg.washington.edu/research/pdfs/reports/Hauser_RF147_PCSR.pdf

The results of a recent assessment of population structure in Pacific cod inferred from microsatellite DNA variation across much of its North American range demonstrate a clear isolation by distance (IBD) pattern, suggesting restricted gene flow, and thus a substantial amount of self-recruitment, among putative stock components at spatial scales relevant to current fisheries management and conservation practices. In particular, Pacific cod (like Atlantic cod) appear to form localized populations in fjord environments or where deep water barriers, such as submarine canyons, may limit adult dispersal. Genetic differentiation among coastal sites indicates the presence of a large stock complex along continental shelves and slopes, with gene flow sufficiently restricted to develop a significant IBD pattern. Tests of genic and genotypic heterogeneity, as well as estimates of F_{ST} and R_{ST} , consistently inferred significant genetic differentiation among populations at distances exceeding ~1700 km along this coastal continuum, a spatial scale comparable with detectable IBD in Atlantic cod (1600 km) in the western North Atlantic (Pogson et al. 2001).

Samples from the coast of Washington State and British Columbia were distinct from those in Alaska and, to a lesser degree to each other. The IBD pattern among coastal locations across North America is one of the strongest relationships for a marine fish reported to date. Despite the potential for extensive adult movement, Pacific cod may not undertake directed migrations over their lifetime. Cod tagged in the Eastern Bering Sea exhibited high site fidelity, with 70% of recaptures occurring within 80 km (Shi et al. 2007). Studies in the Gulf of Alaska have shown that although some fish travelled in excess of 600 km, about 75% stayed within 25 km over considerable time periods (Cunningham et al. 2009).

<http://www.pmel.noaa.gov/foci/publications/2009/cunn0670.pdf>

In conclusion, the results of this study confirm the presence of a genetic discontinuity across the Bering Sea that represents a secondary contact zone between two major population groups isolated by mid-Pleistocene glaciation.

Pleistocene ice-ages greatly influenced the historical abundances of Pacific cod, *Gadus macrocephalus*, in the North Pacific and its marginal seas. Canino et al. (2010) surveyed genetic variation at 11 microsatellite loci and mitochondrial (mt) DNA in samples from twelve locations from the Sea of Japan to Washington State [1)East China Sea, Korea; 2)Sea of Okhotsk, Japan; 3)Near Islands, AK; 4)Central Aleutian Islands, AK; 5)Adak Island, AK; 6)Atka Island, AK; 7)Unimak Pass, AK; 8)Kodiak Island, AK; 9)Hecate Strait, BC Canada; 10)Coastal Washington, WA; 11)Strait of Georgia, WA; 12)Puget Sound, WA]. Both microsatellite (mean H = 0.868) and mtDNA haplotype (mean h = 0.958) diversities were large and did not show any geographical trends. Genetic differentiation between samples was significantly correlated with geographical distance between samples for both microsatellites ($F_{ST} = 0.028$, $r^2 = 0.33$) and mtDNA ($F_{ST} = 0.027$, $r^2 = 0.18$). Both marker classes showed a strong genetic discontinuity between northwestern and northeastern Pacific populations that likely represents groups previously isolated during glaciations that are now in secondary contact. Significant differences appeared between samples from the Sea of Japan and Okhotsk Sea that may reflect ice-age isolations in the northwest Pacific. In the northeast Pacific, a microsatellite and mtDNA partition was detected between coastal and Georgia Basin populations. The presence of two major coastal mtDNA lineages on either side of the Pacific Ocean basin implies at least two ice-age refugia and separate postglacial population expansions facilitated by different glacial histories. (<http://www.ncbi.nlm.nih.gov/pubmed/20819160>).

Regarding Pacific cod genetic difference between the Western and Eastern Bering Sea, A.V.Vinnikov in his PhD dissertation "Pacific cod of Western Kamchatka: biology, stock dynamics and fishery" (December 2008, in Russian, an extended abstract available at http://www.imb.dvo.ru/files/Autoreferat_Vinnikov.pdf) used data of electrophoresis on 28 protein systems (5 polymorphic loci) and demonstrated that the Pacific cod of the Russian Western Bering Sea together with that of Okhotsk Sea (his target study) and of both southern and northern Kurile Islands belong to the Asiatic genetic pool, is different from that of Pacific cod of North American waters.

http://doc.nprb.org/web/08_prjs/817_Final%20report.pdf

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
1.2.1	<p>Rating determination</p> <p><i>The area through which the species migrates during its life cycle is considered by the management system.</i></p> <p>Pacific cod is distributed widely over the EBS as well as in the AI area and the GOA. The GOA and BSAI Pacific cod stocks are considered to be different stocks and are managed as two different units. Pacific cod is a transoceanic species, occurring at depths from shoreline to 500 m. Juveniles occur mostly over the inner continental shelf at depths of 60 to 150 m. Adults occur in depths from the shoreline to 500 m, although occurrence in depths greater than 300 m is fairly rare. Preferred substrate is soft sediment, from mud and clay to sand. In the EBS, where the largest concentration of Pacific cod is found spawning aggregations are found at the 200 m isobaths, at the shelf edge. Average depth of occurrence tends to vary directly with age for at least the first few years of life. These areas are surveyed and the biological and population data from these assessments are included within the stock synthesis models.</p> <p>Although they are not considered to be a migratory species, individual adult Pacific cod have been found to move more than 1,000 km (NOAA 1990, Shimada and Kimura 1994). In the northern extent of the range, there exists a seasonal bathymetric movement from deep spawning areas of the outer shelf and upper slope in fall and winter to shallow middle-upper shelf feeding grounds in the spring and early summer (Dunn and Matarese 1987, Hart 1973, NOAA 1990, Shimada and Kimura 1994, Stepanenko 1995). Larvae may be transported by tidal current to nursery areas (Garrison and Miller 1982). Juveniles are found in polyhaline to euryhaline waters, whereas adults are found in marine waters. There is some evidence to suggest that the fish move to deeper water with growth (Hart 1973, NOAA 1990), but they are not found exclusively in deeper water (Brodeur et al. 1995, Palsson 1990). Despite the potential for extensive adult movement, Pacific cod may not undertake directed migrations over their lifetime. Cod tagged in the EBS exhibited high site fidelity, with 70% of recaptures occurring within 80 km (Shi et al. 2007). Studies in the GOA have shown that although some fish travelled in excess of 600 km, about 75% stayed within 25 km over considerable time periods. Combined with tagging data, with caution, these results may potentially be used in the future to develop a model of cod dispersal to determine a more appropriate geographic scale for management and conservation, seen the recent genetic structure studies for this species in the North Pacific.</p> <p>Evidence</p> <p>http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPCod.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOAPCod.pdf http://www.nwfsc.noaa.gov/publications/techmemos/tm44/pacificcod.htm http://www.pmel.noaa.gov/foci/publications/2009/cunn0670.pdf</p>

<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
1.2.2	<p>Rating determination <i>The biological unity and other biological characteristics of the stock are considered within the management system.</i></p> <p>The biological unity of Pacific cod in the waters off Alaska is taken into account. Please see the discussion in clause 1.2 and 1.2.1 above for details. In terms of accounting for biological characteristics, the yearly Pacific cod stock assessment (GOA and BSAI SAFE) reports are based on a Stock Synthesis model that uses both length-structured and age-structured data including estimates of natural mortality, catchability, variability in estimated age, variability in estimated length at age, season specific parameters governing the weight at length schedule, recruitment, maturity etc... In addition the SAFE reports estimates and evaluates stock status, structure and the genetics. Furthermore, the Pacific cod in Alaska is assessed in terms trophic relationship (prey and predators species of Pacific cod and abundance, composition of Pacific cod prey variance by time and area), fishery effects on the ecosystem (predation pressure on shared prey species) and essential fish habitats.</p> <p>Evidence http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPCod.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOAPCod.pdf http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf</p>
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
1.2.3	<p>Rating determination <i>All fishery removals and mortality of the target stocks are considered (BSAI and GOA SAFEs) by management.</i></p> <p>All fishery removals and mortality of the target stock(s) are considered by management. For both the BSAI and the GOA Pacific cod stocks (see EBS and GOA Pacific cod SAFEs), the management organizations collect the necessary information on removals and mortality (including natural mortality) of the target stock, as well data on bycatch and discards. Strictly enforced daily landing reports, at sea and shore-based fishery enforcement, fishery observers and an extensive mandatory and voluntary logbook program verify and ground-</p>

	<p>truth total mortality estimates.</p> <p>For further information, refer to the chapter 3.5 of the Background section.</p> <p>Evidence http://www.afsc.noaa.gov/REFM/docs/2011/BSAIpCod.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf</p>
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
1.2.4	<p>Rating determination</p> <p><i>The Alaska Pacific cod fisheries management system (NPFMC/NMFS; and ADFG/BOF) routinely takes into account all previously-agreed management measures.</i></p> <p>Many examples exist that show the continued implementation of previously agreed regulations for Pacific cod management within the Alaska EEZ and state waters. (5 AAC 28.089 Guiding Principles)</p> <p>One example is the continuous use the 2 million mt optimum yield cap for the BSAI groundfish fisheries and coordination of state water cod management with the NPFMC. That is also true for the GOA management area.</p> <p>On a more general perspective, the NPFMC and BOF public meetings (the NPFMC meets five times each year, usually in February, April, June, October and December; the BOF meetings generally occur from October through March, four to six times per year) allow for continuous review and improvement (where needed) of fishery management measures where all fishery stakeholders routinely participate, interact and input within the management process of the Pacific cod fisheries.</p> <p>Evidence http://www.fakr.noaa.gov/npfmc/PDFdocuments/meetings/Management_FMP.pdf http://www.fakr.noaa.gov/npfmc/public-meetings/meeting-calendar.html http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main</p>

FAO CCRF 7.1.5		
<p>1.4.2 States seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement shall consult with the latter, in advance to the extent practicable, and take its views into account.</p>		
FAO CCRF 7.3.5		
<p>Evidence adequacy rating:</p> <p style="text-align: center;"> <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low </p>		
Clause	Evidence	
1.4	This clause is not applicable. The stocks here in question are not considered shared resources exploited by two or more States. Please refer to clause 1.3.	
<p>Evidence adequacy rating:</p> <p style="text-align: center;"> <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low </p>		
Clause	Evidence	
1.4.1	This clause is not applicable. The stocks here in question are not considered shared resources exploited by two or more States. See Clause 1.4.	
<p>Evidence adequacy rating:</p> <p style="text-align: center;"> <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low </p>		
Clause	Evidence	
1.4.2	This clause is not applicable. The stocks here in question are not considered shared resources exploited by two or more States. See Clause 1.4.	

<p>Clause:</p> <p>1.5 The Applicant fishery’s management system shall actively foster cooperation between States with regard to:</p> <ul style="list-style-type: none"> • Information gathering and exchange • Fisheries research • Fisheries management • Fisheries development <p style="text-align: right;"><i>FAO CCRF 7.3.4</i></p>		
<p>Evidence adequacy rating:</p> <p style="text-align: center;"> <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low </p>		
Clause	Evidence	
1.5	This clause is not applicable. The stocks here in question are not considered shared resources exploited by two or more States. Please refer to clauses 1.3. and 1.4.	

<p>Clause:</p> <p>1.6. States and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, <i>inter alia</i>, the relative benefits derived from the fishery and the differing capacities of countries to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management and research.</p> <p style="text-align: right;"><i>FAO CCRF 7.7.4</i></p> <p>1.6.1 Without prejudice to relevant international agreements, States shall encourage banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures.</p> <p style="text-align: right;"><i>FAO CCRF 7.8.1</i></p>		
<p>Evidence adequacy rating:</p> <p style="text-align: center;"> <input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low </p>		

Clause	Evidence
1.6	<p>Rating determination</p> <p><i>Only the U.S. federal government and the State of Alaska conduct conservation and management activities for Pacific cod off Alaska. Both state and federal management of Pacific cod display a clear means for financing the activities of fishery management organizations and arrangements (detailed in GOA and BSAI Groundfish FMPs). Where appropriate, the costs for fisheries conservation, management and research are recovered.</i></p> <p>Specific costs incurred during the management, research and enforcement of the groundfish stocks in the BSAI and GOA are reported in the BSAI and GOA Groundfish Fishery Management Plans. Please refer to these management plans for precise expenditure figures. Generally speaking, the costs of fisheries management and conservation in the U.S. derive from the following services and are funded through Congressional appropriations.</p> <p>1) Research; data collection, surveys, data analysis, and stock assessment services are mainly financed through Congressional appropriations, other public sector funding, and industry funding.</p> <p>2) Management; conservation and management of the fishery and services for fishery participants, state and industry assistance programs, including marine fisheries commissions, disaster assistance are mainly financed through Congressional appropriations and industry.</p> <p>3) Enforcement; vessel boarding, dockside monitoring, vessel monitoring system (VMS) implementation, auction inspection, aerial surveillance, criminal investigations are funded through Congressional appropriations and industry (for some VMS).</p> <p>Wherever possible, in addition to appropriations, fishery management organizations will seek to balance the costs of management by organizing self-funding programs. An example is the restructuring of the current groundfish observer program. In January 2013, the new observer program replaces the existing observer service delivery model, in which industry contracts directly with observer providers to meet observer coverage requirements in Federal regulations, with a new system (i.e., restructuring) in which NMFS would contract directly with observer providers and to determine when and where observers are deployed. Vessels and processors under the restructured observer program would pay either a fee based on a percentage of ex-vessel revenue (not to exceed 2%), or a daily observer fee, to fund the program.</p> <p>NOAA budget</p> <p>The NOAA budget is divided into two primary accounts: Operations, Research and Facilities (ORF) and Procurement, Acquisition and Construction (PAC). These two</p>

	<p>accounts make up over 99 percent of the total Fiscal Year (FY) 2011 NOAA appropriation.</p> <p>NMFS is dedicated to the stewardship of living marine resources through science-based conservation and management within the 200-mile U.S. EEZ. The President's FY 2012 Budget requested a net increase of \$20.9 million for NMFS (including the Pacific Coastal Salmon Recovery Fund and the Fisherman's Contingency Fund). The NMFS budget generally covers the following:</p> <ol style="list-style-type: none"> 1) <i>Protected Species Research & Management;</i> 2) <i>Fisheries Research and Management;</i> 3) <i>Enforcement & Observers/Training;</i> 4) <i>Habitat Conservation & Restoration;</i> 5) <i>Other Activities Supporting Fisheries.</i> <p>Other NOAA Accounts</p> <p>The Pacific Coastal Salmon Recovery Fund was established in FY 2000 to fund State, Tribal and local conservation initiatives to help recover threatened and endangered Pacific salmon populations in the states of California, Washington, Oregon, Idaho, and Alaska. FY 2011 President's Request includes \$65 million for the Pacific Coastal Salmon Recovery Fund.</p> <p>NOAA uses the Fishermen's Contingency Fund to compensate domestic fishermen for the damage or loss of fishing gear and resulting economic loss due to obstructions related to oil and gas exploration, development or production in the Outer Continental Shelf. The funds come from fees collected annually by the Secretary of the Interior from the holders of leases, explorations, permits, easements, and rights of way. FY 2011 President's Request includes \$350 thousand for the Fisherman's Contingency Fund.</p> <p>The Fisheries Finance Program Account provides direct loans that promote building sustainable fisheries. The program provides Individual Fishing Quota (IFQ) financing at the request of a Fishery Management Council. The program also makes long term fixed rate financing available to U.S. citizens who otherwise do not qualify for financing and refinancing of the construction, reconstruction, reconditioning, and in some cases, the purchasing of fishing vessels, shoreside processing, aquaculture, and mariculture facilities.</p> <p>The Promote and Develop American Fishery Products & Research Pertaining to American Fisheries Fund receives 30 percent of the import duties the Department of Agriculture collects on fishery-related products. NOAA will use a portion of these funds to offset marine fishery resource programs in the Operations, Research and Facilities (ORF) appropriation in FY 2011. NOAA uses the remaining funds to promote industry development through competitively-awarded external grants for innovative research and development of projects in the fishing industry and for internal research that complements the external program.</p> <p>The Damage Assessment and Restoration Revolving Fund (DARRF) receives proceeds</p>
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	<p>must be at least 75 percent US ownership (see the Jones Act) and must possess appropriate federal groundfish BSAI and GOA permits or State of Alaska vessel permits to participate.</p> <p>http://alaskafisheries.noaa.gov/regs/680/680a4.pdf 50CFR679: www.fakr.noaa.gov/regs/default.htm http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/Groundfish-2012-2013.pdf</p>
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Clause:	
1.7	<p>Procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review to revise or abolish them in the light of new information.</p> <ul style="list-style-type: none"> • Review procedures shall be established within the management system. • A mechanism for revision of management measures shall exist. <p style="text-align: right;">FAO CCRF 7.6.8</p>

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High	<input type="checkbox"/> Medium <input type="checkbox"/> Low

Clause	Evidence																					
1.7	<p>Rating determination <i>Procedures (through NPFMC and BOF public meetings) are in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review to revise or abolish them in the light of new information.</i></p> <p>The Pacific cod fisheries are managed under the NPFMC’s Groundfish FMPs. The NPFMC amends its FMPs as often as necessary; the most recent update is of 2012. Both the NPFMC, for federal waters, and the BOF, for State waters, allow for the continuous review of conservation and management measures (5 AAC 096.600 - 096.660) The MSA is periodically revised and reauthorized (i.e. the Sustainable Fisheries Act added 3 standards to MSA).</p> <p>Evidence</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">GOA</td> <td style="width: 15%;">Groundfish</td> <td style="width: 15%;">Fishery</td> <td style="width: 15%;">Management</td> <td style="width: 15%;">Plan</td> <td style="width: 15%;">(updated 06/12)</td> <td style="width: 10%; text-align: right;">–</td> </tr> <tr> <td></td> <td colspan="5">www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html</td> <td></td> </tr> <tr> <td>BSAI</td> <td>Groundfish</td> <td>Fishery</td> <td>Management</td> <td>Plan</td> <td>(updated 06/12)</td> <td style="text-align: right;">–</td> </tr> </table>	GOA	Groundfish	Fishery	Management	Plan	(updated 06/12)	–		www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html						BSAI	Groundfish	Fishery	Management	Plan	(updated 06/12)	–
GOA	Groundfish	Fishery	Management	Plan	(updated 06/12)	–																
	www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html																					
BSAI	Groundfish	Fishery	Management	Plan	(updated 06/12)	–																

	www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html http://www.fakr.noaa.gov/npfmc/public-meetings/meeting-calendar.html http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main	
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Clause:		
<p>1.8 The management arrangements and decision making processes for the fishery shall be organized in a transparent manner.</p> <ul style="list-style-type: none"> • Management arrangements • Decision-making <p style="text-align: right;"><i>FAO CCRF 7.1.9</i></p>		
Evidence adequacy rating:		
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
1.8	<p>Rating determination <i>The NPFMC's management arrangements and decision making processes for the fishery are organized in a very transparent manner.</i></p> <p>The NPFMC's management arrangements and decision making processes for the fisheries are organized in a very transparent manner. The NPFMC (and NMFS) as well as the BOF (and ADFG) provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The NPFMC and the BOF actively encourages stakeholder participation, and all NPFMC and BOF deliberations are conducted in open, public session. Anyone may submit regulatory proposals, and all such proposals are given due consideration by both the NPFMC and the BOF. Rules impose transparency so that all BOF and NPFMC members' discussions are open to the public. No more than a predetermined number of BOF or NPFMC members can meet together unless the meeting is an open public meeting.</p> <p>Evidence</p> <p>www.fakr.noaa.gov/npfmc/default.htm www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main</p>	

<p>Clause:</p> <p>1.9 Management organizations not party to the Agreement to Promote Compliance with International Conservation and Management Measures by Vessels Fishing in the High Seas shall be encouraged to accept the Agreement and to adopt laws and regulations consistent with the provisions of the Agreement.</p> <p style="text-align: right;"><i>FAO CCRF 8.2.6</i></p>	
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
1.9	<p>Not relevant. <i>The Pacific cod fisheries under assessment occur exclusively within the EEZ of the Alaska.</i></p> <p>The United States ratified the The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas on the 19 December 1995. While the Pacific cod fisheries under assessment occur exclusively within the EEZ of the Alaska, the Compliance Agreement is important if climate change ever alters stock distribution such that high seas harvests become a concern.</p> <p>Evidence</p> <p>http://www.oceanlaw.net/projects/current/pdf/ifa_sample.pdf http://www.fao.org/Legal/treaties/012s-e.htm http://www.fao.org/fishery/topic/14766/en</p>

<p>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.</p> <p style="text-align: right;"><i>FAO CCRF 10.1.1/10.1.2/10.1.4/10.2.1/10.2.2/10.2.4</i></p>						
Confidence Ratings	Low	0 out of 16	Medium	0 out of 16	High	15 out of 16

<p>Clause:</p> <p>2.1 An appropriate policy, legal and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, taking into account the fragility of coastal ecosystems, the finite nature of their natural resources and the needs of coastal communities.</p> <p style="text-align: right;"><i>FAO CCRF 10.1.1</i></p> <p>2.1.1 States shall develop, as appropriate, institutional and legal frameworks in order to determine the possible uses of coastal resources and to govern access to them taking into account the rights of coastal fishing communities and their customary practices to the extent compatible with sustainable development.</p> <p style="text-align: right;"><i>FAO CCRF 10.1.3</i></p> <p>2.1.2 In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.</p> <p style="text-align: right;"><i>FAO CCRF 10.2.3</i></p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
2.1	<p>Rating determination</p> <p><i>An appropriate policy, legal and institutional framework is present to achieve sustainable and integrated use of living marine resources, taking into account the fragility of coastal ecosystems, the finite nature of their natural resources and the needs of coastal communities.</i></p> <p>The NPFMC and the BOF are required to manage the Pacific cod trawl, longline, pot and jig fisheries in a sustainable manner, as mandated by the MSA National Standards and the Alaska Constitution, respectively.</p> <p>The NPFMC and the NMFS participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes, a</p>

socio-economic and biological/environmental impact assessment of the various scenarios, before a path of action is chosen. This usually happens whenever resources under their management may be affected by other developments. Also, federal agencies, including the NPFMC, are responsible for producing NEPA documents each time they renew or amend regulations. One recent example for this is the restructuring of the observer programme, specifically amendments 86 and 76 (BSAI and GOA FMP respectively), which is due for implementation in January 2013.

http://alaskafisheries.noaa.gov/analyses/observer/amd86_amd76_eairirfa0311.pdf
http://alaskafisheries.noaa.gov/frules/observer112012_asfiled.pdf

Therefore, all of the NPFMC proposed regulations include NEPA considerations. NEPA, therefore, is a comprehensive process to provide checks and balances against changes to the environment that may impact ecosystems and the natural processes, as well as the socio-economic sphere of fisheries.

Similarly, the Bureau of Land Management (BLM) actions in Alaska are governed by the NEPA of 1969 and other laws, including the Federal Land Policy and Management Act of 1976 (FLPMA) and the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). When an activity or action is proposed on BLM-administered lands, the BLM must analyze the proposed action to assess how it may affect the quality of the human environment (<http://www.blm.gov/ak/st/en/info/nepa.html>)

Every agency in the executive branch of the Federal Government has a responsibility to implement NEPA. In NEPA, Congress directed that, to the fullest extent possible, the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in NEPA. To implement NEPA's policies, Congress prescribed a procedure, commonly referred to as "the NEPA process" or "the environmental impact assessment process". A Citizen Guide to the NEPA process, has been published based on research and consultations undertaken by the Council on Environmental Quality (CEQ). Participants in the NEPA Regional Roundtables held in 2003-2004 clearly voiced the need for a guide to provide an explanation of NEPA, how it is implemented, and how people outside the Federal government — individual citizens, private sector applicants, members of organized groups, or representatives of Tribal, State, or local government agencies — can better participate in the assessment of environmental impacts conducted by Federal agencies.

http://ceq.hss.doe.gov/nepa/Citizens_Guide_Dec07.pdf

The NEPA processes provide public information and a robust opportunity for public involvement. Decisions are made through public processes and involvement of fishery managers, fishermen, fishing organizations and fishing communities. Stakeholders are actively invited through publicly advertised and scheduled meetings.

State of Alaska and the NEPA process

The state is a cooperating agency in the NEPA process for federal actions, so that gives the State of Alaska another seat at the table for federal actions. This includes decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. The BOF, in conjunction with the ADFG, is responsible for all the Pacific cod management measures. Both ADFG and BOF routinely take into account the risks and uncertainties of fishery management. Any proposed changes to the existing management regime by government, industry, or the public must go through a rigorous regulatory review process. During this process department scientists and biologists prepare detailed reports that include the best scientific data available at the time. These are delivered to the board and the public for their consideration.

<http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main>.

DEC, ADFG, DNR and the USFWS

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

ADFG, on the hand, 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. <http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akendangered>

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

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, tourism, and transportation work as a team to provide input throughout federal planning processes (<http://dnr.alaska.gov/commis/opmp/anilca/anilca.htm>).

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 BOF and NPFMC public meeting processes

The BOF and the NPFMC have openly public processes. Any individual or group can submit proposals for discussion of management and research for the Pacific cod fisheries in Alaska. The BOF meets in communities throughout coastal Alaska, while the NPFMC meets in communities in Alaska as well as in Washington and Oregon to provide public opportunities. Written comments are accepted when it is not possible to attend in person.

<http://www.fakr.noaa.gov/npfmc/>

<http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main>

Federal and State agencies cooperation

The assessment team is confident that the NEPA process, existing agencies and processes (e.g. ADFG, ADEC, DNM, USFWS, ANILCA and OPMP), and the existing intimate and routine cooperation between federal and state agencies managing Alaska's coastal resources (living and non-living) is capable of planning and managing coastal developments in a transparent, organized and sustainable way, that minimizes environmental issues while taking into account the socio-economic aspects, needs and interests of the various stakeholders of the coastal zone.

<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
2.1.1	<p>Rating determination <i>The routine collaboration and processes within and between federal and state agencies in order allows determining the possible uses of coastal resources and to govern access to them taking into account the rights of coastal fishing communities and their customary practices to the extent compatible with sustainable development.</i></p> <p>In addition to the information provided in clause 2.1, the management organizations within Alaska and their processes take into account the rights of coastal fishing communities and their customary practices to the extent compatible with sustainable development.</p> <p>The beginning of such processes is clearly demonstrated by the NPFMC and BOF public decision-making processes.</p> <p>The Alaska Board of Fisheries process The BOF main role is to conserve and develop the fishery resources of the state. The BOF is charged with making allocative decisions, and ADFG is responsible for management based on those decisions. The BOF meets four to six times per year in communities around the state to consider proposed changes to fisheries regulations around the state. The BOF uses the biological and socioeconomic information provided by the ADFG, public comment received from people inside and outside of the state, and guidance from the Alaska Department of Public Safety and Alaska Department of Law when creating regulations that are sound and enforceable. Advisory committees are the local "grass roots" groups that meet to discuss fish and wildlife issues and to provide recommendations to the boards. There are 82 committees throughout the state each with expertise in a particular local area. This process ensures that the local communities' customary uses and practices are considered.</p> <p>As authorized by Alaska Statute 16.05.260 which originally passed in 1959, the Joint BOF and ADFG established 82 Advisory committees for the purpose of providing a local forum for the collection and expression of opinions and recommendations on matters related to the management of fish and wildlife resources. The regulations governing the advisory committee are <u>5 AAC Chapter 96 and 97</u>. Meetings are always open to the public and are generally attended by department staff and members of the public who can offer background information on agenda topics. Advisory Committees are intended to provide a local forum on fish and wildlife issues.</p> <p>http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main.</p>

The Council process

The NPFMC system was designed so that fisheries management decisions were made at the regional level to allow input from affected stakeholders which assures that the rights of coastal communities and their historic access to the fishery is included in the decision process. NPFMC meetings are open, and public testimony - both written and oral - is taken on each and every issue prior to deliberations and final decisions. Public comments are also taken at all Advisory Panel and Scientific and Statistical Committee meetings. While there is not a formal "call for proposals," interested stakeholders are welcome to draft letters to the NPFMC.

Each NPFMC decision is made by recorded vote in public forum after public comment. Final decisions then go to NMFS for a second review, public comment, and final approval. Decisions must conform to the MSA, the NEPA, Endangered Species Act, Marine Mammal Protection Act, and other applicable law including several executive orders. Regulatory changes may take up to a year or longer to implement, particularly if complex or contentious, but the NPFMC makes every attempt in being open and transparent throughout the process. The NPFMC meets five times each year, usually in February, April, June, October and December, with three of the meetings held in Anchorage, one in a fishing community in Alaska and one either in Portland or Seattle. Most NPFMC meetings take seven days, with the Advisory Panel (AP) and Scientific and Statistical Committee (SSC) usually following the same agenda and meeting two days earlier (<http://www.fakr.noaa.gov/npfmc/index.html>).

Joint BOF and NPFMC Meetings

BOF and the NPFMC have signed a joint protocol agreement to help coordinate compatible and sustainable management of fisheries within each organization's jurisdiction. A committee was formed, the Joint Protocol Committee, which includes three members from each group that meets at least once a year to identify and discuss issues of mutual interest. The entire BOF and NPFMC meet jointly once a year to consider proposals, committee recommendations, the analyses, and other topics of mutual concern. The joint meeting is typically held in Anchorage in February, depending upon NPFMC and BOF meeting schedules.

<http://www.fakr.noaa.gov/npfmc/PDFdocuments/meetings/212JntProtocolAgenda.pdf>

CDQ

The Community Development Quota (CDQ) Program began in December of 1992 with the goal of promoting fisheries related economic development in western Alaska. The CDQ Program allocates a percentage of all BSAI quotas for groundfish, prohibited species, halibut and crab to eligible communities. The Program allocates 10.7% of the Pacific cod BSAI TAC to eligible communities. The purpose of the program is to (i) provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the BSAI Management Area; (ii) to support economic development in western Alaska; (iii) to alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska.

There are 65 communities within a fifty-mile radius of the BS coastline who participate in the program. The CDQ program allocated a portion of the BSAI harvest amounts to CDQ groups, including halibut, groundfish (pollock, Pacific cod, flatfish and rockfish), crab and bycatch species. The CDQ program was granted perpetuity status during the 1996 reauthorization of the MSA.

The six CDQ groups are located throughout the western Alaska coastline and South towards the AI, these are:

- Aleutian Pribilof Island Community Development Association (6 communities)
- Bristol Bay Economic Development Corporation (17 communities)
- Central Bering Sea Fishermen's Association (1 community)
- Coastal Villages Region Fund (20 communities)
- Norton Sound Economic Development Corporation (15 communities)
- Yukon Delta Fisheries Development Association (6 communities).

A map of these communities is available at:

<http://www.commerce.state.ak.us/bsc/CDQ/cdq.htm>

The CDQ program has been successfully contributing to fisheries infrastructure in western Alaska by funding docks, harbors, vessel acquisition and the construction of seafood processing facilities. The CDQ program has allowed CDQ groups to acquire equity ownership interests in the halibut, groundfish, and crab sectors that provide additional revenues to fund local in-region economic development projects, and education and training programs.

The State waters Pacific cod fisheries

The State waters Pacific cod fisheries were carved out by the State over the objections of the NPFMC, specifically to provide opportunity for entry of small vessels associated with coastal communities. These small vessels were foreclosed from entry into the federal fisheries that had come to be dominated by large non-local vessels that had pushed through entry moratoria and license limitations that locked out entrance by vessels based in small coastal communities.

Evidence

<http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main>

<http://www.adfg.alaska.gov/index.cfm?adfg=process.advisory>

<http://www.fakr.noaa.gov/npfmc/public-meetings/meeting-calendar.html>

<http://alaskafisheries.noaa.gov/cdq/default.htm>

<http://alaskafisheries.noaa.gov/cdq/allocations/annualmatrix2012.pdf>

<http://www.dced.state.ak.us/bsc/cdq/cdq.htm>

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
2.1.2	<p>Rating determination <i>In setting policies for the management of coastal areas, the fisheries management organizations involved in the management of the Pacific cod takes account of the risks and uncertainties involved.</i></p> <p>Risks and uncertainties related to the policies set up for the management of coastal areas are taken into account within and throughout the various NEPA processes, NPFMC and BOF proceedings. Please see previous Clauses under fundamental 2 for further information and evidence.</p>

Clause:	
<p>2.2 Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involved in other activities related to coastal area management planning and development.</p> <p style="text-align: right;"><i>FAO CCRF 10.1.2</i></p>	
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
2.2	<p>Rating determination <i>Representatives of the fisheries sector and fishing communities are consulted in the decision-making processes and in other activities related to coastal area management planning and development.</i></p> <p>Representatives of the fisheries sector and fishing communities are consulted in the decision-making processes and in other activities related to coastal area management planning and development. This happens through the NEPA processes, and especially through the NPFMC and BOF proceedings as well as through public review processes organized by the NMFS. Please refer to previous Clauses in this section for further information and evidence.</p>

Clause:	
2.4	<p>States and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.10</i></p> <p>2.4.1 The public shall be kept aware on the need for the protection and management of coastal resources and the participation in the management process by those affected.</p> <p style="text-align: right;"><i>FAO CCRF 10.2.1</i></p>
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
2.4	<p><i>Rating determination</i> <i>Conservation and management measures, laws, regulations and other legal rules governing their implementation are effectively disseminated.</i></p> <p>National Public Radio (NPR) is the main source of information for Alaska fisherman (http://www.npr.org/). All fishery report passes out through NPR and keep informed fishermen of development as they are implemented. In addition to local radio, the internet (NMFS, NPFMC and ADFG websites), and printed news releases and Emergency Orders (available at local harbourmaster’s offices, marine supply outlets, etc) are also important sources of public information. The Marine Conservation Alliance (MCA) has a website that give links to all of the various State, federal plans and proposals, Industry and USCG information (http://www.marineconservationalliance.org/). NPR and MCA are widely used by industry and the communities.</p> <p>The NPFMC and BOF public processes encourage fisheries stakeholders to become involved in all the decision-making processes relative to the fishery resource in question. Many of these processes will result in legislation. These agencies provide vast amounts of written and electronic information related to the fisheries under their management on their websites, at local offices, and via radio updates. Fishery users are educated about conservation and management measures by simple virtue of involvement in the process, and by the public nature of the management system, starting from decision making to the final stages of law/regulation publication. Stakeholders involvement allows for facilitation in application and support in the implementation of fisheries management measures. See previous clauses for evidence.</p>

<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
2.4.1	<p>Rating determination <i>The public is kept aware (NPR) on the need for the protection and management of coastal resources and the participation in the management process by those affected.</i></p> <p>NPR is a common source of information for Alaska fisherman. Additionally, both electronic and hard copies of regulatory actions are available from all NFMS and ADFG offices. Both the NPFMC and the BOF also make upcoming agendas and scientific materials to be discussed available on their web sites, and at local offices.</p> <p>While NMFS Office for Law Enforcement (OLE) is tasked with enforcing the laws and regulations to manage Alaska’s marine resources, continuous education of the American public and ocean resource users is key in protection and conservation. OLE special agents, enforcement officers and support personnel routinely make presentations to school, scout and civic groups. These presentations cover a vast array of subjects within enforcement and conservation.</p> <p>Marine mammal protection, endangered species, sustainable fisheries, vessel monitoring systems, new Federal fishing regulations, and proper stranding procedures are just a few of the topics that they address. Special agents and enforcement officers are engaged in their communities and can be solicited directly through the local field office (http://www.nmfs.noaa.gov/pr/education/).</p> <p>NOAA’s NMFS Protected Resources Outreach and Education Plan of 2006 strives to give direction to the myriad efforts currently underway across the NMFS Protected Resources (PR) regional and headquarters offices and NMFS science centers. This plan incorporates visions and mandates from NOAA, NMFS, and PR into an outline and plan of action addressing outreach and education for the next three to five years. Workshop participants identified challenges to outreach and education, most effectively addressed at a national level, which form the basis of the Outreach and Education plan.</p> <p>In all NMFS/PR offices and at NMFS science centers, outreach and education activities are successfully underway. The work is carried out by full time outreach specialists, program staff with partial outreach responsibilities, and by interested staff who integrate outreach and education into their regular duties.</p> <p>Outreach and education will improve the public’s perspective of Protected Resource’s programs by increasing the public’s knowledge of the status of species, threats to their continued survival, and how NMFS science and management are working to address. (http://www.nmfs.noaa.gov/pr/pdfs/education/strategic_plan.pdf).</p> <p>http://www.adfg.alaska.gov/static/species/wildlife_action_plan/cwcs_main_text_combined.pdf</p>

Clause:	
<p>2.5 The economic, social and cultural value of coastal resources shall be assessed in order to assist decision-making on their allocation and use.</p> <ul style="list-style-type: none"> • Economic assessment • Social and cultural assessment <p style="text-align: right;"><i>FAO CCRF 10.2.2</i></p>	
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
2.5	<p>Rating determination <i>The primary job of the NPFMC and the BOF is to manage the resources sustainably and to determine the allocation of resources to different users using biological and socio-economic information collected and analyzed by the NMFS and the ADFG.</i></p> <p>The Regulatory Flexibility Act (RFA) requires agencies to consider the impact of their rules (Fishery Management Plans, Fishing Regulations) on small entities (fishermen communities) and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities. http://www.eeoc.gov/eeoc/plan/regflexibilityact.cfm</p> <p>In addition, the White House, through Executive Order (E.O.) 12866, requires Executive Branch agencies to perform benefit-cost analyses for all rules it deems to be “significant” and to submit these analyses to the Office of Management and Budget for review. http://www.epa.gov/ttnecas1/econdata/Rmanual2/2.2.html</p> <p>In August 2000, the NMFS issued guidelines for economic analysis of Fishery Management Actions. The purpose of the document was to provide guidance on understanding and meeting the procedural and analytical requirements of E.O. 12866 and the RFA for regulatory actions of federally managed fisheries.</p> <p>Economic analyses are also required to varying degrees under the MSA, the NEPA, the Endangered Species Act, and other applicable laws. http://www.nmfs.noaa.gov/sfa/domes_fish/OperationalGuidelines/OGeconomicanalysis_d.htm</p> <p>MSA lists 10 National Standards, to be used to obtain policy objectives. National Standard five states that the federal government must consider efficiency in utilization; and not have economic allocation as a sole purpose in their decision making process. National Standard eight requires that the NPFMC consider fishing communities to provide for their</p>

sustained participation, while to the extent practicable, minimizing adverse economic impacts. The BOF does an equivalent work for the state water managed fisheries.

The primary job of the NPFMC and the BOF is to manage the resources sustainably and to determine the allocation of resources to different users. To do so, they use biological and socio-economic information collected and analyzed by the NMFS and the ADFG. The NPFMC, NMFS and ADFG all have staff economists that participate in the economic, social and cultural evaluation and review process of fishery management proposals. They advise the NPFMC and BOF members, as well as their agency heads that help lead the regulation amendment process.

Secondarily, on a higher level, the NEPA process has the same requirements, as the biological and socio-economic aspects of the fishery must be taken into account before a decision for a change in management can take place.

The AFSC began a large scale socio-economic and cultural assessment of the Alaskan fishery users in 2005. In that year, the AFSC compiled baseline socioeconomic information about the 136 Alaska communities most involved in commercial fisheries. Communities were selected by assessing fishery-involvement indicators including landings, processors, vessel homeports, vessel ownership, crew licenses, and gear operator permits. The profiles compiled information from the US Census, ADFG, the Commercial Fisheries Entry Commission (CFEC), NMFS Restricted Access Management Division, Alaska Department of Community and Economic Development, and various community groups, websites, and archives.

The 5-page profiles for each community follow the same general outline:

- People and Place (Location, Demographics, History).
- Infrastructure (Current Economy, Governance, Facilities).
- North Pacific Fisheries involvement (Commercial, Recreational, Subsistence Fishing).

The AFSC has updated the Alaskan community profiles to include new U.S. Census data from 2010 and input from the communities and industry. 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 updated community profiles will be published as a NOAA Technical Memorandum in late 2012/early 2013.

The Economic status of the fisheries off the GOA and BSAI area can be found in the Economic SAFE. These reports are published yearly along with the Ecosystem SAFEs and the various fishery Stock Assessment and Resource Evaluation (SAFE) reports.

	<p>http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf</p> <p>In addition, the Alaska Fisheries Information Network (AKFIN) was established in 1997 under the direction of the Pacific States Marine Fisheries Commission (PSMFC) to consolidate, manage and dispense information related to Alaska's commercial fisheries. In addition to providing analysts with access to the data library, AKFIN fulfill requests from a wide range of organizations in need of consolidated commercial fisheries information including the NPFMC, NMFS, Alaska Department of Labor and the PSMFC. Their primary purpose is to provide complex data sets to fisheries analysts and economists to support the Council's decision-making process.</p> <p>http://www.akfin.org/about-akfi</p>
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Clause:	
2.6	<p>In accordance with capacities, measures shall be taken to establish or promote systems to monitor the coastal environment as part of the coastal management process using physical, chemical, biological, economic and social parameters.</p> <p style="text-align: right;"><i>FAO CCRF 10.2.4, 10.2.5</i></p>
2.6.1	<p>States shall promote multidisciplinary research in support and improvement of coastal area management, in particular on its environmental, biological, economic, social, legal and institutional aspects.</p> <p style="text-align: right;"><i>FAO CCRF 10.2.5</i></p>

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	

Clause	Evidence
2.6	<p><i>Rating determination</i> <i>Monitoring of the coastal environment (biological, physical, chemical, geological parameters) in Alaska is largely performed by federal and state agencies. Economic and social parameters are assessed by the staff of the NPFMC, NMFS and ADFG either during the NEPA review of plan amendments or during their on-going studies and evaluations.</i></p> <p>Monitoring of the coastal environment in Alaska is performed by federal and state agencies including the U.S. Forest Service, U.S. Fish and Wildlife Service, and the NMFS, ADFG as well as many institutions of higher learning (such as the University of Alaska Institute of Marine Science (IMS)). IMS faculty and research staff provides expertise in marine biology, biological oceanography, physical, chemical and geological oceanography. With an annual research budget of approximately \$5.5 million, current IMS projects include Northeast Pacific near-surface monitoring of temperature, salinity and</p>

fluorescence, polycyclic aromatic hydrocarbon research, and Arctic ocean biodiversity. (<http://www.ims.uaf.edu/>)

Economic and social parameters are assessed by the staff of the NPFMC, NMFS and ADFG either during the NEPA review of plan amendments or during their on-going studies and evaluations. For Oceanography, the North Pacific Research board (NPRB) has funded millions of dollars for numerous studies describing baseline oceanographic parameters and supported environmental buoy arrays (<http://www.nprb.org>). NPRB also have funded major ecosystem studies (currently ongoing) in the GOA and BSAI worth 10's of millions of US\$ (see GOAIERP and BSIERP). The NPRB joined with NSF and their BASIS program to augment the special funding of BSIERP to nearly \$52 million. The NPRB also funded individual projects to support management and conservation of Council related fisheries. Each grant of the NPRB includes a requirement that a portion of the funds be directed to community education and outreach. Additionally, NMFS Pacific Marine Environmental Lab (PMEL) regularly collects oceanographic and environmental data, which is important to understanding the changing habitat of groundfish and other marine species. (<http://www.pmel.noaa.gov>).

ADEC

The Alaska Department of Environmental Conservation (ADEC) Division of Water establishes standards for water cleanliness; regulates discharges to waters and wetlands; provides financial assistance for water and wastewater facility construction, and waterbody assessment and remediation; trains, certifies and assists water and wastewater system operators; and monitors and reports on water quality. This agency also monitors and enforces the discharges associated with fish and shellfish processing (<http://dec.alaska.gov/water/MoreAboutWater.htm>). ADEC Division of Spill Prevention and Response prevents spills of oil and hazardous substances, prepares for when a spill occurs and responds rapidly to protect human health and the environment (<http://dec.alaska.gov/spar/index.htm>).

ADFG

ADFG Habitat Division conducts research on watersheds, active mining sites, fire-impacted woodlands, anadromous fish streams, and coastal and marine environments throughout Alaska in an effort to document and mitigate human-related impacts, changes in habitat & species abundance (<http://www.adfg.alaska.gov/index.cfm?adfg=habitatresearch.main>). ADFG also collects survey data for the cod resources in state waters.

AFSC

The AFSC's "*Ecosystem Monitoring and Assessment Program*" (EMA) main goal is to improve and reduce uncertainty in stock assessment models of commercially important fish and shellfish species through the collection of observations of survey catch and oceanography. Fishery observers and survey scientists collect information regarding fish abundance, size, distribution, diet and energetic status. Oceanographic observations include temperature, conductivity, salinity, density, light transmission, photosynthetically available radiation (PAR), oxygen, Chlorophyll a, and estimates of the composition and biomass of phytoplankton and zooplankton (includes jellyfish) species. These fisheries and

oceanographic observations are used to connect climate change and variability in large marine ecosystems to early marine survival of commercially important fish species in the GOA, Bering Sea, and Arctic.

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

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

In 2005, the AFSC also compiled baseline socioeconomic information about the 136 Alaska communities most involved in commercial fisheries. The AFSC has recently updated these profiles including 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 updated community profiles will be published as a NOAA Technical Memorandum in late 2012/early 2013.

<http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php>

<http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf>

NMFS

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

USCG

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

enforcement of those regulations necessary to help recover and maintain the country's marine protected species and their marine ecosystems. Coast Guard objectives include assisting in preventing the decline of marine protected species populations, promoting the recovery of marine protected species and their habitats, partnering with other agencies and organizations to enhance stewardship of marine ecosystems and ensuring internal compliance with appropriate legislation, regulations and management practices (<http://www.uscg.mil/hq/cg5/cg531/LMR.asp>).

RAM

The NMFS Alaska Regional Office's Restricted Access Management Program (RAM) is responsible for managing Alaska Region permit programs, including those that limit access to the Federally-managed fisheries of the North Pacific. RAM prepares and distributes reports on landings in the federal fisheries (<http://www.fakr.noaa.gov/ram/>).

AFKIN

The Alaska Fisheries Information Network (AKFIN) was established in 1997 under the direction of the Pacific States Marine Fisheries Commission (PSMFC) to consolidate, manage and dispense information related to Alaska's commercial fisheries. AFKIN was founded in response to an increased need for detailed, organized fishery information to help in making management decisions with a mission to maintain an analytic database of both state and federal historic, commercial Alaska fisheries data relevant to the needs of fisheries analysts and economists and to provide that data in a usable format (<http://www.akfin.org/about-akfin>).

ANILCA

In addition, the Alaska National Interest Lands Conservation Act (ANILCA) directs federal agencies to consult and coordinate with the state of Alaska. State agencies responsible for natural resources conservation and management, tourism, and transportation work as a team to provide input throughout federal planning processes.

(<http://dnr.alaska.gov/commis/opmp/anilca/anilca.htm>)

OPMP

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

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
2.6.1	<p>Alaska fisheries management agencies promote multidisciplinary research in support and improvement of coastal area management, in particular on its environmental, biological, economic, social, legal and institutional aspects.</p> <p>The agencies reported above (in clause 2.6) and their efforts are continuously aimed at improving the management of the coastal areas of Alaska. Environmental, biological, economic, social, legal and institutional aspects of the coastal zone are routinely researched, many times using a multidisciplinary approach. Please see clause 2.6 for some examples and evidence.</p>

Clause:	
2.7	<p>In the case of activities that may have an adverse transboundary environmental effect on coastal areas, States shall:</p> <p>a) Provide timely information and, if possible, prior notification to potentially affected States;</p> <p>b) Consult with those States as early as possible.</p> <p style="text-align: right;"><i>FAO CCRF 10.3.2</i></p>
Evidence adequacy rating:	
<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
2.7	<p>This clause is not applicable. The Alaska Pacific cod fisheries here in question are not considered trans-boundary, straddling, highly migratory fish stocks or high seas fish stocks exploited by two or more States. Please see clause 1.2 for further information.</p>

<p>Clause:</p> <p>2.8 States shall cooperate at the sub-regional and regional level in order to improve coastal area management.</p> <p style="text-align: right;">FAO CCRF 10.3.3</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
2.8	<p>Rating determination</p> <p><i>There is intimate, routine and compatible collaboration between state and federal management systems in order to improve coastal area management. The NEPA process brings together the various federal and state agencies whenever a fishery specific development or proposal for change in management is proposed over the coastal zone in Alaska.</i></p> <p>There is intimate, routine and compatible collaboration between state and federal management. This is highlighted by the Joint Protocol of 1997 between the NPFMC and BOF, which intent is to provide long-term cooperative, compatible management systems that maintain the sustainability of the fisheries resources in State and Federal waters, setting up an annual Joint BOF/NPFMC meeting on coordinating state/federal issues. The September 1999 addendum to the Joint Protocol and State/Federal Action Plan designated a subgroup of the BOF and NPFMC to their joint protocol committee and specified staffing issues.</p> <p>The NEPA process brings together the various federal and state agencies whenever a fishery specific development or proposal for change in management is proposed over the coastal zone in Alaska.</p> <p>The Alaska National Interest Lands Conservation Act (ANILCA) directs federal agencies to consult and coordinate with the state of Alaska. Moreover, the Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP) coordinates the review of larger scale projects in the state.</p> <p>Evidence</p> <p>http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.findings http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/findings/ff97170a.pdf http://dnr.alaska.gov/commis/opmp/ http://dnr.alaska.gov/commis/opmp/anilca/anilca.htm</p>

<p>Clause:</p> <p>2.9 States shall establish mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas.</p> <p style="text-align: right;">FAO CCRF 10.4.1</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
2.9	<p>Rating determination</p> <p><i>Alaska has established mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas.</i></p> <p>Alaska has established mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas.</p> <p>The NMFS in connection with the NPFMC managing the cod resource in the BSAI and the GOA, and participates in coastal area management-related institutional frameworks through the NEPA processes. This usually happens whenever resources under their management may be affected by other developments. Federal agencies, including the NPFMC, are responsible for producing NEPA documents each time they renew or amends regulations. Therefore, all of the NPFMC proposed regulations include NEPA considerations.</p> <p>The ANILCA directs federal agencies to consult and coordinate with the state of Alaska. State agencies responsible for natural resources, tourism, and transportation work as a team to provide input throughout federal planning processes (http://dnr.alaska.gov/commis/opmp/anilca/anilca.htm).</p> <p>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 the Aleutian Island Ecosystem Plan, 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/).</p>

	<p>between the crab and groundfish fleets. The NPFMC and BOF public meeting processes allows for stakeholder input towards rule making and allocate to the various gear users to avoid risk conflict. State water fisheries for Pacific cod for example do not allow trawl gear.</p> <p>Evidence</p> <p>http://www.fakr.noaa.gov/npfmc/catch-shares-allocation/allocations.html</p>	
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<p>3. Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.</p> <p style="text-align: right;"><i>FAO CCRF 7.3.3/7.2.2</i></p>						
Confidence Ratings	Low	0 out of 6	Medium	0 out of 6	High	6 out of 6

<p>Clause:</p> <p>3.1 Long-term management objectives shall be translated into a plan or other management document and be subscribed to by all interested parties.</p> <p style="text-align: right;"><i>FAO CCRF 7.3.3 ECO 28.1</i></p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
3.1	<p>Rating determination</p> <p><i>The BSAI and GOA FMPs present long-term management objectives for the Alaska Pacific cod fisheries. Each of the state-managed Pacific cod fisheries is subject to an annually-published FMP.</i></p> <p>Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a FMP and any necessary amendments, for each fishery under its authority that requires conservation and management.</p> <p>These include FMPs for Pacific cod fisheries in the GOA and the BSAI. Both FMPs present long-term management objectives for the Alaska Pacific cod fisheries. These include sections that describe a Summary of Management Measures and Management and Policy Objectives.</p> <p>National Standards for Fishery Conservation and Management</p> <p>The Sustainable Fisheries Act (SFA) substantially amended the MSA in 1996. Among other things, the SFA placed increased emphasis on ending overfishing and rebuilding overfished stocks. The SFA also added three new national standards to the seven existing standards in the MSA to focus attention on specific areas of concern – impacts of management actions on fishing communities, bycatch reduction, and safety at sea. The MSA, as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. They are:</p>

1. Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.
2. Conservation and management measures shall be based upon the best scientific information available.
3. To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.
4. Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be A) fair and equitable to all such fishermen; B) reasonably calculated to promote conservation; and C) carried out in such manner that no particular individual, corporation, or entity acquires an excessive share of such privileges.
5. Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.
6. Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
7. Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.
8. Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to A) provide for the sustained participation of such communities, and B) to the extent practicable, minimize adverse economic impacts on such communities.
9. Conservation and management measures shall, to the extent practicable, A) minimize bycatch and B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
10. Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Management Objectives

Under the direction of the NPFMC, the GOA and BSAI FMPs define nine management

and policy objectives that are reviewed annually. They are:

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

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

Management measures detailed in the two FMPs include:

- Quotas, allocated by region and by gear type
- Permit requirements
- Seasonal restrictions and closures
- Geographical restrictions and closed areas
- Gear restrictions
- Prohibited species
- Retention and utilization requirements
- Recordkeeping and reporting requirements
- Observer requirements
- FMP review process

The Alaska Groundfish Programmatic Supplemental Environmental Impact Statement

This Programmatic SEIS has multiple purposes. First, it serves as the central environmental document supporting the FMP for the groundfish fishery in the BSAI and the FMP for the GOA groundfish fishery. The historical and scientific information and analytical discussions contained herein are intended to provide a broad, comprehensive analysis of the general environmental consequences of fisheries management in the EEZ off Alaska. This document also provides agency decision-makers and the public with information necessary for making informed decisions in managing the groundfish fisheries, and sets the stage for future management actions. In addition, it describes and analyzes current knowledge about the physical, biological, and human environment in order to assess impacts resulting from past and present fishery activities. Significant changes have occurred in the environment since the original Environmental Impact

Statements (EISs) for the GOA and BSAI FMPs were published approximately 25 years ago. While Environmental Assessments (EA) and several EISs have been prepared for FMP amendments over the ensuing years, none have examined the groundfish FMPs at a programmatic level. The NEPA requires preparation of an EIS or Supplemental EIS (SEIS) when significant environmental changes have occurred. Significant changes have certainly occurred in the environment as well as within the fisheries themselves. This Programmatic SEIS is intended to bring both the decision-maker and the public up-to-date on the current state of the environment, while describing the potential environmental consequences of different policy approaches to managing the groundfish fisheries off Alaska. In doing so, it serves as the overarching analytical framework that will be used to define future management policy with a range of potential management actions (http://www.fakr.noaa.gov/sustainablefisheries/seis/final062004/Exec_sum.pdf)

State Fisheries

5 AAC 28.089 Guiding Principles for groundfish fishery regulations:

- (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.

Six of the seven state-managed Pacific cod fisheries are subject to an annually-published FMP. These FMPs include details of the following management measures:

- GHs
- Gear restrictions
- Seasonal restrictions

- Vessel restrictions that limit and control access
- Buoy marking, pot storage and landing requirements
- Permissible bycatch proportions
- Reporting requirements

“5 AAC 28.081. Gulf of Alaska Pacific cod Management Plans” sets the regulations for the directed state Pacific cod fishery. This section applies to the management plans for Pacific cod as set out for the Prince William Sound Area (5 AAC [28.267](#)), Cook Inlet Area (5 AAC [28.367](#)), Kodiak Area (5 AAC [28.467](#)), Chignik Area (5 AAC [28.537](#)), Aleutian Islands Area (5 AAC [28.647](#)) and the South Alaska Peninsula Area (5 AAC [28.577](#)).

The Prince William Sound and Cook Inlet state fisheries are subject to fixed FMPs which include quota-setting guidelines, season and gear restrictions, and other regulations. Both fisheries are also subject to an annual Fishery Management Report to the BOF, which details additional management measures, annual quotas, landings data, and other management information.

In Southeast Alaska, the Pacific cod harvests occur almost exclusively within inside waters and are not part of the federal TAC. The BOF, with 28 years of landings records, has set an annual GHR for this fishery of 340 to 567 mt (the harvest has never exceeded 408 mt). Gear is limited to hooks and line or pot gear and ADFG conducts inseason management closures to spread fishing effort over the available Pacific cod habitat. Because no stock assessment is conducted on this stock, it is considered to be either tier 5 or 6, and even with extensive landing records, it receives a conservative harvest approach.

Evidence

http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.pastmeetinginfo2011_2012
<http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf>
<http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf>
<http://www.adfg.alaska.gov/FedAidpdfs/FMR11-69>
<http://www.adfg.alaska.gov/FedAidpdfs/FMR11-64>
<http://www.adfg.alaska.gov/FedAidpdfs/FMR11-63>
<http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section367.htm>
<http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section267.htm>
<http://www.adfg.alaska.gov/FedAidPDFs/FMR11-47.pdf>
<http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section081.htm>
[http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=\[Group+!275+aac+28!2E089!27!3A\]/doc/{@1}/hits_only?firsthit](http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[Group+!275+aac+28!2E089!27!3A]/doc/{@1}/hits_only?firsthit)

<p>Clause:</p> <p>3.2 Management measures shall provide inter alia that:</p> <p>3.2.1 Excess fishing capacity is avoided and exploitation of the stocks remains economically viable;</p> <p>3.2.2 The economic conditions under which fishing industries operate promote responsible fisheries;</p> <p>3.2.3 The interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries, are taken into account;</p> <p>3.2.4 Biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected;</p> <p>3.2.5 Depleted stocks are allowed to recover or, where appropriate, are actively restored;</p> <p style="text-align: right;">FAO CCRF 7.2.2</p> <p style="text-align: right;">ECO 28.2</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
3.2.1	<p>Rating determination</p> <p><i>Excess fishing capacity is avoided and exploitation of the stocks remains economically viable.</i></p> <p>The License Limitation Program (LLP)</p> <p>In the GOA, in 1996, a moratorium on entry of new vessels into the groundfish fishery was implemented. The large number of vessels fishing for a limited resource had created a “race for fish,” characterized by short seasons and economic inefficiency. The intent of the moratorium was to prevent these problems from worsening while comprehensive solutions were being developed. The eligibility period for moratorium qualification was January 1, 1988 through February 9, 1992, during which time a vessel shall have made at least one legal landing of groundfish.</p> <p>In June 1997, the NPFMC adopted a LLP to supersede the vessel moratorium. The LLP is the first step in fulfilling the NPFMC’s commitment to develop a comprehensive rationalization program for the Alaska groundfish and crab fleet. The LLP would limit the number, size, and specific operation of vessels that may be used in fisheries for groundfish, other than demersal shelf rockfish east of 140 deg. W. long. and sablefish managed under the Individual Fishing Quota (IFQ) program for Pacific halibut and sablefish, in the EEZ off Alaska. Licenses would be issued to eligible applicants based on fishing that occurred from a qualifying vessel in endorsement areas in BSAI, GOA, or</p>

BSAI/GOA management areas during the general qualification period. Licenses would be issued to either catcher vessel or catcher/processor vessel categories. Minimum landings requirements vary according to vessel length category, the area, and vessel length designation. The LLP was approved by the Secretary in September 1997.

As of January 1, 2000 a Federal LLP license is required for vessels participating in directed fishing for LLP groundfish species in the GOA or BSAI, or fishing in any BSAI LLP crab fisheries. A vessel must be named on an original LLP license that is onboard the vessel. The LLP license requirement is in addition to all other permits or licenses required by federal regulations. The LLP is a Federal program and LLP licenses are not required for participation in fisheries that occur in the waters of the State of Alaska.

The Restricted Access Management (RAM) Program has prepared lists of License Limitation Program (LLP) groundfish and crab licenses. LLP licenses are initially issued to persons, based on the activities of original qualifying vessels.

There are four exceptions to the LLP license requirement:

1. vessels that do not exceed 26 feet in Length Overall (LOA) in the GOA;
2. vessels that do not exceed 32 feet LOA in the BSAI;
3. vessels that do not exceed 60 feet LOA and that are using jig gear (but no more than 5 jig machines, one line per machine, and 15 hooks per line) are exempt from the LLP requirements in the BSAI; and,
4. certain vessels constructed for, and used exclusively in, Community Development Quota fisheries.

GOA Pacific cod Allocations

The GOA groundfish fisheries are among the few remaining limited access (not rationalized) fisheries in Alaska. Of these fisheries, Pacific cod is the predominant groundfish species targeted by the fixed gear sectors in the GOA.

In recent years, competition among fixed gear participants in the Western and Central GOA groundfish fisheries has intensified, particularly during the A season (January-June), when fish are aggregated and of highest value. The NPFMC's April 2009 action adds gear-specific (pot, hook-and-line, or jig) Pacific cod endorsements to GOA fixed gear licenses that meet a minimum catch threshold during 2002-2008. The threshold is 10 mt of Pacific cod landings for small vessels (<60 ft in length), and 50 mt for large vessels (≥60 ft in length) and catcher processors. The action reduced the number of fixed gear licenses eligible to access the GOA Pacific cod fisheries by 75%. As a result, the number of participants in the directed GOA Pacific cod fisheries will be permanently capped at the number of available licenses, and new entrants will have to purchase an existing license if they wish to fish in federal waters. This action may enhance stability in the GOA

Pacific cod fisheries, reduce competition among fixed gear participants, and protect historic catch shares of participants.

BSAI Pacific cod Allocations

Pacific cod is currently managed as one stock in the BSAI, and there are nine separate industry sector allocations established to divide the ITAC, in addition to the CDQ allocation. In 2008, the SSC has noted there may be sufficient justification for a split in the BSAI Pacific cod between the BS and AI areas, and that a precautionary approach should be taken by specifying separate ABCs for BSAI Pacific cod. In response to the SSC's recommendation, and in anticipation of further recommendations during a future harvest specifications process, the NPFMC initiated efforts to evaluate how to divide the nine non-CDQ BSAI Pacific cod allocations between the two areas.

Groundfish licenses are currently required to participate in the BSAI groundfish fisheries in Federal waters. Groundfish licenses contain endorsements that define what the vessel using the license is allowed to do. An area endorsement defines the geographic location the license allows a vessel to fish. Under the groundfish LLP, separate BS and AI area endorsements were earned and issued based on historic fishing patterns. Licenses may contain endorsements for both areas (BS and AI), or one of the two areas. Gear endorsements define what type of gear may be used: non-trawl, trawl, or both. Further, Pacific cod gear endorsements are required for non-trawl vessels $\geq 60'$ to participate in the BSAI fixed gear Pacific cod fishery: hook-and-line catcher processors, pot catcher processors, hook-and-line catcher vessels, and pot catcher vessels. Vessels fishing with jig gear in the BSAI are exempt from the LLP, provided they comply with size and gear limitations.

State waters

ADFG annually issues an emergency order creating parallel Pacific cod seasons inside state waters (0-3 nm) of the Kodiak, Chignik, and South Alaska Peninsula management areas. Vessels Participating in parallel Pacific cod fisheries are not required to possess a LLP permit. General statewide groundfish regulations include a vessel registration requirement, legal gear definitions, bycatch allowances, and requirements for seabird avoidance measures to be used when fishing with longline gear. Vessel registration for Pacific cod may be non exclusive, which allows a vessel to register with ADFG to fish more than one management area (but not concurrently) within a calendar year, or exclusive, which restricts a vessel from fishing in another exclusive area, but would allow a vessel to fish in a nonexclusive area. The state fisheries for Pacific cod are not closed access fisheries.

Evidence

<http://www.fakr.noaa.gov/npfmc/catch-shares-allocation/allocations.html#BSAIPcodAllocations>
<http://www.adfg.alaska.gov/FedAidPDFs/FMR11-47.pdf>
<http://www.adfg.alaska.gov/FedAidPDFs/FMR11-44.pdf>
http://www.fakr.noaa.gov/npfmc/PDFdocuments/catch_shares/Pcod/BSAIPcodsplit211.pdf

Evidence adequacy rating:

High **Medium** **Low**

Clause	Evidence
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3.2.2 Rating determination
The economic conditions (profitable and stable) under which the Pacific cod fisheries industry operates promote responsible fisheries.

The Alaskan Pacific cod fisheries are very tightly managed fisheries and also fisheries that have largely remained economically stable since the 1990s.

In 2009, ex-vessel value of Pacific cod catch in the BSAI was \$88 million, and in the GOA was \$23 million. Ex-vessel price averaged \$0.19/lb for trawl gear and \$0.26/lb for fixed gear. Production for all Pacific cod products in Alaska was 100,340 mt worth \$281 million (products included whole fish, headed and gutted fish, and fillets).

Figure 29 shows real ex-vessel value of the pollock, Pacific cod and sablefish (3 most valuable groundfish species) in the domestic commercial fisheries off Alaska, 2006-2010 (base year = 2010). The estimates are for catch from both federal and state of Alaska fisheries. Pacific cod in Alaska is the second most profitable fisheries after walleye pollock.

		2006		2007		2008		2009		2010	
		Quantity	Value								
Pollock	Whole fish	1.95	\$1.1	1.94	\$1.2	1.70	\$1.1	2.04	\$2.1	1.24	\$1.1
	Head & gut	23.80	\$29.7	31.11	\$44.9	24.30	\$42.1	57.27	\$85.0	60.81	\$95.4
	Roe	29.97	\$291.5	30.47	\$262.0	20.79	\$241.9	18.49	\$162.9	16.45	\$98.0
	Deep-skin fill.	53.16	\$153.6	64.59	\$197.3	42.39	\$154.9	41.28	\$166.8	40.28	\$155.2
	Other fillets	117.26	\$320.1	106.13	\$295.6	79.67	\$301.8	76.57	\$296.2	71.17	\$263.7
	Surimi	178.51	\$364.8	161.62	\$352.5	125.70	\$526.3	87.12	\$249.8	103.59	\$357.2
	Minced fish	28.47	\$50.9	27.68	\$45.6	20.36	\$40.4	22.10	\$42.2	21.59	\$41.5
	Fish meal	66.93	\$68.5	58.81	\$60.4	43.89	\$48.7	29.63	\$37.7	38.32	\$60.3
	Other products	26.34	\$21.0	24.51	\$20.5	19.45	\$21.2	22.91	\$18.7	26.25	\$26.4
	All products	526.40	\$1,301.1	506.85	\$1,280.0	378.24	\$1,378.3	357.41	\$1,061.5	379.72	\$1,098.8
Pacific cod	Whole fish	1.56	\$2.1	2.10	\$4.0	3.28	\$4.8	4.58	\$5.3	3.01	\$2.8
	Head & gut	81.93	\$289.1	88.29	\$345.3	82.00	\$335.7	72.28	\$187.7	80.32	\$232.2
	Salted/split	2.00	\$8.0	2.18	\$10.7	1.58	\$5.0	.02	\$0	-	-
	Fillets	9.84	\$69.2	7.90	\$64.2	9.24	\$81.3	11.00	\$63.3	14.67	\$85.7
	Other products	16.04	\$36.1	13.23	\$30.6	14.55	\$31.8	12.42	\$25.0	17.47	\$30.0
All products	111.37	\$404.5	113.71	\$454.8	110.65	\$458.7	100.29	\$281.4	115.47	\$350.8	
Sablefish	Head & gut	8.58	\$85.9	8.93	\$94.4	7.32	\$90.5	6.79	\$87.5	6.70	\$105.2
	Other products	.55	\$4.7	.43	\$2.8	.99	\$8.5	.68	\$7.1	.49	\$5.2
	All products	9.13	\$90.6	9.36	\$97.2	8.32	\$99.0	7.47	\$94.6	7.18	\$110.5

Figure 29. Production and gross value of groundfish products in the fisheries off Alaska by species, 2006-2010 (1,000 metric tons product weight and million dollars).

<http://www.afsc.noaa.gov/refm/docs/2011/economic.pdf>

	<p>The groundfish fisheries off Alaska are required to harvest their target catch under the constraints of improved retention/improved utilization (IR/IU). This program requires that pollock and cod harvested must be retained while fishing Pacific cod. This program has reduced waste and improved efficiency. Highgrading and discarding was significantly reduced, also increasing the economic cost/benefit ratio of the fishery.</p> <p>http://www.fakr.noaa.gov/regsg/679b27.pdf</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
3.2.3	<p><i>Rating determination</i> <i>The interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries are taken into account.</i></p> <p>The GOA and BSAI FMPs describe management measures designed to take into account the interests of subsistence, small-scale, and artisanal fisheries. Specific FMP management objectives and sub-objectives include: jig allocations, CDQ allocations, the promotion of sustainable fisheries and communities, the promotion of equitable and efficient use of fishery resources and increase Alaska native consultation (please see FMPs for further details).</p> <p>Community Development Quota Programs The CDQ Program was created by the NPFMC in 1992 to provide western Alaska communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. It allocates 10.7% of all BSAI quotas for groundfish (including cod), prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to (i) to provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the Bering Sea and Aleutian Islands Management Area; (ii) to support economic development in western Alaska; (iii) to alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska.</p> <p>State subsistence management The State of Alaska manages subsistence, sport/recreational (used interchangeably), commercial, and personal use harvest on lands and waters throughout Alaska. ADFG is responsible for managing subsistence, commercial, sport, and personal use fisheries. The highest priority use is for subsistence under both state and federal law. The Alaska BOF adopts regulations through a public process to conserve and allocate fisheries resources to various user groups. Subsistence fisheries management includes coordination with</p>	

	<p>the Federal Subsistence Board and Office of Subsistence Management, which also manages subsistence uses by rural residents on federal lands and applicable waters under Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA).</p> <p>The State of Alaska cooperated with the NPFMC to assure that small community based vessels would fish under the NPFMC rationalization programs, and that small local community based jig vessels received a separate gear allocation. They also assured that consideration for CDQ groups were incorporated into the NPFMC plans, including CDQ allocations and vessel exemptions (see NPFMC archives).</p> <p>Evidence</p> <p>www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
3.2.4	<p>Rating determination</p> <p><i>The NPFMC has developed a comprehensive approach to protect and conserve biodiversity of aquatic habitat and ecosystems. The NMFS is responsible for maintaining the endangered species list for marine species and managing those species once they are listed. By law, the Commissioners of ADFG and Natural Resources must take measures to preserve the natural habitat of fish and wildlife species that are recognized as threatened with extinction.</i></p> <p>The NPFMC has developed a comprehensive approach to protect and conserve biodiversity of aquatic habitat and ecosystems. The Groundfish FMPs for the GOA and the BSAI set regulations for the sustainable exploitation of the groundfish resources which includes Pacific cod. In addition to this, the bycatch in each of these fisheries making up the groundfish complex are taken into account and managed accordingly in one form or another (i.e. PSC limits, Maximum Retainable Allowance etc..). Management regulations that recognize and protect EFH, define area closures to protect habitat or reduce bycatch impacts, prohibit the harvest of forage fish, split TAC harvest seasonally to limit impacts on spawning stocks and to maintain total groundfish harvests below the OY ecosystem caps in the BSAI and the GOA. These frameworks are concerned with the overall conservation of biodiversity of aquatic habitats and ecosystems in the GOA and BSAI. There are two Forage Fish Amendments (BSAI FMP Amendment 36 and GOA FMP Amendment 39) including herring, sandlance, euphausiids, ect. The amendments defined a forage fish species category and authorized that the management of this species category be specified in regulations in a manner that prevents the development of a commercial directed fishery for forage fish which are a critical food source for many</p>	

marine mammal, seabird and fish species.

<http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAIfmpAPPENDIX.pdf>

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

In addition to this, the purpose of the Endangered Species Act (ESA) is to conserve threatened and endangered species and their ecosystems. A species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. Two federal agencies, the NMFS and the U.S. Fish and Wildlife Service (USFWS), are responsible for maintaining lists of species that meet the definition of threatened or endangered under the ESA. The NMFS is responsible for maintaining the endangered species list for marine species and managing those species once they are listed. The USFWS is responsible for maintaining the endangered species list for terrestrial and freshwater species and managing those species once they are listed. NMFS and USFWS must determine if any species is endangered because of any of the following factors:

- The present or threatened destruction, modification, or curtailment of its habitat or range;
- Overutilization for commercial, recreational, scientific, or educational purposes;
- Disease or predation;
- The inadequacy of existing regulatory mechanisms;
- Other natural or manmade factors affecting its continued existence.

These are the species in Alaska designated as endangered by NMFS and USFWS:

- Aleutian Shield Fern
- Blue Whale
- Bowhead Whale
- Cook Inlet Beluga Whale
- Eskimo Curlew
- Fin Whale
- Humpback Whale
- Leatherback Sea Turtle
- North Pacific Right Whale
- Sei Whale
- Short-tailed Albatross
- Sperm Whale
- Steller Sea Lion (west of 144°)

The listing of a species as endangered makes it illegal to "take" (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to do these things) that species. Federal agencies may be allowed limited take of species through interagency consultations with NMFS or USFWS. Non-federal individuals, agencies, or organizations

may be granted limited take through special permits with conservation plans. Adverse effects on listed species must be minimized, and in some cases conservation efforts are required to offset the take.

Critical Habitat

The ESA requires that management agencies identify and protect critical habitat for all endangered species. Critical habitat is defined as the land, water, and air necessary for the recovery of the endangered species, and the extent and location of critical habitat will be determined by the species needs of open space for individual and population growth, food, water, light (or other nutritional requirements), breeding sites, dispersal, seed germination, and lack of disturbance. Critical habitat has been designated for some, but not all, endangered species that occur in Alaska.

State Species of Concern

ADFG is responsible for determining and maintaining a list of endangered species in Alaska under AS 16.20.190. A species or subspecies of fish or wildlife is considered endangered when the Commissioner of ADFG determines that its numbers have decreased to such an extent as to indicate that its continued existence is threatened. The State Endangered Species List currently includes two birds (Short-tailed Albatross and Eskimo Curlew) and three marine mammals (blue whale, humpback whale, and right whale). The five State listed species are also listed as endangered under the United States ESA. The parameters that define endangered species differ between State and Federal authorities.

Protection of Habitat

By law, the Commissioners of ADFG and Natural Resources must take measures to preserve the natural habitat of fish and wildlife species that are recognized as threatened with extinction. Details on protection of habitat can be found in AS 16.20.185.

Relating to Steller sea lions, the BSAI and GOA Groundfish FMP species:

- Maintain or adjust current protection measures as appropriate to avoid jeopardy of extinction or adverse modification of critical habitat for ESA-listed Steller sea lions.
- Encourage programs to review status of endangered or threatened marine mammal stocks and fishing interactions and develop fishery management measures as appropriate.
- For groundfish species identified as key prey of Steller sea lions (i.e., walleye pollock, Pacific cod, and Atka mackerel), directed fishing is prohibited in the event that the spawning biomass of such a species is projected in the stock assessment to fall below B20% in the coming year (this was also adopted by the BOF for the PWS state fishery).
- Gear testing exemptions must not be within a designated Steller sea lion

	<p>protection area at any time of the year.</p> <p>Evidence</p> <p>http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.main http://www.fakr.noaa.gov/npfmc/bycatch-controls/GOA-salmon-bycatch.html http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html http://www.fakr.noaa.gov/npfmc/conservation-issues/habitat-protections.html http://www.fakr.noaa.gov/npfmc/PDFdocuments/resources/Ecosystemapproach.pdf</p>																
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>																	
Clause	Evidence																
3.2.5	<p>Rating determination</p> <p><i>Depleted stocks are allowed to recover or, where appropriate, are actively restored (through the harvest control rule, overfishing and overfished status determination). The BSAI and the GOA Pacific cod stocks are above the reference point and are not depleted.</i></p> <p>BSAI</p> <p>This year, the BSAI Pacific cod stock spawning biomass is estimated to be well above B40%, and is projected to increase further. Thus, Pacific cod is not a depleted stock. BSAI spawning biomass for 2012 is estimated at a value of 410,000 Mt. This is above the BSAI B40% value of 355,000 t, thereby placing Pacific cod in sub-tier “a” of Tier 3. Given this, estimates of OFL, maximum permissible ABC, and the associated fishing mortality rates for 2012 and 2013 as follows (2013 values are predicated on the assumption that 2012 catch will equal 2012 maximum permissible ABC; catches are for the entire BSAI):</p> <table border="1" data-bbox="304 1440 1171 1659"> <thead> <tr> <th>Year</th> <th>Overfishing Level</th> <th>Maximum Permissible ABC</th> </tr> </thead> <tbody> <tr> <td>2012</td> <td>369,000 t</td> <td>314,000 t</td> </tr> <tr> <td>2013</td> <td>374,000 t</td> <td>319,000 t</td> </tr> <tr> <td>2012</td> <td>0.36</td> <td>0.30</td> </tr> <tr> <td>2013</td> <td>0.36</td> <td>0.30</td> </tr> </tbody> </table> <p>The age 0+ biomass BSAI projections for 2012 and 2013 (using SS) are 1,690,000 Mt and 1,720,000 Mt. For comparison, the age 3+ BSAI projections for 2012 and 2013 (using SS) are 1,620,000 Mt and 1,620,000 Mt.</p> <p>However, as mentioned in the Section 3.4 of the Background, harvest specifications for the combined BSAI unit have been extrapolated from the Pacific cod EBS model. The initial exploration of age-structured modelling for the Pacific cod in the AI in 2012 indicated a sharp trend of decreasing of all the estimated amounts since the 1990’s.</p>	Year	Overfishing Level	Maximum Permissible ABC	2012	369,000 t	314,000 t	2013	374,000 t	319,000 t	2012	0.36	0.30	2013	0.36	0.30	
Year	Overfishing Level	Maximum Permissible ABC															
2012	369,000 t	314,000 t															
2013	374,000 t	319,000 t															
2012	0.36	0.30															
2013	0.36	0.30															

Especially, the total (age 0+) biomass and the relative spawning biomass have the lowest values for the last two years. The Council is preparing for development of separate BS and AI OFL, ABC and TAC recommendations in line with start of the 2014 Pacific cod fishing season.

GOA

For the GOA stock; Spawning biomass for 2012 is estimated at a value of 121,000 Mt. This is above the *B40%* value of 104,000 Mt, thereby placing Pacific cod in sub-tier “a” of Tier 3.

Units	Year	Overfishing Level	Maximum Permissible ABC
Harvest amount	2012	104,000 t	87,600 t
Harvest amount	2013	108,000 t	91,000 t
Fishing mortality rate	2012	0.53	0.44
Fishing mortality rate	2013	0.53	0.44

The age 0+ biomass projections for 2012 and 2013 (using SS) are 521,000 Mt and 530,000 Mt. For comparison, the age 3+ projections for 2012 and 2013 (using SS) are 472,000 Mt and 494,000 Mt.

Overfishing and Overfished Status Determinations

To the extent practicable, two status determinations are made annually for each stock and stock complex. The first is the —overfishing status, which describes whether catch is too high. The second is the —overfished status, which describes whether biomass is too low (see also clause 7.1).

Determination of “Overfishing” Status

The OFL for a given calendar year is specified at the end of the preceding calendar year on the basis of the most recent stock assessment. For each stock and stock complex, a determination of status with respect to —overfishing is made inseason 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 inseason action, an FMP amendment, a regulatory amendment or a combination of these actions will be implemented to end such overfishing immediately.

Determination of “Overfished” Status

A stock or stock complex is determined to be overfished if it falls below the minimum stock size threshold (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 maximum fishing

	<p>mortality threshold (MFMT), also referred as the “OFL control rule”. MFMT is the level fishing mortality (F), on an annual basis, used to compute the smallest annual level of catch that would constitute overfishing.</p> <p>Within two years of such time as a stock or stock complex is determined to be overfished, an FMP amendment or regulations will be designed and implemented to rebuild the stock or stock complex to the MSY level within a time period specified at Section 304(e)(4) of the MSA. If a stock is determined to be in an overfished condition, a rebuilding plan would be developed and implemented for the stock, including the determination of an F_{OFL} and F_{MSY} that will rebuild the stock within an appropriate time frame.</p> <p>The MSA also requires identification of any fisheries that are —approaching a condition of being overfished, which is defined as a determination that the fishery —will become overfished within two years. The approaching overfishing determination is made by projecting the numbers-at-age vector from the current year forward two years under the assumption that the stock will be fished at $\max F_{ABC}$ in each of those years, then determining whether the stock would be considered —overfished at that time. In the event that a stock or stock complex is determined to be approaching a condition of being overfished, an inseason action, an FMP amendment, a regulatory amendment or a combination of these actions will be implemented to prevent overfishing from occurring. In other words, fishing will be decreased or stopped accordingly.</p> <p>Evidence</p> <p>http://www.afsc.noaa.gov/refm/stocks/assessments.htm http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html</p>	
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B. Science and Stock Assessment Activities

<p>4. There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.9/7.4.4/7.4.5/7.4.6/8.4.3/12.4</i></p> <p style="text-align: right;"><i>FAO Eco 29.1-29.3</i></p>						
Confidence Ratings	Low	0 out of 14	Medium	0 out of 14	High	9 out of 14

<p>Clause:</p> <p>4.1 Reliable and accurate data required for assessing the status of fisheries and ecosystems - including data on retained catch of fish, by catch, discards and waste shall be collected.</p> <p>4.1.1 These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery.</p> <p style="text-align: right;"><i>FAO CCRF 7.4.6, 7.4.7, 12.4</i></p> <p style="text-align: right;"><i>Eco 29.1-29.3</i></p> <p>4.1.2 Timely and reliable statistics shall be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices and in sufficient detail to allow sound statistical analysis for stock assessment. Such data shall be updated regularly and verified through an appropriate system. The use of research results as a basis for the setting of management objectives, reference points and performance criteria, as well as for ensuring adequate linkage, between applied research and fisheries management shall be promoted.</p> <p style="text-align: right;"><i>FAO CCRF 7.4.4, 12.13</i></p> <p style="text-align: right;"><i>Eco 29.1</i></p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
4.1	<p>Rating determination</p> <p><i>Reliable and accurate data required for assessing the status of fisheries and ecosystems - including data on retained catch of fish, by catch, discards and waste are collected (BSAI and GOA surveys, catch data, observer data). The NMFS and the ADFG collect fishery data and conduct fishery independent surveys to assess Pacific cod fisheries and ecosystems in GOA and BSAI areas. GOA and BSAI SAFE documents provide complete</i></p>

	<p><i>descriptions of data types and years collected.</i></p> <p>The annual age-based assessment for BSAI and GOA Pacific cod uses data collected from commercial landings and transshipment reports, port and at-sea observer length sampling and length and age data from fishery independent surveys in the EBS, the AI and the GOA. The RACE division of the AFSC is responsible for federally managed fisheries (3-200 nm) while the ADFG undertake coastal surveys and gather and collect data from state managed fisheries (0-3 nm). The ratio of relative abundance from the EBS and AI surveys are used to translate the stock projections from the assessment of Pacific cod in the EBS to the entire BSAI assessment area. It is noted that there is significant progress in the development of an age-disaggregated assessment for the Aleutian Islands Pacific cod as well as separate (BS-AI) TAC recommendations.</p> <p>It is noted that the overall data collection program is probably one of the most extensive in the world. At-sea (processor and catcher-processor vessels) are legally required to report commercial and non-commercial catch data on a daily basis, while catch and auxiliary information from a very extensive observer program, in many cases covering 100% of the fleet activity, is also transmitted on a daily basis. Landings data from shore based processing facilities are also transmitted on a daily basis and the processing facilities subject to a high level of observer coverage, in many cases amounting to 100% coverage.</p> <p>The size of the groundfish stock area necessitates an extensive survey program http://www.afsc.noaa.gov/RACE/groundfish/survey_data/data.htm .Many of the commercial groundfish fisheries are managed on a limited entry (state fishery is an open fishery but federal fishery is a closed entry fishery), this necessitates in-season management that monitors TAC uptake on a daily basis to ensure that the TAC is not overshot http://www.fakr.noaa.gov/2012/2012.htm. (See also Clause 7.1)</p> <p>Fishery dependent data</p> <p>Pacific cod are distributed across a wide area in the North Pacific in both federal and state managed waters. The species is fished with a range of gear types, including trawl, lines and traps. Pacific cod are associated with two Federally managed fisheries, the GOA and the BSAI and seven state-managed (within 3 nm) fisheries management areas. Each management area is subject to its own fisheries management plan. For catch reporting purposes, fisheries areas are subdivided into coastal areas (3 nm) managed under the jurisdiction of ADFG and offshore reporting areas under the jurisdiction of NMFS (Figure 30).</p>
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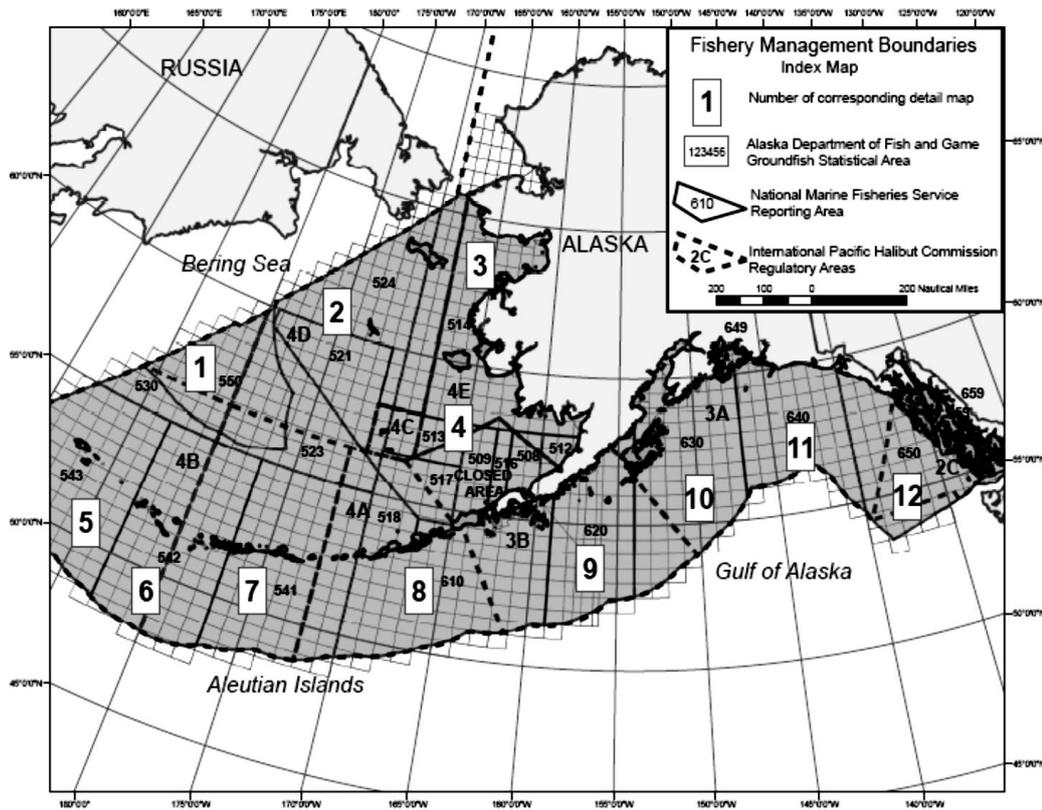


Figure 30. State and Federal groundfish reporting areas in the BSAI and the GOA.

Source: http://www.fakr.noaa.gov/maps/reporting_areas/index.pdf

The Fisheries Monitoring and Analysis Division (FMA) of the NMFS monitors groundfish fishing activities in the US EEZ. FMA is responsible for the biological sampling of commercial fishery catches, estimation of catch and bycatch mortality, and analysis of fishery-dependent survey data. The Division is responsible for training and oversight of at-sea observers who collect catch data onboard fishing vessels and at onshore processing plants. Data and analysis are provided to the Sustainable Fisheries Division of the Alaska Regional Office for the monitoring of quota uptake and for stock assessment, ecosystem investigations and research programs.

As well as increased observer coverage on all vessels >40' (vessels <40' are exempted for the first year) and the introduction of full coverage in fleets previously subject partial coverage criteria, vessels remaining within the partial coverage grouping will be selected based on a random draw system with a mandatory obligation to carry an observer. The new observer plan, due for implementation in January 1 2013, also makes provisions for the use of remote sensing technology as an alternative to sea going observers for certain vessel categories.

For all operations under Federal jurisdiction, all US vessels catching Pacific cod within the US EEZ, land based and stationary floating processor and factory (motherships) receiving catches of Pacific Cod are legally obliged to maintain records of all transactions.

To facilitate reporting of commercial catch from both state and federally managed fisheries, data from a wide range of sources is gathered in the Catch Accounting System (CAS), a multi-agency (NMFS, IPHC and ADFG) system that centrally collates landings data from shore based processing and landings operations as well as retained catch observations from individual vessels. The CAS system also provides a centralized data platform for the collation of catch (landings and discards) data from the extensive observer program. A schema of the CAS system is shown in Figure 31.

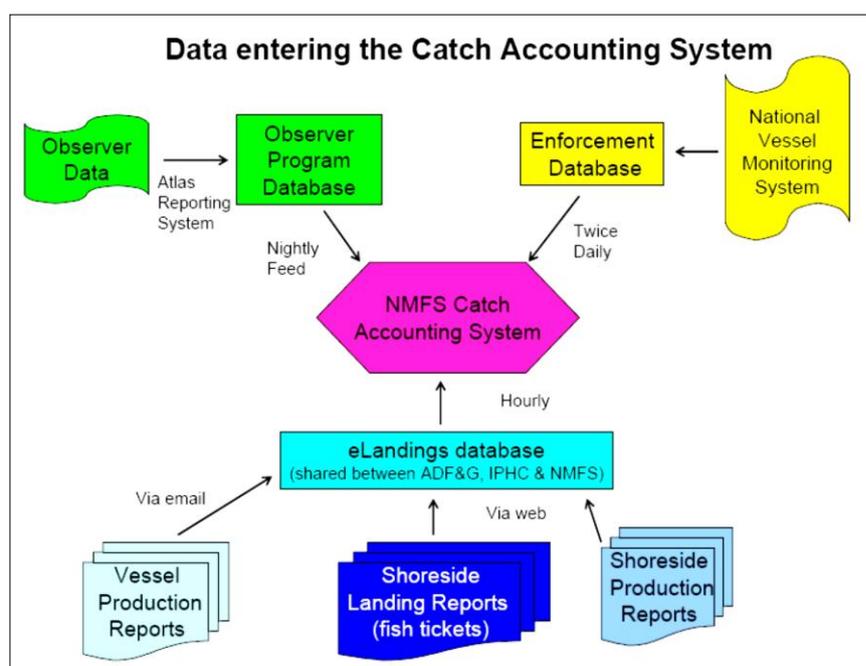


Figure 31. Schema of the inter-agency and Catch Accounting System (CAS).

A detailed description of the catch sampling and catch estimation procedures used for groundfish fisheries of Alaska can be found here:

<http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-205.pdf>

and the observer sampling manual here:

<http://www.afsc.noaa.gov/FMA/default.htm>

Fishery independent survey data

The RACE division undertakes a very extensive survey program covering the EBS, the GOA and the AI (<http://www.afsc.noaa.gov/RACE/>).

Annual NOAA EBS ground fish survey and a biannual AI survey data are used for the BSAI stock assessment. While the EBS and the AI are managed as a combined stock, only the EBS stock is subject to a formal analytical assessment. The AI stock is quantified by inflating and extrapolating the results of the EBS assessment and the last available biomass ratios from each surveys used to scale up the assessment of the EBS stock to the BSAI area. Sub-samples of length and age taken from the survey are used for

assessments.

The NOAA biennial GOA groundfish survey data is used for the assessment for Pacific cod in the GOA. All three surveys (EBS, AI and GOA) collect demographic data (length and age) as well as stomach content data for potential use in multi-species assessment models. The survey schedule in the AI has been one trawl survey every 3 years from 1991 to 2000, from 2000 to 2006 the trawl survey was biennial, with the following in 2010. The survey schedule in the GOA has been a trawl survey every 3 ys from 1984 to 1999 and since 1999 the trawl survey is biennial. The annual EBS survey program follows systematic stratified design with two geographic strata: NW (arctic area) and SE (sub-arctic area) three depth strata (inner shelf < 50 m; mid-shelf between 50 and 200 m; and outer shelf > 200 m). On average 376 survey stations are completed annually in the EBS survey, with tow duration of 30 min. at a speed of 3 knots. The nominal survey abundance index is standardized with the area swept. The GOA survey follows the same stratification as the EBS survey, a random stratified survey design. The survey is biennial, with the NOAA survey schedule alternating each year between the GOA (Figure 32) and the AI survey area (Figure 33). For each survey year, on average 825 stations surveyed by three boats in the GOA, and 420 stations surveyed by two boats in the AI. Due to the relatively narrow shelf area around the AI, the AI survey design differs from the GOA and EBS surveys in that fixed station approach is used.

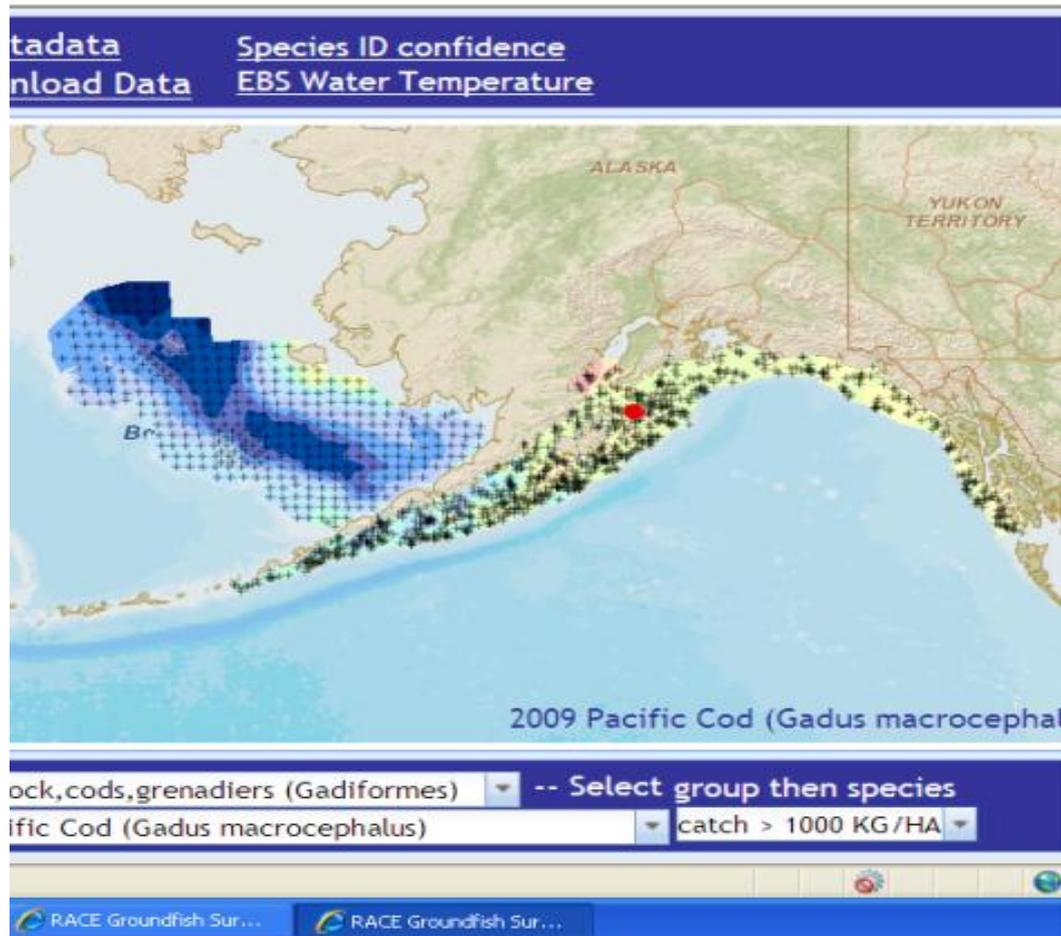


Figure 32. Positions for the 2009 RACE groundfish survey covering the EBS and GOA.

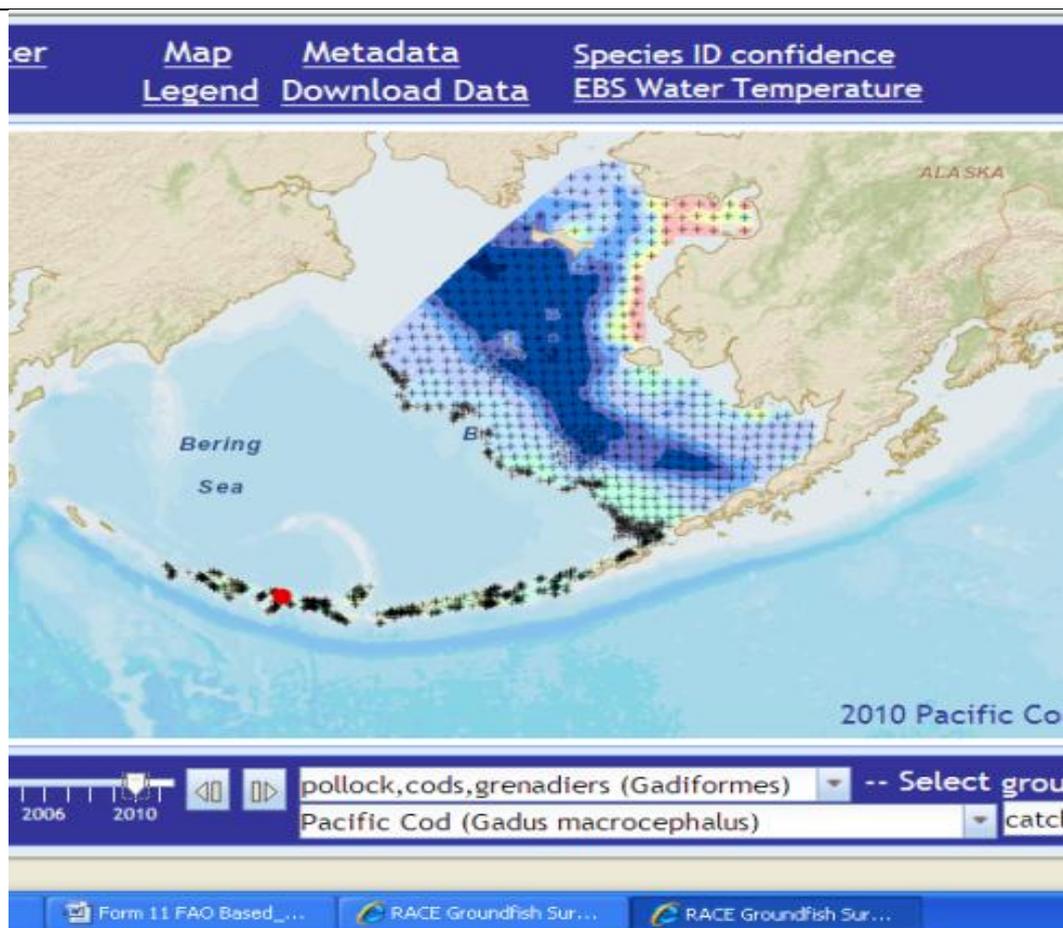


Figure 33. Survey positions for the 2010 RACE groundfish survey covering the EBS and AI.

The RACE groundfish survey program follows well defined and detailed survey protocols. The EBS survey was subject to an independent review in 2012 <http://www.fakr.noaa.gov/npfmc/PDFdocuments/resources/SAFE/CrabSAFE/912Chapters/ChenReview912.pdf> which concluded that the “EBS crab and groundfish bottom trawl surveys provide a comprehensive and consistent time series of abundance indices and relevant biological information on many key crab and finfish populations, which are critical to the stock assessment of these populations. The survey design and sampling protocol appear to be scientifically sound and robust, and adequately addresses management needs.”

In addition to the GOA and BSAI groundfish surveys undertaken by the ASFC, the ADFG also undertake an annual inshore bottom trawl survey. Intercalibration studies between the NMFS and ADFG have been undertaken to explore the possibility of generating a combined survey index.

<http://www.adfg.alaska.gov/static/home/library/PDFs/afrb/vonsv8n2.pdf>

<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
4.1.1	<p>Rating determination</p> <p><i>These data are collected, at an appropriate time and level of aggregation (BSAI and GOA) by relevant management organizations connected with the fishery, and provided to relevant fisheries organizations (NPFMC/ADFG, available on websites).</i></p> <p>Catch data from observers and from the mandatory reporting requirements for at-sea and on-shore activities are updated on a daily basis and uploaded to the centralized (CAS) system. Data from observer programme is collated daily and applied of intra-seasonal management including triggering of area and fishery closures. Catch data, including both landings and discard data and TAC uptake data are reported daily. Effort data is reported and updated daily.</p> <p>The EBS component of the Pacific cod stock is survey annually by the RACE division of AFSC, while the AI and GOA components of the stock are surveyed bi-annually, with the RACE survey schedule alternating between AI and GOA each year. All three surveys (EBS, AI and GOA) collect demographic data (length and age) as well as stomach content data for potential use in multi-species assessment models. The nearshore component of the GOA stock (<3 nm) is surveyed annually by ADFG.</p> <p>The Fisheries Monitoring and Analysis Division (FMA) of the AFSC are responsible for the timely transmission of fisheries sampling data from both at-sea and onshore sampling programme http://www.afsc.noaa.gov/fma/default.htm. Data transmission is near real-time and used by both the Sustainable Fisheries Division of the Alaskan Regional Office for real time monitoring of quota uptake and scientists at the AFSC for stock assessment purposes. Data transmission is facilitated by the Information and Monitoring Technologies Program, who support the information needs for real time monitoring of quota uptake and supply the data necessary for stock assessment purposes http://www.afsc.noaa.gov/fma/imt.htm.</p> <p>The annual assessment process follows a standard timeline, culminating in the presentation of the assessment of Pacific cod (and other groundfish species) during the winter (Nov/Dec) meeting of the NPFMC. The Plan Team assessment authors rollover the previous year’s ABC for the October NPFMC meeting. NPFMC adopts this as a Proposed ABC/TAC so that the public is noticed that a new assessment is occurring and may receive public comment. The proposed ABC/TAC does not go into effect, it is simply to notice the public under the new multiyear plan cycle. During the spring and summer period commercial catch and survey abundance, including length and age data for FMP species, are prepared in preparation for the final assessment runs by NMFS scientists and presented during the November Plan Team meeting, this is followed by the</p>

	<p>December NPFMC meeting where final assessment proposals are acted upon by the SSC, AP and the NPFMC. Their selection is used as the basis for setting fishing opportunities in the following year by the NPFMC. It is also noted that the entire process is transparent, with detailed minutes of the SSC (and other NPFMC committees) available on the web. http://www.fakr.noaa.gov/npfmc/resources-publications/meeting-minutes.html</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
<p>4.1.2</p>	<p>Rating determination</p> <p><i>Timely (yearly SAFE reports), complete and reliable statistics are compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices and in sufficient detail to allow sound statistical analysis for stock assessment. Such data are updated regularly (yearly) and verified through an appropriate system (peer review). These research results are used as a basis for the setting of management objectives, reference points and performance criteria.</i></p> <p>Ultimately, the REFM division utilizes the catch and sampling data to undertake annual stock assessments of Pacific cod. There is a well-established system where assessments are undertaken by stocks assessment scientists from the AFSC and reviewed by Plan Teams and are subsequently used as the basis of TAC setting by the NPFMC.</p> <p>All necessary catch and landings statistics are updated in near real-time through the centralized CAS system. Biological sampling from at-sea and ashore monitoring program collected by the FMA Division are stored and transmitted in near real-time through the Information Monitoring and Technologies Program and are available at appropriate timelines for the undertaking of stock assessments by AFSC scientists.</p> <ul style="list-style-type: none"> • The Age and Growth Program of the REFM Division is responsible of the analysis of age structures, otoliths in the case of Pacific cod http://www.afsc.noaa.gov/REFM/Age/default.htm. The program ages otoliths obtained from fishery independent surveys undertaken by the RACE division and otoliths collected by field operatives from the at-sea and ashore sampling program. The Age and Growth program operates a centralized data base (AGEDATA) and an online tracking system which provides status reports including: <ul style="list-style-type: none"> • Daily updates of ageing status • Request details • Number of ages requested • Number of current ages entered into AGEDATA database • Age and Growth group responsible for ageing • AGEDATA table name 	

	<ul style="list-style-type: none"> • Cruise and vessel info • Age reader information <p>In general the AFSC and the NMFS Alaskan Regional Office operate a very efficient and streamlined data management system which is transparent, updated in near-real time, and open. The system is state of the art.</p> <p>Within the NPFMC process, the use of scientific research culminating in the yearly SAFE (species, economic, ecosystem) reports has been used as the management basis for setting and updating management objectives (reduction of bycatch, improved utilization of catches, SSL protection measures etc...), reference points and performance criteria (OFL, ABC, ACL etc...) and has ensured a direct link between applied research and fisheries management, with full participation and integration of views and proposals from the public, industry and other interested stakeholders in the decision making process.</p> <p>http://www.fakr.noaa.gov/npfmc/public-meetings/committees-related-meetings.html</p>	
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Clause:	
<p>4.2 An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures shall be established.</p> <p style="text-align: right;"><i>FAO CCRF 8.4.3</i></p> <p style="text-align: right;"><i>FAO Eco 29.2bis</i></p>	
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
4.2	<p><i>Rating determination</i></p> <p><i>An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures is established. Data gathered under the auspices of the North Pacific Groundfish Observer Programme (NPGOP) covers all biological information associated with commercial fisheries, and interactions with sharks, rays, seabirds, marine mammals and other species.</i></p> <p>Data gathered under the auspices of the North Pacific Groundfish Observer Programme (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</p>

species with limited or no commercial value.

Observer data is collated and utilized for the following purposes:

- (1) monitor target catch and bycatch;
- (2) understand the population status and trends of fish stocks and protected species, as well as the interactions between them;
- (3) determine the quantity and distribution of net benefits derived from living marine resources;
- (4) predict the biological, ecological, and economic impacts of existing management actions and proposed management options

http://www.afsc.noaa.gov/FMA/Manual_pages/MANUAL_pdfs/manual2012.pdf

As well as providing demographic data for scientific purposes, the observer programme is also used extensively in- and post-season management. Daily reports are electronically transmitted via the CAS system. This 'real-time' data is used as the basis to trigger area as well as fisheries closures e.g. if maximum catch allocations of target or Prohibited Species are caught.

Financing of the NPGOP is based on a cost recovery formula where individual vessel operators must pay the daily observer costs as a condition of license.

Approximately 300 observers are deployed annually. Observers are employed by four accredited private companies and training is provided by the Observer Training Center of the University of Alaska Anchorage. The Fisheries Monitoring and Analysis (FMA) division of NOAA provide oversight, quality assurance analysis, briefings and trip de-briefings to the observer training and operational programmes. Data collection methods and standardized techniques are described in detail in the NPGOP sampling manual http://www.afsc.noaa.gov/FMA/Manual_pages/MANUAL_pdfs/manual2012.pdf.

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 Alaskan Fisheries Science Centre for stock assessment purposes.

Coverage is extensive. To date, vessels greater the 125' must have 100% observer coverage and for specific fisheries (such as pollock) two observers must be carried. For vessels >60' and <125', at least 30% of the overall fleet effort is monitored by at-sea observers. For shore processing plants with a through put of greater than 1000 mt/month, there is full observer coverage, for plants process more than 500 mt/month, then 30% of the processing days (a day in which groundfish is received or processed) must be subject to observer coverage. Faunce and Barbeaux (2011) note that observer converge equates to approximately 35,000 at-sea observer days annually. The detailed breakdown of observer coverage by area, gear group, vessel length class and the percentage of the total catch at sea and onshore landings for 2004-2007 can be found here:

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/Observer/percen

[t_observed.pdf](#)

The level of coverage is variable between area, gear type and vessel length category. In general, coverage of catch and landings by vessels >125' is 100%, irrespective of gear category or area. Based on the annual observer data from 2004 to 2007, coverage is generally greater in the AI (95%) and the BS (86%), while coverage in the Central GOA (35%), Eastern GOA (47%) and Western GOA (31%) is considerably lower. Although, by International standards this is a very high coverage rate.

Despite the high levels of coverage, the absence of observer data from vessels <60' and vessel only subject to partial coverage has led to concerns about potential statistical bias in catch estimates. As well as partial coverage issues, concerns about the observer stratification and non-random selection of vessels has been of concern. Bias can affect the validity of an observation if fishing operation(s) are not representative of the unobserved fleet or is too much sampling effort is undertaken in a metier, at the expense of another, that contributes more to the overall mortality or impact. Analysis undertaken using data obtained from the NPGOP has been published in peer reviewed journals (e.g. Faunce and Barbeaux, 2011; Faunce, 2011) and national reports (Cahalan *et al*, 2010). This analysis has led to a revision in the observer programme aimed at improving the statistical robustness observer data.

Starting January 1st 2013, the restructured observer program will change substantially and will aim to remedy the potential sources of bias identified above. As well as the introduction of observer coverage on all vessels >40' (vessels <40' are exempted for the first year), vessels remaining within the partial coverage grouping will be selected based on a random draw system with a mandatory obligation to carry an observer.

<http://www.fakr.noaa.gov/sustainablefisheries/observers/>

Given the extensive observer coverage, its recent restructuring to correct issues, bias and coverage levels, the cost recovery model used and the breadth of scientific data collected and its use, the BSAI and GOA groundfish observer program sets the international benchmark standard.

There is currently no observer coverage in the State fisheries. However, since the vast majority of Pacific cod is caught in the federal fisheries, the assessment team considers that the observer program is effective and covers the most important portion of the Pacific cod fishery fleet.

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2011/BSAIpCod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf>

Clause:	
<p>4.3 Sufficient knowledge of social, economic and institutional factors relevant to the fishery in question shall be developed through data gathering, analysis and research.</p> <p style="text-align: right;"><i>FAO CCRF 7.4.5</i></p> <p>4.3.1 Sub-regional or regional fisheries management organizations or arrangements shall compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures.</p> <p style="text-align: right;"><i>FAO CCRF 7.4.6, 7.4.7</i></p>	
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
4.3	<p>Rating determination</p> <p><i>Sufficient knowledge of social, economic and institutional factors relevant to the fishery in question is developed through data gathering, analysis and research (Economic and Social Sciences Research Program within NMFS’s REFM). The economic and social importance of Pacific cod fisheries are contrasted and considered with biological and ecological considerations under the various NEPA evaluations required when significant changes in management are proposed.</i></p> <p>The Regulatory Flexibility Act (RFA) requires federal agencies to consider the impact of their rules (Fishery Management Plans, Fishing Regulations) on small entities (fishermen communities) and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities.</p> <p>http://www.eeoc.gov/eeoc/plan/regflexibilityact.cfm</p> <p>In addition, the White House, through Executive Order (E.O.) 12866, requires Executive Branch agencies to perform benefit-cost analyses for all rules it deems to be “significant” and to submit these analyses to the Office of Management and Budget for review.</p> <p>http://www.epa.gov/ttnecas1/econdata/Rmanual2/2.2.html</p> <p>In August 2000, the NMFS issued guidelines for economic analysis of Fishery Management Actions. The purpose of the document was to provide guidance on understanding and meeting the procedural and analytical requirements of E.O. 12866 and the RFA for regulatory actions of federally managed fisheries.</p> <p>Economic analyses are also required to varying degrees under the MSA, the NEPA, the</p>

<p>Endangered Species Act, and other applicable laws.</p> <p>http://www.nmfs.noaa.gov/sfa/domes_fish/OperationalGuidelines/OGeconomicanalysis_d.htm</p> <p>The economic and social importance of Pacific cod fisheries are contrasted and considered with biological and ecological considerations under the NEPA (http://ceq.hss.doe.gov/welcome.html) evaluation.</p> <p>The act requires the pertinent management authority to have their own implementing procedures and as such NPFMC policy decisions must include a NEPA evaluation that describes the potential social and economic impact assessment of any proposed new or amendment to fishery management measures (i.e. restructuring of observer program in the GOA and BSAI, fishery rationalization, SSL measures etc...). These procedures must also be in accordance with other mandatory requirements such as the MSA e.g. attainment of MSY considerations. In addition, the MSA requires that a regional and economic evaluation be undertaken for any management policy.</p> <p>The annual <i>Fisheries Economics of the US</i> report and the periodic <i>Fishing Communities of the US</i> report are part of the Fisheries Economics & Socio-cultural Status & Trends series. These reports provide detailed descriptive statistics relating to commercial fisheries from both an economic and social (community) perspective.</p> <p>http://www.st.nmfs.noaa.gov/st5/publication/index.html</p> <p>The REFMM division presents an annual Economic Status Report of the Groundfish fisheries in Alaska http://www.afsc.noaa.gov/REFMM/docs/2011/economic.pdf. The figures and tables in the report provide 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 (F.O.B. Alaska) 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 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. In addition, broader macro-economic external factors, such as exchange rates, consumer trends in seafood consumption, seafood imports, had impact on of pricing, volume, supply and demand.</p> <p>The NOAA Fisheries Human Dimensions Program is responsible for undertaking community profiles and the gathering of quantitative social indicators used to monitor and understand the wellbeing of communities (and individuals) that are reliant to commercial fisheries.</p> <p>http://www.st.nmfs.noaa.gov/humandimensions/index http://www.st.nmfs.noaa.gov/economics/fisheries/commercial/regional-economic-impacts/index.</p>

	<p>The Human Dimensions program also undertakes oral interviews (Voices from the Fisheries) which document human interactions with commercial fisheries, associated industries and the broader ecosystem. This provides a powerful means of exploring and mapping the role and interrelationship of stakeholders. Individual transcripts can be found at the following link: http://www.st.nmfs.noaa.gov/voicesfromthefisheries/index.html</p> <p>NOAA operate an extensive research and monitoring program aimed at the gathering and analysis of socio-economic data from fishery dependent areas and communities under its "Community Profile Series" http://www.st.nmfs.noaa.gov/humandimensions/community-profiles/index</p> <p>In 2005, the AFSC also compiled baseline socioeconomic information about the 136 Alaska communities most involved in commercial fisheries. The new profiles from 2011 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 updated community profiles will be published as a NOAA Technical Memorandum in late 2012/early 2013. http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
<p>4.3.1</p>	<p><i>Rating determination</i> <i>Sub-regional or regional fisheries management organizations (NMFS/ADFG) compile data (SAFE report, ADFG Scientific and Technical Publications) and make them available (NMFS and ADFG websites), in a manner consistent with any applicable confidentiality requirements (NOAA administrative order 216-100, memorandum of agreement signed between NOAA, ADFG and the Alaska Commercial Fishery Entry Commission), timely and in the public domain.</i></p> <p>Pacific cod are managed under the auspices of the NPFMC, one of eight regional fishery management councils established under the MSA (1976). For each species covered under an FMP, annual assessments SAFE reports are presented to the NPFMC each year. The stock assessments are compiled by Plan Teams with input from the NMFS-AFSC and other institutions such as the ADFG. Each SAFE report contains a detailed biological assessment of each stock as well as prognosis of future catch options relative to biological and exploitation reference points as well as an economic status report. The NPFMC are reliant on the NMFS and other bodies such as the ADFG for the collection</p>	

and provision of both biological and economic data.

Commercial catch data are collated at an almost real-time rate. To facilitate reporting of commercial catch from both state and federally managed fisheries, data from a wide range of sources is gathered in the CAS, a multi-agency (NMFS, IPHC and ADFG) system that centrally collates landings data from shore based processing and landings operations as well as retained catch from individual vessels. The CAS system also provides a centralized data platform for the collation of catch (landings and discards) data from the extensive observer program. Observer data is delivered each 24hrs and is available on line within a few days and week catch reports are available here <http://www.fakr.noaa.gov/2012/2012.htm>. To protect confidentiality both observer and weekly catch reports are aggregated to a minimum of 3 processing operations.

All fisheries in the BSAI and GOA are subject to total allowable limits on Prohibited Species Catch (PSC). Under the FMP, once the total allowable limits are reached, commercial fishing activity must cease. This necessitates the availability of up to date catch information which is updated weekly. As well as posting up to date catch statistics, NOAA publishes detailed updates on any changes in regulation. The NPFMC operate in a fully transparent manner with meeting minutes and sub-committee reports freely available on the NPFMC web site:

<http://www.fakr.noaa.gov/npfmc/resources-publications/meeting-minutes.html>

Scientific and Technical Publications relating to state-managed fisheries are available on the ADFG website:

<http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.main>

<http://www.adfg.alaska.gov/sf/publications/index.cfm?ADFG=main.fullTextSearchSubmit>

NOAA administrative order 216-100 prescribes policies and procedures for protecting the confidentiality of data submitted to and collected by the NMFS. Confidential data are those identifiable with a person. Before release to the public, data must be aggregated to protect the individual identities. For fisheries data, this requires that there must be at least 3 entities contributing to any level of aggregated data. Only authorized users have access to confidential data, they must have a need to collect or use these data in the performance of an official duty, and they must sign a statement of nondisclosure affirming their understanding of NMFS obligations with respect to confidential data and the penalties for unauthorized use and disclosure. Confidential data must be maintained in secure facilities. Data collected by a contractor, such as an observer contractor, must be transferred timely to authorized Federal employees; no copies of these data may be retained by the contractor. NMFS may permit contractors to retain aggregated data. A data return clause shall be included in the agreement. All procedures applicable to Federal employees must be followed by contractor employees collecting data with Federal authority. Under agreements with the State, each State data collector collecting confidential data will sign a statement at least as protective as the one signed by Federal employees, which affirms that the signer understands the

	<p>applicable procedures and regulations and the penalties for unauthorized disclosure.</p> <p>In addition, a memorandum of agreement was signed in September 1999 between the NOAA, ADFG and the Alaska Commercial Fishery Entry Commission (CFEC). The purpose of this agreement is to outline the understanding between the NOAA, U.S. Department of Commerce (DOC), ADFG and the CFEC, regarding reciprocal provision of direct access to, and subsequent storage and usage of, confidential data regarding marine fisheries in and off Alaska, such as fishery landings data and port sampling data.</p> <p>https://docs.google.com/viewer?a=v&q=cache:Hit556BFZOwJ:www.reginfo.gov/public/do/DownloadDocument%3FdocumentID%3D363353%26version%3D1+agreement+between+NOAA,+ADFG,+CFEC+on+confidential+fishery+data&hl=en&gl=ie&pid=bl&srcid=ADGEESi7De3rnfRg8PAgSaE3mqGRTToAPmBPgyDt6_qReJD3Hm7S9b_pWTBVKQA7k7GyxEOGGBfclJqHt0K_oisc9YVXI3oLPDt_5RKS0_j4x8FBfxIFwOSv3f7EMCXnSa3jfgGyXUVjr&sig=AHIEtbSUNn7ep_0PXSVirN4FYkumumXnRg</p> <p>Evidence</p> <p>http://www.st.nmfs.noaa.gov/st1/recreational/documents/Intercept_Appendices/Appendix%20M%20031408%20NOAA%20administrative%20order%20216-100.pdf</p>
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Clause:	
4.4	States shall stimulate the research required to support national policies related to fish as food.
<i>FAO CCRF 12.7</i>	
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
4.4	<p>Rating determination</p> <p><i>State and national policies regarding seafood are guided and driven by the Alaska Seafood Marketing Institute (ASMI), Food and Drug Administration (FDA), Department of Agriculture (USDA), the National Institute of Health (NIH) and many others.</i></p> <p>State and national policies regarding seafood are guided and driven by the Alaska Seafood Marketing Institute (ASMI), Food and Drug Administration (FDA), Department of Agriculture (USDA), the National Institute of Health (NIH) and many others. ASMI is the state agency primarily responsible for increasing the economic value of Alaskan seafood</p>

	<p>through marketing programs, quality assurance, industry training, and sustainability certification. The powers of the ASMI board include: conducting or contracting for scientific research to develop and discover health, dietetic, or other uses of seafood harvested and processed in the state, and prepare market research and product development plans for the promotion of any species of seafood and their byproducts (Alaska Statute 16.51.090 Powers of Board).</p> <p>The State of Alaska also operates the Kodiak Seafood and Marine Science Center, previously named the Fishery Industrial Technology Center, as a component of the University of Alaska (UAF). The mission of the UAF Kodiak Seafood and Marine Science Center is to increase the value of Alaska's fishing industry and marine resources through research, technological development, education and service.</p> <p>Promoting the sustainable use of Alaska fisheries through collaborative research, application, education and information transfer in areas of:</p> <ul style="list-style-type: none"> - Seafood safety - Seafood quality - Bycatch reduction - Product market and development - Environmental concerns - Marine Advisory Program extension <p>http://www.sfos.uaf.edu/kmsmc/about/</p>
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Clause:		
<p>4.5 States shall ensure that the economic, social, marketing and institutional aspects of fisheries are adequately researched and that comparable data are generated for ongoing monitoring, analysis and policy formulation.</p> <p style="text-align: right;"><i>FAO CCRF 12.9</i></p>		
Evidence adequacy rating:		
<p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
4.5	The adequacy rating is considered high. Supporting information and evidence are presented under supporting clauses 4.3 and 4.4.	

<p>Clause:</p> <p>4.6 States shall investigate and document traditional fisheries knowledge and technologies, in particular those applied to small-scale fisheries, in order to assess their application to sustainable fisheries conservation, management and development.</p> <p style="text-align: right;"><i>FAO CCRF 12.12</i></p>		
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
4.6	<p><i>Rating determination</i></p> <p><i>Scientists document traditional fisheries knowledge and technologies, in particular those applied to small-scale fisheries, in order to assess their application to sustainable fisheries conservation, management and development.</i></p> <p>Fisheries targeting Pacific cod occur in both federal and state waters off Alaska in the GOA and BSAI and are an important species for many local, small scale coastal fishing communities. The NOAA Fisheries Human Dimensions Program collates and analyses tacit and community knowledge through the Voices from the Fisheries program. These fisheries are very well established and have included traditional fisheries knowledge and practices through the years, by a natural process of passing knowledge from one fisherman to another.</p> <p>http://www.st.nmfs.noaa.gov/humandimensions/publications/index</p>	

<p>Clause:</p> <p>4.7 States conducting scientific research activities in waters under the jurisdiction of another State shall ensure that their vessels comply with the laws and regulations of that State and international law.</p> <p style="text-align: right;"><i>FAO CCRF 12.14</i></p>		
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
4.7	Not applicable to Pacific cod as fisheries contained with national EEZ.	

<p>Clause:</p> <p>4.8 States shall promote the adoption of uniform guidelines governing fisheries research conducted on the high seas and shall, where appropriate, support the establishment of mechanisms, including, <i>inter alia</i>, the adoption of uniform guidelines, to facilitate research at the sub-regional or regional level and shall encourage the sharing of the results of such research with other regions.</p> <p style="text-align: right;"><i>FAO CCRF 12.15, 12.16</i></p>		
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
4.8	Not applicable to Pacific cod as fisheries contained with national EEZ.	

<p>Clause:</p> <p>4.9 States and relevant international organizations shall promote and enhance the research capacities of developing countries, <i>inter alia</i>, in the areas of data collection and analysis, information, science and technology, human resource development anti provision of research facilities, in order for them to participate effectively in the conservation, management and sustainable use of living aquatic resources.</p> <p style="text-align: right;"><i>FAO CCRF 12.18</i></p>		
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
4.9	Not applicable to Pacific cod as fisheries contained with national EEZ.	

<p>Clause:</p> <p>4.10 Competent national organizations shall, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished.</p> <p style="text-align: right;"><i>FAO CCRF 12.19</i></p>		
<p>Evidence adequacy rating:</p>		

<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
4.10	Not applicable to the Pacific cod stocks of Alaska as they are neither overfished nor very lightly fished. These stocks have been exploited for several decades.	

Clause:		
4.11 Relevant technical and financial international organizations shall, upon request, support States in their research efforts, devoting special attention to developing countries, in particular the least developed among them and small island developing countries.		
<i>FAO CCRF 12.20</i>		
Evidence adequacy rating:		
<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
4.11	Not applicable to Pacific cod as no small island developing country is involved with this fishery.	

<p>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.</p> <p style="text-align: right;"><i>FAO CCRF 7.2.1/12.2/12.3/12.5/12.6/12.7/12.17</i></p> <p style="text-align: right;"><i>FAO Eco 29-29.3</i></p>						
Confidence Ratings	Low	0 out of 11	Medium	0 out of 11	High	9 out of 11

<p>Clause:</p> <p>5.1 States shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, social science, aquaculture and nutritional science. The research shall be disseminated accordingly. States shall also ensure the availability of research facilities and provide appropriate training, staffing and institution building to conduct the research, taking into account the special needs of developing countries.</p> <p style="text-align: right;"><i>FAO CCRF 12.1, 7.4.2</i></p> <p>5.1.1 An appropriate institutional framework shall be established to determine the applied research which is required and its proper use (i.e. assess/evaluate effectiveness of stock assessment model) for fishery management purposes.</p> <p style="text-align: right;"><i>FAO CCRF 12.2, 12.6</i></p>	
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<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
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Clause	Evidence
<p>5.1</p>	<p>Rating determination</p> <p><i>Alaska ensures that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, social science, aquaculture and nutritional science (NMFS, ADFG, ASMI). The research is disseminated accordingly. Alaska also ensures the availability of research facilities and provides appropriate training, staffing and institution building to conduct the research.</i></p> <p>The nationally funded research into marine living resources in the North Pacific is primarily undertaken by the AFSC, although there are also a number of important research and monitoring programs undertaken by ADFG and academic institutes. The AFSC is a branch of the NMFS. The mission of the AFSC is to “<i>plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence</i>”.</p>

The staff of the AFSC, amounting to over 400, (not all working on Pacific cod) is engaged in a broad arena of science covering fishery resources, oceanography, marine mammal, and environmental research including impacts of global warming and the impact of receding ice cover in the North Pacific. Figure 34 shows the structure of the organization and the various programs that AFSC undertake.

AFSC is primarily engaged in providing scientific and technical advice for the NPFMC and state bodies such as ADFG.

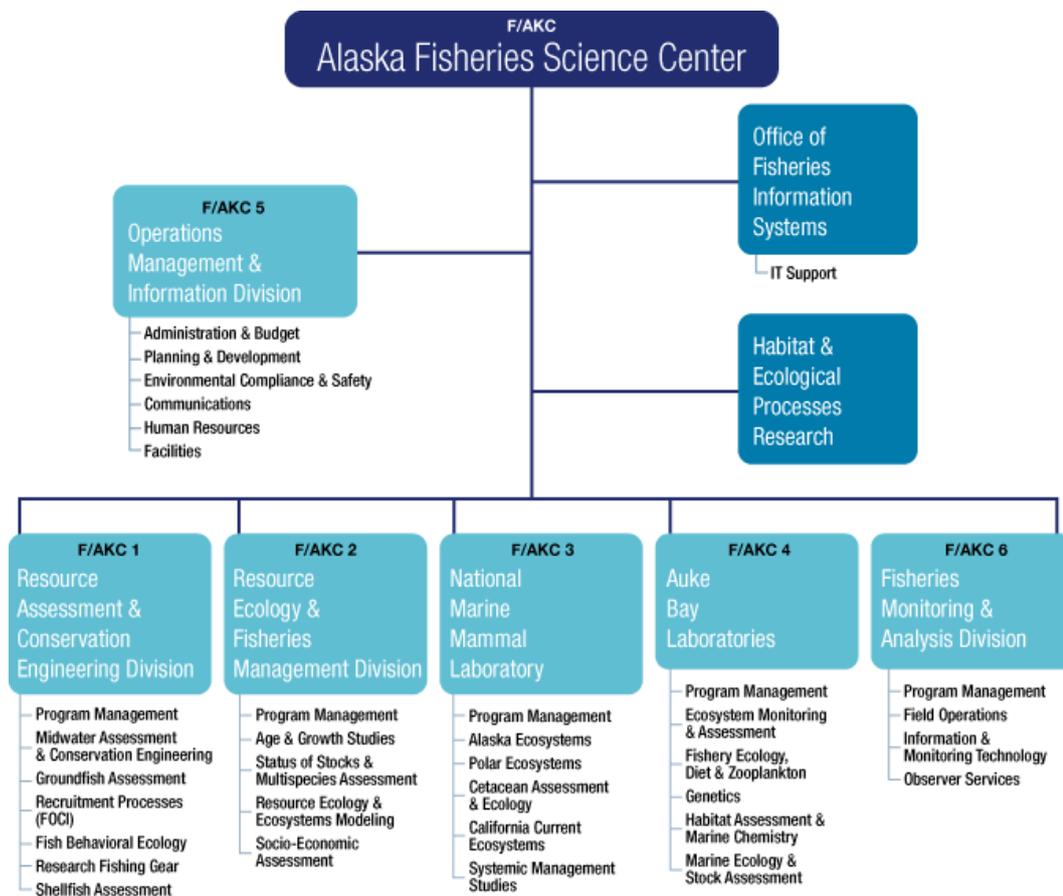


Figure 34. AFSC structure.

Within AFSC, REFM is responsible for the provision of stock assessment. REFM scientists work as part of Plan Teams who have the primary responsibility of presenting the outcomes of stock assessments to the SSC of the NPFMC. The Age and Growth Program of the REFM division are responsible for age determination from samples taken by at-sea and shore based observers and from fishery independent surveys. In addition, the Age Determination Unit of the ADFG also provides age information for Pacific cod caught in state waters.

Specifically relating to the assessment and management of Pacific cod, the RACE division is responsible for annual groundfish surveys, develop by-catch reduction techniques to enable the commercial fisheries manage and limit catches of PSC species and other unwanted catches, assess and quantify discard mortality and to undertake research into benthic impact of commercial gears.

The Auke Bay Laboratories conducts scientific research on fish stocks, fish habitats, and

the chemistry of marine environments. Information from this research is widely used by commercial interests such as fishing industries, and governmental agencies involved in managing natural resources.

The National Marine Mammal Laboratory conducts research on marine mammals, with particular attention to issues related to marine mammals off the coasts of Oregon, Washington and Alaska. Information is provided to various U.S. governmental and international organizations to assist in developing rational and appropriate management regimes for marine resources under NOAA's jurisdiction.

The FMA division monitors groundfish fishing activities in the EEZ off Alaska and conducts research associated with sampling commercial fishery catches, estimation of catch and bycatch mortality, and analysis of fishery-dependent data. The Division is responsible for training, briefing, debriefing and oversight of observers who collect catch data onboard fishing vessels and at onshore processing plants and for quality control/quality assurance of the data provided by these observers.

NOAA operate an extensive research programme into resource economics and social sciences

The current areas of research include:

- 2010 Southeast Alaska Fisheries Economic Activity survey
- Alaska Fisheries and Global Trade
- Econometric Measurement of Fishing Capacity and Capacity Utilization
- Fishing Productivity and its Relation to Management Regimes
- Effects of Temporal Aggregation in Fishery Supply Models
- Properties of the Stochastic Distance Function and its Role in Fishery Analyses

http://www.afsc.noaa.gov/REFM/Socioeconomics/current_research.php

The entire data collation, analysis and assessment procedures are periodically subject to extensive external peer review through the CIE.

<http://www.fakr.noaa.gov/protectedresources/stellers/esa/biop/final/cie/about.htm>

BSAI and GOA were subject to such a review in 2011.

<ftp://ftp.afsc.noaa.gov/afsc/public/pcod/default.htm>

State management occurs from 0-3 miles from the coastline. The state of Alaska establishes seasons and GHs through the BOF process. State scientists, managers and regulators determine research priorities during annual Policy and Planning Committee (PPC) meetings. ADFG scientists conduct research associated with sampling commercial fishery catches, estimation of catch, and analysis of fishery-dependent data, and collect biological and economic data as basis for the setting of Pacific cod management objectives. ADFG also provides to Divisions of Sport Fish and Commercial Fisheries staff technical fisheries reports policies, standard and guidance (<http://www.adfg.alaska.gov/FedAidPDFs/SP12-14.pdf>).

	<p>ASMI is a public-private partnership between the State of Alaska and the Alaska seafood industry established to foster economic development of a renewable natural resource. ASMI is playing a key role in the repositioning of Alaska’s seafood industry as a competitive market-driven food production industry. Its work to boost the value of Alaska’s seafood product portfolio is accomplished through partnerships with retail grocers, foodservice distributors, restaurant chains, foodservice operators, universities, culinary schools, and the media. It conducts consumer campaigns, public relations and advertising activities, and aligns with industry efforts for maximum effectiveness. ASMI also functions as a brand manager of the Alaska Seafood family of brands (http://pressroom.alaskaseafood.org/about/).</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
<p>5.1.1</p>	<p>Rating determination</p> <p><i>An appropriate institutional framework (National Standard Guidelines for Fishery Management Plans published by the NMFS) is established to determine the applied research which is required and its proper use (i.e. assess/evaluate stock assessment model/practices) for fishery management purposes (SAFE reports).</i></p> <p>The <i>National Standard Guidelines for Fishery Management Plans</i> published by the NMFS require that a SAFE report be prepared and reviewed annually for each FMP. The SAFE report summarizes the best available scientific information concerning the past, present, and possible future condition of the stocks, marine ecosystems, and fisheries that are managed under Federal regulation. It provides information to the NPFMC for determining annual harvest levels from each stock, documenting significant trends or changes in the resource, marine ecosystems, and fishery over time, and assessing the relative success of existing state and Federal fishery management programs. The SAFE reports are published in three sections: a “Stock Assessment” section, which comprises the bulk of this document, and “Economic Status of Groundfish Fisheries off Alaska” and “Ecosystem Considerations” sections, which are bound separately. (BSAI SAFE report 2010)</p> <p>The adequacy and appropriateness of the stock assessments are ensured by extensive peer review. For BSAI and GOA groundfish assessments, the review process begins with an internal review of assessments by the AFSC. Following that review, assessments are reviewed annually by the groundfish plan teams who provide comments to the assessment authors on revisions to the assessment as well as to make recommendations to the SSC regarding OFL and ABC levels for each stock. The majority of the plan team members have expertise in stock assessment and fisheries biology with some additional</p>	

members bringing in expertise in fishery management, in-season catch accounting, seabirds, marine mammals, and economics. The assessments as well as the plan team recommendations are then subsequently reviewed by the SSC who make the final OFL and ABC recommendations to the NPFMC. The SSC may modify the recommendations from the Plan Team based upon additional considerations. The NPFMC sets TAC at or below the ABC recommendations of the SSC.

The AFSC periodically requests a more comprehensive review of groundfish stock assessments by the CIE. These reviews are intended to lay a broader groundwork for improving the stock assessments outside the annual assessment cycle. CIE recommendations are provided to the stock assessment author, the AFSC, the plan team, and the SSC for review, comment, and consideration of priorities for improving the assessment. (SSCWorkshop10.pdf)

Three external reviewers from the CIE were contracted to review assessments of BSAI and GOA Pacific cod in 2011. The terms of reference covered several aspects of the assessments including the use of fishery dependent and fishery independent data, gaps in modeling, accounting for assessment uncertainties, ageing issues, variation in survey trawl catchability. NMFS respond to the review and incorporated it into the following assessment cycle.

Please refer to the [stock assessment activities](#) section in the background for further details on the BS, AI and GOA model and stock assessment characteristics.

Evidence

http://www.fakr.noaa.gov/npfmc/PDFdocuments/catch_shares/Pcod/PcodModelsRev411Oliveria.pdf

http://www.fakr.noaa.gov/npfmc/PDFdocuments/catch_shares/Pcod/411PcodreviewChen.pdf

http://www.fakr.noaa.gov/npfmc/PDFdocuments/catch_shares/Pcod/411PcodreviewDarby.pdf

Clause:	
<p>5.2 The state of the stocks under management jurisdiction, including the impacts of ecosystem changes resulting from fishing pressure, pollution or habitat alteration shall be monitored.</p> <p style="text-align: right;"><i>Eco 31</i></p> <p>5.2.1 The research capacity necessary to assess the effects of climate or environment change on fish stocks and aquatic ecosystems shall be established. The state of the stock under State Jurisdiction, including the impacts of ecosystem changes resulting from fishing pressure, pollution or habitat alteration shall be established.</p> <p style="text-align: right;"><i>FAO CCRF 12.5</i></p>	
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
5.2	<p>Rating determination</p> <p><i>Both the BSAI and GOA Pacific cod stocks are subject to a rigorous annual analytical assessment process involving the testing of different model approaches and derivations, extensive internal review processes. Interaction between the commercial fisheries targeting Pacific cod and the wider ecosystem are considered in the annual Ecosystem Considerations report of the SAFE documents.</i></p> <p>Both the BSAI and GOA Pacific cod stocks are subject of fisheries management plans (BSAI FMP http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf and GOA FMP http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf). The BSAI FMP was implemented in 1982 and the GOA FMP implemented in 1978. As a condition of these plans, both stocks must be assessed annually and that these evaluations form the basis for management actions. SAFE Reports are prepared and reviewed annually for each FMP species or species group. The SAFE reports comprise of three sections concerning i) Stock assessment ii) Economic Status and iii) Ecosystem considerations.</p> <p>The Stock assessment reports are prepared by multi-agency “Plan Teams” and largely based on input from stock assessment scientists from the NMFS-AFSC. Both the EBS and GOA Pacific cod stocks are subject to a rigorous analytical assessment process involving the testing of different model approaches and derivations, extensive internal review processes. Assessment approaches and outcomes are reviewed twice annually prior to the submission of the ‘best’ assessment to the NPFMC each December. The 2011 presentations made to the NPFMC on the assessments of GOA groundfish species can be found here: http://www.afsc.noaa.gov/REFM/Docs/2011/GOA_Plan_Team_Dec_2011.pdf</p>

and for the BSAI groundfish here:

http://www.afsc.noaa.gov/REFM/Docs/2011/BSAI_Plan_Team_Dec_2011.pdf

2012 stock assessment reports for the assessments of GOA Pacific cod in 2011 can be found here <http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf> and for BSAI here <http://www.afsc.noaa.gov/REFM/docs/2011/BSAIpcod.pdf>

Beginning with the 1994 GOA SAFE report a model using the Stock Synthesis 1 (SS1) assessment program and based largely on length-structured data formed the primary analytical tool used to assess the GOA Pacific cod stock. Similarly, SS1 was first applied to the EBS Pacific cod in the 1992 stock assessment. This first application used age-structured data and SS1 continued to be used, but based largely on length structured data since 2004.

It should be emphasized that the model has always been intended to assess only the EBS portion of the BSAI stock. Conversion of model estimates of EBS biomass and catch to BSAI equivalents has traditionally been accomplished by application of an expansion factor based on the relative survey biomasses between EBS and AI. The AI stock is quantified by inflating and extrapolating the results of the EBS assessment and the last available biomass ratios from each surveys used to scale up the assessment of the EBS stock to the BSAI area. Sub-samples of length and age taken from the survey are used for assessments. There is significant progress in the development of an age-disaggregated assessment for the Aleutian Islands Pacific cod, with independent adoption of OFL, ABC and TAC recommendations planned for the 2014 fishing season.

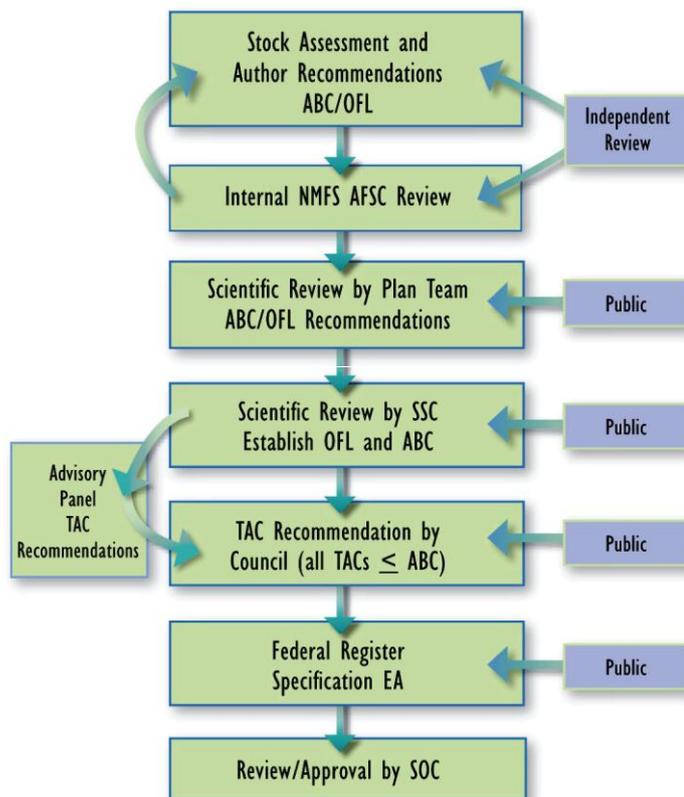
In addition, all assessed groundfish stocks are also subject to periodic external peer review through the CIE program.

<http://www.fakr.noaa.gov/protectedresources/stellers/esa/biop/final/cie/about.htm>

The objective of the CIE program is to ensure that assessment approaches are appropriate and meet best international standards.

The BSAI and GOA Pacific cod were subject to a CIE review in 2011. In the latest review it was noted that *“The amount and quality of work carried out on the assessment models for Pacific cod are impressive by any standard, and the data collection regimes, fishery-dependent and independent, are some of the best and most comprehensive to be found anywhere today”*.

Scientific Review Process for North Pacific Stock Assessments and Catch Specifications



http://www.fakr.noaa.gov/npfmc/PDFdocuments/resources/Species_Profiles2011.pdf

Interaction between the commercial fisheries targeting Pacific cod and the wider ecosystem are considered in the annual *Ecosystem Considerations* report of the SAFE document <http://www.afsc.noaa.gov/REFM/docs/2011/ecosystem.pdf>. The reports are compiled by the REFM and reviewed by the Plan Teams. These are highly detailed and provide information on the interactions between commercial fisheries and the physical environment trends (area disturbance/impact by fisheries by gear type), oceanographic conditions such as trends in bottom and surface temperature, ice cover, status of oceanographic current and gyres, ecosystem trends such as phytoplankton and zooplankton production, status of key marine invertebrate species, benthic communities, marine mammals and seabirds as well as commercial and non-commercial fish species. What is of significant use is the presentation of trends in the time series for key ecosystem indicators (Figure 35) and an analysis of trends. The reports also identify specific ‘hot topics’ such as the state of endangered or threatened species and also provide area specific summary ‘report cards’ which identify key findings and issues associated with each area. The report card for the EBS can be found here <http://access.afsc.noaa.gov/reem/ecoweb/EbsReportCard2011.pdf> and the report card for AI here <http://access.afsc.noaa.gov/reem/ecoweb/AIreportcard2011.pdf>

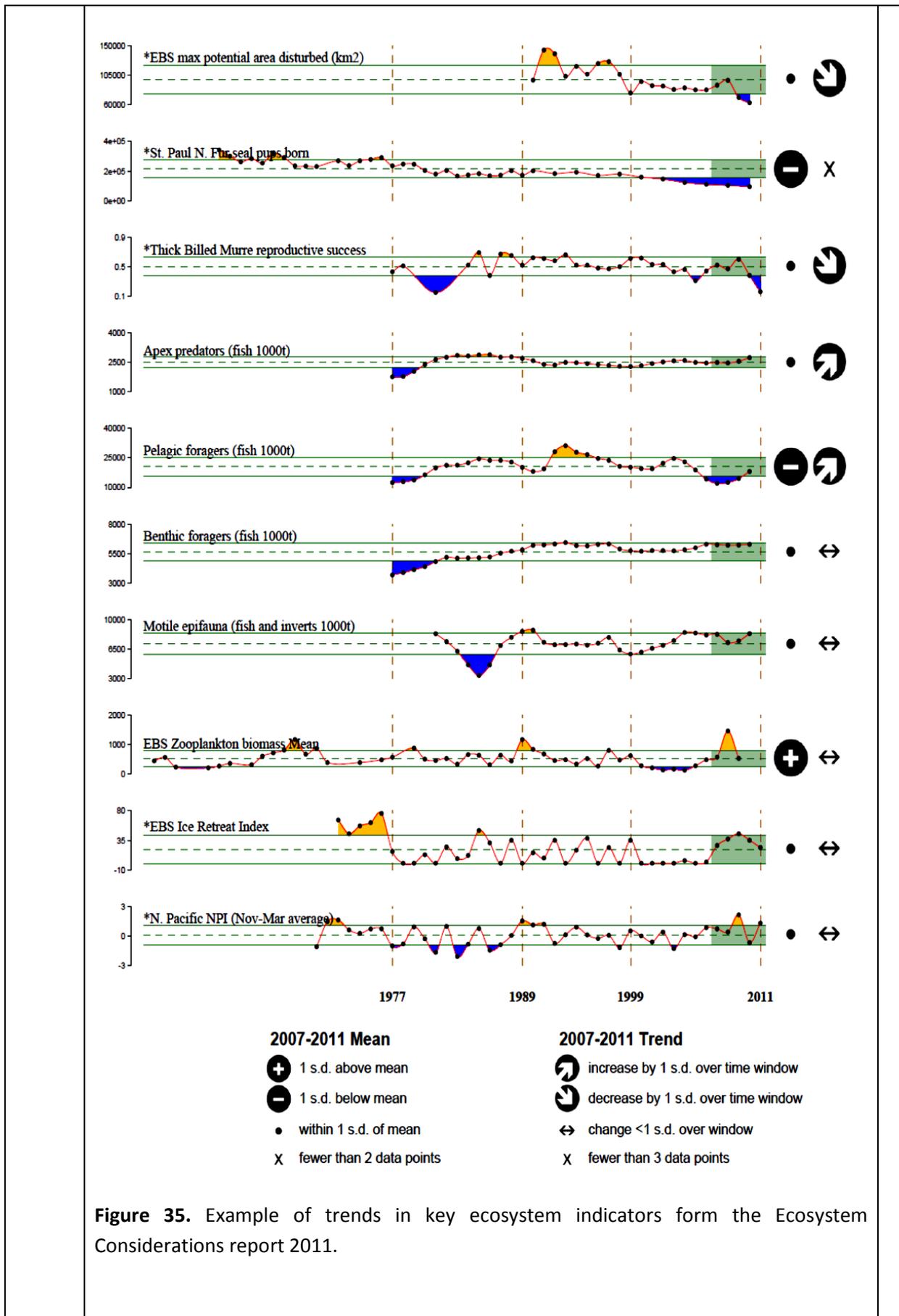


Figure 35. Example of trends in key ecosystem indicators from the Ecosystem Considerations report 2011.

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. Alaskan waters are relatively free of industrial pollutants, which are aggressively monitored by the DEC. These include wastewater discharge, storm water discharge, seafood water discharge, placer mining discharge, log transfer discharge, and others. (<http://www.dec.state.ak.us/>).

The Ecosystem considerations report also provides information indices (area disturbed by trawling) based on swept area estimates of commercial trawls, used to monitor trends in the scale (area) of trawling over time for EBS, AI and GOA and provide a proxy index of habitat disturbance.

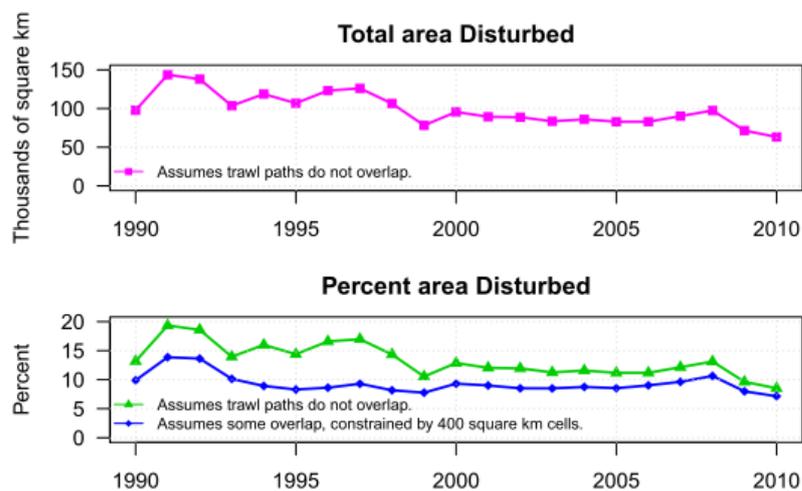


Figure 36. Total maximum potential trawl area disturbed, and the percent area disturbed. The green line, representing percent area disturbed, sums the area disturbed assuming no spatial overlap of trawl hauls in a year, thus providing an upper limit to the estimated of area disturbed. The blue line represents the percent of area disturbed with spatial overlap of trawl hauls within 400 km² cells, thereby, limiting the disturbance of trawl recorded in a cell to 400 km².

In addition to the use of habitat disturbance indices derived from commercial fishing activity (swept area), CPUE trends derived from RACE survey data are provided for various epifauna (sponges, soft corals etc) species, although it is acknowledged that survey trawls have low (and undefined) catchability of such organisms, the index does provide a useful trend in abundance over time (Figures 37 and 38).

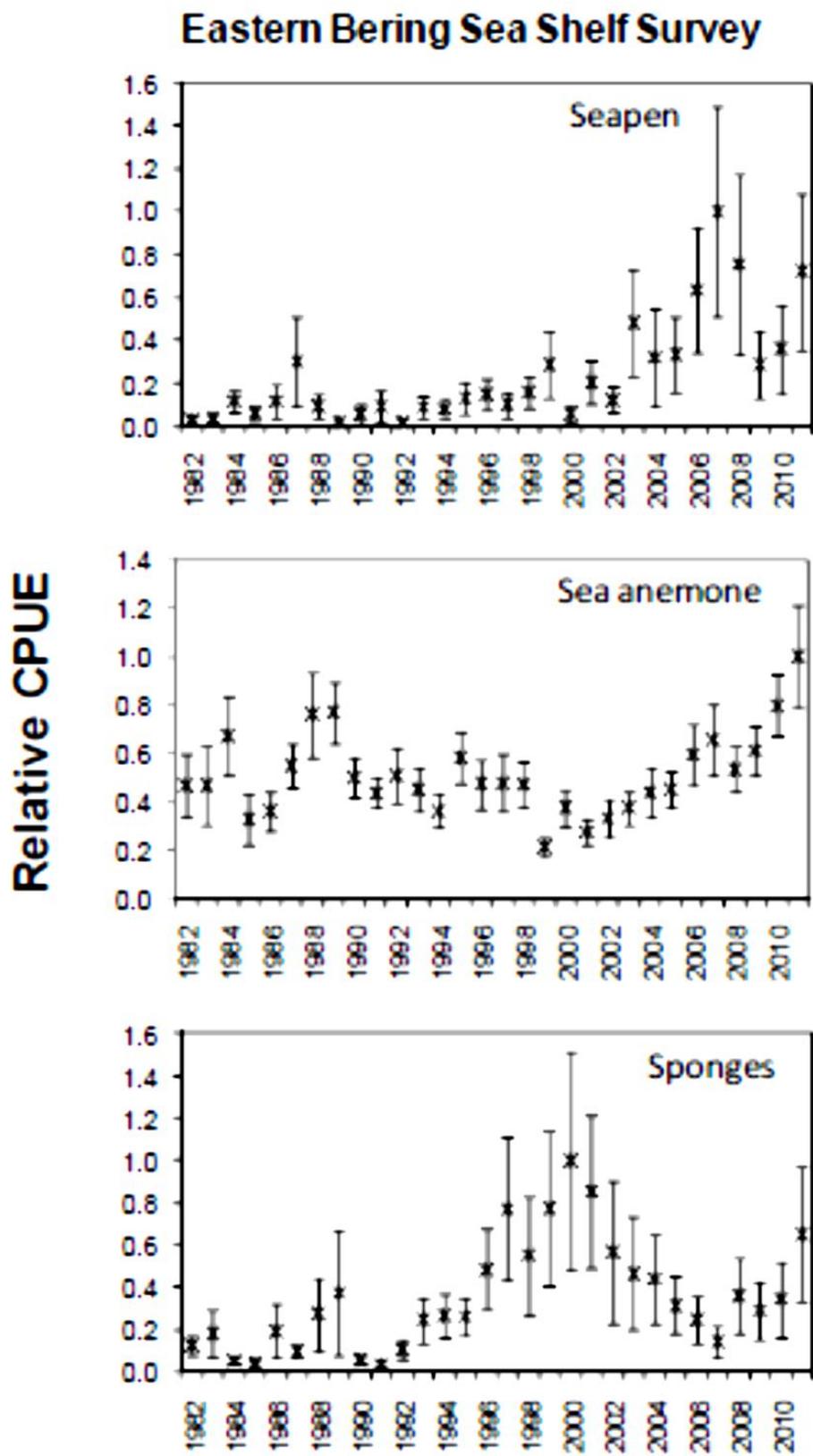


Figure 37. Relative CPUE trends of structural epifauna from the RACE bottom trawl survey of the EBS shelf, 1982-2011. Data points are shown with standard error bars.

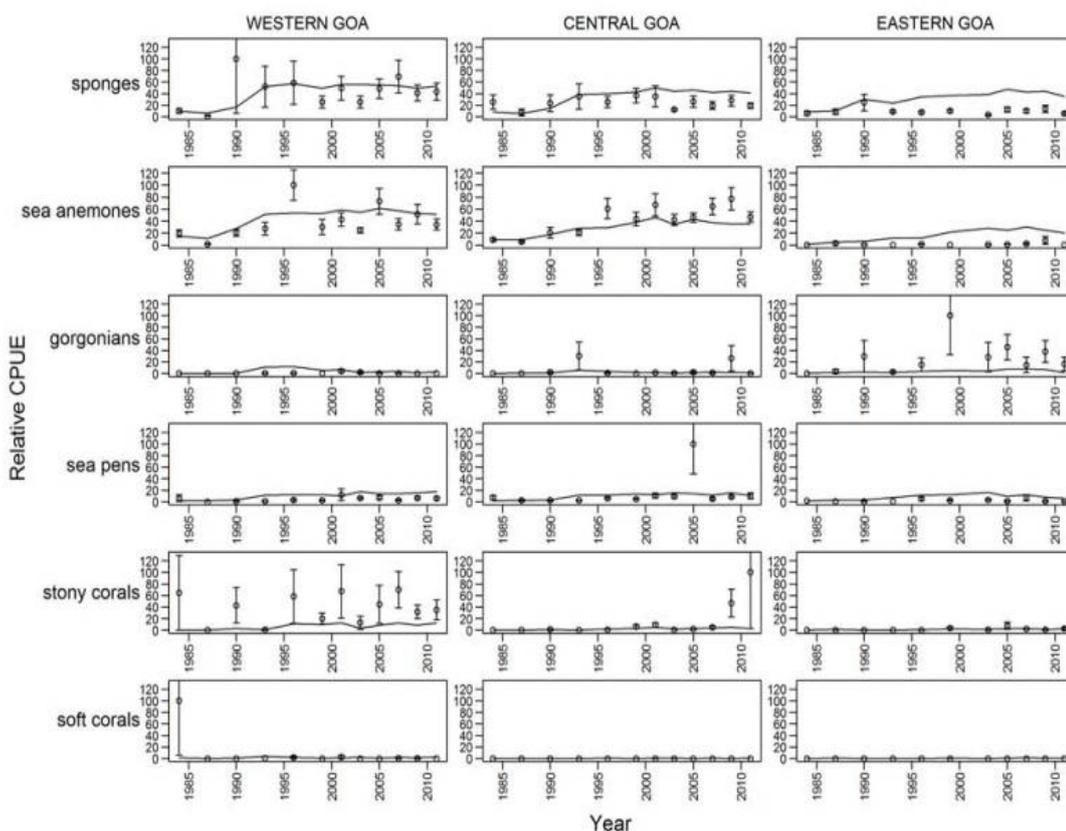


Figure 38. Mean CPUE of structural epifauna species groups by area from RACE bottom trawl surveys in the GOA from 1983 through 2011. Error bars represents standard errors. The solid lines represent the percentage of non-zero catches.

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2011/ecosystem.pdf>

Research on the effects of climate or environment change on fish stocks and aquatic ecosystems is discussed further in section 13.1.2.

Evidence adequacy rating:

High **Medium** **Low**

Clause	Evidence
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5.2.1	<p>Rating determination</p> <p><i>Given the depth and detail presented in the Ecosystem Considerations reports discussed above, it is clear that there is extensive research being undertaken to investigate the impacts of changes on the environment on all aspects of the marine ecosystem.</i></p>
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	<p>Given the depth and detail presented in the Ecosystem Considerations reports discussed above, it is clear that there is extensive research being undertaken to investigate the impacts of changes on the environment on all aspects of the marine ecosystem. The NOAA FATE program (Fisheries and The Environment) http://fate.nmfs.noaa.gov/ undertakes research into the impact of environmental forcing e.g. global warming on the productivity and dynamics of a wide range of marine species. One of the primary objectives of FATE is to identify and collate data associated with a suite of ecological indicators, such as those presented above and to integrate these into traditional stock assessments.</p> <p>REFM scientists in the Status of Stocks and Multispecies Assessments (SSMA) program use biological and oceanographic information coupled with numerical simulation techniques to study the interaction of fish populations, fisheries, and the environment. The Fishery Interaction Team of SSMA conducts field studies to examine potential commercial fishery impacts on prey including reduction in the abundance or availability of prey at local scales and disturbance of prey fields.</p> <p>http://www.afsc.noaa.gov/REFM/</p> <p>The REEM focuses on multi-species interactions, food web modeling and the integration into single, multi-species and broader environmental modeling approaches.</p> <p>http://www.afsc.noaa.gov/refm/reem/default.php</p> <p>Annual results are published in the Ecosystem SAFE documents provided to the NPFMC. These reports provide a concise summary of the status of marine ecosystems in Alaska for stock assessment scientists, fishery managers, and the public. One section of the report covers Ecosystem Status and Management Indicators, and provides detailed information and updates on the status and trends of ecosystem components as well as either early signals of direct human effects on ecosystem components that might warrant management intervention or to provide evidence of the efficacy of previous management actions. In the first instance, the indicators are likely to be ones that summarize information about the characteristics of the human influences (particularly those related to fishing, such as catch composition, amount, and location) that are influencing a particular ecosystem component. A major component of the report is an ecosystem assessment that synthesizes historical climate and fishing effects on the EBS, the AI and the GOA ecosystems using information from the Ecosystem Status and Management Indicators section and stock assessment reports. Notable trends that capture unique occurrences, changes in trend direction, or patterns across indicators are highlighted. An ongoing goal is to produce an ecosystem assessment utilizing a blend of data analysis and modeling to clearly communicate the current status and possible future directions of ecosystems.</p> <p>http://www.afsc.noaa.gov/REFM/docs/2011/ecosystem.pdf</p>
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<p>Clause:</p> <p>5.3 Management organizations shall cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources.</p> <p style="text-align: right;"><i>FAO CCRF 12.7</i></p>		
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
5.3	<p>Rating determination</p> <p><i>Management organizations cooperate with relevant international organizations (e.g. US-Canada Governments) to encourage research in order to ensure optimum utilization of fishery resources.</i></p> <p>The Canada/US Groundfish Committee was established in 1959 and is sanctioned as an advisory group by the State Departments of both nations. The Technical Sub-Committee (TSC) It is the only coast-wide forum for official exchange of information on the status of groundfish stocks and groundfish research among US federal and state agencies and the Canadian Department of Fisheries and Oceans.</p> <p>The NOAA has an extensive number of international agreements with international organizations, individual governments and regional unions. These are managed through the NOAA office of International Affairs: http://www.nmfs.noaa.gov/ia/index.htm.</p> <p>Many of this focus on promoting international collaboration between NMFS and national and regional laboratories outside the US. A full list of and the contents of the bi-lateral and international agreements can be found here: http://www.nmfs.noaa.gov/ia/intlagree/docs/2012/international_agreements.pdf</p>	

<p>Clause:</p> <p>5.4 The fishery management organizations shall directly, or in conjunction with other States, develop collaborative technical and research programmes to improve understanding of the biology, environment and status of trans-boundary aquatic stocks.</p> <p style="text-align: right;"><i>FAO CCRF 12.17</i></p>		
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		

Clause	Evidence
5.4	Not Applicable. Alaska Pacific cod is not considered a trans-boundary aquatic stock.

Clause:	
5.5	Data generated by research shall be analyzed and the results of such analyses published in a way that confidentiality is respected where appropriate.
5.5.1	Results of analyses shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence is made available as a contribution to fisheries conservation, management and development.
5.5.2	In the absence of adequate scientific information, appropriate research shall be initiated in a timely fashion.
<i>FAO CCRF 12.3</i>	

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High	<input type="checkbox"/> Medium <input type="checkbox"/> Low

Clause	Evidence
5.5	<p>Rating determination</p> <p><i>NMFS and ADFG publish the results of Pacific cod fisheries data analysis (SAFE reports, ADFG Scientific and Technical Publications) in a way that confidentiality is respected where appropriate (NOAA administrative order 216-100, memorandum of agreement signed between the NOAA, ADFG and the Alaska Commercial Fishery Entry Commission).</i></p> <p>The AFSC has a strong publication record in both peer reviewed scientific journals as well as reports to industry and the relevant management authorities e.g. NPFMC. Numerous articles are published in peer reviewed journals covering all aspects of marine and environmental science http://www.afsc.noaa.gov/Publications/default.htm. Individual divisions of NMFS also upload recent publications on their relevant web pages. With regards to the publication of data that could be considered commercially sensitive, AFSC policy is to aggregate data to the level of at least three producers e.g. vessels.</p> <p>Scientific and Technical Publications relating to state-managed fisheries are available on the ADFG website: http://www.adfg.alaska.gov/sf/publications/index.cfm?ADFG=main.fullTextSearchSubmit http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.main</p> <p>NOAA administrative order 216-100 prescribes policies and procedures for protecting</p>

	<p>the confidentiality of data submitted to and collected by the NMFS. Confidential data are those identifiable with a person. Before release to the public, data must be aggregated to protect the individual identities. For fisheries data, this requires that there must be at least 3 entities contributing to any level of aggregated data. Only authorized users have access to confidential data, they must have a need to collect or use these data in the performance of an official duty, and they must sign a statement of nondisclosure affirming their understanding of NMFS obligations with respect to confidential data and the penalties for unauthorized use and disclosure. Confidential data must be maintained in secure facilities. Data collected by a contractor, such as an observer contractor, must be transferred timely to authorized Federal employees; no copies of these data may be retained by the contractor. NMFS may permit contractors to retain aggregated data. A data return clause shall be included in the agreement. All procedures applicable to Federal employees must be followed by contractor employees collecting data with Federal authority. Under agreements with the State, each State data collector collecting confidential data will sign a statement at least as protective as the one signed by Federal employees, which affirms that the signer understands the applicable procedures and regulations and the penalties for unauthorized disclosure.</p> <p>http://www.st.nmfs.noaa.gov/st1/recreational/documents/Intercept_Appendices/Appenix%20M%20031408%20NOAA%20administrative%20order%20216-100.pdf</p> <p>In addition, a memorandum of agreement was signed in September 1999 between the NOAA, ADFG and the Alaska Commercial Fishery Entry Commission (CFEC). The purpose of this agreement is to outline the understanding between the NOAA, U.S. Department of Commerce (DOC), ADFG and the CFEC, regarding reciprocal provision of direct access to, and subsequent storage and usage of, confidential data regarding marine fisheries in and off Alaska, such as fishery landings data and port sampling data.</p> <p>https://docs.google.com/viewer?a=v&q=cache:Hit556BFZOwJ:www.reginfo.gov/public/do/DownloadDocument%3FdocumentID%3D363353%26version%3D1+agreement+between+NOAA,+ADFG,+CFEC+on+confidential+fishery+data&hl=en&gl=ie&pid=bl&srcid=ADGEESi7De3rnfRg8PAGSaE3mqGRTToAPmBPgyDt6_qReJD3Hm7S9b_pWTBVKQA7k7GyxEOGGBfcJaQHt0K_oisc9YVXI3oLPDt_5RKS0_j4x8FBfxIFwOSv3f7EMCXnSa3jfgGyXUVjr&sig=AHIEtbSUNn7ep_0PXSVirN4FYkumumXnRg</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
5.5.1	<p>Rating determination</p> <p><i>The yearly publication of the SAFE reports, Ecosystem and Economic Considerations reports as well as numerous ad hoc technical papers for the NPFMC meetings and</i></p>	

<p><i>committees and the ADFG Scientific and Technical Publications adequately demonstrates that the most up to date and best scientific advice is provided to those responsible for fisheries and marine resource management.</i></p> <p>The NPFMC web site also contains an extensive publication listing covering scientific papers of interest http://www.fakr.noaa.gov/npfmc/resources-publications/scientific-papers.html , reports of the assessment Plan Teams as well as the minutes of the NPFMC meetings and sub-committee meetings e.g. Advisory Panel and the Scientific and Statistics Committee. SAFE reports are usually available at the Alaska Fishery Science Center website.</p> <p>Scientific and Technical Publications relating to state-managed fisheries are available on the ADFG website: http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.main http://www.adfg.alaska.gov/sf/publications/index.cfm?ADFG=main.fullTextSearchSubmit</p>	
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
5.5.2	Not relevant as there are no apparent data deficiencies for either the BSAI or GOA Pacific cod stocks.

<p>Clause:</p> <p>5.6 Studies shall be promoted which provide an understanding of the costs, benefits and effects of alternative management options designed to rationalize fishing, in particular, options relating to excess fishing capacity and excessive levels of fishing effort.</p> <p style="text-align: right;"><i>FAO CCRF 7.4.3</i></p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
5.6	<p><i>Rating Determination</i></p> <p><i>Studies are promoted which provide an understanding of the costs, benefits and effects of alternative management options designed to rationalize fishing, in particular, options relating to excess fishing capacity and excessive levels of fishing effort.</i></p>

	See clause 2.5 for details on the RFA and NEPA process and clause 3.2.1. for details relating to the avoidance excess fishing capacity and excessive levels of fishing effort.	
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Clause:		
<p>5.7 In the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact shall be considered.</p> <p style="text-align: right;"><i>FAO CCRF 7.6.7</i></p>		
Evidence adequacy rating:		
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
5.7	<p><i>Rating Determination</i></p> <p><i>See clause 2.5 for details on the RFA and NEPA process which, in the evaluation of alternative conservation and management measures, consider their cost-effectiveness and social impact.</i></p> <p>See clause 2.5 for details on the RFA and NEPA process. As an example, the recent changes to the observer program due to be implemented in 2013 (see clause 4.2) have seen in depth socio-economic analysis for the fleets impacted by the restructuring of the program.</p> <p>http://alaskafisheries.noaa.gov/sustainablefisheries/observers/</p>	

C. The Precautionary Approach

<p>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 target. Remedial actions shall be available and taken where reference point or other suitable proxies are approached or exceeded.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.2/7.5.3</i></p> <p style="text-align: right;"><i>Eco 29.2/29.2bis/30-30.2</i></p>						
Confidence Ratings	Low	0 out of 5	Medium	1 out of 5	High	4 out of 5

<p>Clause:</p> <p>6.1 States shall determine for the stock both safe targets for management (Target Reference Points) and limits for exploitation (Limit Reference Points), and, at the same time, the action to be taken if they are exceeded.</p> <p>6.1.1 Target reference point(s) shall be established.</p> <p>6.1.2 Limit reference points shall be established. When a limit reference point is approached, measures shall be taken to ensure that it will not be exceeded.</p> <p>6.1.3 Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the level of fishing permitted shall be commensurate with the current state of the fishery resources.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.3, 7.6.1</i></p> <p style="text-align: right;"><i>FAO Eco 29.2-29.2bis,29.6,30-30.2</i></p> <p>6.1.4 Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.3</i></p> <p style="text-align: right;"><i>FAO Eco 29.6, 30.2</i></p> <p>6.1.5 In implementing the precautionary approach, States shall take into account, inter alia, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points , levels and distribution of fishing mortality and the impact of fishing activities, including discards, on non-target and associated or dependant species as well as environmental and socio-economic conditions.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.2</i></p>						
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<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
6.1	<p>Rating determination</p> <p><i>The BSAI and GOA groundfish management plans define target ($B_{40\%}$) and limit ($B_{17.5\%}$) reference points for Pacific cod and other groundfish covered by these plans. Each SAFE report describes the current fishing mortality rate, stock biomass relative to target and limit reference points.</i></p> <p>The BSAI and GOA groundfish management plans define target and limit reference points for Pacific cod and other groundfish. Each SAFE report describes the current fishing mortality rate, stock biomass relative to target and limit reference points. Both management plans specify the Overfishing Limits (OFL) and the Fishing mortality rate (F_{OFL}) used to set OFL and Acceptable Biological Catch (ABC) and the fishing mortality rate (F_{ABC}) used to set ABC, the determination of each is dependent on the knowledge base for each stock. The management plan classifies each stock based on a tier system (Tiers 1-6) with Tier 1 having the greatest level of information on stock status and fishing mortality relative to MSY considerations. The resultant harvest control rule for determining appropriate ABC and OFL depending on the information base (presence/absence of B, B_{MSY}, F, F_{MSY} and F_{spr}) is shown in Figure 39.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Tiers used to determine ABC and OFL for groundfish stocks.</p> <p>(1) Information available: Reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY}.</p> <p>1a) Stock status: $B/B_{MSY} > 1$ $F_{OFL} = m_A$, the arithmetic mean of the pdf $F_{ABC} \leq m_H$, the harmonic mean of the pdf</p> <p>1b) Stock status: $a < B/B_{MSY} \leq 1$ $F_{OFL} = m_A \times (B/B_{MSY} - a)/(1 - a)$ $F_{ABC} \leq m_H \times (B/B_{MSY} - a)/(1 - a)$</p> <p>1c) Stock status: $B/B_{MSY} \leq a$ $F_{OFL} = 0$ $F_{ABC} = 0$</p> <p>(2) Information available: Reliable point estimates of B, B_{MSY}, F_{MSY}, $F_{30\%}$, and $F_{40\%}$.</p> <p>2a) Stock status: $B/B_{MSY} > 1$ $F_{OFL} = F_{MSY} \times (F_{30\%}/F_{40\%})$ $F_{ABC} \leq F_{MSY}$</p> <p>2b) Stock status: $a < B/B_{MSY} \leq 1$ $F_{OFL} = F_{MSY} \times (F_{30\%}/F_{40\%}) \times (B/B_{MSY} - a)/(1 - a)$ $F_{ABC} \leq F_{MSY} \times (B/B_{MSY} - a)/(1 - a)$</p> <p>2c) Stock status: $B/B_{MSY} \leq a$ $F_{OFL} = 0$ $F_{ABC} = 0$</p> </div>

	<p>(3) <i>Information available: Reliable point estimates of B, B_{40%}, F_{30%}, and F_{40%}.</i></p> <p>3a) <i>Stock status: B/B_{40%} > 1</i> $F_{OFL} = F_{30\%}$ $F_{ABC} \leq F_{40\%}$</p> <p>3b) <i>Stock status: a < B/B_{40%} ≤ 1</i> $F_{OFL} = F_{30\%} \times (B/B_{40\%} - a)/(1 - a)$ $F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - a)/(1 - a)$</p> <p>3c) <i>Stock status: B/B_{40%} ≤ a</i> $F_{OFL} = 0$ $F_{ABC} = 0$</p> <p>(4) <i>Information available: Reliable point estimates of B, F_{30%}, and F_{40%}.</i> $F_{OFL} = F_{30\%}$ $F_{ABC} \leq F_{40\%}$</p> <p>(5) <i>Information available: Reliable point estimates of B and natural mortality rate M.</i> $F_{OFL} = M$ $F_{ABC} \leq 0.75 \times M$</p> <p>(6) <i>Information available: Reliable catch history from 1978 through 1995.</i> $OFL =$ <i>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</i> $ABC \leq 0.75 \times OFL$</p>	
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Figure 39. Tier used to determine ABC and OFL for groundfish stocks

In general terms the harvest control rules become progressively precautionary with increasing tier classification and catch options are automatically adjusted depending on the status of stocks relative to B_{msy} or the biomass B_{x%} corresponding to the percentage of the equilibrium spawning biomass that would be obtained in the absence of fishing (tier 1-2; 3).

For Pacific cod, there are no reliable estimates of MSY, but reliable estimates of reference points relative to spawning per recruit are: B_{40%} which equates to 40% of the equilibrium spawning biomass that would be obtained in the absence of fishing and F_{35%}/F_{40%} the fishing mortality rate that reduces the equilibrium level of spawning per recruit to 35%/40% of the level that would be obtained in the absence of any fishing. This places both BSAI and GOA Pacific cod into Tier 3. The suitability of these proxies has been the subject of considerable research (Clark 1991, Restrepo 1999).

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPCod.pdf>
<http://www.afsc.noaa.gov/REFM/docs/2011/GOAPCod.pdf>
http://www.fakr.noaa.gov/npfmc/PDFdocuments/resources/Species_Profiles2011.pdf
 Clark, W.G., 1991. Groundfish exploitation rates based on life history parameters. Can. J. Fish. Aquat. Sci. 48, 734–750. (<http://www.iphc.int/papers/f35.91.pdf>)

	Restrepo, V. (ed.) 1999. Proceedings of the fifth national NMFS Stock Assessment Workshop: Providing scientific advice to implement the precautionary approach under the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Tech. Memo. NMFS-F/SPO-40. http://www.st.nmfs.noaa.gov/StockAssessment/workshop_documents/nsaw5/introduc.pdf												
Evidence adequacy rating: <input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low													
Clause	Evidence												
6.1.1	<p>Rating determination <i>Target reference points ($B_{40\%}$) are established and are conservative.</i></p> <p>In general terms the harvest control rules become progressively precautionary with increasing Tier classification and catch options are automatically adjusted depending on the status of stocks relative to B_{msy} or the biomass $B_{x\%}$ corresponding to the percentage of the equilibrium spawning biomass that would be obtained in the absence of fishing (tier 1-2; 3). For Pacific cod, there are no reliable estimates of MSY, but reliable estimates of reference points relative to spawning per recruit are: $B_{40\%}$ which is equal to 40% of the equilibrium spawning biomass that would be obtained in the absence of fishing and $F_{35\%/F_{40\%}}$ - the fishing mortality rate that reduces the equilibrium level of spawning per recruit to 35%/40% of the level that would be obtained in the absence of any fishing. These reference points are justified by scientific literature in the 90s (Clark 1991). This places both BSAI and GOA Pacific cod into Tier 3. Both stocks are above their target reference point $B_{40\%}$.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Stock</th> <th>Target Reference Point (TRP)</th> <th>Biomass at TRP</th> <th>Biomass at present</th> </tr> </thead> <tbody> <tr> <td>BSAI</td> <td>$B_{40\%}$</td> <td>355.000 t</td> <td>410.000 t</td> </tr> <tr> <td>GOA</td> <td>$B_{40\%}$</td> <td>104.000 t</td> <td>121.000 t</td> </tr> </tbody> </table> <p>http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPcod.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf</p>	Stock	Target Reference Point (TRP)	Biomass at TRP	Biomass at present	BSAI	$B_{40\%}$	355.000 t	410.000 t	GOA	$B_{40\%}$	104.000 t	121.000 t
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Evidence adequacy rating: <input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low													
Clause	Evidence												
6.1.2	<p>Rating determination <i>Limit reference points ($B_{17.5\%}$) are established. The management approach also</i></p>												

stipulates that if the stock shows a decline in biomass beyond limit reference point e.g. $B_{17.5\%}$ then the fishery is closed.

The management plan specifies the application of a Maximum Fishing Mortality Threshold (MFMT) which is defined as the level of fishing mortality used to compute the smallest level of catch that would constitute overfishing, this would equate to fishing in excess of FMSY, where in the long term the stock would produce yields below maximum sustainable yield. The OFL is the resultant catch that would result from applying MFMT which is the level above which overfishing is occurring. **In terms of biomass limit, the plan defines the Minimum Stock Size Threshold (MSST) which is the biomass below which the stock is considered to be overfished. Where possible MSST should be set at one half of the MSY stock size, or the minimum stock size at which rebuilding would be expected to occur within 10 years.**

Under the management plan, part of or the entire target fishery can be closed if it is expected that bycatch rates in non-target species would result in the TAC being exceeded, in other words the target fishery would be closed before full uptake of the TAC. In general terms the entire management approach is precautionary, fishing at F_{MSY} constitutes an upper acceptable bound. For Pacific cod (and other species), the TAC's are set well below catch levels that would have resulted from the application of F_{msy} as a target for setting fishing opportunities as seen in other jurisdictions e.g. EU. The management approach also stipulates that if the stock shows a decline in biomass beyond $B_{35\%}$ then the maximum allowable catch declines at a quicker rate.

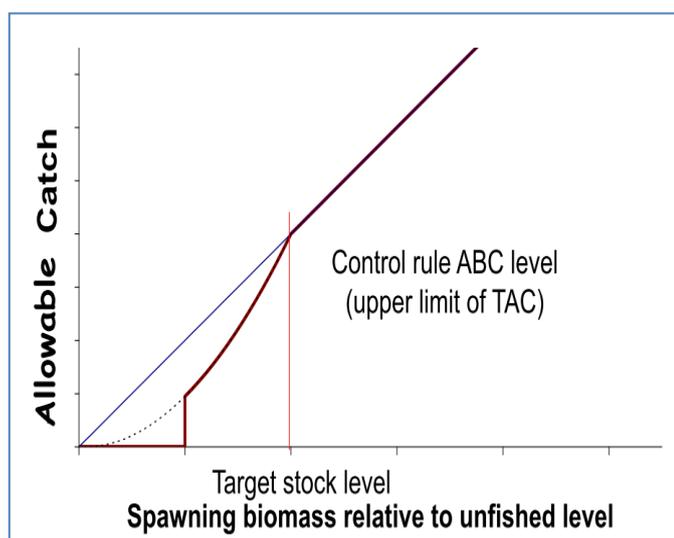


Figure 40. Schematic of the harvest control rules relative to the upper limit of the total allowable catch relative to spawning stock biomass. The vertical line represents the biomass target reference point. If the stock biomass falls below this level then the TAC (brown line) is adjusted downwards quicker than the rate of decline (blue line) to a point where a zero TAC is set.

	<p>Evidence https://alaskafisheries.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf https://alaskafisheries.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOA.pdf</p>																																																																																																								
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6.1.3	<p>Rating determination <i>Pacific cod stocks are subject to an annual stock assessment which has the express intention of assessing the status of the stocks relative to MSY proxy ($F_{40\%}/B_{40\%}$) reference points. Both BSAI and GOA stocks are above their target reference point $B_{40\%}$. However, a preliminary stock assessment of AI Pacific cod appears to be indicating the approaching of the limit reference point for this stock. Accordingly, the harvest pressure appears not to be commensurate with the current state of the stock.</i></p> <p>BSAI and GOA Pacific cod stocks status Tables 13 and 14 show the stock and exploitation status of combined BS and AI and GOA Pacific cod from the latest assessments.</p> <p>Table 13. Stock and exploitation summary relative to B and F reference points for the combined BS and AI Pacific cod stock. The table also includes OFL, ABC and TAC recommendations based on the assessment scientists preferred model choice.</p> <table border="1"> <thead> <tr> <th rowspan="2">Quantity</th> <th colspan="2">As estimated or specified last year for:</th> <th colspan="2">As estimated or recommended this year for:</th> </tr> <tr> <th>2011</th> <th>2012</th> <th>2012</th> <th>2013</th> </tr> </thead> <tbody> <tr> <td><i>M</i> (natural mortality rate)</td> <td>0.34</td> <td>0.34</td> <td>0.34</td> <td>0.34</td> </tr> <tr> <td>Tier</td> <td>3b</td> <td>3a</td> <td>3a</td> <td>3a</td> </tr> <tr> <td>Projected total (age 0+) biomass (t)</td> <td>1,560,000</td> <td>1,750,000</td> <td>1,690,000</td> <td>1,720,000</td> </tr> <tr> <td>Female spawning biomass (t)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Projected</td> <td>358,000</td> <td>389,000</td> <td>410,000</td> <td>437,000</td> </tr> <tr> <td> $B_{100\%}$</td> <td>961,000</td> <td>961,000</td> <td>889,000</td> <td>889,000</td> </tr> <tr> <td> $B_{40\%}$</td> <td>384,000</td> <td>384,000</td> <td>355,000</td> <td>355,000</td> </tr> <tr> <td> $B_{35\%}$</td> <td>336,000</td> <td>336,000</td> <td>311,000</td> <td>311,000</td> </tr> <tr> <td>F_{OFL}</td> <td>0.29</td> <td>0.31</td> <td>0.36</td> <td>0.36</td> </tr> <tr> <td>$maxF_{ABC}$</td> <td>0.25</td> <td>0.26</td> <td>0.30</td> <td>0.30</td> </tr> <tr> <td>F_{ABC}</td> <td>0.25</td> <td>0.26</td> <td>0.30</td> <td>0.30</td> </tr> <tr> <td>OFL (t)</td> <td>272,000</td> <td>329,000</td> <td>369,000</td> <td>374,000</td> </tr> <tr> <td>maxABC (t)</td> <td>235,000</td> <td>281,000</td> <td>314,000</td> <td>319,000</td> </tr> <tr> <td>ABC (t)</td> <td>235,000</td> <td>281,000</td> <td>314,000</td> <td>319,000</td> </tr> <tr> <th>Status</th> <th colspan="2">As determined last year for:</th> <th colspan="2">As determined this year for:</th> </tr> <tr> <td></td> <td>2009</td> <td>2010</td> <td>2010</td> <td>2011</td> </tr> <tr> <td>Overfishing</td> <td>No</td> <td>n/a</td> <td>No</td> <td>n/a</td> </tr> <tr> <td>Overfished</td> <td>n/a</td> <td>No</td> <td>n/a</td> <td>No</td> </tr> <tr> <td>Approaching overfished</td> <td>n/a</td> <td>No</td> <td>n/a</td> <td>No</td> </tr> </tbody> </table>	Quantity	As estimated or specified last year for:		As estimated or recommended this year for:		2011	2012	2012	2013	<i>M</i> (natural mortality rate)	0.34	0.34	0.34	0.34	Tier	3b	3a	3a	3a	Projected total (age 0+) biomass (t)	1,560,000	1,750,000	1,690,000	1,720,000	Female spawning biomass (t)					Projected	358,000	389,000	410,000	437,000	$B_{100\%}$	961,000	961,000	889,000	889,000	$B_{40\%}$	384,000	384,000	355,000	355,000	$B_{35\%}$	336,000	336,000	311,000	311,000	F_{OFL}	0.29	0.31	0.36	0.36	$maxF_{ABC}$	0.25	0.26	0.30	0.30	F_{ABC}	0.25	0.26	0.30	0.30	OFL (t)	272,000	329,000	369,000	374,000	maxABC (t)	235,000	281,000	314,000	319,000	ABC (t)	235,000	281,000	314,000	319,000	Status	As determined last year for:		As determined this year for:			2009	2010	2010	2011	Overfishing	No	n/a	No	n/a	Overfished	n/a	No	n/a	No	Approaching overfished	n/a	No	n/a	No
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Table 14. Stock and exploitation summary relative to B and F reference points for the GOA Pacific cod stock. The table also includes OFL, ABC and TAC recommendations based on the assessment scientists preferred model choice.

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2011	2012	2012	2013
M (natural mortality rate)	0.38	0.38	0.38	0.38
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	428,000	401,300	521,000	530,000
Female spawning biomass (t)				
Projected	124,100	111,900	121,000	127,000
$B_{100\%}$	256,300	256,300	261,000	261,000
$B_{40\%}$	102,500	102,500	104,000	104,000
$B_{35\%}$	89,700	89,700	91,400	91,400
F_{OFL}	0.51	0.51	0.53	0.53
$maxF_{ABC}$	0.42	0.42	0.44	0.44
F_{ABC}	0.42	0.42	0.44	0.44
OFL (t)	102,600	92,300	104,000	108,000
maxABC (t)	86,800	78,200	87,600	91,000
ABC (t)	86,800	78,200	87,600	91,000
Status	As determined last year for:		As determined this year for:	
	2009	2010	2010	2011
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Figure 41 plots the trajectory of relative fishing mortality and relative female spawning biomass from 1977 through 2011 based on the Model 3b (the trajectory is similar in GOA and BSAI). Nearly the entire trajectory lies underneath the maxFABC control rule and above $B_{35\%}$.

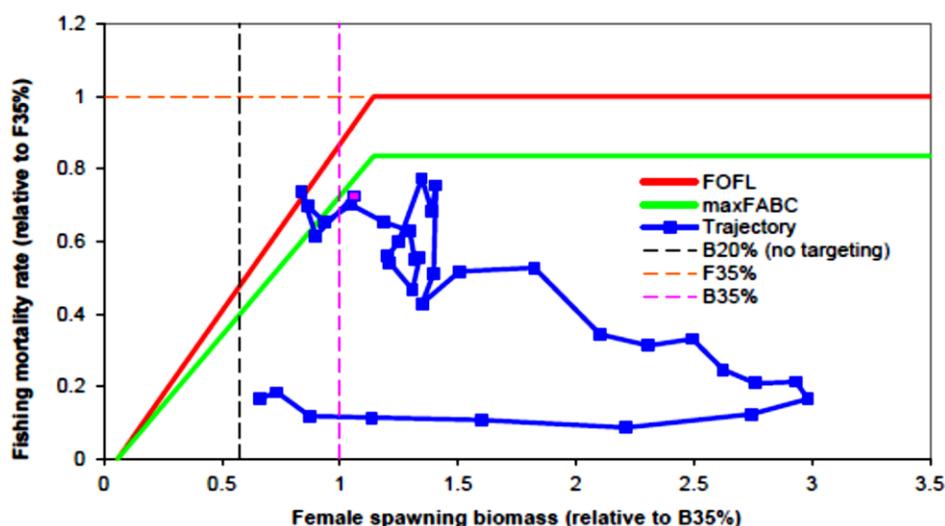


Figure 41.a Trajectory of BSAI Pacific cod fishing mortality and female spawning biomass as estimated by Model 1, 1977-present (magenta square = 2011).

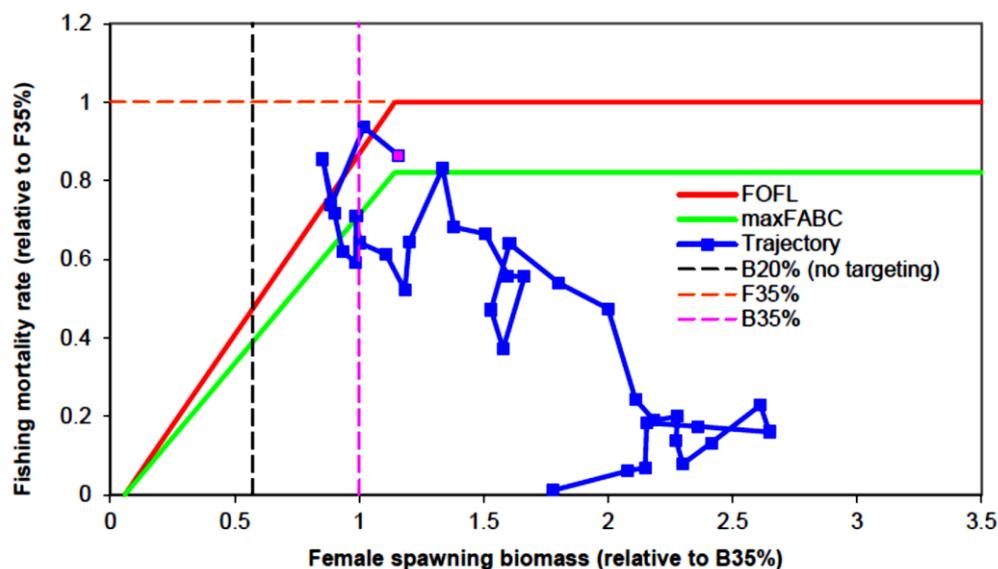


Figure 41.b. Trajectory of Pacific cod fishing mortality and female spawning biomass as estimated by model 3, 1977-present (magenta square = 2011).

AI Pacific cod stock status

As mentioned previously, harvest specifications for the combined BSAI unit have been extrapolated from the Pacific cod EBS model. But in light of the evidence that Pacific cod in the EBS and AI should be viewed as separate stocks (Canino et al. 2005, Cunningham et al. 2009, Canino et al. 2010, Spies 2012), in 2010 the SSC requested that a separate assessment be prepared for Pacific cod in the AI. In response, the 2011 assessment contained an initial exploration of age-structure modeling for the AI Pacific cod.

Then, two models were presented in the 2012 preliminary assessment, both estimated using Stock Synthesis (SS), and both based largely on last year’s accepted model for the EBS Pacific cod (Thompson and Lauth 2011). The initial exploration of age-structured modeling for Pacific cod in the AI indicates a sharp trend of decreasing of all the estimated amounts since the 1990’s. Especially, the total (age 0+) biomass (Figure 42) and the relative spawning biomass (Figure 43) have the lowest values for the last two years.

The relative spawning biomass could be approaching the limit reference point ($B_{17.5\%}$).

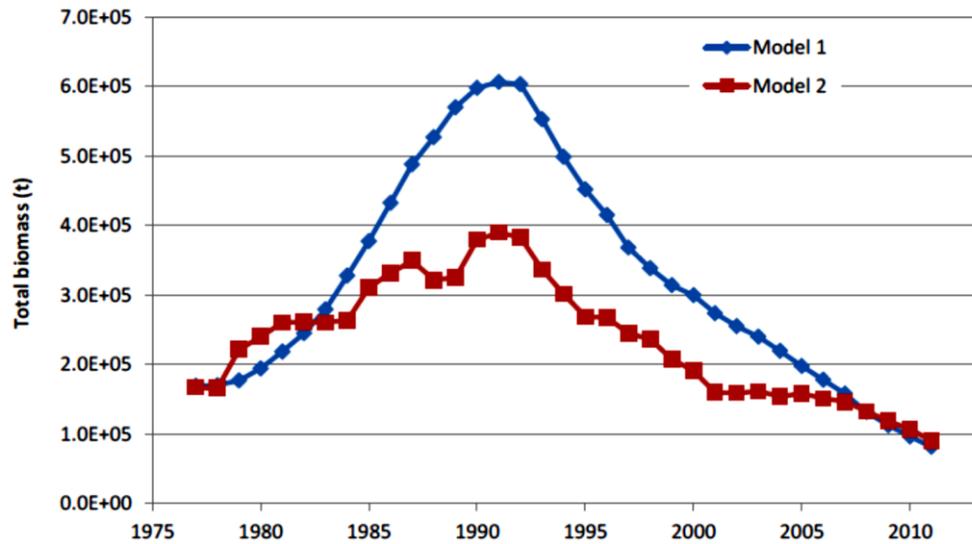


Figure 42. Time series of total (age 0+) biomass (t) as estimated by Models 1 and 2.

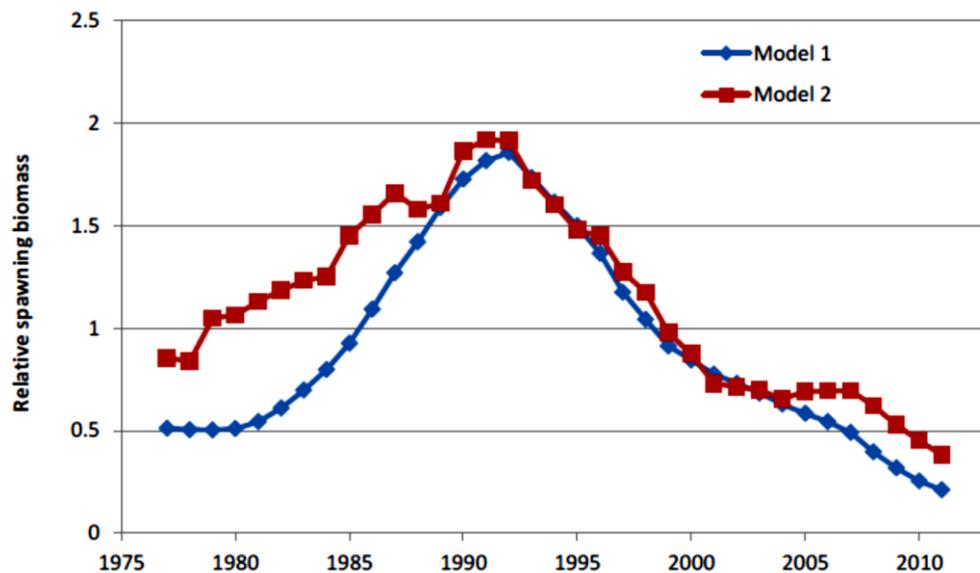


Figure 43. Time series of spawning biomass relative to $B_{100\%}$ as estimated by Models 1 and 2.

Therefore the current approach of setting a single ABC for the entire BSAI area raises potentially serious conservation concerns for Pacific cod in the AI. As noted in the SAFE introduction, the SSC has put the NPFMC on notice for some time that it expects to adopt an area-specific ABC and OFL for the Aleutians. Given the heightened conservation concern, the SSC intends to set separate ABC/OFL for EBS Pacific cod and AI Pacific cod for the 2014 fishing season based on the best available information at that time, regardless of whether the upcoming age-structured model is adequate for stock status determinations. NMFS recommendation advised the NPFMC to initiate preparation of any background supporting documents such as a supplemental NEPA

	<p>The GHL limits catch during state-water Pacific cod fisheries and apportion resources among state management areas and legal gear types. The Council and NMFS have developed an automatic process that sets TAC/GHL levels in state-waters for the state managed fisheries so that they do not fish outside of ABC/ACL. The fisheries, the management and the scientific systems can all be considered as state of the art.</p> <p>The level of discarding is closely monitored with at-sea observers and measures are taken to reduce discarding (see section 4.1, 8.4 and 9.5). A significant portion of critical habitat for Steller Sea Lions has been closed to reduce the impact of the Pacific cod fishery on this endangered marine mammal. The NEPA requires preparation of EISs for major Federal actions significantly affecting the quality of the human environment. NEPA is a comprehensive process to provide checks and balances against changes to the environment that may impact ecosystems and the natural processes.</p> <p>Evidence</p> <p>http://www.afsc.noaa.gov/REFM/docs/2011/BSApcod.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf http://ceq.hss.doe.gov/welcome.html</p>	
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<p>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.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.1/7.5.4/7.5.5</i></p> <p style="text-align: right;"><i>FAO ECO 29.6/32</i></p>						
Confidence Ratings	Low	0 out of 6	Medium	0 out of 6	High	3 out of 6

<p>Clause:</p> <p>7.1 The precautionary approach shall be applied widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment.</p> <p style="text-align: right;"><i>FAO Eco 29.6</i></p> <p>7.1.1 The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.1</i></p> <p style="text-align: right;"><i>Eco 29.6/32</i></p>	
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<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
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Clause	Evidence
7.1	<p>Rating determination</p> <p><i>The precautionary approach is applied widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment.</i></p> <p>The FAO Guidelines for the Precautionary Approach (PA) for fisheries management (FAO 1995) advocate a comprehensive management process that includes data collection, monitoring, research, enforcement, and review. More specifically, prior identification of desirable (target) and undesirable (limit) outcomes must be carried out and measures are required that will avoid undesirable outcomes with high probability and correct them promptly should they occur. The Guidelines suggest that this be achieved through decision rules that specify in advance what action should be taken when specified deviations from operational targets are observed (i.e. harvest control rules). Furthermore, the Guidelines suggest that a management plan should not be accepted until it has been shown to perform effectively in terms of its ability to</p>

avoid undesirable outcomes (for example through simulation trials). Lastly, the absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species as well as non-target species and their environment.

FAO. 1995. Precautionary approach to fisheries. Part 1: Guidelines on the precautionary approach to capture fisheries and species introductions. FAO Fisheries Technical Paper 350/1 [online]. Available from <http://www.fao.org/DOCREP/003/W3592E/W3592E00.HTM>

The pacific cod fishery in Alaska contains all the elements listed above and is therefore considered to conform to the FAO PA Guidelines.

Federally-managed fisheries

The FMPs have pre-defined harvest control rules that include limit and target reference points and are used to determine annual catch limits to control exploitation within sustainable bounds and to promote optimal utilization around MSY. The harvest control rules include a variable harvest rate that is reduced if the stock falls below a target level of B_{MSY} , or its proxy of $B_{40\%}$, in order to promote stock rebuilding. The harvest rate is controlled to be below a limit reference point of F_{OFL} . F_{OFL} is maintained at a constant level of F_{MSY} , or its proxy $F_{35\%}$ when the stock size is above the target, it is reduced if the stock size falls below the target, and is set to 0 if stock size falls below a critical level. The critical level may be adjusted upward if other considerations suggest a more conservative approach is warranted. This single species approach is applied to all groundfish stocks in Alaska.

(BSAI and GOA Groundfish Management Plans)

(BSAI and GOA Pacific cod SAFE documents)

The advisory process for Alaskan pacific cod fisheries has measures built in to further enhance conservation. Stocks are assigned to 1 of 6 “tiers” that represent descending levels of knowledge about their ecology and fishing history. Management reference points differ among the tiers and become more conservative when knowledge is lacking. This is discussed further in section 7.1.1. The OFL is defined and monitored in order to determine whether overfishing is occurring. The ABC is defined in such a way as to take into account uncertainty regarding the OFL estimation and other uncertainties in the stock assessments. The Plan teams have the option to propose alternatives to the ABC if conditions warrant, such as additional uncertainties, recruitment variability, and declining stock trends. The ABC is always lower than the OFL. The SSC then reviews the SAFE report and Plan Team recommendation, and makes its own recommendation to the NPFMC. This recommendation includes ACL.

The 2006 reauthorization of the MSA included the requirement that the NPFMC’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 NPFMC’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)). The NPFMC then reviews the SAFE report, Plan Team recommendation, and SSC recommendation; then makes its own recommendation to the Secretary, with the constraint that the NPFMC’s recommended ABC cannot exceed the SSC’s recommended ABC or ACL.

(BSAI and GOA Groundfish Management Plans)

The next stage of the management process is to determine the annual total allowable catch (TAC) for each stock. The TAC must be lower than or equal to the ABC. The TAC may be lower than the ABC is warranted on the basis of bycatch considerations, management uncertainty, socioeconomic considerations, or if required to have the sum of all TACs for directed species in the ecosystem (BSAI and GOA separately) to fall within the range of the OY. In this way, the management system addresses multi-species, ecosystem, and social needs of the fishery. (Dicosimo et al. 2010 <http://icesjms.oxfordjournals.org/content/67/9/1861.full>)

In application, the NPFMC sets $TAC \leq ABC < OFL$. Actual groundfish harvests have averaged approximately 90% of the cumulative TAC and 65% of the cumulative ABC (Figure 44), because of the complex array of accountability measures governing these fisheries.

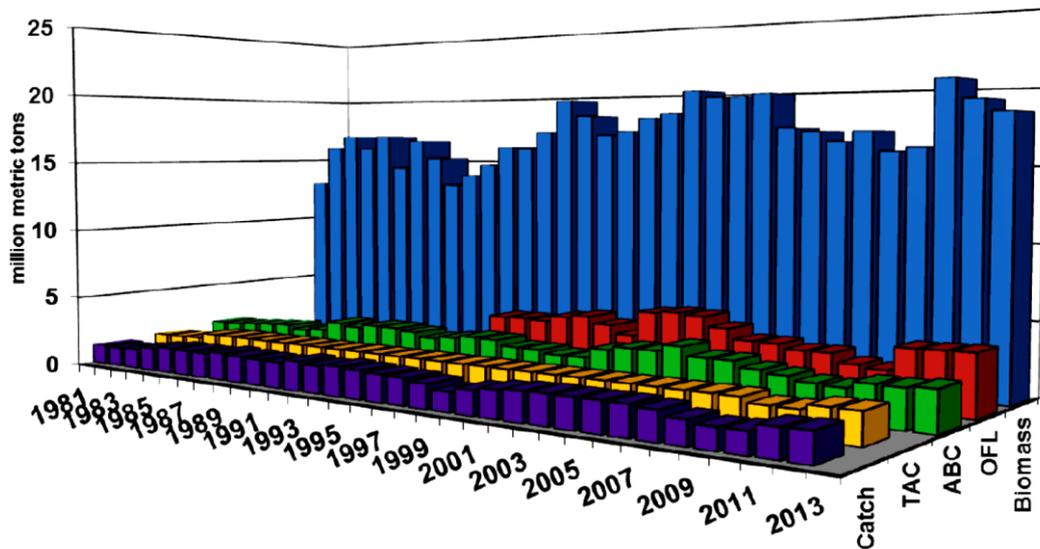


Figure 44. Cumulative estimates of biomass, OFL, ABC, TAC, and annual catch (all in million tons) across all groundfish species in the BSAI, 1981-2013. <http://www.afsc.noaa.gov/REFM/Docs/2012/BSAIntro.pdf>

	<p>Besides the MSA, US fisheries management must be consistent with the requirements of other regulations including the Marine Mammal Protection Act, the Endangered Species Act, and the Migratory Bird Treaty Act. NMFS uses Steller sea lion protection measures to ensure the groundfish fisheries off Alaska are not likely to jeopardize the continued existence of the western population of Steller sea lions or adversely modify their critical habitat.</p> <p>Pacific cod fisheries restrictions; http://alaskafisheries.noaa.gov/rr/tables/tab15.pdf</p> <p>Please follow the link below to visualize the stellar sea lion closures in Alaska. http://alaskafisheries.noaa.gov/sustainablefisheries/sslpm/cod_trawl.pdf</p> <p>Management of the federal Pacific cod fisheries is highly compliant with all these principals. Annual SAFE reports use best available science and multiple fishery models to make management recommendations for the following year. An on-going process of review and revision ensures that management actions are effective and achieve desired outcomes with high probability.</p> <p>State-managed fisheries</p> <p>State-managed fishery harvests are based on federal quotas. The NPFMC's TAC limits are set for the federal and parallel Pacific cod fisheries and resources apportioned among federal management areas to distribute fishing effort. Harvest from federal and parallel seasons are subtracted from the same TAC. The GHL limits catch during state-water Pacific cod fisheries and apportion resources among state management areas and legal gear types. The NPFMC and NMFS have developed an automatic process that sets TAC/GHL levels in state-waters for the state managed fisheries so that they do not fish outside of ABC/ACL. NPFMC /NMFS sets aside 25% of the Western GOA ABC for the Alaskan Peninsula state-water fishery GHL and 25% of the Central GOA ABC is set aside and divided between Cook Inlet (3.75%), Kodiak (12.5%) and Chignik (8.75%). The AI state waters receive 3% of the BSAI TAC. Prince William Sound receives 25% of the Eastern GOA ABC. Because the NPFMC's TAC setting process is a multi-year procedure, any overages by the state fisheries can adjust the following year's ABC to assure compliance with the requirement to remain below the ACL.</p> <p>Evidence</p> <p>http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/Groundfish-2012-2013.pdf http://www.adfg.alaska.gov/FedAidpdfs/fmr11-47.pdf http://www.adfg.alaska.gov/FedAidPDFs/FMR11-44.pdf</p>	
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<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
7.1.1	<p><i>Rating determination</i></p> <p><i>When new uncertainties arise, research recommendations are made and there is accountability in subsequent years to follow up on related action items. However, these uncertainties do not lead to a postponement for providing advice, in all cases precaution is the rule.</i></p> <p>Reference points are based on the MSY concept. In tier 2, the same reference points are used but there is not such a stringent statistical requirement. In tier 3, there is limited knowledge of the stock recruitment relationship and proxies are used for the MSY reference points. The suitability of these proxies has been the subject of considerable research (Clark 1991, Restrepo 1999). OFL and ABC decision rules are progressively more conservative for tier 4, 5, and 6 stocks.</p> <p>There are several steps between assessing the status of stocks relative to national standards and what the annual catch would be at that standard (OFL), and the establishment of the annual TAC. The following relationship is in place:</p> <p>TAC ≤ ABC < OFL</p> <p>The rules for determining the OFL and ABC are such that the OFL is always greater than the ABC. This is explicitly designed to account for uncertainties (see above). While there are prescribed rules for determining the ABC, there are provisions in the management plans for assessment authors, Plan teams, and SSC to recommend more conservative ABC if there are uncertainties in the data, recruitment variability, or a declining trend in population size. In other words, in the face of uncertainty it is explicitly stated that the correct course of action is to become more conservative. And, finally, the NPFMC is permitted to recommend more conservative ABC when warranted. The NPFMC’s ABC can only be equal to or lower than the SSC’s. Then, additional ecosystem and socioeconomic considerations are taken into account before the TAC is established. However, the TAC can only be equal to or less than the ABC. When new uncertainties arise, research recommendations are made and there is accountability in subsequent years to follow up on related action items. However, these uncertainties do not lead to a postponement for providing advice, in all cases precaution is the rule.</p> <p>(BSAI and GOA groundfish management plans); (BS and GOA Pacific cod SAFE documents)</p>

<p>Clause:</p> <p>7.2 For new and exploratory fisheries, procedures shall be in place for promptly applying precautionary management measures, including catch or effort limits.</p> <p>7.2.1 Provisions shall be made for the gradual development of new or exploratory fisheries while information is being collected on the impact of these fisheries, allowing an assessment of the impact of such fisheries on the long-term sustainability of the stocks.</p> <p>7.2.2 Information collection and precautionary management provisions shall be established and initiated early on to allow impact assessment.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.4</i></p> <p>7.2.3 Contingency plans shall be agreed in advance for the appropriate management response to serious threats to the resource as a result of overfishing or adverse environmental changes or other phenomena adversely affecting the fishery resource. Measures may be temporary and shall be based on best scientific evidence available.</p> <p style="text-align: right;"><i>FAO CCRF 7.5.5</i></p>		
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
7.2	<p>Not applicable. Alaska Pacific cod fisheries are well-established fisheries.</p> <p>A new or exploratory fishery would normally be assigned to tier 6. In which case the OFL would be set to the average catch for of a given period and the maximum ABC would be set to 75% of this value. None of the Pacific cod fisheries in Alaska are considered new or exploratory.</p>	
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
7.2.1	<p>Not applicable. Alaska Pacific cod fisheries are well-established fisheries. See clause 7.2</p>	

<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
7.2.2	<p>Not applicable. Alaska Pacific cod fisheries are well-established fisheries. See clause 7.2</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
7.2.3	<p>Rating determination</p> <p><i>The PA and harvest control rules are used as a management method to prevent overfishing or as a contingency plan to respond to overfishing or adverse environmental changes or other phenomena adversely affecting the fishery resource.</i></p> <p>The precautionary approach (7.1) and harvest control rules as described in 7.1.1 are used as a management method to prevent overfishing or as a contingency plan to respond to overfishing and the in-season management is used to close fisheries that have exceeded reference points.</p> <p>The NMFS and ADFG undertake ecosystem level research regarding the effects of climate change on the Pacific cod, predator and prey relationships and related fisheries in the BSAI and GOA area. For example, the impacts of climate change on fish and fisheries is expected to increase the demand for more accurate stock projections and harvest strategies that are robust to shifting production regimes.</p> <p>Evidence</p> <p>http://www.afsc.noaa.gov/REFM/docs/2011/BSAipc.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf</p>	

D. Management Measures

<p>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.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.1/7.1.2/7.1.6/7.4.1/7.6.1/7.6.9/12.3</i></p> <p style="text-align: right;"><i>FAO Eco 29.2/29.4/30</i></p>						
Confidence Ratings	Low	0 out of 10	Medium	0 out of 10	High	10 out of 10

<p>Clause:</p> <p>8.1 Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of optimum utilization, and be based on verifiable and objective scientific and/or traditional sources. In the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact shall be considered.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.1 Others 7.4.1/7.6.7</i></p> <p style="text-align: right;"><i>Eco 29.2/29.4</i></p> <p>8.1.1 States shall prohibit dynamiting, poisoning and other comparable destructive fishing practices.</p> <p style="text-align: right;"><i>FAO CCRF 8.4.2</i></p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
8.1	<p>Rating determination</p> <p><i>Alaska Pacific cod commercial fisheries are managed according to a modern management plan that attempts to balance long-term sustainability of the resources with optimum utilization. For every change/amendment or new development affecting fisheries management and therefore modifying the FMPs, there is an evaluation of alternative conservation and management measures, including considerations of their cost effectiveness and social impact.</i></p>

Conservation and management measures are outlined in the BSAI and GOA FMPs for Groundfish. Along with yearly stock assessment surveys and reports (SAFEs), evaluation of the fisheries stock status, determination of OFL (consistent with MSY), ABC, ACL and TAC accounting for scientific uncertainty and ability and precision in catch control (see explanatory figure below), part of the assessment procedure is an extensive ecosystem assessment (see clause 13.1) that shows development towards ecosystem-based management.

The management is intended to conform to the *National Standards for Fishery Conservation and Management* according to the MSA. Within this frame the groundfish fishery has 46 clear *management objectives falling under the following objectives*:

- *Prevent Overfishing;*
- *Promote Sustainable Fisheries and Communities;*
- *Preserve Food Web;*
- *Manage Incidental Catch and Reduce Bycatch and Waste;*
- *Avoid Impacts to Seabirds and Marine Mammals;*
- *Reduce and Avoid Impacts to Habitat;*
- *Promote Equitable and Efficient Use of Fishery Resources;*
- *Increase Alaska Native Consultation.*

Determining Harvest Levels

The management uses several reference/target reference points that are summarized here and in detail discussed in the FMPs.

- *Maximum sustainable yield (MSY)* 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.
- *Optimum yield (OY)* is the amount of fish which a) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems; b) is prescribed as such on the basis of the MSY from the fishery, as reduced by any relevant economic, social, or ecological factor; and c) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the MSY in such fishery.
- *Maximum fishing mortality threshold (MFMT, also called the "OFL control rule")* is the level of fishing mortality (F), on an annual basis, used to compute the smallest annual level of catch that would constitute overfishing. Overfishing occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. The MFMT may be expressed either as a single number (i.e., a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.

- *Overfishing limit (OFL)* is the annual amount of catch that results from applying the MFMT to a stock or stock complex's abundance. The OFL is the catch level above which overfishing is occurring.
- *Minimum stock size threshold (MSST)* is the level of biomass below which the stock or stock complex is considered to be overfished. To the extent possible, the MSST should equal 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.
- *Acceptable biological catch (ABC)* is a level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. The ABC is set below the OFL.
- *Annual catch limit (ACL)* is the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures. ACL cannot exceed the ABC, and may be divided into sector- ACLs.
- *Total allowable catch (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). The TAC is also constrained by the BSAI and GOA Optimum Yield cap.

Management measures in the FMPs include (i) permit and participation, (ii) authorized gear, (iii) time and area, and catch restrictions, (iv) measures that allow flexible management authority, (v) designate monitoring and reporting requirements for the fisheries, and (vi) describe the schedule and procedures for review of the FMP or FMP component.

For every change/amendment or new development affecting fisheries management and therefore modifying the FMPs, there is an evaluation of alternative conservation and management measures, including considerations of their cost effectiveness and social impact. The Regulatory Flexibility Act (RFA) requires agencies (NPFMC, ADFG) to consider the impact of their rules (Fishery Management Plans, Fishing Regulations) on small entities (fishermen communities) and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities.

In August 2000, the NMFS issued guidelines for economic analysis of Fishery Management Actions. The purpose of the document was to provide guidance on understanding and meeting the procedural and analytical requirements of E.O. 12866 and the RFA for regulatory actions of federally managed fisheries. http://www.epa.gov/fedfac/documents/executive_order_12898.htm

Economic and social analysis is part of the NEPA (essentially an environmental impact assessment) requirements, of which the NPFMC and NMFS consistently adhere and

	<p>comply with. A recent change affecting Pacific cod fisheries in Alaska is the restructuring and implementation (Jan 2013) of the groundfish observer program.</p> <p>http://www.fakr.noaa.gov/sustainablefisheries/amds/default.htm http://ceq.hss.doe.gov/nepa_contacts/agency_implementing_procedures.html</p> <p>In addition to the federal FMPs, regulations for 6 of the 7 state-managed fisheries are set out in annual region-specific FMPs (regulations for parallel fisheries in state waters are generally identical to federal regulations). The board uses the biological and socio-economic information provided by ADFG, public comment received from inside and outside the state, as well as guidance from the Alaska Department of Public Safety and the Alaska Department of Law when creating regulations that are sound and enforceable. These exist for Kodiak, South Alaska Peninsula, Chignik, the Aleutian Islands, Cook Inlet and Prince William Sound. The state fisheries are managed by allocation of a portion of the federal TAC to the state fishery (depending on biomass abundance in the various areas). Overall, state managed fisheries removals are eventually accounted for by ACL.</p> <p>http://www.sfos.uaf.edu/fitc/teaching/courses/FSN261/lectures/FISH%20261%20Lect%205%20Management%20Enforcement%20as%20given_2012.pdf</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
8.1.1	The BSAI/GOA FMPs and the State fisheries FMPs authorize only trawls, hook-and-line, pots, jigs; hence no dynamiting, poisoning and other comparable destructive fishing practices are allowed.	
<p>Clause:</p> <p>8.2 States shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery.</p> <p>8.2.1 Arrangements shall be made to consult these parties and gain their collaboration.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.2 Others 7.1.6</i></p>		
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	

<p>8.2</p>	<p>Rating determination</p> <p><i>The NPFMC and BOF and their public meeting processes allow for the various stakeholders and fishery users to be involved in the decision making process relevant to cod fisheries in Alaska.</i></p> <p>The NPFMC and BOF and their public meeting processes allow for the various stakeholders and fishery users to be involved in the decision making process relevant to cod fisheries in Alaska. This allows the NPFMC and BOF to identify, consult and gain collaboration with the parties interested in harvest and management of the fisheries resources. Please refer to the information supplied under fundamental clause 2 for more details.</p> <p>http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo</p> <p>http://www.fakr.noaa.gov/npfmc/public-meetings/council-meeting.html</p> <p>There is a legitimate interest of domestic parties in the use and management of the fishery. This is ensured by the TAC apportionment to different fishing sectors.</p> <p><u>Apportionment</u></p> <p>In the BSAI, after subtraction of the Community Development Quota(CDQ) allowance, the remaining TAC is allocated 1.4% for vessels using jig gear, 2.3% for catcher processors using trawl gear listed in Section 208(e)(1)-(20) of the AFA, 13.4% for catcher processors using trawl gear as defined in Section 219(a)(7) of the Consolidated Appropriations Act, 2005 (P.L. 108-447), 22.1% for catcher vessels using trawl gear, 48.7% for catcher processors using hook-and-line gear, 0.2% for catcher vessels ≥60' LOA using hook-and-line gear, 1.5% for catcher processors using pot gear, 8.4% for catcher vessels ≥60' LOA using pot gear, and 2.0% for catcher vessels <60' LOA that use either hook-and-line gear or pot gear. Allocations may be seasonally apportioned. TACs in the GOA are apportioned by regulatory area, and by district for some stocks. Areas or districts may also be managed together. For the Central and Western areas Pacific cod TAC is allocated 90% to the inshore sector and 10% to the offshore sector only for the GOA. TAC is then allocated to the harvest sectors (catcher vessels and catcher processors using trawl, pot, hook-and-line, and jig gear). The Western and Central GOA harvest sector allocations superseded the inshore and offshore processing sector allocations. No trawling is allowed in the Eastern GOA, so harvest is restricted to fixed gear and jig. Figures 45 and 46 illustrate BSAI and GOA apportionment.</p>	
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Gear sector	Percent	Share of gear sector total	Share of sector total	Seasonal apportionment	
				Dates	Amount
Total TAC	100	261,000	n/a	n/a	n/a
CDQ	10.7	27,927	n/a	See § 679.20(a)(7)(i)(B)	n/a
Total hook-and-line/pot gear	60.8	141,708	n/a	n/a	n/a
Hook-and-line/pot ICA ¹	n/a	500	n/a	See 679.20(a)(7)(ii)(B)	n/a
Hook-and-line/pot sub-total	n/a	141,208	n/a	n/a	n/a
Hook-and-line catcher/processor	48.7	n/a	113,106	Jan 1–Jun 10	57,684
				Jun 10–Dec 31	55,422
Hook-and-line catcher vessel ≥60 ft LOA	0.2	n/a	465	Jan 1–Jun 10	237
				Jun 10–Dec 31	228
Pot catcher/processor	1.5	n/a	3,484	Jan 1–Jun 10	1,777
				Sept 1–Dec 31	1,707
Pot catcher vessel ≥60 ft LOA	8.4	n/a	19,509	Jan 1–Jun 10	9,950
				Sept 1–Dec 31	9,559
Catcher vessel <60 ft LOA using hook-and-line or pot gear	2	n/a	4,645	n/a	n/a
Trawl catcher vessel	22.1	51,509	n/a	Jan 20–Apr 1	38,117
				Apr 1–Jun 10	5,666
				Jun 10–Nov 1	7,726
AFA trawl catcher/processor	2.3	5,361	n/a	Jan 20–Apr 1	4,021
				Apr 1–Jun 10	1,340
				Jun 10–Nov 1	0
Amendment 80	13.4	31,232	n/a	Jan 20–Apr 1	23,424
				Apr 1–Jun 10	7,808
				Jun 10–Nov 1	0
Alaska Groundfish Cooperative	n/a	n/a	5,816	Jan 20–Apr 1	4,362
				Apr 1–Jun 10	1,454
				Jun 10–Nov 1	0
Alaska Seafood Cooperative	n/a	n/a	25,416	Jan 20–Apr 1	19,062
				Apr 1–Jun 10	6,354
				Jun 10–Nov 1	0
Jig	1.4	3,263	n/a	Jan 1–Apr 30	1,958
				Apr 30–Aug 31	653
				Aug 31–Dec 31	653

¹ The ICA for the hook-and-line and pot sectors will be deducted from the aggregate portion of Pacific cod TAC allocated to the hook-and-line and pot sectors. The Regional Administrator approves an ICA of 500 mt based on anticipated incidental catch in these fisheries.
 Note: Seasonal or sector apportionments may not total precisely due to rounding.

Figure 45. Quota allocation between gear and vessel type for the 2012 BSAI Pacific cod TAC.

Regulatory area and sector	Annual allocation (mt)	A Season		B Season	
		Sector percentage of annual non-jig TAC	Seasonal allowances (mt)	Sector percentage of annual non-jig TAC	Seasonal allowances (mt)
Western GOA					
Jig (1.5% of TAC)	315	N/A	189	N/A	126
Hook-and-line CV	290	0.70	145	0.70	145
Hook-and-line C/P	4,100	10.90	2,257	8.90	1,843
Trawl CV	7,952	27.70	5,736	10.70	2,216
Trawl C/P	497	0.90	186	1.50	311
All Pot CV and Pot C/P	7,869	19.80	4,100	18.20	3,769
Total	21,024	60.00	12,614	40.00	8,410
Central GOA					
Jig (1.0% of TAC)	427	N/A	256	N/A	171
Hook-and-line <50 CV	6,174	9.32	3,938	5.29	2,235
Hook-and-line ≥50 CV	2,835	5.61	2,372	1.10	464
Hook-and-line C/P	2,158	4.11	1,736	1.00	422
Trawl CV	17,581	21.14	8,936	20.45	8,645
Trawl C/P	1,775	2.00	847	2.19	928
All Pot CV and Pot C/P	11,755	17.83	7,538	9.97	4,217
Total	42,705	60.00	25,623	40.00	17,082
Eastern GOA					
		Inshore (90% of Annual TAC)		Offshore (10% of Annual TAC)	
	1,971		1,774		197

Figure 46. Quota allocation between gear and vessel type for the 2012 GOA Pacific cod TAC.

	<p>Additionally the fishery management cycle is an open process with potential for local stakeholder involvement. The NPFMC has signed a Memorandum of Understanding (MOU) with 10 Federal agencies and 4 State agencies, to create the Alaska Marine Ecosystem Forum (AMEF). The AMEF seeks to improve coordination and cooperative understanding between the agencies on issues of shared responsibilities related to the marine ecosystems off Alaska’s coast. The purpose of the forum is to:</p> <ul style="list-style-type: none"> • Promote dialogue and information exchange. • Improve agency coordination by sharing priorities and data. • Allow agencies to understand the ecosystem impact of other activities. • Provide opportunities for problem solving and joint work. <p>Eventually one of the NPFMC's policy priorities is to improve outreach and communications with rural communities and Alaska Native entities and develop a method for systematic documentation of Alaska Native and community participation in the development of fishery management actions. Upon review of several suggestions to expand both ongoing communication and outreach specific to particular projects affecting rural stakeholders, the NPFMC initiated a small workgroup in 2008 to further review potential approaches and provide recommendations. Upon review of the workgroup report in February 2009, the NPFMC approved the workgroup’s primary recommendation to initiate a standing committee (the Rural Community Outreach Committee) to provide input to the NPFMC on ways to improve outreach to communities and Alaska Native entities. The committee was initiated in June 2009. The committee has been instrumental in recommending and implementing changes to improve overall outreach and two-way communication with rural stakeholders, as well as assisting in the development of project-specific, long-term outreach plans for NPFMC actions regarding Bering Sea Chinook and chum salmon bycatch reduction measures.</p> <p>http://www.fakr.noaa.gov/npfmc/rural-outreach/rural-community-outreach-committee.html</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
<p>Clause</p>	<p>Evidence</p>	
<p>8.2.1</p>	<p><i>Rating Determination</i></p> <p><i>Arrangements are made to consult these parties and gain their collaboration.</i></p> <p>The NPFMC and BOF and their public meeting processes allow for the various stakeholders and fishery users to be informed of potential management actions, encourage them to comment on proposed actions, and may consider those comments</p>	

	<p>in the decision making process relevant to Pacific cod fisheries in Alaska. This allows the NPFMC and BOF to identify, inform and gain collaboration with the parties interested in harvest and management of the fisheries resources. Please refer to the information supplied under Fundamental clause 2 for more details.</p> <p>Evidence</p> <p>http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo http://www.fakr.noaa.gov/npfmc/public-meetings/council-meeting.html</p>	
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Clause:	
8.3	<p>Fleet capacity operating in the fishery shall be measured and states shall maintain, in accordance with recognized international standards and practices, statistical data, updated at regular intervals, on all fishing operations and a record of all authorizations to fish allowed by them.</p> <p style="text-align: right;"><i>FAO 8.1.2, 8.1.3</i></p> <p>8.3.1 Mechanisms shall be established where excess capacity exists to reduce capacity to levels commensurate with sustainable use of the resource. Such mechanisms shall include monitoring the capacity of fishing fleets.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.8, 7.6.3</i></p>

Evidence adequacy rating:		
<input checked="" type="checkbox"/> High	<input type="checkbox"/> Medium	<input type="checkbox"/> Low

Clause	Evidence
8.3	<p>Rating determination <i>Fleet capacity operating in the fishery is measured. Alaska maintains, in accordance with recognized international standards and practices, statistical data, updated at regular intervals, on all fishing operations and a record of all authorizations to fish allowed by them (RAM, CFEC).</i></p> <p>The Alaska Region NMFS/RAM division requires that all vessels fishing or processing groundfish possess a federal fishing permit, a federal vessel license or/and 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 submit also comply with all regulations described in the GOA and BSAI FMPs. This includes reporting and landings requirements (elandings 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</p>

<p>Clause:</p> <p>8.4 States and relevant groups from the fishing industry shall encourage the development and implementation of technologies and operational methods that reduce waste and discards of the target species. These measures shall be applied appropriately.</p> <p style="text-align: right;"><i>FAO CCRF 8.4.5</i></p> <p>8.4.1 Technical measures shall be taken into account, where appropriate, in relation to:</p> <ul style="list-style-type: none"> • fish size • mesh size or gear • discards • closed seasons • closed areas • areas reserved for particular (e.g. artisanal) fisheries • protection of juveniles or spawners <p>8.4.2 Suitable arrangements shall be in place to measure performance and to promote, to the extent practicable, the development and use of selective, environmentally safe and cost-effective gear, methods and techniques. Less consistent methods, practices and gears shall be phased out accordingly.</p> <p style="text-align: right;"><i>FAO CCRF 7.6.9, 7.6.4, 8.5.2</i></p> <p>8.4.3 Fishing gear shall be marked in accordance with national legislation in order that the owner of the gear can be identified. Gear marking requirements shall take into account uniform and internationally recognizable gear marking systems.</p> <p style="text-align: right;"><i>FAO CCRF 8.2.4</i></p>	
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Evidence adequacy rating:

High

 Medium

 Low

Clause	Evidence
8.4	<p><i>Rating determination</i></p> <p><i>Alaska and relevant groups from the fishing industry have developed and implemented operational methods that reduce waste and discards of the target species (IR/IU program).</i></p> <p><u>Improved retention/improved utilization program</u></p> <p>The 50 C.F.R. § 679.27 IR/IU Program program has been approved in 1997 requiring 100% retention of pollock and Pacific cod in all BSAI and GOA federal fisheries beginning on January 1, 1998. NPFMC addressed the utilization side of the program by not mandating specific product forms, but by allowing individual operations the flexibility to process pollock and Pacific cod into whatever product forms they wish, subject to a</p>

	<p>minimum required product recovery rate of 15%. State regulations to extend these requirements to onshore processing plants have also been implemented. The regulation was modified in an amendment(s) published April 6, 2006, in 71 FR 17381; effective January 20, 2008.</p> <p>Also, in State waters, when a directed season is open for Pacific cod or pollock, regulations for IR/IU of groundfish (5 AAC 28.070 & 5 AAC 28.075) require that all captured Pacific cod or pollock be retained by the fisherman and accepted by a buyer. Similarly, all Pacific cod or pollock harvested must be retained up to the maximum retainable bycatch amounts when a bycatch season is open for these species.</p> <p>Evidence</p> <p>http://law.justia.com/cfr/title50/50-8.0.1.1.11.2.1.8.html http://law.justia.com/cfr/title50/20060406-1.11.html http://www.adfg.alaska.gov/static/home/news/pdfs/newsreleases/cf/102747562.pdf http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section070.htm</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
8.4.1	<p>Rating determination</p> <p><i>The following technical measures are taken into account, as appropriate, in relation to fish size, mesh size or gear, discards, closed seasons, closed areas, areas reserved for particular (e.g. artisanal) fisheries, and protection of juveniles or spawners.</i></p> <p>These are for the BSAI:</p> <p><u>Fish size</u></p> <p>No fish size limits are implemented for Pacific cod because there is a general depth separation between young and adult cod. Market forces assure that fishermen target adult cod as it fetches a higher price per pound. The IR/IU regulation assures that cod is fully retained and utilized. Pot gear has escape rings to allow juveniles to escape. Longline gear fishes mainly offshore targeting adults.</p> <p><u>Mesh size or gear</u></p> <p>Trawl sweeps modifications have been implemented in the BSAI and the NPFMC is in the process of allowing trials experiments to start in the GOA for implementation in this Region (in depth discussion in clause 8.4.2). Longline gear is regulated as for seabird avoidance measures. False tunnel modifications for pot gear allow a higher catch of Pacific cod and a considerable decreased bycatch of tanner crab (otherwise the highest</p>	

bycatch species in Pacific cod pots).

Discards

Discard mitigation measures have been implemented through the IR/IU program which requires 100% retention of pollock and Pacific cod in federal waters. This regulation is also active in state waters. This is verified by the high degree of observer coverage.

Permit

All vessels participating in the BSAI groundfish fisheries, other than fixed gear sablefish, require a Federal groundfish license, except for: vessels fishing in State of Alaska waters; vessels less than 32' LOA; and jig gear vessels less than 60' LOA that meet specific effort restrictions. Licenses are endorsed with area, gear, and vessel type and length designations. Fixed gear vessels engaged in directed fishing for Pacific cod must qualify for a Pacific cod endorsement. Fishing permits may be authorized, for limited experimental purposes, for the target or incidental harvest of groundfish that would otherwise be prohibited. Authorized gear types authorized by the FMP are trawls, hook-and-line, pots, jigs, and other gear as defined in regulations.

Time and Area Restrictions (Figures 47 and 48)

Season allocation in both pollock and Pacific cod are to limit the % of the annual harvest on the spawning stock. Seasonal allocations protect spawning stocks and diminish fishing pressure during spawning aggregations so Steller sea lions can more easily feed and spawning is less disrupted.

All trawl: Fishing with trawl vessels is not permitted year-round in the Crab and Halibut Protection Zone and the Pribilof Island Habitat Conservation Area. The Nearshore Bristol Bay Trawl Closure area is also closed year-round except for a subarea that remains open between April 1 and June 15 each year. The Chum Salmon Savings Area is closed to trawling from August 1 through August 31.

Nonpelagic trawl: The Red King Crab Savings Area is closed to nonpelagic trawling year round, except for a subarea that may be opened at the discretion of the NPFMC and NMFS when a guideline harvest level for Bristol Bay red king crab has been established. The Aleutian Islands Habitat Conservation Area, Bering Sea Habitat Conservation Area, St. Matthew Island Habitat Conservation Area, St. Lawrence Island Habitat Conservation Area, Nunivak Island, Etolin Strait, and Kuskokwim Bay Habitat Conservation Area, and the Northern Bering Sea Research Area are closed to nonpelagic trawling year-round. Owners and operators of fishing vessels using nonpelagic trawl gear in the Modified Gear Trawl Zone, regardless of target species, must use modified nonpelagic trawl gear as required for the Bering Sea flatfish fishery.

Bottom contact gear: The use of bottom contact gear is prohibited in the Aleutian Islands Coral and Alaska Seamount Habitat Protection Areas year-round. The use of mobile bottom contact gear is prohibited year-round in Bowers Ridge Habitat Conservation Zone.

Marine mammal measures: Regulations implementing the FMP include conservation measures that temporally and spatially limit fishing effort around areas important to marine mammals. NMFS uses Stellar sea lion protection measures (SSLPM) to ensure the groundfish fisheries off Alaska are not likely to jeopardize the continued existence of the western population of Steller sea lions or adversely modify their critical habitat. The management measures disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts.

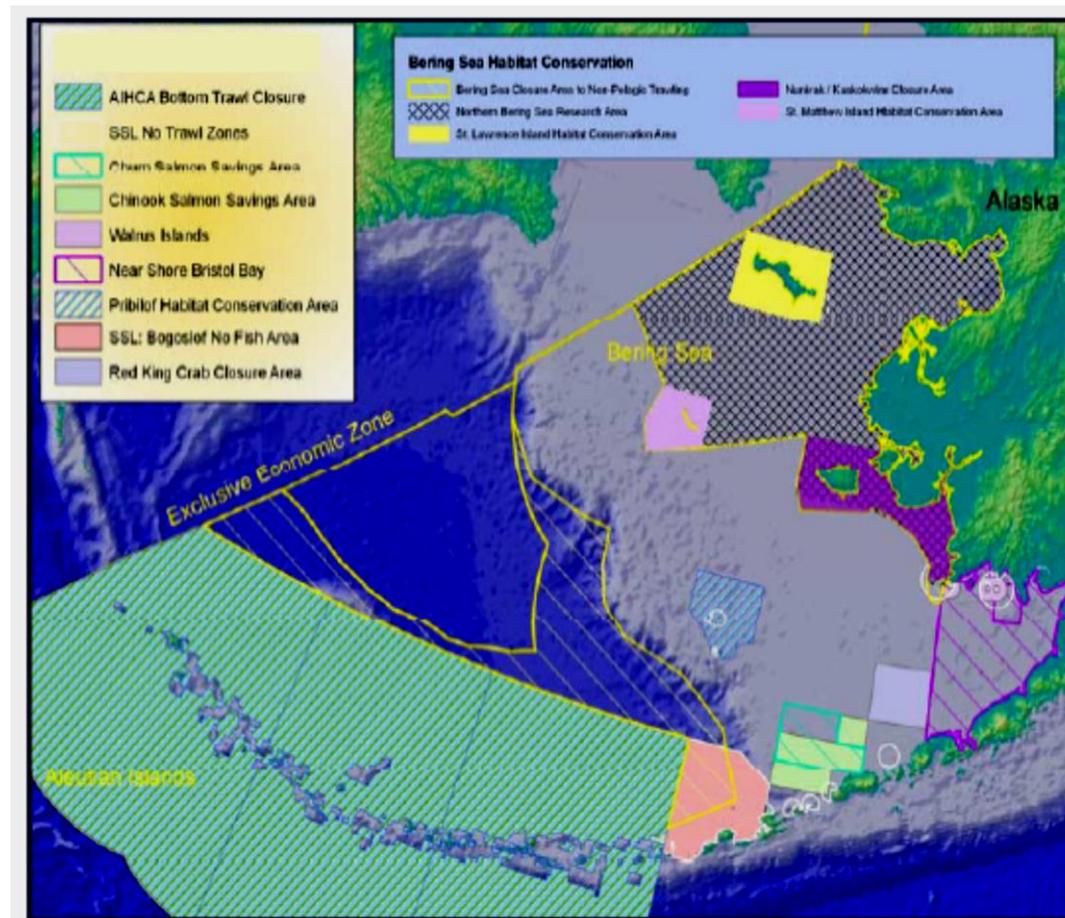


Figure 47. BS Habitat Conservation Closures

http://www.fakr.noaa.gov/habitat/efh/review/efh_5yr_review_sumrpt.pdf

For the GOA these are:Fish size

No fish size limits are implemented for Pacific cod because there is a general depth separation between young and adult cod. Market forces assure that fishermen target adult cod as it fetches a higher price per pound. IR/IU regulation assures that cod is fully retained and utilized. Pot gear has escape rings to allow juveniles to escape. Longline gear fishes mainly offshore targeting adults.

Mesh size or gear

Trawl sweeps modifications have been implemented in the BSAI and the NPFMC is in the process of trials experiments to start in the GOA to implement modified trawl sweeps in this Region (in depth discussion in clause 8.4.2). Longline gear is regulated as for seabird avoidance measures. False tunnel modifications for pot gear allow a higher catch of Pacific cod and a considerable decreased bycatch of tanner crab (otherwise the highest bycatch species in Pacific cod pots).

Discards

Discard mitigation measures have been implemented through the IR/IU program which requires 100% retention of pollock and Pacific cod in federal waters. This regulation is also active in state waters. This is verified by the high degree of observer coverage.

Permit

All vessels participating in the GOA groundfish fisheries, other than fixed gear sablefish and demersal shelf rockfish in Southeast Outside district, require a Federal groundfish license, except for: vessels fishing in State of Alaska waters and vessels less than 26' LOA. Licenses are endorsed with area, gear, and vessel type and length designations. Fishing permits may be authorized, for limited experimental purposes, for the target or incidental harvest of groundfish that would otherwise be prohibited.

Participation Restrictions

American Fisheries Act (AFA): Vessels or processors participating in the BSAI pollock fishery authorized under the AFA are subject to harvesting and processing sideboard restrictions on GOA groundfish.

Time and Area Restrictions (Figure 48)

All vessels: Fishing or anchoring within the Sitka Pinnacles Marine Reserve is prohibited at all times.

All trawl: Use of trawl gear is prohibited at all times in the Southeast Outside district.

Non-pelagic trawl: The use of non-pelagic trawl is prohibited in Cook Inlet. Three types of closure areas are designated around Kodiak Island. Type I areas prohibit non-pelagic trawling year-round; Type II prohibit non-pelagic trawl from February 15 to June 15; adjacent areas designated as Type III may be reclassified by the Regional Administrator as Type I or Type II following a recruitment event. The GOA Slope Habitat Conservation Area is closed to non-pelagic trawling year-round.

Bottom contact gear: The use of bottom contact gear is prohibited in the Gulf of Alaska Coral and Alaska Seamount Habitat Protection Areas year-round.

Anchoring: Anchoring by fishing vessels in the Gulf of Alaska Coral and Alaska Seamount Habitat Protection Areas is prohibited.

Marine mammal measures: NMFS uses Steller sea lion protection measures (SSLPM) to ensure the groundfish fisheries off Alaska are not likely to jeopardize the continued existence of the western population of Steller sea lions or adversely modify their critical habitat. The management measures disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts.

Gear test area exemption: Specific gear test areas for use when the fishing grounds are closed to that gear type, are established in regulations that implement the FMP.

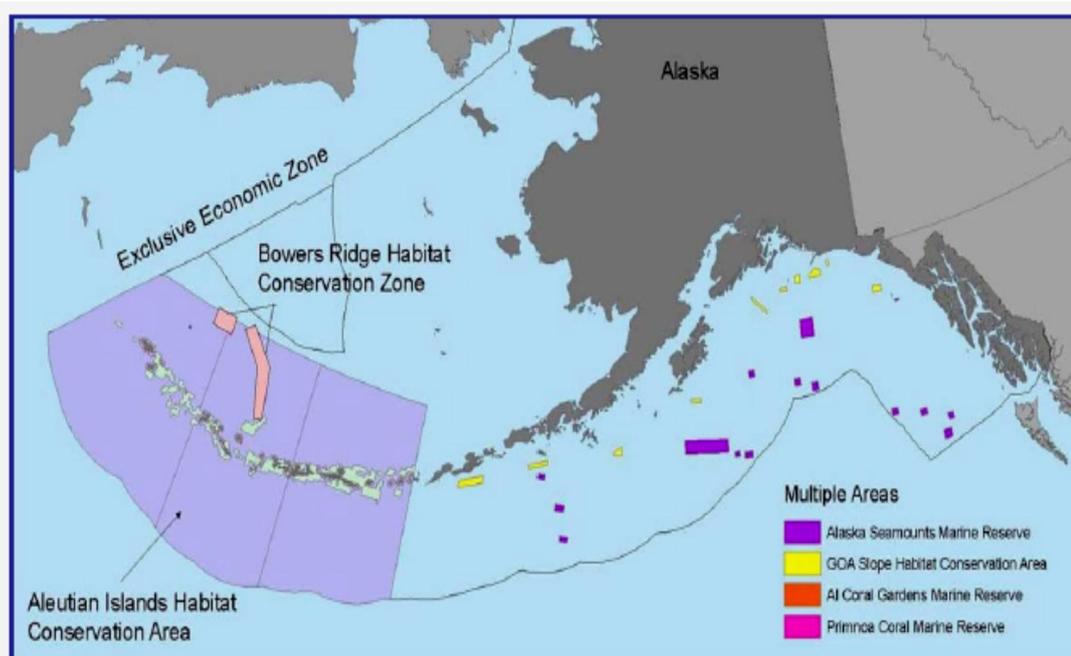


Figure 48. EFH and HAPC Conservation Areas in the GOA and the AI.

http://www.fakr.noaa.gov/habitat/efh/review/efh_5yr_review_sumrpt.pdf

Evidence

<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html>

<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html>

<http://www.fakr.noaa.gov/npfmc/conservation-issues/habitat-protections.html>

<http://www.fakr.noaa.gov/npfmc/conservation-issues/ssl.html>

<http://www.fakr.noaa.gov/sustainablefisheries/sslpm/>

http://www.fakr.noaa.gov/sustainablefisheries/sslpm/pcod_nontrawl.pdf

	<p>http://www.fakr.noaa.gov/sustainablefisheries/sslpm/cod_trawl.pdf http://www.fakr.noaa.gov/regs/default.htm http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.21.pdf http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.45.pdf http://www.tandfonline.com/doi/abs/10.1577/1548-8675(2000)020%3C0897%3AMOCPTR%3E2.0.CO%3B2</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
8.4.2	<p>Rating determination</p> <p><i>The development and use of selective, environmentally safe and cost effective gear (trawl sweep and pot modifications, seabird avoidance for longline), methods and techniques is common practice in Alaska including Pacific cod fisheries as well. The gear as well all the other plethora of management and operational control measures currently allowed for the fishery in question, are in line with the management goals, conservation and optimum utilization of this resource.</i></p> <p><u>Bottom trawl gear</u></p> <p>The issues of primary concern with respect to the effects of fishing on benthic habitat using non pelagic bottom trawl gear are the potential for damage or removal of fragile biota within each area that are used by fish as habitat and the potential reduction of habitat complexity, benthic biodiversity, and habitat suitability. Based on the information available to date, the predominant direct effects caused by nonpelagic trawling include smoothing of sediments, moving and turning of rocks and boulders, resuspension and mixing of sediments, removal of seagrasses, damage to corals, and damage or removal of epibenthic organisms. Trawls affect the seafloor through contact of the doors and sweeps, footropes and footrope gear, and the net sweeping along the seafloor. Ninety percent of the area impacted by flatfish trawling is due to contact between the seafloor and the sweeps.</p> <p>Trawl fishery gear modifications are regulated for flatfish and used for Pacific cod. Much of the trawl Pacific cod catch is taken by flatfish vessels.</p> <p>The RACE Division has actively collaborated with the Bering Sea flatfish fishing industry (Amendment 80 fleet) to develop fishing gear changes that reduce effects of flatfish trawling on the seafloor habitats of the EBS shelf. These conservation engineering efforts originally focused on modification to flatfish trawl gear to reduce impacts to benthic habitat. However, the techniques also showed promise to reduce the bycatch of crabs, and mortality rates of crabs that slip under the gear without being caught (unobserved mortality) as well.</p> <p>During a 2002-05 analysis (NMFS 2005) of the effects of fishing on the EFH of Alaska</p>	

groundfish and subsequent considerations of mitigation actions, fishing industry representatives offered that gear modifications be considered as another management option for reducing trawl effects as an alternative to further area closures. As a result, in 2005, the NPFMC included support for research to develop and test proposed modifications in its EFH actions for the protection of BS EFH. The timeline for the development of trawl gear modifications is showed in Table 15.

Table 15. Timeline for the development of trawl gear modifications (Light green: BS and light red: GOA).

2005	FEB	NMFS and NPFMC considering actions to protect EFH
	FEB	Final action on EFH left action on Bering Sea open for consideration of actions—including gear modifications
	MAY	First meeting with captains and trawl manufacturers - Develop concepts and plan research
	SEPT	Research to develop twin trawl tests of sweep effectiveness for fish capture (F/V Cape Horn)
2006	MAR	Meeting with captains and trawl manufacturers - discuss results and research plan
	SEPT	Twin trawl experiment on effects of different sweep elevations on fish capture (F/V Cape Horn)
	MAY	Experiment to measure effects on benthos—video / sonar sled (F/V Pacific Explorer)
	NOV	Meeting with captains and trawl manufacturers - discuss results and research plan
	DEC	Presented Initial results to Management NPFMC (NPFMC)
	DEC	Workshop - initial discussions of potential regulations and enforcement
2007	MAR	Meeting with captains and trawl manufacturers - discuss results and research plan
	APR	Workshop - Further discussions of potential regulations and enforcement
	JUN	Pilot research on crab mortality - Develop crab mortality methods and pilot test recapture nets (F/V Pacific Explorer)
	JUN/JUL	Experiment to measure effects on benthos over day, week, month, year—video / sonar sled (F/V Pacific Explorer—R/V Oscar Dyson)
	OCT	Meeting with captains and trawl manufacturers - discuss results and research plan
2008	JAN	Presentation of results at annual captains meeting
	MAR	Tests of sweep clearance achieved with alternative bobbin spacing and height (F/V Unimak)
	MAY	Tests of sweep clearance achieved with alternative bobbin spacing and height (F/V Arica)
	JUN	Presented results of sweep clearance tests to NPFMC
	AUG	Crab mortality research—Modifications reduce mortality of Tanner and snow crabs (F/V Pacific Explorer)
	SEPT	Workshop at net shed with captains, gear manufacturers, scientists, enforcement and NPFMC regional staff on regs and enforcement
2009	JAN	Presentation of results at annual captains' meeting
	JAN	Onboard meeting with enforcement, NPFMC and regional staff to clarify regulations and enforcement issues
	FEB	NPFMC presentation on crab mortality research

	JUN AUG OCT OCT NOV	Twin trawl tests of fish capture with thinner cables (F/V Cape Horn) Crab mortality research - Modifications reduce mortality of king crab (F/V Pacific Explorer) Presentation to NPFMC - research update NPFMC recommends regulations Two workshops explaining draft regulations and discussing enforcement
2010	ALL YEAR OCT OCT	Regulations drafted, discussed, reviewed and finalized Fleet and gear manufacturers pretest specific devices, handling and attachment alternatives – comment on draft regulations OCT Final Rule published (Amendment 94) NPFMC initiated a trailing amendment to require trawl sweep modifications on non-pelagic trawl vessels fishing in Central GOA
2011	JAN Spring/Summer	Trawl sweep modifications requirement goes into effect in the BS Four Kodiak-based trawl vessels took aboard AFSC and Alaska Groundfish DataBank staff to measure seafloor clearances achieved with the proposed sweep modifications
2012	FEB AVR	Initial regulatory impact review for the proposed Amendment to the FMP for the GOA Management Plan to require trawl sweep modification in the flatfish fishery in the Central GOA Regulatory impact review for the proposed Amendment to the FMP for the GOA Management Plan to require trawl sweep modification in the flatfish fishery in the Central GOA

Consultation processes and impact assessments have resulted in amendment 94 to the FMP in BSAI. This amendment requires participants using nonpelagic trawl gear in the directed fishery for flatfish in the Bering Sea subarea to modify the trawl gear to raise portions of the gear off the ocean bottom, and this requirement went into effect on January 2011. The gear modification consists in elevating devices to be placed on the trawl sweeps to lift the sweep off the seafloor (Figure 49).

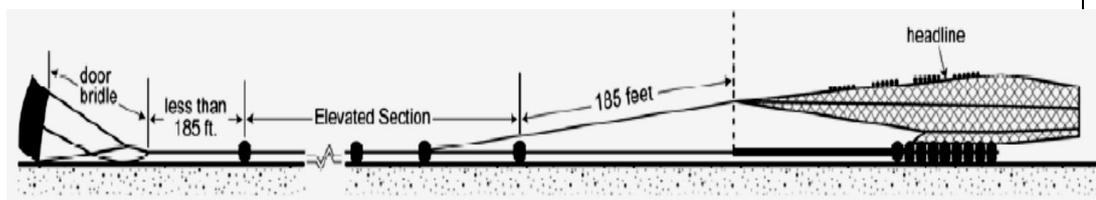


Figure 49. Location of elevating devices in the elevated section of modified nonpelagic trawl gear.

Research (Table 15) has demonstrated that using modified trawl sweeps reduce effects on sessile seafloor animals, reduce mortality of Tanner, Snow and King crabs without negatively affect target catch rates and Pacific cod catches as well.

These results led the NPFMC to recommend requiring modified trawl sweeps for the Central GOA flatfish fishery in order to reduce negative interactions with Tanner crab. In October 2010, the NPFMC initiated a trailing amendment to require trawl sweep

modifications on non- pelagic trawl vessels fishing in the Central GOA (Table 15). Unlike the modification required to the BS trawl sweeps, however, which is required only in the directed flatfish fisheries, the proposed trawl sweep modification for the Central GOA would apply to all non-pelagic trawl fisheries (e.g., flatfish, Pacific cod, pollock, and rockfish). The action was initiated in conjunction with final action on the GOA Tanner crab bycatch measures. The gear modification shall be similar to the BSAI, i.e. elevating devices to be placed on the trawl sweeps to lift the sweep off the seafloor.

However, in the Central GOA flatfish fishery, trawl catcher vessels tend to be smaller than the BS trawl catcher vessels. In addition, sediments and bathymetry of the Central GOA flatfish fishery grounds may be different from the BS flatfish fishery grounds. Recognizing these differences, research and field testing (Table 15) was conducted to ensure that the BS tests and regulation requirements are applicable in the Central GOA flatfish fishery.

In 2012, an amendment to the Fishery Management Plan for the GOA Management Plan has been proposed to require trawl sweep modification in the flatfish fishery in the Central GOA, and those modified trawl sweep requirements should be in place in 2013.

Longline

The NPFMC's fleet rationalization programs for halibut and sablefish and the growth and technical advancements of the offshore Freezer Longline (FLL) fleet lead to gear advancements to reduce bycatch. There are several regulations in place towards seabird avoidance for vessels fishing with hook-and-line gear. Since 1997, NMFS has implemented and revised seabird avoidance measures to mitigate interactions between the federal hook and-line fisheries and seabird. The measures used in longline fisheries in Alaska include the use of streamer lines, sink baited hooks, circle hooks, line shooters, lining tubes, night settings etc. A full page including the history of these developments and the regulations currently in place is available at the following web address:

<http://alaskafisheries.noaa.gov/protectedresources/seabirds/guide.htm>

In addition, vessel operators using hook-and-line gear and fishing for groundfish in State waters must be refer to seabird avoidance measures in State regulation (5AAC 28.005).

Pot design and modifications

In 1997, all known pot fishermen participating in Alaska crab and Pacific cod fisheries were solicited for ideas on alterations to standard cod pots that would reduce Tanner crab bycatch but maintain cod catch rates.

Regulations relating to pot modifications were adopted for reducing the Tanner crab bycatch in the Alaska Pacific cod fisheries. The measures include (i) biodegradable escape mechanisms required for pot gear to minimize bycatch associated with so-called ghost fishing of lost gear (5 AAC 39.145 *Escape Mechanism for Shellfish and Bottomfish Pots*) and (ii) tunnel openings for pot gear limited in size (tunnel eye openings must be 36 inches in perimeter or less) to reduce incidental catch of halibut and crabs. False tunnel modifications for pot gear allow a higher catch of Pacific cod and a considerable

	<p>decreased bycatch of tanner crab (otherwise the highest bycatch species in Pacific cod pots). Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species.</p> <p>Evidence</p> <p>http://www.fakr.noaa.gov/frules/75fr61642.pdf http://www.fakr.noaa.gov/regs/679b27.pdf http://www.fakr.noaa.gov/npfmc/PDFdocuments/bycatch/GOATrawlSweeps211.pdf http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/rawlmods112.pdf http://www.nmfs.noaa.gov/stories/2012/07/07_26_12trawl_gear_innovation.html ftp://ftp.afsc.noaa.gov/posters/pRose03_development-implementation.pdf http://www.fakr.noaa.gov/frules/75fr61642.pdf http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOASummary.pdf http://www.fakr.noaa.gov/npfmc/conservation-issues/gear-mods.html http://www.fakr.noaa.gov/npfmc/bycatch-controls/bsai-go-halibut-bycatch.html http://www.fakr.noaa.gov/npfmc/bycatch-controls/GOA-crab-bycatch.html http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.21.pdf http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.45.pdf http://www.adfg.alaska.gov/FedAidpdfs/FMR11-65.pdf</p>
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
<p>Clause</p>	<p>Evidence</p>
<p>8.4.3</p>	<p>Rating determination</p> <p><i>Fixed gear in Alaska must be marked as for regulations. That is the case in Federal and State fisheries alike.</i></p> <p>The State regulation 5 AAC 28.050 Lawful gear for groundfish states that “All commercial longline or skate gear buoys, or kegs and buoys for groundfish pots, must be marked with the permanent ADFG vessel license plate number of the vessel operating the gear”.</p> <p>http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section050.htm</p> <p>Also, regulations pertaining to vessel and gear markings are set forth in this section and as prescribed in the annual management measures published in the Federal Register pursuant to § 300.62 of chapter III of this title.</p> <p>(1) All hook-and-line, longline pot, and pot-and line marker buoys carried on board or used by any vessel regulated under this part shall be marked with the following:</p> <p>(i) The vessel’s name; and</p>

	<p>(ii) The vessel's Federal fisheries permit number; or (iii) The vessel's ADFG vessel registration number.</p> <p>(2) Markings shall be in characters at least 4 inches (10.16 cm) in height and 0.5 inch (1.27 cm) in width in a contrasting color visible above the water line and shall be maintained so the markings are clearly visible.</p> <p>http://www.fakr.noaa.gov/regs/679b24.pdf</p> <p>Mobile gear such as trawl gear does not carry identifying markings and thus derelict and discarded gear cannot be traced to specific vessels. However, the loss of such gear is very seldom and when it occurs, it is promptly retrieved, given its economic value.</p>	
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<p>9. There shall be defined management measures designed to maintain stocks at levels capable of producing maximum sustainable levels.</p> <p style="text-align: center;"><i>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</i></p> <p style="text-align: right;"><i>FAO Eco 29.2bis</i></p>						
Confidence Ratings	Low	0 out of 11	Medium	0 out of 11	High	8 out of 11

<p>Clause:</p> <p>9.1 Measures shall be introduced to identify and protect depleted resources and those resources threatened with depletion, and to facilitate the sustained recovery of such stocks. Also, efforts shall be made to ensure that resources and habitats critical to the wellbeing of such resources which have been adversely affected by fishing or other human activities are restored.</p> <p style="text-align: right;"><i>FAO CCRF 7.6.10</i></p> <p style="text-align: right;"><i>Eco 30</i></p>
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<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>

Clause	Evidence	
9.1	<p>Rating determination</p> <p><i>Measures are introduced to identify and protect depleted resources and those resources threatened with depletion, and to facilitate the sustained recovery of such stocks (MSA). Also, efforts are made to ensure that resources and habitats critical to the wellbeing of such resources (EFH) which have been adversely affected by fishing or other human activities are restored.</i></p> <p>The Pacific cod stocks in Alaska are not depleted or threatened with deletion. Presently and as projected for 2013 stock biomass levels are well above B40% in both management areas. Careful stock surveys and accompanying stock analysis carried out annually by staff from the NMFS and ADFG ensure populations remain at sustainable levels. See evidence from Section B – Science and Stock Assessment Activities, Fundamental Clauses 4 & 5.</p> <p>The EFH regulations state that the NPFMC and NMFS should conduct a complete review of EFH provisions of FMPs at least once every 5 years and revise or amend the EFH provisions as warranted based on available information. An Omnibus FMP Amendment implemented the changes recommended via the 5-year review that was completed in 2010.</p> <p>During the last review it has been shown that fishing effects on the habitat of Pacific</p>	

	<p>cod in the BSAI and GOA do not appear to have impaired either the stocks 'ability to sustain itself at or near the MSY level. When weighted by the proportions of habitat types used by Pacific cod, the long-term effect indices are low, particularly those of the habitat features most likely to be important to Pacific cod (infaunal and epifaunal prey). The fishery appears to have had minimal effects on the distribution of adult Pacific cod. Effects of fishing on weight at length, while statistically significant in some cases, are uniformly small and sometimes positive. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.</p> <p>Evidence</p> <p>http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPCod.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOAPCod.pdf http://www.fakr.noaa.gov/habitat/efh/review.htm</p>	
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Clause:		
<p>9.2 When deciding on use, conservation and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood.</p> <p style="text-align: right;"><i>FAO CCRF 7.6.6</i></p>		
Evidence adequacy rating:		
<p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
9.2	<p>Rating determination <i>When deciding on use, conservation and management of the resource, due recognition is given, where relevant, in accordance with national laws and regulations (MSA), to the traditional practices, needs and interests of indigenous people and local fishing communities (through the NPFMC and BOF) which are highly dependent on these resources for their livelihood.</i></p> <p>National Standard 8 of the MSA states that Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable,</p>	

<p>minimize adverse economic impacts on such communities. http://www.nmfs.noaa.gov/sfa/magact/mag3.html#s301</p> <p>The fishery management process for the Alaska groundfish fisheries is an open process with potential for local stakeholder involvement. The Western Alaska CDQ Program allocates a percentage of all BSAI quotas for groundfish, prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to (i) to provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the BSAI Management Area; (ii) to support economic development in western Alaska; (iii) to alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska.</p> <p>Local dependent fishing communities, the GOA communities.</p> <p>CDQs only target native Alaskan communities that are w/in 50 nmi of the Bering Sea coast. There are many coastal communities that are made of native and non-native members outside of the Bering Sea area. The NPFMC has taken actions to address their needs through their jig allocations and 90/10 GOA inshore/offshore allocation. Structure of seasons also can favor local participants, avoid localized depletion and split quota between seasons. Also the BOF's state water allocations were meant to help Pacific cod fishermen in local coastal GOA communities deal with the federal SSL regulations and still have access to Pacific cod.</p> <p>Eventually one of the NPFMC's policy priorities is to improve outreach and communications with rural communities and Alaska Native entities and develop a method for systematic documentation of Alaska Native and community participation in the development of fishery management actions. Upon review of several suggestions to expand both ongoing communication and outreach specific to particular projects affecting rural stakeholders, the NPFMC initiated a small workgroup in 2008 to further review potential approaches and provides recommendations. Upon review of the workgroup report in February 2009, the NPFMC approved the workgroup's primary recommendation to initiate a standing committee (the Rural Community Outreach Committee) to provide input to the NPFMC on ways to improve outreach to communities and Alaska Native entities. The committee was initiated in June 2009.</p> <p>The NPFMC identified three primary tasks for the committee: 1) to advise the NPFMC on how to provide opportunities for better understanding and participation from Alaska Native and rural communities; 2) to provide feedback on community impacts sections of specific analyses, if requested; and 3) to provide recommendations regarding which proposed NPFMC actions need a specific outreach plan and prioritize multiple actions when necessary. The committee has been instrumental in recommending and implementing changes to improve overall outreach and two-way communication with rural stakeholders, as well as assisting in the development of</p>	
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	<p>project-specific, long-term outreach plans for NPFMC actions regarding Bering Sea Chinook and chum salmon bycatch reduction measures.</p> <p>Evidence</p> <p>http://www.fakr.noaa.gov/npfmc/catch-shares-allocation/CDQ.html http://www.fakr.noaa.gov/npfmc/rural-outreach/rural-community-outreach-committee.html https://alaskafisheries.noaa.gov/ram/cgp.htm</p>	
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<p>Clause:</p> <p>9.3 States and relevant groups from the fishing industry shall encourage the development and implementation of technologies and operational methods that reduce discards of the target and non-target species catch. The use of fishing gear and practices that lead to the discarding of catch shall be discouraged and the use of fishing gear and practices that increase survival rates of escaping fish shall be promoted.</p> <p style="text-align: right;"><i>FAO CCRF 8.4.5</i></p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
<p>Clause</p>	<p>Evidence</p>
<p>9.3</p>	<p><i>Rating determination</i></p> <p><i>Several measures are in place to reduce discards of the target and non-target species catch. The use of fishing gear and practices that lead to the discarding of catch is discouraged and the use of fishing gear and practices that increase survival rates of escaping fish is promoted (halibut excluder device, trawl sweep and pot modifications).</i></p> <p>Several measures are in place to reduce discards of the target and non-target species catch. Discards are addressed by the IR/IU program active for Pacific cod, coupled with observer coverage and enforcement activities. Limited access and fleet rationalization has a tremendous impact on reducing bycatch. By reducing fleet size, less gear is on the grounds and most of the effort is on profitable grounds (vessels not displaced to low CPUE area by crowding). Time and area closures also reduce target and non-target bycatch. PSC caps help fishers focus on finding areas of low bycatch so they can continue their target fisheries and avoid foreclosure.</p> <p>IR/IU program</p> <p>The 50 C.F.R. § 679.27 IR/IU programme has been approved in 1997 requiring 100% retention of Pacific cod in all BSAI and GOA federal fisheries beginning on January 1, 1998. NPFMC addressed the utilization side of the program by not mandating specific</p>

product forms, but by allowing individual operations the flexibility to process Pacific cod into whatever product forms they wish, subject to a minimum required product recovery rate of 15%.

Also, in State waters, when a directed season is open for Pacific cod, regulations for IR/IU of groundfish (5 AAC 28.070 & 5 AAC 28.075) require that all captured Pacific cod be retained by the fisherman and accepted by a buyer. Similarly, all Pacific cod harvested must be retained up to the maximum retainable bycatch amounts when a bycatch season is open for this species. State regulations to extend these requirements to onshore processing plants have also been implemented. The regulation was modified in an amendment(s) published April 6, 2006, in 71 FR 17381; effective January 20, 2008.

Prohibited species catches (PSC)

PSC such as halibut, crab and salmon must be discarded as for regulation, hence their retention is prohibited. Fisheries are subject to closure if they attain either their seasonal or annual limit of allowed bycatch mortality. The species that affect the most the Pacific cod fisheries is halibut PSC. Issues with crab bycatch have largely been resolved (trawl sweeps modification) and salmon bycatch is minimal (largely caught by pollock fleet).

Halibut PSC and excluder device

Though the commercial value per pound of halibut is greater than that of most target species in trawl fisheries off Alaska, halibut retention is prohibited for trawlers and individual groundfish target trawl fisheries are subject to closure if they attain either their seasonal or annual limit of allowed halibut bycatch mortality. Although all groundfish fisheries catch considerable amounts of halibut as bycatch, only longline fishermen holding quota share in the IFQ program are allowed to retain halibut in the federally managed fisheries off Alaska. To avoid catching halibut, trawl fishermen voluntarily developed a rigid grate system and escape panel which are installed ahead of the trawl "codend". The bycatch reduction device was then formally tested by an industry trade association in conjunction with a NMFS fishing gear researcher under an experimental Fishing Permit in 1998. Results from the experiment showed the device excluded 94% of the halibut while only releasing 38% of the target flatfish. Linear simulations of the fishery were developed to estimate the potential benefit of the grate. Results indicated that fleet-wide use of the grate would result in a 171% increase in the duration of the fishery, a 61% increase in target flatfish catch, and a 71% reduction in overall halibut bycatch. Other simulations demonstrated a high incentive for individual noncompliance. Factors affecting incentives for voluntary or regulatory use of bycatch reduction devices were explored in detail within the context of the highly regulated flatfish fisheries under federal management off Alaska. Halibut excluder usage occurs in many Bering Sea bottom trawl fisheries and has been trialed in the Gulf of Alaska, currently used by some vessels.

[http://www.mcafoundation.org/doc/Final_halibut_excluder_for_GOA_EFP_\(06-03-2009\)_report%20GAUVIN.pdf](http://www.mcafoundation.org/doc/Final_halibut_excluder_for_GOA_EFP_(06-03-2009)_report%20GAUVIN.pdf)

Bycatch controls for Crabs**BSAI**

Limits on the bycatch of prohibited crab species have been established in some Bering Sea fisheries, to reduce the impacts on these species traditionally harvested by other gear types. When bycatch limits are reached, fisheries responsible for the bycatch are closed for the rest of the season, or are prohibited from fishing in areas with historically high bycatch rates. Area closures have also been implemented throughout the BSAI and GOA to protect crab. In addition to these tools, gear restrictions and other regulations have been implemented to reduce crab bycatch (See clause 8.4.2 for further discussion). For example:

- Biodegradable panels are required for pot gear, to minimize bycatch associated with so-called ghost fishing of lost gear.
- Tunnel openings for pot gear are limited in size to reduce incidental catch of halibut and crabs.
- Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species.
- In 1999, the use of bottom trawl gear was prohibited for vessels targeting pollock in the Bering Sea, to reduce crab and halibut bycatch.
- In 2011, a trawl sweep modification requirement was implemented for vessels participating in the Bering Sea flatfish fishery, to raise the trawl sweep off the seafloor. Research has demonstrated that this gear modification reduces crab bycatch and unobserved mortality of red king crab, Tanner crab, and snow crab.

GOA

Bycatch of crabs is relatively low in GOA fisheries compared to the BSAI. However, area closures have been adopted by the NPFMC to protect both red king crab and Tanner crab in the GOA. PSC limits for crab species in GOA groundfish fisheries have not been established to date. In addition to these tools, gear restrictions and other regulations have been implemented to reduce crab bycatch (See clause 8.4.2. for further discussion). For example:

- Biodegradable panels are required for pot gear, to minimize bycatch associated with so-called ghost fishing of lost gear.
- Tunnel openings for pot gear are limited in size to reduce incidental catch of crabs.
- Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species.
- In 2012, an amendment to the FMP for the GOA Management Plan has been proposed to require trawl sweep modification in the flatfish fishery in the Central GOA, and those modified trawl sweep requirements should be in place in 2013.

Evidence

<http://law.justia.com/cfr/title50/50-8.0.1.1.11.2.1.8.html>

<http://law.justia.com/cfr/title50/20060406-1.11.html>

<http://www.adfg.alaska.gov/static/home/news/pdfs/newsreleases/cf/102747562.pdf>

	http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section070.htm http://www.st.nmfs.noaa.gov/st5/abstracts/The Effectiveness of a Halibut Excluder Device and Consideration of Tradeoffs in its Application.html http://aquaticcommons.org/9781/1/mfr6225.pdf http://www.fakr.noaa.gov/frules/75fr61642.pdf http://www.fakr.noaa.gov/regs/679b27.pdf http://www.fakr.noaa.gov/npfmc/PDFdocuments/bycatch/GOATrawlSweeps211.pdf http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/rawlmods112.pdf http://www.fakr.noaa.gov/regs/679b24.pdf	
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Clause:		
<p>9.4 Technologies, materials and operational methods shall be applied to minimize the loss of fishing gear and the ghost fishing effects of lost or abandoned fishing gear.</p> <p style="text-align: right;"><i>FAO CCRF 8.4.6, 8.4.1</i></p>		
Evidence adequacy rating:		
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
9.4	<p><i>Rating determination</i></p> <p><i>Technology, materials and operational methods (IFQ, LLP) are applied to minimize the deployment/loss of fishing gear. And several measures (pot modifications) have been implemented to minimize the ghost fishing effects of lost or abandoned fishing gear.</i></p> <p>With the implementation of an IFQ system for halibut and sablefish longline fisheries, bycatch and waste were reduced because the race for fish was eliminated, allowing for more selective fishing practices and significant reductions in actual gear deployment/loss. Similarly, pot usage is controlled, first in term of a LLP that limits participation to the fishery and secondly, in terms of number of fishable pots per vessel. Several measures have been implemented:</p> <ul style="list-style-type: none"> • Biodegradable panels are required for pot gear, to minimize bycatch associated with so-called ghost fishing of lost gear. • Tunnel openings for pot gear are limited in size to reduce incidental catch of halibut and crabs. • Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species. <p>http://www.fakr.noaa.gov/npfmc/bycatch-controls/CrabBycatch.html</p>	

<p>Clause:</p> <p>9.5 There shall be a requirement that fishing gear, methods and practices where practicable, are sufficiently selective as to minimize waste, discards, and catch of non-target species - both fish and non-fish species and impacts on associated or dependent species.</p> <p style="text-align: right;"><i>FAO CCRF 7.6.9, 7.2.2</i></p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause	Evidence
9.5	<p>Rating determination</p> <p><i>Reduction measures in terms of gear modifications for trawls, long-lines and pot gears are implemented and are efficient in minimizing bycatch of non target species, both fish and non fish species.</i></p> <p>Discards and bycatch are regularly observed and reported in the SAFE reports. Recent bycatch and discard levels are given in clause 13.1.2. Reduction measures in terms of gear modifications for trawls, long-lines and pot gears are implemented for bycatch of crab, salmon, halibut and seabirds. The IR/IU program has been improved for discard avoidance.</p> <p>PSC limits are in force resulting in fishery closures when catches exceed limits. Additionally bycatch species are assessed to determine PSC limits. Additional regulations include conservation measures that temporally and spatially limit fishing effort around areas important to marine mammals. NMFS uses Steller sea lion protection measures (SSLPM) disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts.</p> <p>For further information, please refer to Clauses 8.4.3, 9.3.</p> <p>Evidence</p> <p>http://alaskafisheries.noaa.gov/protectedresources/stellers/habitat.htm http://www.fakr.noaa.gov/npfmc/bycatch-controls/bsai-goa-halibut-bycatch.html http://www.fakr.noaa.gov/npfmc/bycatch-controls/BSAI-crab-bycatch.html http://www.fakr.noaa.gov/npfmc/bycatch-controls/SalmonBycatch.html http://www.fakr.noaa.gov/npfmc/conservation-issues/protected-species.html http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html</p>

Clause:		
<p>9.8 States and relevant institutions involved in the fishery shall collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behaviour of target and non target species in relation to such fishing gear as an aid for management decisions and with a view to minimizing non-utilized catches.</p> <p style="text-align: right;"><i>FAO CCRF 8.5.3, 12.10</i></p>		
Evidence adequacy rating:		
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
9.8	<p>Rating determination <i>Relevant institutions involved in the fishery collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behaviour of target and non target species in relation to such fishing gear as an aid for management decisions and with a view to minimizing non-utilized catches.</i></p> <p>Gear modifications resulted from an intense collaboration and consultation process between the fishing industry and the groundfish fisheries management and research institutions.</p> <p>For further information, please refer to Clauses 8.4.3, 9.3 and 9.5.</p> <p>Evidence</p> <p>http://www.nmfs.noaa.gov/stories/2012/07/07_26_12trawl_gear_innovation.html ftp://ftp.afsc.noaa.gov/posters/pRose03_development-implementation.pdf http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.21.pdf http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.45.pdf</p>	

<p>Clause:</p> <p>9.9 Policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures, placed with due regard to the safety of navigation.</p> <p style="text-align: right;"><i>FAO CCRF 8.11.1</i></p> <p>9.9.1 States shall ensure that, when selecting the materials to be used in the creation of artificial reefs as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and safety of navigation are observed.</p> <p style="text-align: right;"><i>FAO CCRF 8.11.2</i></p> <p>9.9.2 States shall, within the framework of coastal area management plan, establish management systems for artificial reefs and fish aggregation devices. Such management systems shall require approval for the construction and deployment of such reefs and devices and shall take into account the interests of fishers, including artisanal and subsistence fishers.</p> <p style="text-align: right;"><i>FAO CCRF 8.11.3</i></p>		
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
9.9	Not Applicable. The Pacific cod resources in Alaska are productive and not in an overfished condition. The habitat throughout Alaska is pristine and conducive to productive Pacific cod resources without the addition of artificial reefs and aggregation devices.	
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
9.9.1	Not Applicable. The Pacific cod resources in Alaska are productive and not in an overfished condition. The habitat throughout Alaska is pristine and conducive to productive Pacific cod resources without the addition of artificial reefs and aggregation devices.	

<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
9.9.2	<p><i>Rating Determination</i></p> <p><i>Should it be needed, there is an established management system for artificial reefs.</i></p> <p>Construction and deployment of reefs and enhancement devices requires previous consultation and evaluation, and approval by one or more of the following agencies:</p> <p>NOAA’s National Marine Fisheries Center - Fisheries Restoration Center Alaska Department of Fish and Game – Restoration and Enhancement Alaska Department of Environmental Conservation - Alaska Clean Water Actions US Environmental Protection Agency – River Corridor and Wetland Restoration Coastal America – Regional Conservation Projects US Fish and Wildlife Service – Partners for Fish and Wildlife Program and Alaska Coastal Program</p> <p>Any project with potential for considerable impact on the natural environment will also be required to go through an environmental and socio-economic NEPA analysis. This is well explained under Fundamental clause 2 of this report. Also, the NPFMC and BOF manage fisheries in Alaska and within their public process they offer fishermen the opportunity to get involved and participate in the various decision making processes relevant to fisheries management.</p>	

<p>10. Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.</p> <p style="text-align: right;"><i>FAO CCRF 8.1.7/8.1.10/8.2.4/8.4.5</i></p>						
Confidence Ratings	Low	0 out of 3	Medium	0 out of 3	High	3 out of 3

<p>Clause:</p> <p>10.1 States shall enhance through education and training programmes the education and skills of fishers and, where appropriate, their professional qualifications. Such programmes shall take into account agreed international standards and guidelines.</p> <p style="text-align: right;"><i>FAO CCRF 8.1.7, 8.4.1</i></p>
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<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>

Clause	Evidence	
10.1	<p>Rating determination</p> <p><i>The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional Pacific cod crew members must pass. Such programmes take into account agreed international standards and guidelines.</i></p> <p>The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional Pacific cod crew members must pass. Training ranges from firefighting on a vessel, damage control, man-overboard, MARPOL, etc., and The Sitka-based Alaska Marine Safety Education Association alone has trained more than 10,000 fishermen in marine safety and survival through a Coast Guard-required class on emergency drills http://www.npfvoa.org/ ; http://www.adn.com/2011/04/27/1832381/workplace-fatalities-fall-sharply.html#ixzz1Xt1ESQqh.</p> <p>The State of Alaska, Department of Labor & Workforce Development (ADLWD) includes AVTEC (formerly called Alaska Vocational Training & Education Center, now called Alaska’s Institute of Technology). One of AVTEC’s main divisions is the Alaska Maritime Training Center. The goal of the Alaska Maritime Training Center is to promote safe marine operations by effectively preparing captains and crew members for employment in the Alaskan maritime industry. The Alaska Maritime Training Center is a United States Coast Guard (USCG) approved training facility located in Seward, Alaska, and offers USCG/STCW-compliant maritime training. (STCW is the international Standards of Training, Certification, & Watchkeeping.) In addition to the standard courses offered, customized training is available to meet the specific needs of maritime companies. Courses are delivered through the use of their world</p>	

	<p>class ship simulator, state-of-the-art computer-based navigational laboratory, and modern classrooms equipped with the latest instructional delivery technologies.</p> <p>The Center’s mission is to provide Alaskans with the skills and technical knowledge to enable them to be productive in Alaska’s continually evolving maritime industry.</p> <p>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.</p> <p>The Center’s course offerings include –</p> <p>Video Tutorials –</p> <ul style="list-style-type: none"> * How to get your Merchant Mariner’s Credential; * Which Course Do You Need? <p>U.S. Coast Guard Approved/STCW-Compliant Courses –</p> <ul style="list-style-type: none"> * Able Seaman; * Assistance Towing Operations; * Automatic Radar Plotting Aids (ARPA) Operations; * Basic Safety Training - STCW'95; includes: <ul style="list-style-type: none"> ** First Aid & CPR; ** Personal Safety and Social Responsibility; ** Basic Fire Fighting; ** Personal Survival Techniques; Bridge Resource Management (BRM); Global Maritime Distress & Safety System (GMDSS); * Master Not More Than 200 Tons Program; * Meteorology; * Operator of Uninspected Passenger Vessels (OUPV); * Proficiency in Survival Craft; * Qualified Member of Engine Department (QMED) Oiler; * Radar Observer (Unlimited), Original; * Radar Observer (Unlimited), Refresher; * Radar Observer (Unlimited), Recertification; * Rating Forming Part of a Navigational Watch; * Seafood Processor Orientation and Safety Course; * Shipboard Emergency Medicine. * Tankship – Dangerous Liquids (P.I.C.); * Visual Communications/Flashing Lights; * Medical Care Provider <p>Additional AVTEC Maritime Courses</p> <ul style="list-style-type: none"> * FCC Marine Radio Operators Permit Examination <p>The University of Alaska Sea Grant Marine Advisory Program (MAP) provides education and training in several other sectors, including –</p>	
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	<p>* better process control; * HACCP (Hazard Analysis / Critical Control Point); * sanitation control procedures; * marine refrigeration technology; * net mending; * icing & handling; * direct marketing; * financial management for fishermen; * maximizing fuel efficiency</p> <p>In addition, MAP conducts sessions of their Alaska Young Fishermen’s Summit. Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation, to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. In addition to this, MAP provides training and technical assistance to fishermen and seafood processors in Western Alaska. Following completion of a needs assessment in year one of the project, a number of training courses and workshops were developed in cooperation with local communities and CDQ groups.</p> <p>Additional education is provided by the Fishery Industrial Technology Center, in Kodiak, Alaska.</p> <p>Evidence</p> <p>http://www.avtec.edu/AMTC.htm http://www.stcw.org/ http://seagrant.uaf.edu/map/ http://seagrant.uaf.edu/map/fishbiz/index.php http://www.sfos.uaf.edu/fitc/academicprograms/ http://www.npfvoa.org/ http://www.adn.com/2011/04/27/1832381/workplace-fatalities-fall-sharply.html#ixzz1Xt1ESQqh http://www.sfos.uaf.edu/pcc/projects/07/brown/</p>	
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Clause:	
10.2	<p>States, with the assistance of relevant international organizations, shall endeavour to ensure through education and training that all those engaged in fishing operations be given information on the most important provisions of this Code, as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations.</p> <p style="text-align: right;"><i>FAO CCRF 8.1.10</i></p>
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence

10.2	<p>Rating determination</p> <p><i>The MAP provides education and training in several sectors, including fisheries management, in the forms of seminars and workshops. While there is not much education and training which explicitly deals with the Code, the Alaska fishery management process itself is an excellent de facto educational process.</i></p> <p>The MAP provides education and training in several sectors, including fisheries management, in the forms of seminars and workshops. In addition, MAP conducts sessions of their Alaska Young Fishermen’s Summit. Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation (eg- MSA), to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. While there is not much education and training which explicitly deals with the Code, the Alaska fishery management process itself is an excellent <i>de facto</i> educational process. Anyone who seeks to understand Alaska’s fisheries management process unavoidably winds up becoming very familiar with the Code.</p> <p>Evidence</p> <p>http://seagrant.uaf.edu/map/ http://sustainability.alaskaseafood.org/fao</p>
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Clause:	
10.3	<p>States shall, as appropriate, maintain records of fishers which shall, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their national laws.</p> <p style="text-align: right;">FAO CCRF 8.1.8</p>
Evidence adequacy rating:	
<p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>	
Clause:	Evidence
10.3	<p>Rating determination</p> <p><i>Alaska maintains records of fishers (RAM, CFEC), and whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with national laws.</i></p> <p>The RAM is responsible for managing Alaska Region permit programs, including those that limit access to the Federally-managed fisheries of the North Pacific. RAM</p>

	<p>responsibilities include: providing program information to the public, determining eligibility and issuing permits, processing transfers, collecting landing fees and related activities.</p> <p>The CFEC helps to conserve and maintain the economic health of Alaska’s commercial fisheries by limiting the number of participating fishers. CFEC issues permits and vessel licenses to qualified individuals in both limited and unlimited state waters fisheries, and provides due process hearings and appeals as and when needed.</p> <p>The RAM division as well as the CFEC maintain on their websites, all the fishermen records for which fishing permits are issued (http://www.fakr.noaa.gov/ram/ , http://www.cfec.state.ak.us/).</p>	
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E. Implementation, Monitoring and Control

11.	<p>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.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.7/7.7.3/7.6.2/8.1.1/8.1.4/8.2.1</i></p> <p style="text-align: right;"><i>FAO Eco 29.5</i></p>						
Confidence Ratings	<table style="display: inline-table; border: none;"> <tr> <td style="border: 1px solid black; padding: 2px 10px;">Low</td> <td style="border: 1px solid black; padding: 2px 10px;">0 out of 6</td> <td style="border: 1px solid black; padding: 2px 10px;">Medium</td> <td style="border: 1px solid black; padding: 2px 10px;">0 out of 6</td> <td style="border: 1px solid black; padding: 2px 10px;">High</td> <td style="border: 1px solid black; padding: 2px 10px;">2 out of 6</td> </tr> </table>	Low	0 out of 6	Medium	0 out of 6	High	2 out of 6
Low	0 out of 6	Medium	0 out of 6	High	2 out of 6		

11.1.	<p>Effective mechanisms shall be established for fisheries monitoring, surveillance, control and enforcement measures including, where appropriate, observer programmes, inspection schemes and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question.</p> <p style="text-align: right;"><i>FAO CCRF 7.1.7 Others 7.7.3, 8.1.1</i></p> <p style="text-align: right;"><i>Eco 29.5</i></p>
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Evidence adequacy rating:		
<input checked="" type="checkbox"/> High	<input type="checkbox"/> Medium	<input type="checkbox"/> Low

Clause	Evidence
11.1	<p>Rating determination</p> <p><i>Management of Alaska Pacific cod fisheries by the NPFMC, BOF and the agencies responsible for implementation and enforcement of regulations ensure that effective mechanisms are in place to assure compliance. Enforcement measures include an observer program, vessel monitoring systems on board vessels, USCG and AWT boardings and inspection activities and dockside landing inspections.</i></p> <p>Observer program</p> <p>Details of the observer program and coverage in Alaska Pacific cod fisheries are provided in Clause 4.2. of this report. Coverage is higher in the BSAI than the GOA.</p> <p>VMS requirements</p> <p>On January 8, 2002, an emergency interim rule (67 FR 956) was issued by NMFS to implement Steller sea lion protection measures. All vessels using pot, hook-and-line or trawl gear in the directed fisheries for pollock, Pacific cod or Atka mackerel are required [Section 679.7(a)(18)] to have an operable VMS on board. This requirement is necessary to monitor fishing restrictions in Steller sea lion protection and forage</p>

	<p>areas.</p> <p>Also, when the vessels are fishing Pacific cod in the state parallel fishery, they would use their VMS as directed by their federal fishing permit.</p> <p>U.S. Coast Guard and Office of Law Enforcement activities</p> <p>The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce federal fisheries laws and regulations, especially 50CFR679. OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. According to OLE –</p> <p>“While a vast majority of commercial and recreational fishermen comply with the enacted conservation measures, there are still those fishermen - both domestic and foreign - who attempt to thwart the law and conduct fraudulent business. In recent years, the OLE has stepped up its presence in the international scene as more and more fish are imported and exported into and out of the United States.”</p> <p>“Major fishing companies, commercial fishermen, recreational boaters and sport fishermen and other ocean users are ultimately responsible for the conservation of the ocean, therefore they must be vigilant of their actions which might inflict damage upon the numerous ecosystems within our oceans.”</p> <p>“While catches are usually seized at the onset of an investigation, violators can also be assessed both civil penalties and criminal fines; and on occasion boats are seized and individuals are sent to Federal prison.”</p> <p>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.</p> <p>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.</p> <p><u>BSAI Pacific cod fleet enforcement</u></p> <p>Pacific cod in the BSAI is targeted by many different gear types including non-pelagic trawl, longline, pot, and jig gear. The active size of these fleets is approximately 263 vessels, and the USCG attempts to board approximately 48 vessels each year. From fiscal year 2008 through the end of fiscal year 2012, the USCG conducted 160 boardings on BSAI Pacific cod vessels, noting 31 violations on 25 vessels.</p>	
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Figure 50 shows the number of boardings and vessels with violation per year.

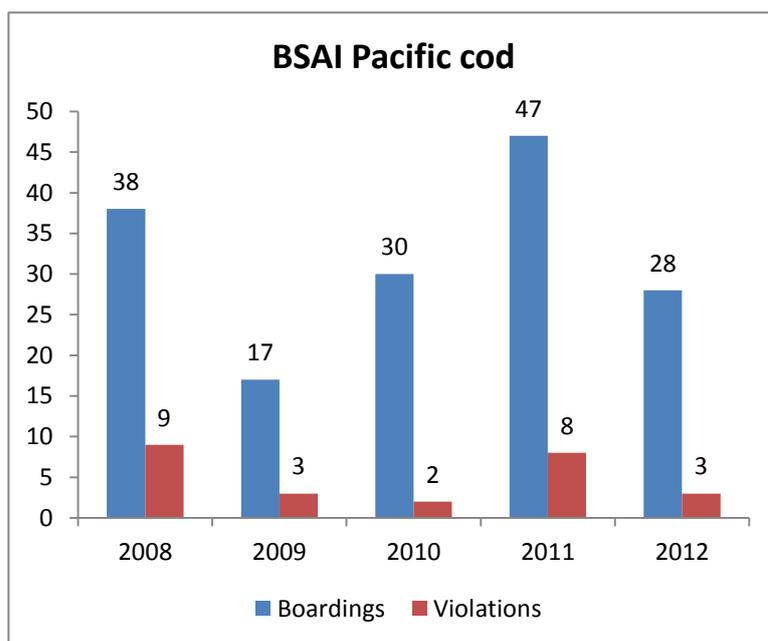


Figure 50. Number of boardings and vessels with violation in the BSAI Pacific cod fleet. Source: USCG, March 2013.

The annual average is 32 boardings, 5 violations and 15.63% of vessels had fisheries violations. Violations over 5 years are distributed in the following manner:

- Logbook errors: 13
- FFP not on board: 2
- LLP not on board: 3
- MRA overages: 4
- Observer coverage: 1
- IR/IU species: 2
- VMS: 1
- SSL no transit: 1
-

GOA Pacific cod fleet enforcement

Pacific cod in the GOA is targeted by many different gear types including non-pelagic trawl, longline, pot, and jig gear. The active size of these fleets is approximately 643 vessels, and the USCG attempts to board approximately 52 vessels each year. From fiscal year 2008 through the end of fiscal year 2012, the USCG conducted 291 boardings on GOA Pacific cod vessels, noting 25 violations on 19 vessels.

Figure 51 shows the number of boardings and vessels with violation per year.

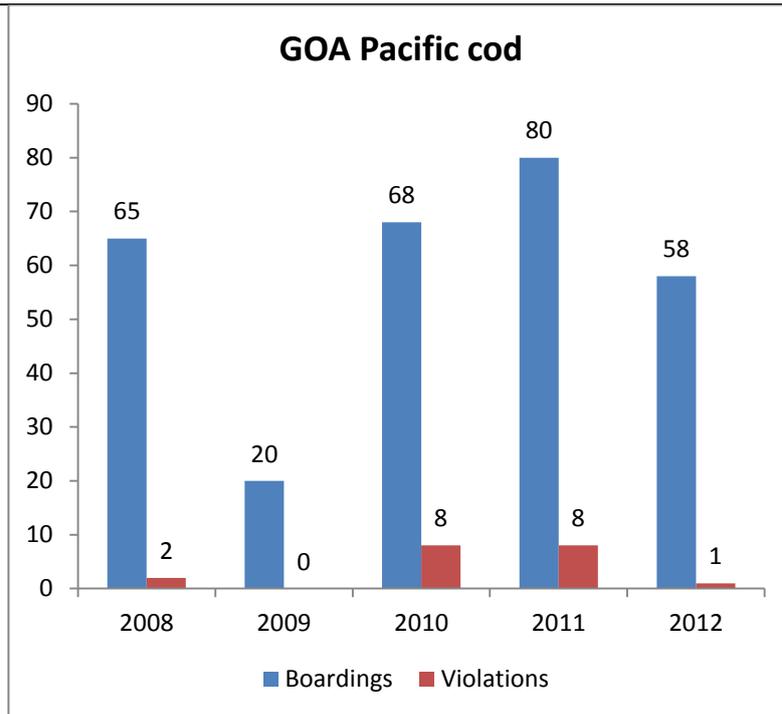


Figure 51. Number of boardings and vessels with violation in the GOA Pacific cod fleet. Source: USCG, March 2013.

The annual average is 58 boardings, 3.8 violations and 6.53% of vessels had fisheries violations. Violations over 5 years are distributed in the following manner:

- Logbook errors: 5
- FFP not on board: 4
- Observer coverage: 4
- Boarding ladder: 3
- Seabird avoidance device: 3
- Unsafe handling of halibut: 3
- Gear violations: 1
- Closed area: 1

Stated-managed waters

The Alaska Wildlife Troopers enforce state regulations. OLE mainly operates on shore, USCG at sea, and the AWT enforce heavily on shore. Additionally, ADFG field staff is properly trained and deputized and can therefore enforce regulations and make arrests.

<http://www.nmfs.noaa.gov/ole/index.html>
<http://dps.alaska.gov/AWT/marine.aspx>

<p>Clause:</p> <p>11.2 Fishing vessels shall not be allowed to operate on the resource in question without specific authorization.</p> <p style="text-align: right;"><i>FAO CCRF 7.6.2 Other 8.1.2, 8.2.1</i></p>		
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
11.2	<p>Rating determination</p> <p><i>Fishing vessels are not allowed to operate on the resource in question without specific authorization.</i></p> <p>Every fishing vessel targeting Pacific cod in Alaska is required to have a federal or state permit. See the RAM and CFEC websites for more details.</p> <p>http://www.fakr.noaa.gov/ram/ http://www.cfec.state.ak.us/</p>	

<p>Clause:</p> <p>11.3 States involved in the fishery shall, in accordance with international law, within the framework of sub-regional or regional fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance and enforcement of applicable measures with respect to fishing operations and related activities in waters outside their national jurisdiction.</p> <p style="text-align: right;"><i>FAO CCRF 8.1.4</i></p> <p>11.3.1 States which are members of or participants in sub-regional or regional fisheries management organizations or arrangements shall implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants which engage in activities which undermine the effectiveness of conservation and management measures established by such organizations or arrangements.</p> <p style="text-align: right;"><i>FAO CCRF 7.7.5, 8.3.1</i></p>		
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Evidence adequacy rating:		
<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
11.3	Not Applicable. The Pacific cod fisheries under assessment here are harvested exclusively within the Alaska EEZ only. Those fisheries are not part of any international agreement or part of a framework of sub-regional or regional fisheries management organizations or arrangements. In addition, there are no fisheries for Pacific cod in international waters abutting the GOA or BSAI EEZ except for fisheries in northwestern British Columbia and in Russian waters across the Bering Sea Convention Line. Those fisheries are regulated by their own Governments.	
Evidence adequacy rating:		
<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low		
Clause	Evidence	
11.3.1	Not Applicable. The Pacific cod fisheries under assessment here are harvested exclusively within the Alaska EEZ only. Those fisheries are not part of any international agreement or part of a framework of sub-regional or regional fisheries management organizations or arrangements.	

Clause:
<p>11.4 Flag States shall ensure that no fishing vessels entitled to fly their flag fish on the high seas or in waters under the jurisdiction of other States unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish.</p> <p style="text-align: right;"><i>FAO CCRF 8.2.2</i></p> <p>11.4.1 Fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State, shall be marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels.</p> <p style="text-align: right;"><i>FAO CCRF 8.2.3</i></p>

<p>12. There shall be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.</p> <p style="text-align: right;"><i>FAO CCRF 7.7.2/8.2.7</i></p>						
Confidence Ratings	Low	0 out of 4	Medium	0 out of 4	High	2 out of 4

<p>Clause:</p> <p>12.1 National laws of adequate severity shall be in place that provide for effective sanctions.</p> <p>12.1.1 Sanctions shall be in force that affects authorization to fish and/or to serve as masters or officers of a fishing vessel, in the event of non-compliance with conservation and management measures.</p> <p style="text-align: right;"><i>FAO CCRF 7.7.2/8.1.9/8.2.7</i></p>

<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>

Clause	Evidence
12.1	<p><i>Rating determination</i></p> <p><i>The MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator. The State of Alaska also has an aggressive marine fisheries compliance program with stiff penalties if a vessel is caught in non-compliance.</i></p> <p>In Alaska waters, federal enforcement policy section 50CFR600.740 states –</p> <p>(a) The MSA provides four basic enforcement remedies for violations, in ascending order of severity, as follows:</p> <p>(1) Issuance of a citation (a type of warning), usually at the scene of the offense (see 15 CFR part 904, subpart E).</p> <p>(2) Assessment by the Administrator of a civil money penalty.</p> <p>(3) For certain violations, judicial forfeiture action against the vessel and its catch.</p> <p>(4) Criminal prosecution of the owner or operator for some offenses.</p> <p>It shall be the policy of NMFS to enforce vigorously and equitably the provisions of the MSA by utilizing that form or combination of authorized remedies best suited in a particular case to this end.</p>

(b) Processing a case under one remedial form usually means that other remedies are inappropriate in that case. However, further investigation or later review may indicate the case to be either more or less serious than initially considered, or may otherwise reveal that the penalty first pursued is inadequate to serve the purposes of the MSA. Under such circumstances, the Agency may pursue other remedies either in lieu of or in addition to the action originally taken. Forfeiture of the illegal catch does not fall within this general rule and is considered in most cases as only the initial step in remedying a violation by removing the ill-gotten gains of the offense.

(c) If a fishing vessel for which a permit has been issued under the MSA is used in the commission of an offense prohibited by section 307 of the MSA, NOAA may impose permit sanctions, whether or not civil or criminal action has been undertaken against the vessel or its owner or operator. In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator. The State of Alaska also has a very aggressive marine fisheries compliance program with stiff penalties if a vessel is caught in non-compliance.



Magnuson-Stevens Act Schedule

Magnuson-Stevens Act Schedule	
VIOLATION	OFFENSE LEVEL
VIOLATIONS REGARDING GEAR	
<p>Minor-Moderate Violations Examples: Violating area specific gear requirements, having non-complying gear onboard, or fishing with non-compliant gear; falsifying or failing to affix vessel markings; failing to comply with gear tag or marking requirements; dumping gear.</p>	II - III
<p>Moderate Violations Example: Fishing for Western Pacific bottomfish management unit species (MUS) using prohibited gear.</p>	IV
VIOLATIONS REGARDING THE FACILITATION OF ENFORCEMENT, SCIENTIFIC MONITORS OR OBSERVERS	
<p>Minor - Moderate Violations Examples: Failing to provide information, notification, accommodations, access, or reasonable assistance to either a NFMS-approved observer or a sea sampler conducting his or her duties aboard a vessel; submitting false or inaccurate data, statements, or reports; discarding, release, or transferring fish before bringing it aboard or making it available to an observer for sampling.</p>	II-III



Magnuson-Stevens Penalty Matrix

Harm to the Resource or Regulatory Program, Offense Level	Level of Intent			
	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

The Marine Division of AWT and the State of Alaska Department of Law pursue a very aggressive enforcement policy. They attend the BOF and are integral into the process for formulation or legislation, analogous to the USCG attendance and input in the Council process. AWT has Statutory / Regulatory legislation pertaining to their Authority: AS 16 Fish & Game, 5AAC Fish & Game, 20 AAC Commercial Fishing, AS 11 Criminal, AS 46 Environment, AS 44 State Government, AS 02 Aeronautics, AS 18 Health & Safety. A State violation is a criminal violation (strict liability).

50CFR600.740 Enforcement policy <http://www.law.cornell.edu/cfr/text/50/600/740>

AWT: http://housemajority.org/coms/hres/27/AWT_Fisheries_Enforcement.pdf

Evidence adequacy rating:

High Medium Low

Clause	Evidence

<p>12.1.1</p>	<p>Rating determination</p> <p><i>Sanctions are in force that affects authorization to fish and/or to serve as masters or officers of a fishing vessel, in the event of non-compliance with conservation and management measures.</i></p> <p>Please see evidence in section 12.1 above and details provided in the “Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions” issued by NOAA Office of the General Counsel – Enforcement and Litigation - March 16, 2011. This Policy provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The purpose of this 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 this Policy, NOAA expects to improve consistency at a national level, provide greater predictability for the regulated community and the public, improve transparency in enforcement, and more effectively protect natural resources.</p> <p>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.</p> <p>http://www.noaanews.noaa.gov/stories2011/pdfs/Penalty%20Policy%20--%20FINAL.pdf</p> <p>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 NPFMC. 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.</p> <p>http://www.fakr.noaa.gov/npfmc/resources-publications/summary-reports.html</p>
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<p>Clause:</p> <p>12.2 Flag States shall take enforcement measures in respect of fishing vessels entitled to fly their flag which have been found by them to have contravened applicable conservation and management measures, including, where appropriate, making the contravention of such measures an offence under national legislation.</p> <p>12.2.1 Sanctions applicable in respect of violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur.</p> <p style="text-align: right;"><i>FAO CCRF 8.2.7</i></p>		
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
12.2	Not applicable. The entire Pacific cod harvests are conducted in Alaskan waters by American vessels. US exercises flag-state authority over fishing vessels wherever they may be and US-flagged vessels found to violate international fishing agreements are subject to the same sort of penalties applied to vessels fishing within the EEZ.	
<p>Evidence adequacy rating:</p> <p><input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
12.2.1	Not applicable. The entire Pacific cod harvests are conducted in Alaskan waters by American vessels. In the case that US-flagged vessels are found to violate international fishing agreements, they are subject to the same sort of penalties applied to vessels fishing within the EEZ.	

F. Serious Impacts of the Fishery on the Ecosystem

13.	<p>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.</p> <p style="text-align: right;"><i>FAO CCRF 7.2.3/8.4.7/8.4.8/12.11</i></p> <p style="text-align: right;"><i>Eco 29.3/31</i></p>						
Confidence Ratings	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">Low</td> <td style="width: 15%; text-align: center;">0 out of 13</td> <td style="width: 15%; text-align: center;">Medium</td> <td style="width: 15%; text-align: center;">0 out of 13</td> <td style="width: 15%; text-align: center;">High</td> <td style="width: 15%; text-align: center;">13 out of 13</td> </tr> </table>	Low	0 out of 13	Medium	0 out of 13	High	13 out of 13
Low	0 out of 13	Medium	0 out of 13	High	13 out of 13		

Clause:	<p>13.1 States shall assess the impacts of environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks, and assess the relationship among the populations in the ecosystem.</p> <p style="text-align: right;"><i>FAO CCRF 7.2.3</i></p> <p>13.1.1 Adverse environmental impacts on the resources from human activities are assessed and, where appropriate, corrected.</p> <p style="text-align: right;"><i>FAO CCRF 7.2.2</i></p> <p>13.1.2 The most probable adverse impacts of the fishery on the ecosystem/environment shall be considered, taking into account available scientific information, and local knowledge.</p> <p style="text-align: right;"><i>Eco 31</i></p> <p>13.1.3 In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence is necessary to ascertain the adequacy of mitigation measures.</p> <p style="text-align: right;"><i>Eco 30.4, 31.4</i></p> <p>13.1.4 Impacts that are likely to have serious consequences shall be addressed. This may take the form of an immediate management response or a further analysis of the identified risk.</p> <p style="text-align: right;"><i>Eco 29.3,29.4, 31</i></p>
Evidence adequacy rating:	

<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
13.1	<p>Rating determination</p> <p><i>Alaska’s fisheries management organizations conduct assessments and research on environmental factors on Pacific cod and associated species and their habitats. Findings and conclusions are published in SAFE document, annual Ecosystem Considerations documents, and other research reports.</i></p> <p>SAFE documents. SAFE documents for the BSAI and GOA Pacific cod summarize ecosystem considerations for the stocks. They include sections for 1) Ecosystem effects on the stock; and 2) Effects of the Pacific cod fishery on the ecosystem. Since 2003, SAFE documents for BSAI and GOA have also included an annual summary Ecosystem Assessment in the appendix prepared by the REEM group at the AFSC. The primary intent of the assessment is to summarize historical climate and fishing effects of the shelf and slope regions of the eastern BSAI, and GOA, and to provide an assessment of the possible future effects of climate and fishing on ecosystem structure and function from an ecosystem perspective. It also looks at the effects of environmental change on fish stocks. Since 1999, the section has included information on indicators of ecosystem status and trends, and more ecosystem-based management performance measures.</p> <p>Ecosystem Effects on Pacific cod stock</p> <p>A primary ecosystem phenomenon affecting the Pacific cod stock seems to be the occurrence of periodic “regime shifts” in which central tendencies of key variables in the physical environment change on a scale spanning several years to a few decades (Boldt (ed.), 2005). One well documented example of such regime shift occurred in 1977, and shifts occurring in 1989 and 1999 have also been suggested (e.g. Hare and Mantua 2000). An attempt was made to estimate the change in median recruitment of BSAI and GOA Pacific cod associated with the 1977 regime shift. According to this year’s model, pre-1977 median recruitment was only about 20% and 32% of post-1976 recruitment for BSAI and GOA Pacific cod, respectively.</p> <p>The prey and predators of Pacific cod have been described or reviewed by Albers and Anderson (1985), Livingston (1989, 1991), Lang et al. (2003), Westrheim (1996), and Yang (2004). The composition of Pacific cod prey varies to some extent by time and area. In terms of percent occurrence, some of the most important items in the diet of Pacific cod in the BSAI and GOA have been polychaetes, amphipods, and crangonid shrimp. In terms of numbers of individual organisms consumed, some of the most important dietary items have been euphausiids, miscellaneous fishes, and amphipods. In terms of weight of organisms consumed, some of the most important dietary items have been walleye pollock, fishery offal, yellowfin sole, and crustaceans. Small Pacific cod feed mostly on invertebrates, while large Pacific cod are mainly piscivorous. Predators of</p>

Pacific cod include Pacific cod, halibut, salmon shark, northern fur seals, Steller sea lions, harbor porpoises, various whale species, and tufted puffin. Major trends in the most important prey or predator species could be expected to affect the dynamics of Pacific cod to some extent.

<http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPcod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOApcod.pdf>

FATE research. NOAA also supports the Fisheries And The Environment (FATE) program to ensure the sustainable use of US fishery resources under a changing climate. The focus of FATE is on the development, evaluation, and distribution of leading ecological and performance indicators.

<http://fate.nmfs.noaa.gov/projects>

PICES Special Publication 1: Marine Ecosystems of the North Pacific.

The North Pacific ecosystem status report is a contribution by the North Pacific Marine Science Organization (PICES) to identify, describe, and integrate observations of change in the North Pacific Ocean that are occurring now, and have occurred during the past several years; it will remain a work-in-progress. Publication 1 represents the first attempt to describe, in a systematic and integrated fashion, the state of the North Pacific Ocean. This first step describes the present state of the marine ecosystems of the North Pacific Ocean (status), in the context of their recent past (last five years) and longer variability (trends); it summarizes regional assessments into a broad basin-wide synthesis; identifies critical factors that cause changes in these ecosystems; and it identifies key questions and critical data gaps that inhibit understanding of these marine ecosystems

http://www.pices.int/publications/special_publications/NPESR/2005/npesr_2005.aspx

The North Pacific Research Board (NPRB) was created by Congress in 1997 to conduct research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean with a priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs. While the NPRB has invested millions of dollars on obtaining this objective, they have also developed two special projects that seek to understand the integrated ecosystems of the BSAI and GOA. For the GOA Integrated Ecosystem Research Program, more than 40 scientists from 11 institutions are taking part in the \$17.6 million Gulf of Alaska ecosystem study that looks at the physical and biological mechanisms that determine the survival of juvenile groundfish in the eastern and western GOA. The study includes two field years (2011 and 2013) followed by one synthesis year (<http://gulfofalaska.nprb.org/>).

For the Bering Sea, a large multiyear ecosystem project is winding towards completion. It consists of two large projects that will be integrated. One funded by the National

Science Foundation (NSF's BEST program is the Bering Ecosystem Study, a multi-year study (2007-2010)). The other funded by NPRB (BSIERP, is the Bering Sea Integrated Ecosystem Research Program (2008-2012)). The overlapping goals of these projects led to a partnership that brings together some \$52 million worth of ecosystem research over six years, including important contributions by NOAA and the US Fish & Wildlife Service. From 2007 to 2012, NPRB, NSF, and project partners are combining talented scientists and resources for three years of field research on the eastern Bering Sea Shelf, followed by two more years for analysis and reporting (<http://bsierp.nprb.org/focal/index.html>).

The NPFMC has been concerned that the warming Arctic and BS may cause groundfish to migrate more northward. Some recent research indicates that cold pools of water near the bottom may keep pollock from moving north into the Arctic. As scientists observed climate warming in the Bering Sea, they suspected valuable commercial fish species such as Pacific cod and walleye pollock would move north toward the Bering Strait and into the Arctic Ocean. Scientists say a pool of cold water in the northern Bering Sea has been a locked door to the northward migration of pollock and cod. Water along the ocean floor where pollock live has been kept cold by the layer of sea ice that forms every winter on the surface of the northern Bering Sea. That ice is expected to persist even with climate warming. Cold water sets up below the ice layer and remains cold throughout the summer.

<http://juneauempire.com/state/2011-10-24/bering-sea-study-detects-cold-pool-keep-valuable-walleye-pollock-cod-moving-north>

The Final Programmatic Supplemental Environmental Impact Statement is an extensive review of the Alaska Groundfish Fisheries (PSEIS) (NMFS 2004). It provides information about effects of the fishery on the ecosystem and effects of the ecosystem on the groundfish fishery.

http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Exec_sum.pdf
http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_5.pdf

Lastly, the NPFMC has and will continue to consider habitat protection measures. They are particularly tasked with the assessment of EFH as it pertains to managed species (i.e., Pacific cod).

<http://www.fakr.noaa.gov/npfmc/conservation-issues/habitat-protections.html>

Evidence adequacy rating:													
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low													
Clause	Evidence												
13.1.1	<p>Rating determination</p> <p><i>Adverse environmental impacts on the resources from human activities (fishing and non-fishing activities) are assessed and, where appropriate, corrected (NEPA).</i></p> <p>The Final Programmatic Supplemental Environmental Impact Statement is an extensive review of the Alaska Groundfish Fisheries (PSEIS) (NMFS 2004). It provides information about effects of the Alaska groundfish fisheries on the ecosystem and effects of the ecosystem on the groundfish fisheries.</p> <p>http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Exec_sum.pdf http://alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_5.pdf</p> <p>The Pacific cod resource in the BSAI and GOA stocks appears to be above their target reference point B₄₀%.</p> <table border="1"> <thead> <tr> <th>Stock</th> <th>Target Reference Point (TRP)</th> <th>Biomass at TRP</th> <th>Biomass at present</th> </tr> </thead> <tbody> <tr> <td>BSAI</td> <td>B₄₀%</td> <td>355.000 t</td> <td>410.000 t</td> </tr> <tr> <td>GOA</td> <td>B₄₀%</td> <td>104.000 t</td> <td>121.000 t</td> </tr> </tbody> </table> <p>http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPCod.pdf http://www.afsc.noaa.gov/REFM/docs/2011/GOAPCod.pdf</p> <p>Regarding the EBS - AI Pacific cod split and the potential conservation status of AI Pacific cod, described elsewhere in the document, the SSC intends to set separate ABC/OFL for EBS Pacific cod and AI Pacific cod for the 2014 fishing season based on the best available information at that time, regardless of whether the age-structured model in preparation for AI cod is adequate for stock status determinations. SSC recommendation advised the Council to initiate preparation of any background supporting documents such as a supplemental NEPA document that may be required for specification of separate ABCs/OFLs in 2014'. There is a high degree of certainty that the NPFMC will implement this action at the December 2013 NPFMC meeting, in advance of the 2014 Pacific cod harvest season.</p> <p>NEPA – The NPFMC’s analytical review documents that evaluate proposed changes to the conservation and management of groundfish and shellfish stocks for which they are</p>	Stock	Target Reference Point (TRP)	Biomass at TRP	Biomass at present	BSAI	B ₄₀ %	355.000 t	410.000 t	GOA	B ₄₀ %	104.000 t	121.000 t
Stock	Target Reference Point (TRP)	Biomass at TRP	Biomass at present										
BSAI	B ₄₀ %	355.000 t	410.000 t										
GOA	B ₄₀ %	104.000 t	121.000 t										

responsible, are NEPA compliant documents. These documents are widely distributed and made available so that the public at large and other natural resource, management or development agencies will have an opportunity to testify or comment on possible impacts to their sphere of influence. In like manner, when other resource, development or management agencies that receive federal funds wish to implement new activities or develop new regulations that may impact fisheries under the auspicious of the NPFMC, they must also develop NEPA documents which show their project's plan conform to existing FMPs and seek comments from the NPFMC on ways that their proposed activities may impact the NPFMC. Specifically, NEPA requires federal agencies to prepare Environmental Assessments or Environmental Impact Statements prior to making decisions.

http://www.solano.com/pdf/N20_TOC.pdf (The NEPA Book) or
http://www.solano.com/old_site_02/oldsite/bookinfo_nepa.htm

See also the evidence provided in clause 13.1.

Impacts of non-fishing activities

The waters and substrates that comprise EFH are susceptible to a wide array of human activities unrelated to fishing. Broad categories of such activities include, but are not limited to, mining, dredging, fill, impoundment, discharges, water diversions, thermal additions, actions that contribute to nonpoint source pollution and sedimentation, introduction of potentially hazardous materials, introduction of exotic species, and the conversion of aquatic habitat that may eliminate, diminish, or disrupt the function of EFH.

In November 2011, the NMFS produced a report relating to the impacts to EFH from non-fishing activities in Alaska. The general purpose of this document is to identify non-fishing activities that may adversely impact EFH and provide conservation recommendations that can be implemented for specific types of activities to avoid or minimize adverse impacts to EFH. This information must be included in FMPs. Non fishing activities discussed in the document are subject to a variety of regulations and restrictions designed to limit environmental impacts under federal, state, and local laws. Also, NEPA requires federal agencies to prepare Environmental Assessments or Environmental Impact Statements prior to making decisions.

NEPA documents on oil and gas exploration are very common, and in many cases involve interaction with fisheries management organizations due to potential or proposed spatial overlap between living and non living resources.

Evidence

<http://alaskafisheries.noaa.gov/habitat/efh/nonfishing/impactstoefh112011.pdf>

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
13.1.2	<p>Rating determination</p> <p><i>Fishery Effects on the Ecosystem are in assessed in the SAFE Ecosystem Considerations appendix. Overall there are significant efforts to consider and limit the effect of the fishery on the ecosystem and environment.</i></p> <p>Potentially, fisheries for Pacific cod can have effects on other species in the ecosystem through a variety of mechanisms, for example by relieving predation pressure on shared prey species (i.e., species which serve as prey for both Pacific cod and other species), by reducing prey availability for predators of Pacific cod, by altering habitat, by imposing bycatch mortality, or by “ghost fishing” caused by lost fishing gear. Overall there are strong efforts to consider and limit the effect of the fishery on the ecosystem and environment.</p> <p>Ecosystem impacts and gear modifications</p> <p>Gear modifications have been implemented in the BSAI and are in the process of being implemented in the GOA to lift the sweep off the seafloor and hence limit detrimental effects of fishing gear interacting with seafloor, habitat and related biota. Research has demonstrated that elevated sweeps also reduces unobserved mortality of crab from interacting with the trawl sweeps.</p> <p>There are also several regulations in place dealing with seabird avoidance, including circle hooks, scarelines, line settings, weighted longlines (see clause 8.4.3) for vessels fishing with hook-and-line gear. Further gear-related measures include (i) biodegradable panels required for pot gear, to minimize bycatch associated with ghost fishing of lost gear (5 AAC 39.145 <i>Escape Mechanism for Shellfish and Bottomfish Pots</i>) and (ii) tunnel openings for pot gear (tunnel eye openings must be 36 inches in perimeter or less) to reduce incidental catch of halibut and crabs. Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species.</p> <p>Bycatch</p> <p>Detailed bycatch reduction programs are in place for species impacted by the fishery such as crab, halibut, seabirds, as well as measures to allow sufficient cod resources for Steller sea lions predation.</p> <p>Incidental catches of no target species in the BSAI and the GOA in 2010-2011 are shown in Table 16. Only sea stars and giant grenadier account for a significant bycatch per year. With the development of the groundfish fisheries, regulations were implemented to limit bycatch of halibut, so as to minimize impacts on the domestic halibut fisheries. Interception of juvenile halibut (~30 cm and greater) often occurs in trawl fisheries</p>

targeting other groundfish species (such as rock sole, pollock, yellowfin sole, and Pacific cod). Incidental catch of halibut also occurs in groundfish hook and line and pot fisheries. Regulations require that all halibut caught incidentally must be discarded, regardless of whether the fish is living or dead. Halibut is a PSC species and reaching the PSC quota closes the fishery.

Table 16. Incidental catches (t) of non-target species groups in the BSAI and the GOA in 2010-2011.

Area	BSAI		GOA	
	2010	2011	2010	2011
Benthic urochordata	10	34	0	0
Birds	3	3	0	0
Bivalves	3	9	3	6
Brittle star unidentified	0	1	0	2
Capelin	0	1		
Corals bryozoans	12	7	0	1
Dark rockfish	4	0	12	1
Eelpouts	3	3	0	0
Eulachon	0	0	1	
Giant grenadier	515	1067	138	76
Greenlings	1	0	1	1
Grenadier	116	10	0	4
Gunnels				
Hermit crab unidentified	1	1	2	1
Invertebrate unidentified	45	46	1	8
Lanternfishes (myctophoidae)				
Misc crabs	6	3	3	2
Misc crustaceans	0	0		0
Misc fish	58	92	87	127
Misc inverts (worms etc	0	0		
Other osmerids	0	0		
Pacific sand lance	0	0		0
Pandalid shrimp	0	0	0	
Polychaete unidentified	0	0		
Scypho jellies	42	180	11	1
Sea anemone unidentified	85	123	7	9
Sea pens whips	23	24	3	1
Sea star	154	148	868	675
Snails	18	18	1	1
Sponge unidentified	14	13	0	0
Stichaeidae	0			0
Surf smelt				
Urchins dollars cucumbers	2	4	1	2

PSC

Incidental catches of PSC in 2010-2011 are shown in Table 17. Catches of prohibited species are highest for halibut and crabs.

Table 17. Catches of prohibited species by BSAI and GOA Pacific cod fisheries in 2010-2011.

Area	BSAI		GOA	
	2010	2011	2010	2011
Halibut (kg)	>6.6*10 ⁶	>3.9 * 10 ⁶	>2*10 ⁶	>2*10 ⁶
Herring (kg)	94	6	0	0
Chinook salmon (n)	1264	480	435	1247
Non Chinook salmon (n)	47	287	114	0
Bairdi tanner crab (n)	>400*10 ³	>300*10 ³	>170*10 ³	>18*10 ³
Blue king crab (n)	>54*10 ³	>1*10 ³	0	0
Golden king crab (n)	903	385	0	2
Opilio tanner crab (n)	>300*10 ³	>190*10 ³	18	0
Red king crab (n)	>6*10 ³	>18*10 ³	0	0

Seabirds

NOAA has developed a Fisheries National Seabird Program which addresses an array of seabird issues, i.e. monitoring and reducing seabird bycatch in US marine fisheries, working globally to reduce seabird interactions in international fisheries, and promoting the importance of seabirds as ecosystem indicators and a vital component of healthy ocean ecosystems.

The FMA Division supports the world’s largest seabird bycatch monitoring effort through the North Pacific Groundfish Observer Program. Between 36,000 and 39,000 coverage days are completed each year in the Alaskan groundfish fisheries (longline, pot, pelagic trawl, and non-pelagic trawl), and data are provided for analysis of seabird bycatch. The AFSC has been producing estimates of seabird bycatch in Alaskan groundfish fisheries since the late 1990s.

Incidental Take of an Endangered Short-Tailed Albatross in the Pacific cod fishery

In 2011, a groundfish fishery observer reported to their inseason advisor that they had recovered a short-tailed albatross (*Phoebastria albatrus*) (listed as endangered under the US Endangered Species Act in 2000) while monitoring gear retrieval on a Bering Sea freezer longline vessel fishing for Pacific cod. The AFSC immediately reported this take to the U.S. Fish and Wildlife Service and also informed interested parties in NOAA, the fishing industry, and environmental non-government organizations. Based on information supplied by AFSC staff, the Alaska Regional Office issued a Fisheries Information Bulletin on 31 October 2011, describing this most recent take. The Short-tailed Albatross Biological Opinion for the longline fleet allows for 4 observed birds in a

two-year period. This is based on observed birds, whether within or outside of the actual sample period, and is not based on the extrapolated numbers. A new 2-year period began on 16 September 2011, making this the first take in the current period. The vessel was using paired streamer lines and had not observed any short-tailed albatross in the area prior to the take event.

This single Short-tailed albatross recorded by an observer expanded to an estimate of 5 birds taken by the Pacific cod fishing fleet in 2011, according to the bird catch according system. No reported Short-tailed albatross takes thus far in 2012.

Some of the most current species status information for the North Pacific albatrosses can be found on the Agreement on the Conservation of Albatrosses and Petrels (ACAP) website, their [species assessments](#). The short-tailed, black-footed and Laysan albatross species are all listed under ACAP's Annex 1.

<http://www.acap.aq/acap-species/english/other-documents/species-assessments>

Seabird avoidance by fishing gears and methods

Several regulations on seabird avoidance by fishing gears and methods are in place. Regulations - 50 CFR 679: Fisheries of the Exclusive Economic Zone Off Alaska. These are specifically:

§ 679.2 Definitions. Definition of avoidance gear and seabirds.

§ 679.5 Recordkeeping and Reporting. 679.5(c)(1)(xvii) The bird avoidance gear codes used on Catcher Vessel Daily Fishing Logbook (DFL) and Catcher/processor Daily Cumulative Production Logbook (DCPL)

§ 679.24 Gear Limitations. 679.24(e) Seabird avoidance program for vessels fishing with hook-and-line gear.

§ 679.32 Groundfish and halibut CDQ catch monitoring. 679.32(f)(5) Seabird avoidance requirements for CDQ.

§ 679.42 Limitations on use of QS and IFQ. 679.42(b)(2) Seabird avoidance gear and methods for IFQ.

§ 679.50 Groundfish Observer Program. 679.50(g)(1)(viii)(F) Vessel responsibilities for collecting all seabirds that are incidentally taken.

<http://www.fakr.noaa.gov/protectedresources/default.htm>

<http://www.fakr.noaa.gov/protectedresources/seabirds/regulations.htm>

<http://www.fakr.noaa.gov/protectedresources/seabirds/guide.htm>

<http://www.fakr.noaa.gov/protectedresources/seabirds/bycatchregs.htm>

Sharks

The GOA Pacific cod fisheries caught 27% of the total incidental catch of the spiny dogfish (Table 19) and 37% of the total incidental catch of the Pacific sleeper shark (Table 20). Spiny dogfish (*Squalus suckleyi*) is listed under the IUCN Red list as “Vulnerable”. Fisheries and population trend data indicate that the southern part of the Northeast Pacific stock has also declined through overfishing, but stocks appear stable off Alaska. <http://www.iucnredlist.org/apps/redlist/details/61413/0>

Table 19. Estimated catch (tons) of spiny dogfish in the GOA by fishery, 1990-1996 catch estimated by pseudo-blend estimation procedure (Gaichas et al. 1999). 1997-2001 catch estimated with NMFS new pseudo blend estimation procedure (Gaichas 2002). Years 2003-2010 from NMFS AKRO using the improved pseudo blend estimation procedure. Catch by target fishery and species are not available for 2002. Spiny dogfish do not occur in the Atka mackerel fishery. Bycatch in the halibut fisheries has been estimated by NMFS AKRO since 2003, but is based only on landed sharks and does not include discarded catch.

Fishery	Pollock	Pacific Cod	Flatfish	Rockfish	Halibut	Sablefish	Grand Total	Year % of Total 97-11
1990	57.6	36.0	13.5	1.8		59.0	170.9	
1991	29.3	52.6	16.2	16.4		26.2	141.2	
1992	84.4	50.5	116.0	22.4		40.7	320.6	
1993	137	10.1	138.5	2.4		95.3	383.4	
1994	22	16.9	83.4	2.5		35.4	160.2	
1995	2.8	28.1	24.1	18.4		50.7	140.6	
1996	2.9	15.3	182.6	19.8		79.5	336.9	
1997	2.8	57.6	137.2	326.2		133.7	657.5	8%
1998	4.9	727.2	69.0	3.1		59.6	864.9	10%
1999	8.6	160.2	56.6	4.8		83.4	313.6	4%
2000	18.7	29.4	66.3	146.6		136.6	397.6	5%
2001	11.6	172.8	162.5	25.1		122.1	494.0	6%
2002	-	-	-	-	-	-	-	
2003	6.1	43.6	166.0	35.5	6.6	17.3	275.0	3%
2004	9.2	19.6	15.5	2.3	13.4	123.2	183.2	2%
2005	15.2	27.9	50.1	2.8	17.3	329.3	442.7	6%
2006	50.0	113.2	122.9	2.0	713.2	147.4	1,148.6	14%
2007	47.6	250.2	151.4	6.2	210.5	165.6	831.4	10%
2008	59.6	289.6	87.3	4.8	0.5	91.1	533.0	7%
2009	17.6	113.7	204.8	7.0	603.2	80.7	1,027.1	13%
2010	19.8	118.1	164.0	3.5	21.4	70.8	397.7	5%
2011	1.5	20.0	46.8	0.7	69.1	248.9	387.1	5%
Fishery % of Total	3%	27%	19%	7%	21%	23%		

Table 20. Estimated catch (tons) of Pacific sleeper shark in the GOA by fishery, 1990-1996 catch estimated by pseudo-blend estimation procedure (Gaichas et al. 1999). 1997-2001 catch estimated with NMFS new pseudo blend estimation procedure (Gaichas 2002). Years 2003-2010 from NMFS AKRO using the improved pseudo blend estimation procedure. Catch by target fishery and species are not available for 2002. Bycatch in the

halibut fisheries has been estimated by NMFS AKRO since 2003, but is based only on landed sharks and does not include discarded catch.

Fishery	Pollock	Pacific Cod	Flatfish	Rockfish	Atka Mackerel	Halibut	Sablefish	Grand Total	Year % of Total 97-11
1990	2.9	9.9	0.4	4.3	0		2.2	19.7	
1991	27.2	2.8	3.1	0	0		16.2	49.4	
1992	1.1	27.4	2.7	0	0		6.4	37.6	
1993	156.5	21.8	1	0	0		35.5	214.8	
1994	79.6	16.6	0.8	1.3	0		21.2	119.5	
1995	16.9	13.7	20.7	0.1	0		11.6	63	
1996	14.5	11.9	12.1	0	0.2		26.4	65.9	
1997	22.3	59.3	46	0.9	0		7.5	135.9	4%
1998	32.4	19.6	10.1	0.2	0		11.3	74	2%
1999	34.1	505.8	6	3	0		8.7	557.7	17%
2000	178.4	376.8	35.9	0.3	0		16.7	608.2	18%
2001	145.9	65.8	6.3	0.7	0		30.3	249	7%
2002	-	-	-	-	-		-	-	
2003	50.3	56.3	93.0	0.3	0.0	59.1	9.2	268.1	8%
2004	168.9	25.5	73.7	0.8	0.0	8.4	4.2	281.3	8%
2005	196.0	133.8	129.6	0.2	0.0	2.2	18.9	480.7	14%
2006	153.5	13.5	60.4	0.4	0.0	0.8	23.1	251.7	7%
2007	58.9	9.1	222.7	0.0	0.0	3.7	0.7	295.1	8%
2008	47.5	13.2	2.0	1.1	0.0	0.0	0.7	64.6	2%
2009	30.2	4.3	14.5	0.3	0.0	0.0	0.2	49.5	1%
2010	149.6	2.0	7.9	0.0	0.0	0.0	0.4	159.8	5%
2011	2.7	3.9	9.9	2.1	0.0	0.0	4.3	22.9	1%
Fishery % of Total	36%	37%	21%	0%	0%	2%	4%		

There are currently no directed commercial fisheries for shark species in federally or state managed waters of the BSAI and the GOA, and most incidental catch is not retained. Spiny dogfish are allowed as retained incidental catch in some state managed fisheries, and salmon sharks are targeted by some sport fishermen in Alaska state waters. There is no evidence to suggest that overfishing is occurring for any shark species in the BSAI and the GOA because the OFL has not been exceeded.

Total shark catch in 2011 was 417 t in the GOA and 128 t in the BSAI as of October 11, 2011. Recommendations in the GOA sharks SAFE report recommend that the shark complex be managed with spiny dogfish as a Tier 5 species (OFL = FOFL (0.097)*3 yr average biomass, ABC = 0.75*OFL) and the remaining sharks (Pacific sleeper shark, salmon shark and other sharks) as Tier 6 species (OFL = average catch 1997-2007, ABC = 0.75*OFL). The recommended ABC is 5,766 t and OFL is 7,688 t for the spiny dogfish.

The shark complex (Pacific sleeper shark, spiny dogfish, salmon shark and other/unidentified sharks) in the BSAI are a Tier 6 complex, with OFL based on maximum historical catch between the years 1997 – 2007 (ABC is 75% of OFL). Changes in the CAS did not result in new estimates of maximum historical catch and thus did not change the proposed ABC/OFL. For 2011 the same ABC and OFL as in last year’s assessment are recommended: ABC = 1,020 t and OFL = 1,360 t.

Steller Sea Lions

Pacific cod is one of the four most important prey items of Steller sea lions. Furthermore, the size ranges of Pacific cod harvested by the fisheries and consumed by Steller sea lions overlap, and the fishery operates to some extent in the same geographic areas used by Steller sea lion as foraging grounds. The Fisheries Interaction Team of the Alaska Fisheries Science Center has been engaged in research to determine the effectiveness of recent management measures designed to mitigate the impacts of the Pacific cod fisheries (among others) on Steller sea lions.

The Steller sea lion (*Eumetopias jubatus*) was listed as a threatened species under the ESA in 1990 due to substantial declines in the western portion of the range. At the time of listing, the overall abundance of sea lions in the eastern portion of the range (in southeastern Alaska and Canada) was increasing at approximately 3% per year. Critical habitat was designated based on the location of terrestrial rookery and haulout sites, spatial extent of foraging trips, and availability of prey. In 1997, based on demographic and genetic dissimilarities, NMFS designated two distinct population segments (DPSs) of Steller sea lions under the ESA: a western distinct population segment (DPS) and an eastern DPS. Due to persistent decline, the western DPS was reclassified as endangered, while the increasing eastern DPS remained classified as threatened. Through the 1990s, the western DPS continued to decline. The western population showed an increase of approximately 3% per year between 2000 and 2004. This was the first recorded increase in the population since the 1970s. However, the most recent available data from incomplete non-pup surveys in 2006 and 2007 suggest that the overall trend for the western DPS, through 2007, is either stable or slightly declining. Data indicate there are significant trend differences amongst sub-regions within the western DPS. Based on 2004-2005 data, the total population size of western Steller sea lions in Alaska is estimated to be approximately 45,000 animals. The current (as of 2005) population of Steller sea lions in Russia (part of the western DPS) is estimated to be about 16,000. The eastern DPS was estimated to number between 46,000 and 58,000 animals in 2002, and has been increasing at approximately 3% per year since the late 1970s.

Critical habitat for Steller sea lions was designated by NMFS to respond to requirements of the Endangered Species Act. Steller sea lion critical habitat includes a 20 nautical mile buffer around all major haulouts and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas (see <http://alaskafisheries.noaa.gov/protectedresources/stellers/habitat.htm>).

In the late 1990s and early 2000s, NMFS reviewed and evaluated the potential impacts of federally managed groundfish fisheries in Alaska on Steller sea lions through a series of consultations. Two of those consultations resulted in a determination that the commercial fisheries were likely to jeopardize the continued existence of the western DPS of Steller sea lion and adversely modify its critical habitat. Therefore, as required under the ESA, additional conservation measures were implemented to avoid jeopardy and adverse modification. In 2002, NMFS implemented a set of regulations to change

spatial and temporal patterns of the pollock, Pacific cod and Atka mackerel fisheries throughout the range of the western stock in U.S waters (Angliss and Outlaw, 2006) which have been amended over time (see Sea Lion Protection Measures at website: <http://alaskafisheries.noaa.gov/sustainablefisheries/2003hrvstspecssl.htm>).

The management measures were intended to disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts. These measures were expected to promote the recovery of Steller sea lions in areas where potential competition from commercial fisheries may have contributed to the population decline.

Between 2000 and 2004, survey data suggested that the estimated overall abundance of the western DPS of Steller sea lions increased for the first time in decades. However, an increasing trend was not detected in all subregions, and incomplete data from 2006 and 2007 indicate the population overall is either stable or declining slightly. It is not known whether the slow down in decline, the period of increase, and the current stability or near stability is a result of management actions, natural changes in the ecosystem, or other factors.

Much of the effort was focused on eliminating the most direct and certain causes of decline (e.g., shooting, incidental takes). These efforts include the following:

- substantial reduction in disturbance of important rookeries and haulouts;
- substantial reduction in the incidental catch of Steller sea lions in commercial fishing operations, particularly the groundfish trawl fishery;
- significant efforts to reduce intentional take by prohibiting shooting at or near Steller sea lions
- intensive research to better describe the threats to Steller sea lions and provide management with options for recovery actions;
- potential reduction in the competitive interactions between Steller sea lions and commercial fisheries for pollock, Atka mackerel, and Pacific cod in Alaska;
- acquired additional information on the status, foraging ecology, and survivorship of Steller sea lions.

The extensive research program has increased the understanding of the relative impacts of threats that potentially impede the recovery of Steller sea lions. For the western DPS, the threats assessment concludes that the following threats are relatively minor: (1) Alaska Native subsistence harvest, (2) illegal shooting, (3) entanglement in marine debris, (4) disease, and (5) disturbance from vessel traffic and scientific research.

Although much has been learned about Steller sea lions and the North Pacific ecosystem, considerable uncertainty remains about the magnitude and likelihood of the following potential threats to the recovery of the western DPS (relative impacts in parenthesis): competition with fisheries (potentially high), environmental variability

(potentially high), incidental take by fisheries (low), toxic substances (medium) and predation by killer whales (potentially high). Uncertainty, controversy, and disagreement within the scientific and stakeholder communities with regards to the potential threat posed by killer whale predation is especially great, with conclusions about the magnitude of that threat being fairly polarized (low vs. high). However, due to the uncertainty and the need to be precautionary in the assessment of possible threats to the recovery of this endangered DPS, NMFS has categorized the relative potential impact of this threat as “potentially high”.

In contrast, no threats to continued recovery were identified for the eastern DPS. Although several factors affecting the western DPS also affect the eastern, these threats do not appear to be at a level sufficient to keep this population from continuing to recover, given the long term sustained growth of the population as a whole. However, concerns exist regarding global climate change and the potential for the southern part of the range (i.e., California) to be adversely affected. Future monitoring should target this southern portion of the range.

<http://www.fakr.noaa.gov/protectedresources/default.htm>

<http://www.fakr.noaa.gov/protectedresources/stellers/>

<http://www.fakr.noaa.gov/protectedresources/stellers/recovery.htm>

<http://www.fakr.noaa.gov/protectedresources/stellers/recovery/sslrpfinalrev030408.pdf>

Habitat Conservation

NMFS’s Habitat Conservation Division (HCD) works in coordination with industries, stakeholder groups, government agencies, and private citizens to avoid, minimize, or offset the adverse effects of human activities on EFH and living marine resources in Alaska. This work includes conducting and/or reviewing environmental analyses for a large variety of activities ranging from commercial fishing to coastal development to large transportation and energy projects. HCD identifies technically and economically feasible alternatives and offers realistic recommendations for the conservation of valuable living marine resources. HCD focuses on activities in habitats used by federally managed fish species located offshore, nearshore, in estuaries, and in freshwater areas important to anadromous salmon.

EFH in Alaska is identified in Fishery Management Plans developed by the NPFMC and approved by the Secretary of Commerce.

EFH for BSAI Pacific cod are:

Cod Eggs—No EFH Description Determined: Scientific information notes the rare occurrence of Pacific cod eggs in the BSAI.

Larvae – EFH for larval Pacific cod is the general distribution area for this life stage, located in epipelagic waters along the entire shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined; Insufficient information is available.

	<p>Late Juveniles – EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand.</p> <p>Adults – EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel.</p> <p><i>EFH for GOA Pacific cod are:</i></p> <p>Eggs – EFH for Pacific cod eggs is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and upper (200 to 500 m) slope throughout the GOA wherever there are soft substrates consisting of mud and sand.</p> <p>Larvae – EFH for larval Pacific cod is the general distribution area for this life stage, located in pelagic waters along the inner (0 to 50 m) and middle (50 to 100 m) shelf throughout the GOA wherever there are soft substrates consisting of mud and sand.</p> <p>Early Juveniles—No EFH Description Determined; Insufficient information is available.</p> <p>Late Juveniles – EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand</p> <p>Adults – EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the GOA wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel.</p> <p>Fishing’s effects on the habitat of Pacific cod in the BSAI and the GOA do not appear to have impaired either stock’s ability to sustain itself at or near the MSY level. When weighted by the proportions of habitat types used by Pacific cod, the long-term effect indices are low, particularly those of the habitats features most likely to be important to Pacific cod (infaunal and epifaunal prey). The fishery appears to have minimal effects on the distribution of adult Pacific cod. Effects of fishing on weight at length, while statistically significant in some cases, are uniformly small and sometimes positive. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.</p> <p>Evidence</p> <p>http://www.fakr.noaa.gov/habitat/efh.htm</p> <p>http://www.fakr.noaa.gov/habitat/default.htm</p> <p>http://www.fakr.noaa.gov/habitat/efh/review.htm</p>
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Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
13.1.3	As detailed above in Clause 13.1.2, there is specific information on the ecosystem impacts of fishing for the unit of certification.
Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
13.1.4	<p>Rating determination</p> <p><i>Impacts that are likely to have serious consequences (e.g. overfishing, habitat interaction, bycatch and endangered species interactions) are addressed.</i></p> <p>Impacts with serious consequences are assessed in the <i>SAFE Ecosystem Considerations appendix</i>, and are summarized in the respective chapters of the “Assessment of the Pacific Cod Stock in the Eastern Bering Sea and Aleutian Islands Area” and “Assessment of the Pacific Cod Stock in the Gulf of Alaska”, these were presented in clause 13.1.2. Habitat interaction is not considered significant due to the development of trawl sweeps modification, already implemented in the BSAI Region and to be implemented in the GOA in 2013/2014. Bycatch is recorded in detail and endangered species interactions with steller sea lions and short tailed albatrosses are tightly monitored and regulated. The BSAI and GOA stock are not overfished. However, recent evidence has warranted specific action relative to the AI Pacific cod stock due to conservation concerns. This issue has been raised as a minor non conformance under clause 6.1.3 and addressed with a corrective action plan. There is a high degree of certainty that separate OFL, ABC and TAC recommendations will be made at the NPFMC December 2013 public meeting to constrain harvest on the AI Pacific cod stock.</p> <p>Furthermore serious impacts are regulated in the FMPs by identifying ecosystem components and non-target stocks that vulnerable or important for food web functioning.</p> <p><u>These are:</u></p> <p>a) <u>Prohibited Species</u> – are those species and species groups the catch of which must be avoided while fishing for groundfish, and which must be immediately returned to the sea</p>

with a minimum of injury except when their retention is authorized by other applicable law or when their retention is required under section 3.6.1.2 of the FMP (see also Prohibited Species Donation Program described in section 3.6.1.1 of the FMP). Groundfish species and species groups under the FMP for which the quotas have been achieved shall be treated in the same manner as prohibited species. Pacific halibut, Pacific herring, Pacific salmon, steelhead trout, king crab, and Tanner crab are prohibited species in the BSAI and the GOA.

b) Forage fish species, which are a critical food source for many marine mammal, seabird and fish species. The forage fish species category is established to allow for the management of these species in a manner that prevents the development of a commercial directed fishery for forage fish. Management measures for this species category will be specified in regulations and may include such measures as prohibitions on directed fishing, limitations on allowable bycatch retention amounts, or limitations on the sale, barter, trade or any other commercial exchange, as well as the processing of forage fish in a commercial processing facility.

The state of the prohibited and forage species is considered in the setting MSY- and OY-levels. A programmatic supplemental environmental impact statement (PSEIS) was completed in June, 2004. The preferred alternative identified in the PSEIS retained the existing OY range. In addition to impacts on the stocks and stock complexes in the “target species” category the PSEIS analyzed impacts on prohibited species, forage fish, non-specified species, habitat, seabirds, and marine mammals. Ecosystem-level variables analyzed were pelagic forage availability, removal of top predators, introduction of non-native species, energy removal, energy redirection, species diversity, functional diversity (in terms of both trophic relationships and structural habitat), and genetic diversity. Effects were partitioned into direct and indirect effects, persistent past effects, reasonably foreseeable future external effects, and cumulative effects. For the preferred alternative, approximately half of the ecosystem-level effects were determined to be insignificant, conditionally significant/positive, or significant/positive; none were determined to be significant/negative.

The ecological factors that may be considered in the reduction of OY from MSY are described in section 4.6, ecosystem consideration for management of the groundfish fisheries, and is addressed in the ongoing consideration of this information in the development of the SAFE reports. Sections 4.6.2 and 4.6.3 describes climate implicated changes and ecosystem interactions that may be considered an ecological factor that may affect the setting of OY.

Evidence

<http://www.afsc.noaa.gov/REFM/docs/2011/BSAIPCod.pdf>

<http://www.afsc.noaa.gov/REFM/docs/2011/GOAPCod.pdf>

<p>Clause:</p> <p>13.2 Appropriate measures shall be applied to minimize:</p> <ul style="list-style-type: none"> • Catch, waste and discards of non-target species (both fish and non-fish species). • Impacts on associated, dependent or endangered species. <p style="text-align: right;"><i>FAO CCRF 7.6.9</i></p> <p style="text-align: right;"><i>Eco 31.1</i></p> <p>13.2.1 Non target catches, including discards, of stocks other than the “stock under consideration” shall be monitored and shall not threaten these non-target stocks with serious risk of extinction; if serious risks of extinction arise, effective remedial action shall be taken.</p> <p style="text-align: right;"><i>Eco 31.1</i></p>		
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
13.2	<p><i>Rating determination</i> <i>Appropriate measures are applied to minimize catch, waste and discards of non-target species (PSC, area closures, trawl and port gear modifications, longline seabird avoidance) and impacts on associated, dependent or endangered species.</i></p> <p>Bycatch is managed operationally by assessing bycatch species (see SAFE-reports and clause 13.1.2), having bycatch caps (PSC, see below), as well as data collection and validation by the observer program (see below).</p> <p>Measures applied to minimize catch, waste and discards of non-target species are described in the Management Measures for the BSAI and GOA Groundfish Fisheries given in the FMPs.</p> <p>These include for the BSAI: <u>Time and Area Restrictions</u> <i>All trawl:</i> Fishing with trawl vessels is not permitted year-round in the Crab and Halibut Protection Zone and the Pribilof Island Habitat Conservation Area. The Nearshore Bristol Bay Trawl Closure area is also closed year-round except for a subarea that remains open between April 1 and June 15 each year. The Chum Salmon Savings Area is closed to trawling from August 1 through August 31.</p> <p><i>Nonpelagic trawl:</i> The Red King Crab Savings Area is closed to nonpelagic trawling year round, except for a subarea that may be opened at the discretion of the NPFMC and NMFS when a guideline harvest level for Bristol Bay red king crab has been</p>	

	<p>established. The Aleutian Islands Habitat Conservation Area, Bering Sea Habitat Conservation Area, St. Matthew Island Habitat Conservation Area, St. Lawrence Island Habitat Conservation Area, Nunivak Island, Etolin Strait, and Kuskokwim Bay Habitat Conservation Area, and the Northern Bering Sea Research Area are closed to nonpelagic trawling year-round. Owners and operators of fishing vessels using nonpelagic trawl gear in the Modified Gear Trawl Zone, regardless of target species, must use modified nonpelagic trawl gear as required for the Bering Sea flatfish fishery.</p> <p><i>Bottom contact gear:</i> The use of bottom contact gear is prohibited in the Aleutian Islands Coral and Alaska Seamount Habitat Protection Areas year-round. The use of mobile bottom contact gear is prohibited year-round in Bowers Ridge Habitat Conservation Zone.</p> <p><i>Marine mammal measures:</i> Regulations implementing the FMP include conservation measures that temporally and spatially limit fishing effort around areas important to marine mammals. NMFS uses Steller sea lion protection measures (SSLPM) to ensure the groundfish fisheries off Alaska are not likely to jeopardize the continued existence of the western population of Steller sea lions or adversely modify their critical habitat. The management measures disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts.</p> <p><i>Gear test area exemption:</i> Specific gear test areas for use when the fishing grounds are closed to that gear type, are established in regulations that implement the FMP.</p> <p>http://www.fakr.noaa.gov/habitat/efh/review/efh_5yr_review_sumrpt.pdf</p> <p><u>PSC Limits</u></p> <p>Pacific halibut, Pacific herring, Pacific salmon and steelhead, king crab, and Tanner crab are prohibited species and must be avoided while fishing for groundfish and must be returned to the sea with a minimum of injury, except when their retention is required or authorized by other applicable law. Groundfish species and species under this FMP for which TAC has been achieved shall be treated in the same manner as prohibited species. When a target fishery attains a PSC limit apportionment or seasonal allocation, the bycatch zone or management area to which the PSC limit applies will be closed to that target fishery for the remainder of the year or season.</p> <p><i>Red king crab:</i> Based on the size of the spawning biomass of red king crab, the PSC limit in Zone 1 for trawl fisheries is either 23,000, 97,000 or 197,000 red king crab; attainment closes Zone 1.</p> <p><i>C. bairdi crab:</i> Established in regulation for trawl fisheries based on population abundance; attainment closes Zone 1 or Zone 2.</p> <p><i>C. opilio crab:</i> Established in regulation for trawl fisheries in the <i>C. opilio</i> Bycatch Limitation Zone based on population abundance, with minimum and maximum</p>	
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	<p>limits; attainment closes zone.</p> <p><i>Pacific halibut</i>: Halibut mortality limits established in regulation for trawl and non-trawl fisheries.</p> <p><i>Pacific herring</i>: 1% of the annual biomass of eastern Bering Sea herring, for trawl fisheries; attainment may close the Herring Savings Areas.</p> <p><i>Chum salmon</i>: Attainment of 42,000 fish limit in the Catcher Vessel Operational Area between August 15 and October 14 closes the Chum Salmon Savings Area for the rest of that time period.</p> <p><u>Gear modifications and regulation</u></p> <p>In addition to these measures, gear restrictions and other regulations have been implemented to reduce bycatch (See clause 8.4.2 for further discussion). For example:</p> <ul style="list-style-type: none"> • Biodegradable panels are required for pot gear, to minimize bycatch associated with so-called ghost fishing of lost gear. • Tunnel openings for pot gear are limited in size to reduce incidental catch of halibut and crabs. • Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species. • In 1999, the use of bottom trawl gear was prohibited for vessels targeting pollock in the Bering Sea, to reduce crab and halibut bycatch. • In 2011, a trawl sweep modification requirement was implemented for vessels participating in the Bering Sea flatfish fishery, to raise the trawl sweep off the seafloor. Research has demonstrated that this gear modification reduces crab bycatch and unobserved mortality of red king crab, Tanner crab, and snow crab. • There are several regulations in place towards seabird avoidance for vessels fishing with hook-and-line gear. Since 1997, NMFS has implemented and revised seabird avoidance measures to mitigate interactions between the federal hook and-line fisheries and seabird. The measures used in longline fisheries in Alaska include the use of streamer lines, sink baited hooks, circle hooks, line shooters, lining tubes, night settings etc. <p><u>Observer Program</u></p> <p>U.S. fishing vessels that catch groundfish in the EEZ, or receive groundfish caught in the EEZ, and shoreside processors that receive groundfish caught in the EEZ, are required to accommodate NMFS-certified observers as specified in regulations, in order to verify catch composition and quantity, including at-sea discards, and collect biological information on marine resources. A new North Pacific Observer Program (Observer Program) goes into effect January 2013 and makes important changes to how observers are deployed, how observer coverage is funded, and the vessels and processors that must have some or all of their operations observed. These changes will increase the statistical reliability of data collected by the program, address cost inequality among fishery participants, and expand observer coverage to previously unobserved fisheries.</p>	
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<p>For the GOA these include:</p> <p><u>Time and Area Restrictions</u></p> <p><i>All vessels:</i> Fishing or anchoring within the Sitka Pinnacles Marine Reserve is prohibited at all times.</p> <p><i>All trawl:</i> Use of trawl gear is prohibited at all times in the Southeast Outside district.</p> <p><i>Non-pelagic trawl:</i> The use of non-pelagic trawl is prohibited in Cook Inlet. Three types of closure areas are designated around Kodiak Island. Type I areas prohibit non-pelagic trawling year-round; Type II prohibit non-pelagic trawl from February 15 to June 15; adjacent areas designated as Type III may be reclassified by the Regional Administrator as Type I or Type II following a recruitment event. The Gulf of Alaska Slope Habitat Conservation Area is closed to non-pelagic trawling year-round.</p> <p><i>Bottom contact gear:</i> The use of bottom contact gear is prohibited in the Gulf of Alaska Coral and Alaska Seamount Habitat Protection Areas year-round.</p> <p><i>Anchoring:</i> Anchoring by fishing vessels in the Gulf of Alaska Coral and Alaska Seamount Habitat Protection Areas is prohibited.</p> <p><i>Marine mammal measures:</i> NMFS uses Steller sea lion protection measures (SSLPM) to disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts.</p> <p><i>Gear test area exemption:</i> Specific gear test areas for use when the fishing grounds are closed to that gear type, are established in regulations that implement the FMP.</p> <p>http://www.fakr.noaa.gov/habitat/efh/review/efh_5yr_review_sumrpt.pdf</p> <p><u>PSC Limits</u></p> <p>Pacific halibut, Pacific herring, Pacific salmon, steelhead trout, king crab, and Tanner crab are prohibited species and must be returned to the sea with a minimum of injury except when their retention is authorized by other applicable law. Groundfish species and species under this FMP for which the TAC has been achieved shall be treated in the same manner as prohibited species.</p> <p>The attainment of a PSC limit for a species will result in the closure of the appropriate fishery.</p> <p><i>Pacific halibut:</i> Halibut mortality PSC limits are established annually in regulation; may be apportioned by season, regulatory area, gear type, operation type, and/or target fishery.</p> <p><u>Bycatch Reduction Programs</u></p> <p>The NPFMC will annually review the GOA fisheries that exceed a discard rate of 5% of shallow water flatfish, and may propose management measures to reduce bycatch in these fisheries.</p> <p><u>Gear modifications and regulation</u></p> <p>In addition to these measures, gear restrictions and other regulations have been implemented to reduce bycatch (See clause 8.4.2 for further discussion). For</p>	
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	<p>example:</p> <ul style="list-style-type: none"> • Biodegradable panels are required for pot gear, to minimize bycatch associated with so-called ghost fishing of lost gear. • Tunnel openings for pot gear are limited in size to reduce incidental catch of halibut and crabs. • Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species. • In 2012, an amendment to the FMP for the GOA Management Plan has been proposed to require trawl sweep modification in the flatfish fishery in the Central GOA, and those modified trawl sweep requirements should be in place in 2013. • There are several regulations in place towards seabird avoidance for vessels fishing with hook-and-line gear. Since 1997, NMFS has implemented and revised seabird avoidance measures to mitigate interactions between the federal hook and-line fisheries and seabird. The measures used in longline fisheries in Alaska include the use of streamer lines, sink baited hooks, circle hooks, line shooters, lining tubes, night settings etc. <p>Details on each management measure can be found in the FMPs. Time trends in discards of the groundfish fishery are reported in the <i>SAFE Ecosystem Considerations appendix</i> as an ecosystem-based management indicator. In the appendix special consideration is given short-tailed albatross incidentally caught and killed on a longline fishing hook in the Bering Sea in late October in 2011. The event occurred along the EBS shelf on a longline vessel fishing for Pacific cod. This was the first recorded death of this species by a U.S. commercial fishing vessel this year and follows the two deaths recorded in the same fishery last year. Previous to 2010, the last recorded death in a U.S. commercial fishery was in 1998. Short-tailed albatross were federally listed as endangered under the US Endangered Species Act in 2000. The current ESA biological opinion species that the expected take (bycatch) in the longline fishery is four in any 2-year period. In the event that a fifth bird is bycaught, an ESA Section 7 consultation involving the U.S. Fish and Wildlife Service and the National Marine Fisheries Service must be initiated. This process can lead to additional regulatory action on the fishery.</p> <p>The short-tailed albatross were hunted to near extinction from the 1880s to the 1930s; by 1949 there were no known breeding colonies left. Since that time, the population has been increasing rapidly due to a combination of high annual breeding success ($\geq 54\%$) and high adult and juvenile survival ($\geq 95\%$ and $\geq 91\%$, respectively) (Zador et al., 2008b). These high survival rates suggest that fishery-related mortality currently appears to be a low risk for this population. However, given that the short-tailed albatross population is expanding rapidly ($\sim 7\%$ annually; USFWS (2005), Zador et al. (2008b)) it has been suggested that their spatial and temporal overlap with the Alaskan commercial fisheries will become more extensive (Zador et al., 2008a). Specifically, increases in the cod quota may lead to more bycatch incidents. Recent actions by the NPFMC to restructure the observer program and increase data quality</p>	
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	<p>may allow for more detailed monitoring and analysis of bycatch incidents.</p> <p>Other ecosystem-based management indicators related to the issue and referred to in the <i>SAFE Ecosystem Considerations appendix</i> include Structural epifauna, Forage species, Seabird Bycatch Estimates for Alaskan Groundfish Fisheries, Time Trends in Groundfish Discards, Time Trends in Non-Target Species Catch, Areas Closed to Bottom Trawling in the EBS/ AI and GOA and Number of endangered or threatened species.</p> <p>Evidence</p> <p>http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html http://www.fakr.noaa.gov/npfmc/conservation-issues/protected-species.html http://www.afsc.noaa.gov/refm/stocks/assessments.htm http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.45.pdf</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
13.2.1	<p><i>Rating determination</i></p> <p>Non target catches, including discards, of stocks other than the “stock under consideration” are monitored (observer program) and do not threaten these non-target stocks with serious risk of extinction; if serious risks of extinction arise, effective remedial action are taken (fishery closure).</p> <p>Please see the evidence provided in Clause 13.2. U.S. fishing vessels that catch groundfish in the EEZ, or receive groundfish caught in the EEZ, and shoreside processors that receive groundfish caught in the EEZ, are required to accommodate NMFS-certified observers as specified in regulations, in order to verify catch composition and quantity, including at-sea non target discards, and collect biological information on marine resources. A new North Pacific Observer Program (Observer Program) goes into effect January 2013 and makes important changes to how observers are deployed, how observer coverage is funded, and the vessels and processors that must have some or all of their operations observed. These changes will increase the statistical reliability of data collected by the program, address cost inequality among fishery participants, and expand observer coverage to previously unobserved fisheries.</p> <p>http://www.fakr.noaa.gov/sustainablefisheries/observers/</p>	

<p>Clause:</p> <p>13.3 The role of the “stock under consideration” in the food-web shall be considered, and if it is a key prey species in the ecosystem, management measures shall be in place to avoid severe adverse impacts on dependent predators.</p> <p style="text-align: right;">Eco 31.2</p>		
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
13.3	<p>Rating determination</p> <p>The role of the <i>Pacific cod in the food-web</i> is well described, assessed and considered in the management systems as given in the FMPs and SAFE Ecosystem Considerations appendix. Management measures are in place to avoid severe adverse impacts on dependent predators (<i>halibut, salmon shark, toothed whales, SSL</i>).</p> <p>As seen in the previous clauses, 13.1, 13.1.2, the NPFMC, NMFS and other institutions (universities, PICES, NPRB) have studied Pacific cod, and its place in the ecosystem. The role of the Pacific cod in the food-web has been studied, in the BSAI and GOA FMPs and SAFE Ecosystem Considerations appendix.</p> <p>Trophic interactions of Pacific cod are not comprehensively known. Larval feeding is poorly understood. At about 20 mm, larvae eat copepods, but it is unknown what they eat between yolk absorption and this size. Juveniles and adults are carnivorous, and feed at night. Young juveniles in the Bering Sea eat copepods, small shrimps and amphipods, and switch to more crabs with increased size. Adult Pacific cod are omnivores since their diet consists of whatever prey species is most abundant, incl. shrimp, mysids and amphipods, crabs, sandlance and walleye pollock. Larval Pacific cod preyed upon by pelagic fishes and sea birds. Juveniles are eaten by larger demersal fishes, including Pacific cod. Adults are preyed upon by steller sea lions, toothed whales, Pacific halibut and salmon shark. All these species are actively managed and protected through ESA requirements, PSC and OFL limits. The BSAI and GOA Pacific cod stocks are above target reference point, that should allow for enough Pacific cod availability in upper trophic levels.</p> <p>Evidence</p> <p>http://www.nwfsc.noaa.gov/publications/techmemos/tm44/pacificcod.htm http://www.afsc.noaa.gov/refm/stocks/assessments.htm</p>	

Clause:		
<p>13.4 Pollution, waste, catch by lost or abandoned gear are minimized, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost effective fishing gear and techniques.</p> <p style="text-align: right;"><i>FAO CCRF 7.2.2</i></p> <p>13.4.1 States shall introduce and enforce laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating there to (MARPOL 73/78).</p> <p style="text-align: right;"><i>FAO CCRF 8.7.1</i></p>		
Evidence adequacy rating:		
<p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
13.4	<p><i>Rating determination</i></p> <p><i>Pollution, waste, catch by lost or abandoned gear are minimized, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost effective fishing gear and techniques.</i></p> <p>The Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC) Regulations are in place that required used gear to be landed in ports for disposal. Other types of pollution (oil, chemicals, waste, harmful substances and garbage) are controlled under MARPOL and implemented under USCG, EPA or ADEC regulations. Their regulations are in many cases more stringent and broader in nature. All of these agencies have regulations that require individuals or industry to comply with their standards and expeditiously report any infractions to those regulations.</p> <p>Trawl sweeps modifications implemented in the BSAI fishery allow for a very significant decrease in habitat interaction and crab mortality and interaction. These measures are due for implementation in the GOA too, in 2013/2014. Longline gear is regulated to avoid seabird bycatch using streamer lines, sink baited lines, circle hooks, line shooters, night settings etc... Avoiding seabird bycatch increases the number of baited hooks present in the water and therefore improves fishermen CPUEs. Similarly, pot usage is controlled, first in term of a license limitation programme that limits participation to the fishery and secondly, in terms of number of fishable pots per vessel. Biodegradable panels are required for pot gear, to minimize bycatch associated with ghost fishing of lost gear. Tunnel openings for pot gear are limited in size to reduce incidental catch of halibut and crabs. Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target</p>	

	<p>species.</p> <p>Evidence</p> <p>http://www.fakr.noaa.gov/npfmc/bycatch-controls/CrabBycatch.html http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section070.htm http://www.imo.org/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol) http://www.uscg.mil/top/missions/marineenvironmentalprotection.asp http://www.epa.gov/lawsregs/topics/water.html#oceans http://dec.alaska.gov/spar/</p>	
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
13.4.1	<p>Rating determination</p> <p><i>Alaska enforces laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating there to (MARPOL 73/78).</i></p> <p>The information supplied above in Clause 13.4 describes the various state and federal agencies who implement regulations that meet or surpass the MARPOL regulations. Members of the Alaska fishing industry sit on the MARPOL advisory committee.</p>	

<p>Clause:</p>	
<p>13.5</p> <p>13.5.1</p>	<p>There shall be knowledge of the essential habitats for the “stock under consideration” and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved shall be avoided, minimized or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just that part of the spatial range that is potentially affected by fishing.</p> <p style="text-align: right;"><i>Eco 31.3</i></p> <p>Assessment and scientific evaluation shall be carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the introduction on a commercial scale of new fishing gear, methods and operations. Accordingly, the effects of such introductions shall be monitored.</p> <p style="text-align: right;"><i>FAO CCRF 8.4.7 Other 12.11</i></p>

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
13.5	<p>Rating determination <i>There is knowledge of the Pacific cod essential habitats and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved are avoided, minimized or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat is considered.</i></p> <p>The HCD works in coordination with industries, stakeholder groups, government agencies, and private citizens to avoid, minimize, or offset the adverse effects of human activities on Essential Fish Habitat (EFH) and living marine resources in Alaska. This work includes conducting and/or reviewing environmental analyses for a large variety of activities ranging from commercial fishing to coastal development to large transportation and energy projects. HCD identifies technically and economically feasible alternatives and offers realistic recommendations for the conservation of valuable living marine resources. HCD focuses on activities in habitats used by federally managed fish species located offshore, nearshore, in estuaries, and in freshwater areas important to anadromous salmon.</p> <p><u>Pacific cod EFH</u></p> <p>EFH in Alaska is identified in FMPS developed. EFH descriptions are comprised of text and maps (Maps are shown in section 3.1 of the Background section).</p> <p>EFH for BSAI Pacific cod are:</p> <p><i>Cod Eggs</i>—No EFH Description Determined: Scientific information notes the rare occurrence of Pacific cod eggs in the BSAI.</p> <p><i>Larvae</i> – EFH for larval Pacific cod is the general distribution area for this life stage, located in epipelagic waters along the entire shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) throughout the BSAI.</p> <p><i>Early Juveniles</i>—No EFH Description Determined; Insufficient information is available.</p> <p><i>Late Juveniles</i> – EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand.</p> <p><i>Adults</i> – EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel.</p> <p>EFH for GOA Pacific cod are:</p> <p><i>Eggs</i> – EFH for Pacific cod eggs is the general distribution area for this life stage, located</p>

in pelagic waters along the entire shelf (0 to 200 m) and upper (200 to 500 m) slope throughout the GOA wherever there are soft substrates consisting of mud and sand.

Larvae – EFH for larval Pacific cod is the general distribution area for this life stage, located in pelagic waters along the inner (0 to 50 m) and middle (50 to 100 m) shelf throughout the GOA wherever there are soft substrates consisting of mud and sand.

Early Juveniles—No EFH Description Determined; Insufficient information is available.

Late Juveniles – EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand.

Adults – EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the GOA wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel.

Habitat Effects

Fishing's effects on the habitat of Pacific cod in the BSAI and the GOA do not appear to have impaired either stock's ability to sustain itself at or near the MSY level. When weighted by the proportions of habitat types used by Pacific cod, the long-term effect indices are low, particularly those of the habitats features most likely to be important to Pacific cod (infaunal and epifaunal prey). The fishery appears to have minimal effects on the distribution of adult Pacific cod. Effects of fishing on weight at length, while statistically significant in some cases, are uniformly small and sometimes positive. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.

<http://www.fakr.noaa.gov/habitat/efh.htm>

<http://www.fakr.noaa.gov/habitat/default.htm>

<http://www.fakr.noaa.gov/habitat/efh/review.htm>

The NPFMC has, over the years, spent a lot of time in the NEPA process of fixed gear quotas and allocations (for example Halibut/sablefish IFQs and sablefish pot restrictions as well Pacific cod allocations) The NPFMC archives hold these records. The competitiveness of the fixed gear and the value of the resource have led to technological refinements to address economic and environmental issues. The development and use of selective, environmentally safe and cost effective gear, methods and techniques is common practice for the Pacific cod fishery. The gear as well as all the other plethora of management and operational control measures currently allowed for the fishery in question are in line with the management goals, conservation and optimum utilization of this resource.

Trawl gear modification

The issues of primary concern with respect to the effects of fishing on benthic habitat

using non pelagic bottom trawl gear are the potential for damage or removal of fragile biota within each area that are used by fish as habitat and the potential reduction of habitat complexity, benthic biodiversity, and habitat suitability. Based on the information available to date, the predominant direct effects caused by nonpelagic trawling include smoothing of sediments, moving and turning of rocks and boulders, resuspension and mixing of sediments, removal of seagrasses, damage to corals, and damage or removal of epibenthic organisms. Trawls affect the seafloor through contact of the doors and sweeps, footropes and footrope gear, and the net sweeping along the seafloor. Ninety percent of the area impacted by flatfish trawling is due to contact between the seafloor and the sweeps.

The RACE Division has actively collaborated with the BS flatfish fishing industry to develop fishing gear changes that reduce effects of flatfish trawling on the seafloor habitats of the EBS shelf. These conservation engineering efforts originally focused on modification to flatfish trawl gear to reduce impacts to benthic habitat.

Consultation processes and impact assessments have resulted in amendment 94 to the FMP in BSAI. This amendment requires participants using nonpelagic trawl gear in the directed fishery for flatfish in the Bering Sea subarea to modify the trawl gear to raise portions of the gear off the ocean bottom, and this requirement went into effect on January 2011. The gear modification consists in elevating devices to be placed on the trawl sweeps to lift the sweep off the seafloor.

In 2012, an amendment to the Fishery Management Plan for the GOA Management Plan has been proposed to require trawl sweep modification in the flatfish fishery in the Central GOA, and those modified trawl sweep requirements should be in place by 2013.

For further information, see clause 8.4.2 and related. See also previous clause dealing with time, and area closures applied for habitat protection, bycatch reduction and species conservation.

<http://www.fakr.noaa.gov/frules/75fr61642.pdf>

<http://www.fakr.noaa.gov/regs/679b27.pdf>

<http://www.fakr.noaa.gov/npfmc/PDFdocuments/bycatch/GOATrawlSweeps211.pdf>

http://www.fakr.noaa.gov/npfmc/PDFdocuments/conservation_issues/trawlmods112.pdf

<http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/GOA/GOASummary.pdf>

<http://www.fakr.noaa.gov/npfmc/conservation-issues/gear-mods.html>

<http://www.fakr.noaa.gov/npfmc/bycatch-controls/bsai-go-halibut-bycatch.html>

<http://www.fakr.noaa.gov/npfmc/bycatch-controls/GOA-crab-bycatch.html>

<http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.21.pdf>

<http://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1998.45.pdf>

<http://www.adfg.alaska.gov/FedAidpdfs/FMR11-65.pdf>

http://www.fakr.noaa.gov/habitat/efh/review/efh_5yr_review_sumrpt.pdf

<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/bsai-groundfish.html>

<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/goa-groundfish.html>

Evidence adequacy rating:	
<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
Clause	Evidence
13.5.1	<p>Rating determination <i>Assessment and scientific evaluation are carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the introduction on a commercial scale of new gear, methods and operations.</i></p> <p>The NPFMC already has fully mature fisheries and, unless a new gear can be found to conform to all existing laws and regulations it is not likely to be considered. Significant proposed changes to management go through the NEPA process. Never-the-less, the NPFMC and the industry are always looking at gear modifications, methods or operations that will reduce bycatch or minimize gear impact on the bottom habitat. The NPFMC has a structure of “Test Fisheries” that usually employs a research set aside of quota to test the new equipment, operation or methods. These Test Fishery operations are a full-fledged scientific evaluation, incorporating NMFS, NPFMC staff and industry to develop a plan, which the SSC must sign off on, a reasonable expectation of success and a full monitoring and assessment of the research project on completion. Often the project is more fully vetted through other scientific staff if the proposer seeks additional funds, such as NPRB who uses a very competitive open bid process. If the modification is accepted for commercial use after stringent field testing, the NMFS and the NPFMC will continue to collect data on the operation to see if the expected results appear.</p> <p>The Ecosystem chapter and the various fishing effects described in the BSAI and the GOA SAFE documents is the best understanding of habitat disturbances to date. Because the current ecosystem indices (i.e. FIB, species richness and Shannon-Wiener diversity index) all indicate fairly stable ecosystems, this may be applied as a form of baseline fishery impact.</p> <p>Fishing’s effects on the habitat of Pacific cod in the BSAI and the GOA do not appear to have impaired either stock’s ability to sustain itself at or near the MSY level. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.</p> <p>http://www.iphc.int/sa/bycatch/halexcl.pdf http://www.marineconservationalliance.org/?p=1362 http://www.fakr.noaa.gov/habitat/efh/review.htm http://www.st.nmfs.noaa.gov/st5/abstracts/The_Effectiveness_of_a_Halibut_Excluder_Device_and_Consideration_of_Tradeoffs_in_its_Application.html</p>

<p>Clause:</p> <p>13.6 Research shall be promoted on the environmental and social impacts of fishing gear and, in particular, on the impact of such gear on biodiversity and coastal fishing communities.</p> <p style="text-align: right;"><i>FAO CCRF 8.4.8, 7.6.4</i></p>		
<p>Evidence adequacy rating:</p> <p><input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low</p>		
Clause	Evidence	
13.6	<p>Rating determination</p> <p>The NEPA assessment analysis fully evaluates any proposed changes to existing FMP rules and policies as to their impact on biodiversity and coastal fishing communities.</p> <p>The NPFMC, the SSC, the AP and the NPRB all annually produce a list of research priorities that focus on timely and important management concerns. This list helps NMFS, NPRB and other research funding agencies focus their tight research funds to resolve topical fishery management issues. In addition, the NPFMC and NPRB seek individual, community, NGO and fishing industry regulatory or policy proposals and research proposals. This broad group of potential requesters of research or regulatory proposers assures the NPFMC that proposals will include those who are concerned that industrial fisheries such as Pacific cod may cause ecosystem or environmental concerns. Because rural coastal Alaskan communities are often concerned with potential impacts from industrial fisheries, they often go to the NPFMC and BOF with their concern over potential or perceived social impacts.</p> <p>The NEPA assessment analysis, fully described under fundamental clause 2’s supporting clauses, will fully evaluate any proposed changes to existing FMP rules and policies as to their impact on biodiversity and coastal fishing communities. But the MSA also assures that any proposed change will evaluate biodiversity and coastal fishing communities because of the EFH requirements of the MSA and because National Standard 8 requires the NPFMC to minimize adverse economic impacts on coastal fishing communities. Additionally, the NPFMC’s management objectives require that proposed changes promote sustainable fisheries and communities and increase Alaska Native Consultation. Lastly, NMFS has developed the Economic and Social Sciences Research Program within their REFM division; it provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs.</p> <p>Since coastal community members are important affected stakeholders, the AFSC’s Economic and Social Sciences Research (ESSR) Program has been preparing the implementation of the Alaska Community Survey, an annual voluntary data collection</p>	

	<p>program initially focused on Alaska communities for feasibility reasons, in order to improve the socio-economic data available for consideration in North Pacific fisheries management.</p> <p>Please see also Clauses 2.5, 2.6 and 4.3 for further details.</p> <p>Evidence</p> <p>http://www.nmfs.noaa.gov/sfa/magact http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf http://www.afsc.noaa.gov/REFM/Socioeconomics/Default.php</p>	
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Fundamental Clause 14 “Where fisheries enhancement is utilized, environmental assessment and monitoring must consider genetic diversity and ecosystem integrity” is not applicable to the Alaska Pacific cod commercial fishery as it is not an enhanced fishery.

8. External Peer Review

Summary and Recommendation Peer Reviewer A

The information presented in sections 1, 2 and 3 of the report provide sufficient information to support a broad understanding of the Pacific cod biology, stock structure and dynamics, stock assessment activities, fishing history and methods, main management entities and management systems in use by the Federal and State fisheries in Alaska. Both BSAI and GOA fisheries are managed under a structured and legally mandated system based upon and respecting International, National and local fishery laws. Management organizations participate in coastal area management and decision-making processes in support of sustainable use of living marine resources and the avoidance of conflict among users. The long-term management objectives for Alaska Pacific cod fisheries are explicitly translated into Fishery Management Plans (separate for the GOA and the BSAI) under the Magnuson Fishery Conservation Act and the Sustainable Fishery Act. Stocks of this species are successfully managed using effective data analysis system, which is based on information from commercial landings and transshipment reports, port and at-sea data collection by observers and data from fishery independent surveys. This information is obtained following the data collection program, which is probably one of the most extensive in the world. Stock assessment activities are appropriate and regular. Fishing's effects on the stocks and habitats of the Pacific cod in the BSAI and the GOA do not have impaired stocks' ability to sustain themselves at the MSY level. The fishery management plans define a series of target and limit reference points for Pacific cod and other groundfish that provide the framework to manage the fishable resources. These reference points are very conservative therefore making it highly unlikely that stocks will be fished beyond maximum production potential. Management actions and measures for the conservation of the Pacific cod stocks are based on the precautionary approach. The harvest control rules (OFL, ABC and respective mortality rates) become progressively precautionary with decreased available information, and catch options are automatically adjusted depending on the status of stocks and following a six-stage tier structure. These actions and measures are based upon verifiable evidence and advice from available scientific sources. Management measures, designed to maintain stocks at levels capable of producing maximum sustainable levels, are well defined. Fishing operations are to be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations. An effective legal and administrative framework is established and compliance ensured, through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction. Applicable sanctions for violations and illegal activities are of adequate severity to support compliance. Considerations on the Pacific cod fishery effects on the ecosystems of BSAI and GOA are based on best available science and on a risk based management approach for determining most probable adverse impacts, which are appropriately assessed and effectively addressed.

I entirely support all the report scores of particular Clauses, apart from Clause 1.2, which on my opinion, can be also scored with high level of confidence in the evidence adequacy. Because of the aforesaid I recommend that all fisheries contained in the report (Federal and State) identified and operating in US Bering Sea and Gulf of Alaska with all described gear types are suitable for certification under the FAO Based RFM programme.

Full Summary of comments

SECTION	
A	Fisheries Management System
1.	There must be a structured and legally mandated management system based upon and respecting International, National and local fishery laws and considering other coastal resource users, for the responsible utilization of the stock under consideration and conservation of the marine environment.
	<p>A high level of confidence in evidence adequacy is scored to the Clause 1.1. There is an effective administrative and legal framework established at the level of both Alaska State and federal administrations, which is adequate and efficient for fishery resources conservation and management of both state-managed and federal fisheries. The clause 1.2. "Management measures shall take into account the whole stock unit over its entire area of stock distribution" has been scored in the report with medium confidence as a minor non-conformance because "the empirical evidence for discrete stocks of Pacific cod between the Russian and US EEZs (Eastern/Western Bering Sea) is currently lacking". However, A.V.Vinnikov in his PhD dissertation "Pacific cod of Western Kamchatka: biology, stock dynamics and fishery" (December 2008, in Russian, an extended abstract available at http://www.imb.dvo.ru/files/Autoreferat_Vinnikov.pdf) used data of electrophoresis on 28 protein systems (5 polymorphic loci) and demonstrated that the Pacific cod of the Russian Western Bering Sea together with that of Okhotsk Sea (his target study) and of both southern and northern Kurile Islands belong to the Asiatic genetic pool, which is different from that of Pacific cod of North American waters. Therefore, on my opinion the clause 1.2 might be upgraded to the high level of confidence. Because the cod stocks of the Eastern Bering Sea are well isolated from those of the Western Bering Sea, Clauses 1.3 – 1.5 and 1.6.1 obviously are not applicable as indicated in the draft. The clause 1.6 should be scored with high level of confidence of evidence adequacy in agreement with the clear report statement "Only the U.S. federal government and the State of Alaska conduct conservation and management activities for Pacific cod off Alaska. Both state and federal management of Pacific cod display a clear means for financing the activities of fishery management organizations...". Procedures to keep the efficacy of current conservation and management measures and their possible interactions are under continuous review to revise or abolish them in the light of new information. They are well established within management system and mechanism for the revision of management measures exists. Also, the management arrangements and decision making processes for the Pacific cod fishery are well organized in a transparent manner so clauses 1.7-1.8 should be scored with the high confidence in evidence adequacy. Clause 1.9 is not relevant because there is no currently high seas harvest of the Pacific cod. A related statement of the report that "the Compliance Agreement is important if climate change ever alters stock distribution such that high seas harvests become a concern" likely is over-cautious. I can not imagine what kind of climate changes should happen that "fishable" demersal late juveniles and adults of the Pacific Cod that normally live from the inner shelf down to 200 m would be pushed into high seas, where bottom depths are of >2,000 m. Also, as it was stated in the Section F (Page 225) movement of the Pacific Cod north toward the Bering Strait and into the Arctic Ocean during oncoming climate warming is unlikely because this way would be locked by pools of cold water in the northern Bering Sea, which are expected to persist even with climate warming. So it difficult to expect that climatic changes (unless very catastrophic) could ever redistribute the stocks to such a degree that it might be harvested outside of the U.S.A. waters.</p> <p>The Assessment Team acknowledges the points raised by the peer reviewer. The evidence provided towards clause 1.2 have been verified from A.V.Vinnikov dissertation's abstract and has been included as part of the evidence for supporting clause 1.2. The non-conformance originally raised by the assessment team has now been closed, and supporting clause 1.2 is now in full conformance.</p>

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

I agree with the Clause 2.1 being scored as at the high level of confidence in evidence adequacy. The report and supporting documents unambiguously show that the Pacific cod fishery management organizations in Alaska participate in coastal area management-related institutional frameworks through the federal NEPA processes, as well as every agency in the executive branch of the Federal Government has a responsibility to implement NEPA. Both the NPFMC and the BOF are managing sustainable Pacific cod trawl, longline, pot and jig fisheries in Alaska's EEZ. There is no doubts that Clause 2.1.1 should be also scored as that of at the high level of confidence in evidence adequacy as it was proved in the report that "Alaska has appropriate, institutional and legal frameworks in order to determine the possible uses of coastal resources and to govern access to them taking into account the rights of coastal fishing communities and their customary practices to the extent compatible with sustainable development". The same for Clause 2.1.2 and 2.2 because in setting policies for the management of coastal areas, Alaska takes due account of the risks and uncertainties involved, and representatives of the fisheries sector and fishing communities are consulted in the decision making processes in respect to other activities related to coastal area management planning and development. The Clauses 2.3, 2.3.1 and 2.11 about fisheries practices to avoid conflicts among fishers and other users of the coastal area and elaboration of procedures and mechanisms to settle conflicts which arise within the fisheries sector and between fisheries resource users and other users of the coastal area should be also ranked with the high level of confidence in evidence adequacy. Meanwhile I think it is desirable to provide more detailed information about frequency of situations where a trawler incidentally runs over and pull longline or pots, if such information is available. The definition "are not reported as frequent" seems to be a bit vague; something like "... about once or twice every year for a fleet consisting of 30-40 trawlers, 5-7 potters, ca. 15 jiggers, and 25-35 longliners" (numbers there are fictional) might be more self-explanatory. Anyway, this remark is not crucial to impact scoring. Clauses 2.4 and 2.4.1 dealing with public awareness about protection and management of coastal resources and respective legislation also deserve high level of confidence. Scoring the Clause 2.5 with the same high level of confidence in evidence is also well supported. Multidisciplinary research in support and improvement of coastal area management using physical, chemical, biological, economic and social parameters are well organized at the large scale, are regular and at the highest scientific level so the Clauses 2.6 and 2.6.1 also deserve the high level of confidence. Clause 2.7 is not applicable. The clauses 2.8 and 2.9 should be scored with the high level of confidence because the intimate, routine and compatible collaboration between state and federal management as well as established mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas are thoroughly shown throughout the report. There is no doubt also that authorities representing the Alaska fisheries sector in the coastal management process have the appropriate technical capacities and financial resources, so the Clause 2.10 should being also scored the high confidence in evidence adequacy.

The Assessment Team acknowledges the points raised by the peer reviewer. No specific information is available to quantitatively define incidents between the various vessels in the fleet.

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

The Clause 3.1 should be scored with high level of confidence in evidence adequacy because long-term management objectives for Alaska Pacific cod fisheries are explicitly translated into Fishery Management Plans (separate for the GOA and the BSAI) under Magnuson Fishery Conservation Act and Sustainable Fishery Act. The Clauses 3.2.1 (Excess fishing capacity is avoided and exploitation of the stocks remains economically viable), 3.2.2 (The economic conditions under which fishing industries operate promote responsible fisheries are profitable and stable), 3.2.3 (The interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries, are taken into account), 3.2.4 (Biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected) and 3.2.5 (Depleted stocks are allowed to recover or, where appropriate, are actively restored) should be scored with high level of confidence in evidence adequacy.

There are some minor remarks: Page 109 “Vessels no longer hi-graded catch, so the resource was not wasted and the cod and pollock formally discarded are retained” – formerly discarded? Pages 111 and 113: I am a bit confused by a discrepancy between list of the species designated as endangered by NMFS and USFWS (eight whales) and the State Endangered Species list by ADFG that includes only three whale species. Could the difference between these lists be explained there in one – two sentences?

The Assessment Team acknowledges the points raised by the peer reviewer. Formally was a typo from formerly. State and federal management have different definitions for endangered species.

B Science and Stock Assessment Activities

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

Clauses 4.1, 4.1.1 and 4.1.2 require that reliable and accurate data for assessing the status of fisheries and ecosystems - including data on retained catch of fish, bycatch, discards and waste shall be collected at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and timely and reliable statistics on catch and fishing effort shall be compiled, updated and verified to allow sound statistical analysis for stock assessment. An adequate linkage between applied research and fisheries management shall be promoted. Both stocks of the Pacific cod (BSAI and GOA) in Alaska are assessed on the annual basis using data collected from commercial landings and transshipment reports, port and at-sea observer length sampling and length and age data from fishery independent surveys in the EBS, the AI and the GOA following the data collection program, which is probably one of the most extensive in the world. The report of Pew Institute for Ocean Science (available at http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/oceana_bycatch_110403.pdf) based on literature review and simulation studies suggest that coverage levels of > 20% for common species, and >50% for rare species, in most cases would give reasonably good estimates of catch composition and of the total bycatch. Many USA fisheries in the Atlantic and Pacific oceans have the observer coverage between 2 and 25% only (references within the mentioned PIOS report). The Alaska observer program in many cases covers most of the fleet activity, which is an outstanding achievement of the State groundfish fishery management. Direct trawl stock surveys are biennial for GOA and AI and annual for EBS that is sufficient for purposes of stock assessment and management. Clauses 4.3 (about sufficient knowledge of social, economic and institutional factors relevant to the fishery) and 4.3.1 (about data compilation and their availability in sub-regional or regional fisheries management organizations) also

deserve high level of confidence in evidence adequacy. Because of the aforesaid the next Clauses 4.4 and 4.5 requiring that states shall stimulate the research to support national policies related to fish as food and to ensure that the economic, social, marketing and institutional aspects of fisheries are adequately researched, monitored and analyzed for policy formulation also should be scored with high confidence in evidence adequacy. The same for Clause 4.6 dealing with traditional fisheries knowledge and technologies, in particular those applied to small-scale fisheries. Clauses 4.7-4.11 are not applicable. In respect to the Clause 4.8 see comments to the Clause 1.9. In summary, all applicable Clauses of this Section on my opinion should be scored with high level of confidence in evidence adequacy.

[The Assessment Team acknowledges the peer reviewer comments.](#)

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

All Clauses of this Section should be scored with high level of confidence in evidence adequacy. Nationally funded study undertaken by NMFS-AFSC is carried out by over 400 researchers, is engaged in a broad arena of science covering fishery resources, oceanography, marine mammal, and environmental research including impacts of global warming and the impact of receding ice cover in the North Pacific. They are joined by specialists of the Alaska Department of Fish and Game managing inshore (within 3 n.m.) waters as well as there are also a number of important research and monitoring programs undertaken by academic institutions. All these activities are coordinated within appropriate institutional framework – the National Standard Guidelines for Fishery Management Plans. Not many fisheries across the World might boast such a robust scientific support. The annual Ecosystem Considerations report provides detailed information on all kind of ecosystem parameters. The non-pelagic trawl fishery, which is of primary concern among fisheries with respect to the effects on benthic habitats, does not disturb more than 10-20% of the habitat and has a very moderate impact. Research catches show stability or even increase in numbers in bottom epifauna since 1990-ies in both EBS and GOA that is a sign of good environmental impact management. Scientific results are widely available both as peer-reviewed publications and reports.

[The Assessment Team acknowledges the peer reviewer comments.](#)

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

The BSAI and GOA fishery management plans define a series of target and limit reference points for Pacific cod and other groundfish that provide the framework to manage the fishable resources. The OY range was set at 85 percent of the MSY range, which on my opinion, is very reasonable. These reference points are very conservative therefore making it highly unlikely that stocks will be fished beyond maximum production potential. All clauses of this section should be scored with the high level of confidence in evidence adequacy. There is an outstanding mis-print in the expression (Page 158) [OFL<ABC<TAC](#), should be vice-versa.

[Assessment Team: mis-print corrected.](#)

<p>7. Management actions and measures for the conservation of stock and the aquatic environment must be based on the Precautionary Approach. Where information is deficient, a suitable method using risk assessment must be adopted to take into account uncertainty.</p>	
<p>Management actions and measures for the conservation of the Pacific cod stocks are based on the precautionary approach, and its implementation was historically very efficient. It was shown (page 44) that “from 1980 through 2011 TAC averaged about 83% of ABC, and aggregate commercial catch averaged about 90% of TAC”. The BSAI and GOA Pacific cod stocks are not overfished and are not approaching an overfishing condition (see also Fig. 2.4.18, page 161). The harvest control rules (OFL, ABC and respective mortality rates) become progressively precautionary with decrease of available information and catch options are automatically adjusted depending on the status of stocks and following six-stage tier structure. All applicable clauses of this section should be scored with the high level of confidence in evidence adequacy.</p> <p>The Assessment Team acknowledges the peer reviewer comments.</p>	
D	Management Measures
<p>8. Management must adopt and implement effective measures including harvest control rules and technical measures applicable to sustainable utilization of the fishery, and based upon verifiable evidence and advice from available scientific and objective, traditional sources.</p>	
<p>The Alaska Pacific cod fisheries in both GOA and BSAI are managed according to Fishery Management Plans that outline both conservation and management measures to balance long-term sustainability of the cod resources with optimum utilization, to achieve minimal negative impact on the environment as well as reduction in captures and discards of both target and non-target bycatch species. There is a range of time and area restriction put either on all vessels or on boats operating with particular gears. Trawl sweeps modifications (elevated sweeps can reduce unobserved mortality of crabs) have been implemented in the BSAI and the respective trial experiments are about to start in the GOA. Longline gear is regulated as for seabird avoidance measures. False tunnel modifications for pot gear allow a higher catch of cod and a considerable decreased bycatch of tanner crab. On my opinion, all applicable clauses of this section should be scored with the high level of confidence in evidence adequacy.</p> <p>The Assessment Team acknowledges the peer reviewer comments.</p>	
<p>9. There must be defined management measures, designed to maintain stocks at levels capable of producing maximum sustainable levels.</p>	
<p>Fishery Management Plans clearly define healthy management measures designed to maintain the cod stocks at levels capable of producing maximum sustainable levels as was already said above. A proper recognition is given to the traditional practices, needs and interests of indigenous people and local fishing communities by the Community Development Quota Program. Development and implementation of technologies and operational methods that reduce discards of the target and non-target species are well encouraged coupled with adequate observer control and legislative enforcement. Prohibited species catches must be discarded, hence their retention is prohibited. Reduction measures in terms of gear modifications for trawls, long-lines and pot gears are implemented for bycatch of crab, salmon, halibut and seabirds. The retention/improved utilization program has been improved for discard avoidance. Also fisheries are subject to closure if they attain either their seasonal or annual limit of allowed bycatch mortality. The entire set of management measures is very strict and there is no evidence of</p>	

circumvention of regulations relating to fishing selectivity and related impacts. All applicable clauses of this section should be scored with the high level of confidence in evidence adequacy. However, I can not help noticing that evidence for the Clause 9.8 exactly repeats those for the Clause 9.5 and contains little about collaboration between the State and relevant institutions, which is what it is supposed to be about. Such a successful collaboration is obvious from the body of text but it still should be evidenced here separately. Also, there is a mistake on page 194: “using a five-tier system” – a six tier system?

[Assessment Team: comment on clause 9.8 taken, clause modified as proposed. Six tier system also modified appropriately.](#)

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

Alaska enhances through education and training programmes the education and skills of fishers and, where appropriate, their professional qualifications are in agreement with international standards and guidelines. The state endeavours to ensure that all those engaged in fishing operations be given information on the most important provisions of the FAO Code of Conduct for Responsible Fisheries, as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations. Alaska maintains records of fishers, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with national laws. All clauses of this section should be scored with the high level of confidence in evidence adequacy.

[The Assessment Team acknowledges the peer reviewer comments.](#)

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

Management of the Alaska Pacific cod fishery by the NPFMC, BOF and the agencies responsible for implementation and enforcement of regulations ensure that effective mechanisms are in place to assure compliance. These enforcement measures include an extensive observer program, vessel monitoring systems on board vessels, USCG boardings and inspection activities and dockside landing inspections. All applicable clauses of this section should be scored with the high level of confidence in evidence adequacy.

[The Assessment Team acknowledges the peer reviewer comments.](#)

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

National laws of adequate severity are in place to provide for effective sanctions, which are exemplified in the Magnuson-Stevens Act schedule and penalty matrix. All applicable clauses of this section on my opinion should be scored with the high level of confidence in evidence adequacy.

[The Assessment Team acknowledges the peer reviewer comments.](#)

F	Serious Impacts of the Fishery on the Ecosystem
<p>13. Considerations of fishery interactions and effects on the ecosystem must be based on best available science, local knowledge where it can be objectively verified and using a risk based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem must be appropriately assessed and effectively addressed.</p>	
<p>Alaska’s fisheries management organizations assess the impacts of environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks, and assess the relationship among the populations in the ecosystem. Findings and conclusions are published in SAFE document, annual Ecosystem Considerations documents, and other research reports. Effect of the warming of Arctic and Bering Sea is under thorough consideration. Fishery Effects on the Ecosystem are assessed in the SAFE Ecosystem Considerations appendix. Critical habitats are as well assessed and rules and regulations are in place for their protection. There is a range of respective modifications of fishing gears as well as detailed bycatch reduction programs are in place for species impacted by the fishery such as crab, halibut, seabirds, and Steller sea lions. Incidental catches of non-target species are negligible. Overall there exist strong efforts to consider and limit the effect of the fishery on the ecosystem/environment and all adverse impacts are appropriately and effectively addressed. The one thing, which is not entirely clear for me is why the potential threat of toxic substances for the recovery of the western DPS of sea lions was assigned as “medium” (page 238). I think it should be clarified what are those “toxic substances” because (page 145) it was written that “Alaskan waters are relatively free of industrial pollutants, which are aggressively monitored by the DEC”. What was meant there – an oil spill by a tanker like Exxon Valdez once upon a time? Regardless this comment, all applicable clauses of this section on my opinion should be scored with the high level of confidence in evidence adequacy.</p> <p>Assessment Team: Aside from the Exxon Valdez Oil Spill in 1989, which occurred well after the Steller sea lion decline was underway, no other events have been recorded that support the possibility of acute toxicity leading to substantial mortality of Steller sea lions (Calkins <i>et al.</i> 1994). However, results from several studies, both published and still being conducted, do not permit the complete rejection of toxic substances as a factor that may currently impact sea lion vital rates. These studies have been conducted on both Steller sea lions and other pinniped species and are briefly reviewed in the March 2008 NMFS’s Recovery Plan for The Steller Sea Lion available at http://alaskafisheries.noaa.gov/protectedresources/stellers/recovery/sslrpfinalrev030408.pdf</p>	

Summary and Recommendation Peer Reviewer 2

While there is abundant evidence that the Alaska region Pacific cod fisheries are managed responsibly, the assessment report is not well written. Many sections of the report address general aspects of management and assessment of the groundfish fisheries off Alaska as a whole without specific focus on the Pacific cod fishery. In addition, some sections of the report fail to address the clauses they purport to address and in other instances, the assessment report fails to present evidence to support claims about performance with respect to clauses. The assessment report should do a better job of documenting exploitation rates for Pacific cod in the GOA, EBS, and AI and documenting that these exploitation rates are conservative in comparison to exploitation rates on other gadid stocks. The assessment report should describe the results of Management Strategy Evaluations of the Pacific cod fisheries and CIE reviews of the Pacific cod stock assessment models and what those results mean for assessment of the biological sustainability of the fishery.

This is a well-managed fishery but it is far from perfect. The assessment will be more credible if it is forthright in recognition of shortcomings of this fishery with respect to the assessment criteria. Basic shortcomings include the fact that the AI stock is distinct from the EBS stock but current management treats these two stocks as though they were a single stock. One consequence is that the AI stock has likely fallen below the B_{msy} proxy. This is undesirable from the perspective of the NPFMC’s harvest control rules, but this also highlights how conservative those control rules are. A second clear shortcoming is that limited entry in the federal fishery has not eliminated excess capacity and entry is not limited in the State fishery. This suggests that the excess capacity will only get worse over time. A third shortcoming is that the GOA multispecies trawl fishery engages in topping-off on high-value bycatch species and discards additional catches of those species once the Maximum Retainable Allowance has been reached. A fourth shortcoming of the Pacific cod fisheries is that there has been very little research on the social or economic dimensions of these fisheries and communities that serve as bases of operation for the fishing vessels, their owners, and crew and the processing operations that handle the catches. While I would not care to minimize the undesirability of these shortcomings, I doubt that they will jeopardize a conclusion that this is a responsibly managed fishery.

Full Summary of comments

	<p>Background Section</p>
	<p>This section is generally well-written and could be used as reference for following sections. Subsequent sections could be simplified and made less redundant by referring the reader to specific parts of the background section. There are a few issues that should be addressed in a revision of this section:</p> <ol style="list-style-type: none"> 1. Page 11. The discussion of regime shifts should not that although fishery management models attempt to reflect the effects of past regime shifts, they do not attempt to model the probability of future regime shifts. That is, the fishery management models provide forecasts conditional on continuation of the current regime. Assessment team agrees, change made. 2. Page 13. The discussion of stock structure could benefit from being reorganized to

describe stocks from one end of the range to the other rather than jumping around from north to south and east to west.

Assessment team agrees, change made.

5. The summary of catch history could benefit from discussion of the longer history of Pacific cod harvests in the Aleutian Islands region and from representing the full time series of catches in the modern era. These catches are represented in some figures included in later sections of the text. The longer time series of catches can be taken from Lynde (1986) or Bakkala (1993).

Assessment team agrees, change made.

7. No explanation is offered for why survey selectivity is higher in the AI than in the EBS. This is counterintuitive because the ratio of trawlable to non-trawlable habitat is much higher in the EBS. Similarly, there is no discussion of why survey selectivity is higher in GOA than in EBS. Again, this is counterintuitive given what is known of bottom habitat in these areas.

Assessment team response. The catchability coefficient in the AI is tuned to a higher value than the EBS because of the difference in survey net configurations between the two areas (Nichol et al. 2007). It is unclear whether this also applies to the GOA catchability or the reason is altogether different. As for the GOA, following a series of modifications from 1993 through 1997, the base model for GOA Pacific cod remained completely unchanged from 1997 through 2001. During the late 1990s, a number of attempts were made to estimate the natural mortality rate M and the shelf bottom trawl survey catchability coefficient Q , but these were not particularly successful and the Plan Team and SSC always opted to retain the base model in which M and Q were fixed at traditional values of 0.37 and 1.0, respectively.

8. The discussion of AI Pacific cod stock trends should include a discussion about what is known about migration between the AI and EBS and whether the apparent decline in AI abundance could be accounted for by migration into the EBS.

Assessment Team. Despite the BSAI region is managed as one unit, tagging studies (e.g., Shimada and Kimura 1994) have demonstrated significant migration both within and between the EBS, AI, and Gulf of Alaska (GOA). Several white papers and a stock structure report provide various lines of evidence suggesting that Pacific cod in the EBS and AI should be viewed as separate stocks. Building on earlier genetic studies by Canino et al. (2005), Cunningham et al. (2009), and Canino et al. (2010), Spies (2012) concluded that her study "provides the most comprehensive evidence to date for genetic distinctiveness and lack of gene flow between the Aleutian Islands and Eastern Bering Sea." This issue has been raised as a minor non conformance and addressed with a corrective action plan.

9. It is not clear from the text if Pacific cod abundance in state waters is taken into account in estimates of abundance in the EEZ. Does the expansion of survey observations extend into state waters or is it limited to federal waters?

Assessment Team. Six of the seven state-water fisheries are subject to an annual Guideline Harvest Level (GHL) calculated as a percentage of federal fishery quotas, covered by the NMFS groundfish trawl surveys. The ADFG conducts trawl survey to assess crab and

groundfish resources in Kodiak, Chignik, South Peninsula and Eastern Aleutian management districts. However, there is currently no Pacific cod stock assessment model in the state waters but ADFG shares the trawl survey data with the federal scientists for including in the calculation of ACL removals. NMFS is developing methods to fully incorporate ADFG trawl survey data into federal stock assessment and consequently SAFE reports.

10. Even though the AI model is preliminary, it should be summarized in the same way that the BSAI and GOA model parameters are summarized in Table 3.4.1 (page 40) and Table 3.4.1 (page 41).

Assessment team. The same table as for the BSAI and GOA is not available but specific information on the AI model and stock status has been included in the section.

11. Figures 3.5.1, 3.5.2, 3.5.3, 3.6.1, and 3.6.2 should be replaced with figures specific for Pacific cod catches (delete the other species as they are irrelevant to this assessment).

Assessment team disagrees. The assessment team has chosen to present figures specific to Pacific cod to highlight the economic value of the Pacific cod fishery in Alaska and to allow a comparison with the other groundfish fisheries.

12. The tables of bycatch are useful but it is not necessary for them to be reproduced in later sections of the assessment.

The assessment team is conscious that some section of the report may be repetitive but it was necessary to reproduce the tables of bycatches in the Clause 13.1.2 as evidence supporting the text.

13. Page 50. The assertion that the Pacific cod fishery is important to the economy of coastal Alaska is not supported by the information provided. That is, information about the magnitude and ex-vessel gross revenues associated with cod catches is uninformative about whether benefits of the fishery accrue to the state of Alaska let alone to coastal communities.

Assessment Team agrees. Information about benefits to coastal communities added.

15. Nowhere in this section or in the assessment is there a discussion of the sport fishery for Pacific cod. While sport catches are small compared to commercial catches, it should be noted that there are no season or bag limits on Pacific cod in the sport fishery.

Assessment Team. Despite the fact that the Pacific cod sport fishery is open all year long and there is neither bag limits nor size restriction, ADFG confirmed to the Assessment team that the catches are extremely small and do not grant extensive management measures. The Assessment team deemed irrelevant to include a discussion on this item.

A	Fisheries Management System
<p>1. There must be a structured and legally mandated management system based upon and respecting International, National and local fishery laws and considering other coastal resource users, for the responsible utilization of the stock under consideration and conservation of the marine environment.</p>	
<p>The discussion under clause 1.1 provides a useful summary of the framework for management of Pacific cod in state and federal waters off Alaska. The assessment authors correctly note that the population is not managed as a unit throughout its range but they also correctly note that there appears to be some genetic separation between stocks in different jurisdictions. It is unlikely that GOA stocks at the southeast boundary of Alaska are isolated from stocks at the northwestern boundary British Columbia. It is similarly improbable that Pacific cod in the eastern Bering Sea are isolated from Pacific cod in Russian waters immediately to the west of the convention line. These limitations should be explicitly noted and the text should include a brief discussion of what is known about migrations across these boundaries and justification for concluding that the overlap is not biologically significant. (This also applies to the discussion under clause 1.3, 1.4, and 1.5.).</p> <p>The Assessment Team acknowledges the points raised by the peer reviewer. However, further information came in regards to the Clause 1.2. In his PhD dissertation “Pacific cod of Western Kamchatka: biology, stock dynamics and fishery”, A.V.Vinnikov demonstrated that the Pacific cod of the Russian Western Bering Sea together with that of Okhotsk Sea (the target study) and of both southern and northern Kurile Islands belong to the Asiatic genetic pool, which is different from that of Pacific cod of North American waters. Then, the non-conformance originally raised by the assessment team was closed, and supporting clause 1.2 is now in full conformance. Information about cod genetics in BC Canada is already available in the text and highlights the genetic difference between Pacific cod in the GOA and BC. Moreover, the vast majority of cod catches in the GOA is taken in the Central and Western GOA, well away from the BC border, while the Eastern GOA is 1) currently closed to bottom trawl gear and 2) given the small TAC available for Southeast Alaska Pacific cod harvest, stock overlap and conservation concerns between BC and the GOA stocks, is likely very small and not significant.</p> <p>The discussion of the distinction between AI and EBS stocks suggests that the difference is recognized and that the NPFMC is moving towards separate management plans but fails to note that the stocks were not formally separated in the 2012 stock assessment and that they are not being managed separately in the 2013 fishery and that there is no timetable for separating management of AI and EBS stocks. This is important because provisional modeling suggests that the AI stock has been reduced to below the MSY proxy. That is, the AI stock appears to have been harvested to levels that begin to raise concern.</p> <p>Assessment Team agrees with the comment. This is a very important item and has been raised as a non conformance and later addressed with a corrective action plan. The plan details the action that will be taken at the Dec. 2013 Council meeting in Anchorage. Separate harvest recommendations between the BS and AI are planned to be implemented for the 2014 Pacific cod fishing season.</p>	

With respect to clause 1.2.3, it should be noted that it is not clear that sport fishing removals are accounted for in stock assessment and management of Pacific cod. While this is not likely to be problematic, the text should note that sport catches are small (give their magnitude) and that their omission from stock assessment and management models is unlikely to influence estimates of stock status.

ADFG confirmed to the Assessment team that the sport catches are very small and sport fishing removals are not accounted for in stock assessment and management of Pacific cod. The Assessment team deemed irrelevant to include a discussion on this item.

The text under clause 1.6 is a good example of one of the major problems with this assessment: rather than addressing this clause with information specific to the Pacific cod fishery, the assessment includes information that applies to the management of groundfish in the GOA and BSAI. The reader is not provided with any information to know what if any of the economic resources devoted to GOA and BSAI groundfish have been made available to the Pacific cod fishery. Here for example, the reader is provided with information about the NOAA budget and about various funds and accounts but from what is written, it is impossible for the reader to know if all or none of these funds have been applied to the management etc. of Pacific cod.

The Fisheries Management Plans (FMP) governs all groundfish fisheries of the BSAI and the GOA Management Areas. Some information such as stock assessment is available at the species level and some other information such as socio-economic and financial data are generally available at the groundfish species complex level. Table 6-1 of the FMPs (p. 133 for BSAI and p. 119 for GOA) provide detailed data on the estimated cost of groundfish fisheries management by agencies in a “typical” year in the period 2002-2006. It has not been possible to distinguish, in some cases, between GOA and BSAI and no data are available at the species level. The Assessment team deemed the information provided sufficient to support the Clause 1.6 requirements related to the financing of the Pacific cod fishery conservation, management and research.

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

The text under clause 2.1 provides a generic description of federal and state agencies involved in judging whether proposed actions comply with legal requirements. (Note that this material is repeated several times in subsequent sections of the assessment report.) While the Pacific cod fishery is subject to this generic review process, the assessment report would be strengthened if this section was rewritten to emphasize how the Pacific cod fishery is governed and managed.

The Assessment team acknowledges the point made. The Pacific cod fishery government and management are detailed in the Fundamental Clause 1 and its supporting clauses. The clause 2.1 refers to the participation of management organizations in institutional frameworks for a sustainable and integrated use of marine living resources. The evidence provided towards Clause 2.1 meet the requirements by describing how the Pacific cod management organizations participate

in coastal area management related institutional frameworks.

The text under clause 2.1.1 does a better job but still falls short of focusing on Pacific cod. Moreover, the discussion of CDQs included under this clause is inadequate as a discussion of measures undertaken to support the rights of coastal communities. Not only does the discussion of CDQs fail to focus on Pacific cod, but it implies that CDQ is the only management measure taken to foster development of Pacific cod fisheries in coastal communities. It would be appropriate to introduce a discussion of the purpose of the State waters Pacific cod fishery—a fishery that was carved out by the State over the objections of the NPFMC, carved out specifically to provide opportunity for entry of small vessels associated with coastal communities, vessels that were foreclosed from entry into the federal fisheries that had come to be dominated by large non-local vessels, vessels that had pushed through entry moratoria and license limitations that locked out entrance by vessels based in small coastal communities.

The Assessment team disagrees on the first part of the comment. CDQs were implemented to support the economic development of 65 communities within a fifty-mile radius of the BS coastline who participate in the program. The CDQ program allocated a portion of the BSAI harvest amounts to CDQ groups, including halibut, groundfish (pollock, Pacific cod, flatfish and rockfish), crab and bycatch species. The CDQ program was granted perpetuity status during the 1996 reauthorization of the MSA. The six CDQ groups are located throughout the western Alaska coastline and South towards the AI, these are:

- **Aleutian Pribilof Island Community Development Association (6 communities)**
- **Bristol Bay Economic Development Corporation (17 communities)**
- **Central Bering Sea Fishermen's Association (1 community)**
- **Coastal Villages Region Fund (20 communities)**
- **Norton Sound Economic Development Corporation (15 communities)**
- **Yukon Delta Fisheries Development Association (6 communities).**

The assessment team agrees on the second part of the comment, and the information has been added as proposed.

I disagree with the score assigned for clause 2.2. The structure of federal fisheries management is one that informs representatives of the fishing sector and communities but does not involve a formal consultation. Consultation would imply that the fishing sector and communities enter into the discussion in positions of strength. This is not the case. While the NPFMC is obligated to conduct public meetings and to hear public testimony, it is under no obligation to be swayed by public testimony or the expressed interests of fishing communities. This point is not merely semantic. Consultative management processes lead to management decisions that are more sensitive to the interests of those being consulted. The BOF process comes closer to being a consultative process because the BOF agenda is driven by proposals that emerge from local boards. But it too is an informative process rather than a consultative process because of constitutional constraints that limit the ability of the BOF to structure management processes to favor particular communities and their residents.

The Assessment team does not fully agree. The NPFMC and BOF processes are considered transparent and inclusive for the various stakeholders to participate. This has been confirmed through witnessing several of these public meetings over the past years, hearing public testimony

and the actions taken after these (in many cases in favor of those who testified) and has been repeatedly confirmed by the views of many stakeholders that Global Trust has sought information from. It is agreed that not every stakeholder point can be fully adopted in the management of a given fishery but the said federal and state processes offer a unique and important opportunity for stakeholder to get involved in the management process for these fisheries.

The response to clause 2.3.1 needs to be revised. It suggests that NEPA is a conflict resolution process. It is not. NEPA is a process that requires the assessment of potential impacts of federal action. It does not preclude actions that create conflict and it does not provide mechanisms for conflict resolution after the proposed action has been taken.

The NEPA process, through both administrative (through governmental agencies) and legal (through courts of law) procedures, tends to avoid, as appropriate, the emergence of conflicts. In most cases project approvals are withheld until substantive conflicts are resolved. NMFS and NPFMC will participate in the NEPA processes whenever resources under their management may be affected by other developments. The assessment team has made the revision.

The response to clause 2.5 needs revision. The primary sources of requirements for assessment of economic, social, and cultural values of coastal resources are not the MSA or NEPA but are instead the Regulatory Flexibility Act and Executive Orders 12866, 12291, 12898, and 13175. It should also be noted that the SSC has regularly criticized the adequacy of social and economic analyses included in NEPA documents and in Regulatory Impact Reviews and Regulatory Flexibility Act analyses, including analyses related to the management of Pacific cod fisheries in the GOA and BSAI.

Assessment team agrees, section modified as proposed.

The report on clause 2.6 does not include any information specific to the Pacific cod fishery. Yes, the text provides information on research budgets and research organizations, but it does not provide information to help the reader understand how much if any of the research enterprise pertains to Pacific cod. While some of the research pertains to multiple species and ecosystem processes and has some bearing on the biology, ecology, and management of Pacific cod, much of the university and agency work is entirely unrelated to Pacific cod. The NPRB web site includes a simple to use tool to sort for funded projects using species as the sort key. Similar searches for agency funded research in the agencies and the university would provide a reasonable approximation of the amount of research work focused on Pacific cod.

Assessment team. This clause is a general clause related to the monitoring of the coastal zone through various means. No changes are made.

Under clause 2.6.1, the report asserts that Alaska fishery management agencies promote multidisciplinary research related to environmental, biological, economic, social, and legal and institutional aspects of improved coastal area management. Unfortunately, the report does not provide evidence to support this claim. Again, a search of the NPRB project database will quickly demonstrate that very little money has been allocated to economic, social, legal, or institutional studies and even less has been allocated to multidisciplinary projects related to the management of Pacific cod.

Assessment team response. This clause has to be viewed as nested under the overall coastal zone management remit. No changes are made.

After noting in the background section that Alaska stocks of Pacific cod abut stocks in British Columbia and Russia, the assessment report under clause 2.7 seems inappropriately dismissive. Better to point the reader back to the introduction and to note that the stock overlap is not thought to be large and that there are mechanisms for the US, Canada, and Russia to share information about catches of Pacific cod.

Comment taken. The assessment team referred the reader to clause 1.2 where this argument is treated in large detail.

The text related to clause 2.9 is not specific to the Pacific cod fishery and is redundant with other discussions of NEPA and ANILCA.

This clause is a general clause related to the mechanism for cooperation and coordination among authorities involved in the management of coastal areas in Alaska. A good example for illustrating this process is the Pebble Mine Project in Bristol Bay Region of southwest Alaska (<http://dnr.alaska.gov/mlw/mining/largemine/pebble>). The submittal of development applications will require development of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA). The NEPA process will be a multi-year federal effort that mandates multiple opportunities for formal public comment and agency review. The Alaska Department of Natural Resources, Office of Project Management and Permitting, is responsible for coordinating the state permitting process. Although there are no formal public meetings planned by state or federal agencies prior to submittal of the permit applications, state agency staff continue to meet with communities, local government officials, and non-governmental organizations to discuss the project.

The text related to clause 2.10 would be more informative if it specified the number of state and federal personnel specifically tasked with Pacific cod abundance surveys, stock assessments, and in-season management and the amount of budget allocated to support their work.

Assessment team response: data specific to Pacific cod is not available.

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

The response to clause 3.1 could be strengthened by inclusion of a discussion of the Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement (PSEIS). The FMPs provide a description of short term management actions and objectives. The PSEIS considered a wider range of management options and their implications. There is no need to again repeat the 10 MSA national standards.

The Assessment team agrees. Inclusion of a discussion on the Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement has been included.

I disagree with the score given for clause 3.2.1. Actions taken to limit entry to the federal Pacific cod fishery may have helped prevent exacerbation of excess capacity but have not eliminated overcapacity. Moreover, unlike most state fisheries in which entry has been limited, entry is not limited in the state Pacific cod fishery. Furthermore, the state has stated in public meetings of the NPFMC that it will increase the GHL to match any increase in fishing capacity in the pot and jig sectors of the state-waters Pacific cod fishery. Any increase in the GHL is deducted from the TAC for the federal fishery, so while growth of the state fishery does not pose a threat to the Pacific cod stock, it exacerbates

overcapacity in the federal fishery and allows for ever increasing capacity in the state fishery.

The Assessment Team acknowledges the points raised by the peer reviewer. Assessment team response:

Point 1: stocks increase and decrease through the years therefore extra capacity may be required in some years and not in others.

Point 2: Excess capacity is measured against the ability of management to constrain harvest to the limited amounts (i.e. within TAC).

Point 3: It could be argued that this day and age, any fleet has the potential to harvest more than its quotas or allowances.

Point 4: ADFG, in charge of state waters management confirmed that it has had no issues with managing harvests within state waters fisheries for the species in question.

I disagree with the assessment for clause 3.2.2. There are no credible models of the economics of Pacific cod fishing vessels or of the sector as a whole. Not only are there no credible models of the demand for Alaska Pacific cod, there are no estimates of the marginal or average costs of harvesting or processing Pacific cod. The assessment could at least reference the market profiles included in the annual Economics SAFE. The figure included in this section is a repeat of a figure included in the Background and criticized there for not being specific to Pacific cod.

The Assessment team acknowledges the point. More specific information about Pacific cod economics has been included in clause 3.2.2.

Under clause 3.2.3, the discussion on CDQs should be edited to be specific to their catches of Pacific cod and their ownership in fishing and processing operations involved in the Pacific cod fishery. **Assessment team response. The CDQ quota share for Pacific cod is 10.7%. Change made.**

The text under clause 3.2.5 needs to be revised to address the fact that the SSC has recognized that AI and EBS Pacific cod are separate stocks and that best available estimates indicate that the AI stock is below the B_{msy} proxy value. **Assessment Team agrees. Section modified as proposed.**

B	Science and Stock Assessment Activities
<p>4. There must be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.</p>	
<p>I disagree with the rating assessed for clause 4.3. As previously noted, the impetus for economic analyses is the RFA, EO 12866, and other executive orders, not NEPA or MSA. In addition, the SSC has repeatedly criticized the adequacy of social and economic analyses prepared to support management actions proposed for the groundfish fisheries off Alaska, including actions that pertain to the Pacific cod fisheries. Note also that the RACE division does not produce the Economic Status report (Economic SAFE). That report is produced by the REFM division.</p>	

The Assessment team disagrees in regards to the rating of the clause. The Economic SAFE contains detailed information about socio-economic aspects of the groundfish fisheries including market profiles for the most commercially valuable species, included Pacific cod. The report also provides project descriptions and updates for ongoing groundfish-related research activities of the Economic and Social Sciences Research Program at the Alaska Fisheries Science Center. This report and the other listed in the clause provide sufficient knowledge of social, economic and institutional factors relevant to the fishery in question. However, the Assessment team agrees to add reference to the Regulatory Flexibility Act (RFA) and the Executive Order (EGO.) 12866 for improving the evidence provided.

Assessment Team: miss-print corrected (REFM instead of RACE).

The text under clause 4.3.1 needs to be revised. This section should address the compilation and distribution of social and economic data pertaining to the Pacific cod fishery. It does not. **The comment does not apply to clause 4.3.1 which deals largely with confidentiality requirements. No changes made.**

The text under clause 4.4 needs to be revised. The first paragraph is irrelevant to research and policies related to Pacific cod as food. Reference to FITC need to be revised. KSMSC replaced FITC in Fall 2011. **Assessment team agrees. Clause modified as proposed.**

I disagree with the rating given clause 4.5. Simple review of the NPRB project database shows that funding for economic, social, marketing and institutional aspects of fisheries is a tiny fraction of total project funding and that funding specific to these aspects of the Pacific cod fisheries is all but non-existent. **Assessment team disagrees. The clause is meant as a general clause, not necessarily specific to a given fishery.**

I disagree with the rating given clause 4.6. Neither the state nor the federal government has a formal program for gathering TEK related to the Pacific cod fishery. **The assessment team disagrees with the Peer Reviewer comment. Evidence for the contrary is provided in clause 4.6.**

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

My main criticism of this section is that it is not specific to Pacific cod. NMFS-AFSC may have 400 researchers looking at aspects of Alaska region fisheries but the reader is left with no way to know if all or none concern themselves with Pacific cod.

Assessment team agrees with the comment. Not all the NMFS-AFSC staff works on Pacific cod, this has been clarified in the text.

The response to clause 5.5 seems misdirected. It seems to me that the clause is focused on the type of data NMFS publishes in the SAFE and makes available online rather than the journal publications by NMFS staff. **All objective scientific evidence published accounts as evidence.**

I disagree with the rating assigned to clause 5.5.2. Elsewhere, the assessment report freely acknowledges that there is insufficient information for management of the AI stock—that is, there is a

data deficiency for the AI stock. The relevant question is then has research been initiated to address the deficiency? **The Assessment Team acknowledges the point raised by the peer reviewer. A lot of attention has recently been placed on Pacific cod. Recent examples have been the publications on the genetic independence of cod in the Aleutian Islands from the Eastern Bering Sea stock.**

I disagree with the assigned rating for clause 5.6. First off, NEPA and MSA are not the driving requirements for cost-benefit analyses. The drivers are RFA, EO 12866 and various other executive orders. Second, the SSC has repeatedly criticized the adequacy of economic analyses of proposed management actions, including actions affecting the Pacific cod fisheries. **Assessment Team response. Comment taken, changes made.**

The text for clause 5.7 needs to be edited to note that the requirement for cost-effectiveness analyses stems from EO12866. The requirement for assessment of social impacts is largely driven by additional executive orders. This section should, at minimum, list FMP amendments that affect operation of the Pacific cod fisheries. **Assessment team agrees. Clause modified as proposed.**

C	The Precautionary Approach
	<p>6. The current state of the stock must be defined in relation to reference points or relevant proxies or verifiable substitutes allowing for effective management objectives and target. Remedial actions must be available and taken where reference point or other suitable proxies are approached or exceeded.</p>
	<p>This section can be improved by focusing on the Pacific cod fishery. There is no need to describe all six tiers when the GOA and EBS fisheries are tier 3 and preliminary assessment of AI Pacific cod is tier 5. The target reference points for Pacific cod should be given in place of the generic discussion of reference points in the groundfish FMPs. The values reported in tables 6.1.3.1 and 6.1.3.2 should be updated to values published in the 2012 SAFE. Under clause 6.1.4, it should be noted that in-season management is used to close fisheries that have exceeded reference points. The Assessment Team acknowledges the point raised by the peer reviewer. The Assessment team used the December 2011 SAFE as the Pacific cod fishery assessment began in early 2012. Clause 6.1.4, change made.</p>
	<p>7. Management actions and measures for the conservation of stock and the aquatic environment must be based on the Precautionary Approach. Where information is deficient, a suitable method using risk assessment must be adopted to take into account uncertainty.</p>
	<p>This section can be improved by focusing on Pacific cod. Aggregate estimates of groundfish biomass, OFL, ABC, and TAC do not tell the reader anything about application of the precautionary principle in management of Pacific cod. For evidence of precautionary measures, look to the SSC reports and instances where the SSC set the OFL and ABC at lower levels because of uncertainty about model parameters or unfavourable trends. This has happened quite often in GOA cod. Assessment team response. The application of the precautionary approach (PA) in the fisheries management is based</p>

on the same principles for all groundfish fisheries, including Pacific cod.

The text under clause 7.1.1 should be replaced with a discussion specific to Pacific cod. **Assessment team response. The application of the precautionary approach (PA) in the fisheries management is based on the same principles for all groundfish fisheries.**

The text pertaining to clause 7.2.3 should be rewritten to note that while the harvest control rule is used to establish reference points, it is in-season management that ensures that conservation and management actions are triggered when reference values are approached. **The Assessment Team acknowledges the point raised by the peer reviewer, change made.**

The last paragraph on page 167 appears to be a quotation but there is no reference to where the quotation is from. Provide the reference or delete the quotation. **This text comes from the Dec 2011 SAFE documents, reference added.**

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

I disagree with the rating assigned for clause 8.1. There is no meaningful effort to estimate bioeconomic optima or to manage for bioeconomic optima in US fisheries. This is in sharp contrast to Australian fisheries where bioeconomic optima are explicitly calculated as provide a basis for selecting reference points. There is no need to reprint, yet again, the 10 MSA national standards. Nor is there any need to repeat boilerplate on OY, MFMT, etc. Replace this generic information with information specific to the Pacific cod fishery. Page 176. Please note that the AMEF has not met since August 2011 and is effectively moribund. The discussion of CDQs is does not constitute evidence of consultation with stakeholders nor do the Council’s *eventual* policy priorities constitute meaningful consultation. Simply note that the Federal process seeks to inform stakeholders of potential management actions, encourages stakeholders to comment on proposed actions, and may consider those comments in making decisions. Nevertheless, the federal fisheries management process is clearly not a consultative process.

The assessment team disagrees with the peer reviewer comments. The Alaska Pacific cod commercial fisheries are managed according to a modern management plan that attempts to balance long-term sustainability of the resources with optimum utilization. For every change/amendment or new development affecting fisheries management and therefore modifying the FMPs, there is an evaluation of alternative conservation and management measures, including considerations of their cost effectiveness and social impact. This fits accordingly with the requirements of this clause. No evidence has been removed as the clause deals with multiple requirements, not just the one on the consideration of cost-effectiveness and social impact when evaluating alternative conservation and management measures.

The text pertaining to clause 8.3.1 neglects to address the question of excess capacity and instead speaks to overharvesting. Overharvesting affects the biological sustainability of a stock. Excess

capacity affects the economic sustainability of a fishery. While it is hard to imagine overharvesting in the absence of excess capacity, the absence of overharvesting says nothing about the presence or absence of excess capacity. Because there are no credible models of vessel operational economics, there is insufficient information to determine if excess capacity is present and there are no measures in place to reduce capacity below what ever caps are established under license limitation. Clearly, the evidence adequacy rating for this clause should not exceed “medium”.

Assessment team disagrees. The clause requires that mechanisms be established where excess capacity exists to reduce capacity to levels commensurate with sustainable use of the resource. Levels “commensurate” with sustainable use of resource refers to the avoidance of overharvesting and the cod fishery in Alaska is neither overfished or undergoing overfishing. In other words, several mechanisms, including inseason monitoring, exist that restrain fishery harvest when the fishery is about to approach TAC, so as to avoid overharvesting of the resource.

8.4 could be considerably shortened by eliminating redundant text and figures. The text also needs a short discussion of technical measures in effect in the state-waters fisheries.

Assessment team agrees, changes made.

8.4.2 No evidence is provided for the dubious claim that halibut and sablefish IFQs led to gear improvements in the longline fleets (How did the gear change? Longliners still use circle hooks on gangions.)

Assessment team agrees. Clause modified to provide more clarity.

8.4.3 Should note that mobile gear does not carry identifying markings and thus derelict and discarded gear cannot be traced to specific vessels.

Assessment team response. Comment taken, clause modified.

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

9.1 Please clarify use of B35% here in place of B40% used elsewhere in the text. Note that AI stock is estimated to be below MSY. Table 9.1.1 and Table 9.1.2 are redundant.

Assessment team response. Comment taken, B35% modified to B40%. AI Pacific cod issue already treated under clause 6.1.3.

9.2 should be revised to replace generic discussion with discussion specific to Pacific cod fisheries.

Assessment team response. The evidence provided in the clause refers to the AK Pacific cod fisheries

9.3 Page 195 begins with a peculiar sentence about non-target trawl fisheries for halibut, crab, and salmon. Clearly this is just awkward writing as there are no trawl fisheries for these species. Generic discussion of measures taken in the groundfish fisheries should be rewritten to emphasize measures specific to the cod fisheries. This section lacks a discussion of practices in the state Pacific cod

fisheries.

Assessment team response. Points taken, changes made to the clause.

9.4 the first paragraph applies to halibut and blackcod fisheries. How does it apply to the Pacific cod fisheries? Please note that although pots must be individually marked and the number of pots carried is limited in some fisheries, there is no penalty for losing pots and there is no limit to the number of replacement pots that can be deployed.

Assessment team response. Pacific cod represent 46% and 56% of the IFQ halibut and sablefish fleet catches, respectively (Fishing Fleet Profile 2011).

I disagree with the rating assigned to clause 9.6. There are ample anecdotes record in testimony before the NPFMC to suggest that the GOA multispecies trawl fleet engages in selective fishing that includes topping-off loads with maximum retainable allowances of high-valued non-target species.

The Assessment Team acknowledges the point made by the peer reviewer but maintains high rating for the following reasons. The intent of fishing selectivity regulations is not circumvented because maximum retainable allowances (MRA) are legal, to allow flexibility in retention of non target catches. Although it is probably not ideal to top off the target catch with MRAs of valuable species, nor was this the intention of this regulation when first designed, the important aspect to consider is that these catches are recorded and accounted for, and so are discards. The GOA multispecies trawl fleet, starting January 2013 is covered by the newly restructured observer programme. The program was redesigned to improve the overall coverage in this as well as other fleets (i.e. halibut), especially in the GOA, contributing to increasingly reliable estimates of bycatch and discards. The enforcement data provided under Fundamental Clause 11 supports only a small rate of violations. Pacific cod in the GOA is targeted by many different gear types including non-pelagic trawl, longline, pot, and jig gear. The active size of these fleets is approximately 643 vessels, and the USCG attempts to board approximately 52 vessels each year. From fiscal year 2008 through the end of fiscal year 2012, the USCG conducted 291 boardings on GOA Pacific cod vessels, noting 25 violations on 19 vessels. Specifically, from 2008 to 2012 the annual US Coast Guard average has been of 58 boardings to Pacific cod vessels in the GOA, with 3.8 violations and 6.53% of vessels in violations with fisheries regulations. Violations over 5 years are distributed in the following manner:

- **Logbook errors: 5**
- **Federal Fishing Permit not on board: 4**
- **Observer coverage requirements: 4**
- **Boarding ladder: 3**
- **Seabird avoidance device: 3**
- **Unsafe handling of halibut: 3**
- **Gear violations: 1**
- **Closed area: 1**

9.8 should be rewritten to describe experimental fishing permits that have been issued for gear. This clause asks about collaborative research not about management measures. **Assessment team response. Clause modified.**

9.9.2 should note that Alaska does not have an approved Coastal Zone Management plan and consequently coastal zone development, including installation of artificial reefs, etc., falls under federal oversight. **Assessment team. Clause not applicable to Pacific cod fisheries.**

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

I disagree with the adequacy rating assigned for clause 10.3. While Alaska and NMFS maintain fairly comprehensive records of vessel owners and somewhat comprehensive records of skippers, there is no regularly maintained comprehensive record of fishermen in the Pacific cod fishery or in other groundfish fisheries off Alaska. Lack of this data is a well-known shortcoming. It has been the subject of numerous meetings between federal and state bureaucrats and social science researchers. It has not been resolved and is unlikely to be resolved in the near future.

Assessment team response, comment not taken. The clause says “as appropriate”, recognizing that this practice maybe available in some cases and not in others. This evidence is sufficient to support the requirement of the clause.

E	Implementation, Monitoring and Control
	<p>11. An effective legal and administrative framework must be established and compliance ensured, through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.</p>
	<p>11.3 it would be more appropriate to state that there are no fisheries for Pacific cod in international waters abutting the GOA or BSAI EEZ except for fisheries in northwestern British Columbia and in Russian waters across the Bering Sea Convention Line. Those fisheries are regulated by their own governments.</p> <p>Assessment team response. Changes made.</p> <p>11.4 would be better answered by noting that all US-flagged fishing vessels are issued certificates of registry. Similarly, 11.4.1 could be answered by noting that all US-flagged vessels are required to comply with these marking requirements and note that US-flagged Pacific cod vessels do not hold authorizations to fish in Canadian or Russian waters.</p> <p>Assessment team response. Changes made.</p>
	<p>12. There must be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.</p>

12.2 and 12.2.1 it would be more appropriate to note that the US exercises flag-state authority over fishing vessels wherever they may be and that US-flagged vessels found to violate international fishing agreements are subject to the same sort of penalties applied to vessels fishing within the EEZ.
Assessment team response. Changes made.

F	Serious Impacts of the Fishery on the Ecosystem
13.	<p>Considerations of fishery interactions and effects on the ecosystem must be based on best available science, local knowledge where it can be objectively verified and using a risk based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem must be appropriately assessed and effectively addressed.</p>
	<p>Much of this section is redundant and generic. Redundant sections should be dropped and the remainder should be rewritten to highlight information specific to the environmental impacts of the Pacific cod fishery and impacts of the environment on Pacific cod. This is particularly a problem for text pertaining to 13.1 and 13.2.</p> <p>Assessment team response. Section modified.</p>
	<p>13.4 includes an irrelevant and unsubstantiated discussion of the halibut and sablefish longline fishery. Assessment team response. Pacific cod represent 46% and 56% of the IFQ halibut and sablefish fleet catches, respectively (Fishing Fleet Profile 2011).</p>
	<p>13.6 fails to address the promotion of research on environmental and social impacts of fishing gear and the impact of fishing gear on biodiversity and coastal communities. This could be addressed by reference to specific recommendations in the NPFMC research priorities and in the NPRB research plan.</p>
	<p>Assessment Team, changes made.</p>

9. Non-Conformance and Corrective Actions

Non conformances are categorized as minor, major and critical non conformances. Where the Assessment Team concludes that the available evidence does not meet the 'high' confidence rating for a specific clause of the Conformance Criteria, and on further clarification with fishery management organizations, the outcome remains unchanged; a non conformance may be raised against that particular clause.

Low Confidence Rating (Critical Non-Conformance level)

Information/evidence is completely absent or contradictory to demonstrating compliance of an element of a fishery to the given requirements of a supporting clause. In these cases, a **low confidence rating, equivalent to a critical non-conformance** is assigned.

Alternatively, any non-conformance assigned to any Section A to F, above the designated maximum permitted of 1 major non-conformance or 3 minor non-conformances will also result in the assignment of a critical non-conformance (at Section level). A critical non-conformance will essentially stop the assessment (not allowing for certification) unless the applicant is able to provide information/evidence that demonstrates a better state of the fishery than previously assessed. The Validation Report activities are designed to determine if critical non-conformances within the Applicant Management System are likely before proceeding with the assessment. Notwithstanding this, the option of assigning critical non-conformances remains available to the Assessment Team if there is merit for this decision to be taken.

Medium Confidence Rating (at Major Non-Conformance level).

Information/evidence is limited that demonstrates compliance of an element of the fishery to the given requirements of a supporting clause. In these cases a **major improvement is needed to achieve high conformance** and for a **medium confidence rating at this level, a "major non-conformance"** is assigned.

Medium Confidence Rating (at Minor Non-Conformance level)

Information/evidence is broadly available that demonstrates conformity to a clause although there are some gaps in information/performance that if available would clarify aspects of conformity and allow the Assessment Team to assign a higher level of confidence. In these cases a **minor improvement is needed to achieve high conformance** and for a **medium confidence rating at this level, a "minor non-conformance"** is assigned.

High Level of Confidence

Where the Assessment Team agrees that sufficient information/evidence is available to demonstrate conformance/performance to a given supporting clause, a **high level of confidence** is assigned. Sufficient evidence is that which allows, through expert opinion of the collective team, substantiation that a given element of a fishery, complies fully with the FAO-Based Responsible Fisheries Management Conformance Criteria.

Accordingly, a medium confidence rating and consequent minor non-conformance has been issued under Supporting Clause 6.1.3:

Clause 6.1.3. Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the level of fishing permitted shall be commensurate with the current state of the fishery resources.

Non conformance. A preliminary stock assessment of Aleutian Islands Pacific cod appears to be indicating the approaching of the limit reference point for this stock. Accordingly, the harvest pressure appears not to be commensurate with the current state of fishery resource.

Evidence supporting non conformance:

- 1) Recent genetic research indicates the existence of discrete stocks with lack of gene flow between the EBS and AI (Canino et al. 2005, Cunningham et al. 2009, Canino et al. 2010, Spies 2012) significant enough to grant separate management between the two areas.
- 2) A preliminary stock assessment model was developed and presented for the 2012 stock assessment cycle. It was presented in the Dec 2012 BSAI P. cod SAFE report.
- 3) For 2012 and 2013, the AI biomass survey estimate declined to 9% and 7%, respectively. AI cod spawning biomass relative to B100% as estimated by Models 1 and 2 (in the Dec 2012 SAFE) could be approaching the limit reference point (B17.5%).

Corrective Action Plan

A corrective action plan was provided to the assessment team in April 2013, responding to the issued non conformance. This provided reference to a discussion paper available at the Council website (Apr 2013) relating to the EBS - AI Pacific cod split that provided substantiation to the corrective action plan provided. The evidence reported that 'given the heightened conservation concern, the SSC intends to set separate ABC/OFL for EBS Pacific cod and AI Pacific cod for the 2014 fishing season based on the best available information at that time, regardless of whether the age-structured model is adequate for stock status determinations'. SSC recommendation advised the Council to 'initiate preparation of any background supporting documents such as a supplemental NEPA document that may be required for specification of separate ABCs/OFLs in 2014'. The NPFMC should implement this action at the December 2013 NPFMC meeting, in advance of the 2014 Pacific cod harvest season.

BSAI Pacific cod Split and AI Processing Sideboards, Discussion Paper_April 2013, available at:
http://www.alaskafisheries.noaa.gov/npfmc/PDFdocuments/catch_shares/Pcod/BS-AIpcodABC-TACsplit413.pdf

Request for a Corrective Action Plan

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Mr. Randy Rice
Alaska Seafood Marketing Institute
150 Nickerson Street
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Seattle
WA 98109-1634

Ref: fm14b /AK/COD/001/2012

Date: 1st March 2013

Re: Alaska Pacific Cod Commercial Fishery

Dear Randy,

Further to the above listed FAO RFM Full Assessment for the Alaska Pacific Cod Fishery, the Certification Committee met on the 1st March 2013 to consider the draft assessment report of the Alaska Pacific Cod Commercial Fishery.

The Certification committee reviewed the evidence provided and requested further evidence in relation to the following clause:

Clause 6.1.3. Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the level of fishing permitted shall be commensurate with the current state of the fishery resources.

Non conformance. A preliminary stock assessment of Aleutian Islands Pacificcod appears to be indicating the approaching of the limit reference point for this stock. Accordingly, the harvest pressure appears not to be commensurate with the current state of the stock.

Evidence supporting non conformance:

- 1) Recent genetic research indicates the existence of discrete stocks with lack of gene flow between the EBS and AI (Canino et al. 2005, Cunningham et al. 2009, Canino et al. 2010, Spies 2012) significant enough to grant separate management between the two areas.
- 2) A preliminary stock assessment model was developed and presented for the 2012 stock assessment cycle. It was presented in the Dec 2012 BSAI P. cod SAFE report.
- 3) For 2012 and 2013, the AI biomass survey estimate declined to 9% and 7%, respectively. AI cod spawning biomass relative to B100% as estimated by Models 1 and 2 (in the Dec 2012 SAFE) could be approaching the limit reference point (B17.5%).

Should you have any queries regarding the assessment or certification, please do not hesitate to contact us.

Finally, may I express my thanks for your continued participation in the FAO-Based Responsible Fisheries Management Programme.

Yours sincerely,

Bill Paterson
Quality Systems Manager



Company Reg No. 307402

Client Answer and Corrective Action Plan



April 15, 2013

Mr. Bill Paterson

Global Trust Certification Ltd.

Quayside Business Park

Mill Street, Dundalk, Co Louth

Ireland

RE: non-conformance Cod RFM fishery certification

Dear Mr. Paterson:

I am in receipt of your notice of 5th April regarding Clause 6.1.3 of the RFM Conformance Criteria and the Bering Sea Aleutian Island(AI) Cod fishery. As I understand it, there is substantial evidence suggesting the stock structure of the Aleutian Island and Eastern Bering Sea (EBS) are different and distinct. Because of this distinction and the fact that the reference point for AI could potentially be reached without separate management action for the two areas, the certification committee has raised a non-conformance against clause 6.1.3:

Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the level of fishing permitted shall be commensurate with the current state of the fishery resources.

A preliminary stock assessment of Aleutian Island Pacific cod appears to be indicating the approaching of the limit reference point for this stock. Accordingly, the harvest pressure appears not to be commensurate with the current state of the stock.

As client, facilitating the certification on behalf of Alaska's cod fisheries, I am providing herewith relevant information from the Science and Statistical Committee (SSC) of the North Pacific Management Council (NPFMC). This issue was summarized in a SSC discussion paper (Overview of Apportionment of BSAI Pacific Cod Sector Allocations Between BS and AI areas and AI Pacific Cod Processing Sideboards. Item C-3(a), April, 2013 (enclosed). Given this conservation concern, the SSC intends to set separate ABC/OFL for EBS and AI cod for the 2014 season.

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The SSC specific statement to the Council is:

Therefore, the Council should initiate preparation of any background supporting documents such as a supplemental NEPA document that may be required for specification of separate ABCs/OFLs in 2014 (pg 5).

We therefore expect the Council to implement this action at the December 2013 NPFMC meeting, in advance of the 2014 Cod harvest season. Thus, we believe this corrective action should be sufficient to address the non-conformance raised regarding 6.1.3, and is indicative of the responsible fishery management practices of the NPFMC.

I would appreciate it if you could acknowledge acceptance of this evidence in closing out this non-conformance.

Best regards



Randy Rice

Technical Program Director

Alaska Seafood Marketing Institute

1st Surveillance Assessment Actions

During the first surveillance assessment starting in December 2013, the assessment team will verify the adoption of separate OFL/ABC/TAC at the December 2013 NPFMC meeting and rescore Supporting clause 6.1.3 accordingly.

10. Recommendation and Determination

Assessment Team Recommendation

The Assessment Team recommend that the management system of the applicant fishery, the U.S. Alaska Pacific cod commercial fisheries, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fishery with bottom trawl gear, pot gear, longline gear and jig gear, within Alaska's 200 nm EEZ, is certified against the FAO-Based Responsible Fisheries Management Certification Program.

Peer Review Team Recommendation

The Peer Review Team recommend that the management system of the applicant fishery, the U.S. Alaska Pacific cod commercial fisheries, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fishery with bottom trawl gear, pot gear, longline gear and jig gear, within Alaska's 200 nm EEZ, is certified against the FAO-Based Responsible Fisheries Management Certification Program.

Certification Committee Determination

The appointed members of the Global Trust Certification Committee met on the 17th of April 2013. After a detailed discussion about the assessment, the fishery, its management and performance, and based on the corrective action plan addressing the minor non conformance assigned, the Certification Committee determined that the management system of the applicant fishery, the U.S. Alaska Pacific cod commercial fisheries, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fishery with bottom trawl gear, pot gear, longline gear and jig gear, within Alaska's 200 nm EEZ, is certified against the FAO-Based Responsible Fisheries Management Certification Program.

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Appendix 1

Alaska Pacific cod Assessors

Based on the Technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd. confirmed the Assessment Team members for this fishery as follows.

Dave Garforth (Lead Assessor)

Dave Garforth, BSc, HDip. (Applied Science), MSc has been involved in fisheries and aquatic resources for over 20 years. Currently, managing Global Trust FAO based Fishery Certification Program, with experience in the application of ISO 65 based seafood certification systems and a professional background in numerous fishery assessments. Previous professional background of relevance includes; Development Officer in the Irish Sea Fisheries Board, supply chain and trade experience at Pan European Fish Auctions, the enforcement of fisheries regulations as a UK Fishery Officer. Dave is a lead IRCA approved auditor with 5 years third party assessment/audit experience.

Vito Ciccio Romito (Assessor)

Vito holds a BSc in Ecology and an MSc in Tropical Coastal Management (Newcastle University, United Kingdom). His BSc studies focused on bycatch, discards, benthic impact of commercial fishing gear and 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 focused 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 salmon, halibut, sablefish, pollock, Bering Sea king and snow crab and Icelandic cod fisheries.

Dr. Géraldine Criquet (Technical support)

Géraldine 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). Géraldine has joined Global trust Certification in August 2012 as Fisheries Assessment Officer and is involved in FAO RFM and MSC fisheries assessments.

Earl Krygier

Earl gained a BSc in Science, an MSc from the Department of Fisheries and Wildlife, and completed a Ph.D Doctoral Thesis (on the role of nursery areas for juvenile English sole off Oregon) at the Oregon State University. From 1989 to 2008 he worked for ADFG's Commercial Fisheries Division as Extended Jurisdiction Program Manager with primary responsibility on state policy coordination of state, national and international marine fishery matters (research, conservation and management, and policy development), provided support for ADFG's Commissioner in carrying out his NPFMC's responsibilities and acting as the Commissioner's alternate (1989-1997). Earl represented ADFG at the IPHC for 19 years, and he was state representative at the Donut Hole and the U.S./Russian ICC meetings. He sat as alternate for the Commissioner on the North Pacific Research Board (NPRB); represented ADFG on Alaska's CDQ Allocation Team; advised department staff, the Alaska BoF members, the Alaska Legislature and other state officials on NPFMC activities; and proposed management plans, long-range policies and regulatory implications, or inter-jurisdictional issues arising from Council actions. He coordinated ADFG's staff activities at the NPFMC and recommended policies and strategies to the director, commissioner and other state officials in regards to extended jurisdictional fisheries. Earl coordinated the State's conservation and management policy for halibut at the NPFMC, the PFMC and the IPHC, that resulted in proper halibut bycatch management; stock utilization; equitable Alaska subsistence, sport and commercial harvests; helping ensure that development of CDQs and IFQ was done in accordance with conservation & management objectives, fairly and equitably for user groups. From 2008 to present times he is the Owner/Manager of KEE Biological Consultants and served as the Marine Conservation Alliance Foundation's (MCAF) Cooperative Research Coordinator, implementing MCAF's marine research activities in Alaska in cooperation with state or federal agencies, academia, the seafood industry and other interested parties.

Dr. Norman Graham

Dr. Graham started working career as a commercial fisherman followed by a BSc in fishery studies and PhD in by-catch reduction in shrimp fisheries. He has been involved in a broad range of fisheries research and advice, including development and testing of discard mitigation tools, unaccounted mortality and stock assessment (assessor for Megrim in West of Scotland and North Sea). Considerable expertise in the provision of scientific advice for managers, interface between industry-science-policy, use of fishery dependent data and member of a number of national and international scientific working groups and committees including stock assessment, stock review and advice drafting groups.

Dr. Christian Möllman

Christian Möllmann holds a MSc (1996) and PhD (2002) in "Fisheries Biology" from University of Kiel, Germany. Between 2002 and 2004 he was a Post Doctorate Researcher at University of Kiel and the Danish Institute for Fisheries Research (now DTU-Aqua) in Charlottenlund Denmark. He was furthermore a Senior Scientist at the Danish Institute for Fisheries Research (2004-2006) and

Hamburg University (2006-2008). Since 2008 he is a Full Professor for “Fisheries Science” at Hamburg University, Institute for Hydrobiology and Fisheries Science. His research focuses on direct and indirect effects of climate-induced variability and change as well as fisheries on the structure and function of marine food-webs. The ultimate goal of his work is the integration of environmental processes into an ecosystem-based management of marine resources. He is especially an expert on holistic assessments of marine ecosystems. He has participated, led and initiated several International Councils for the Exploration of the Seas (ICES) Fish Stock Assessment and Integrated Ecosystem Assessment Working Groups. Due to its expertise he advised several national and international bodies such as the Swedish and the EU Parliament.

Appendix 2

Based on the Technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd. confirmed the External Peer Reviewers members for this fishery as follows.

Dr. Keith Criddle

Keith Criddle is the Ted Stevens Distinguished Professor of Marine Policy at the University of Alaska Fairbanks where he also serves as Director of the Fisheries Division. He received a PhD in agricultural economics from the University of California Davis in 1989. His research focuses on the intersection between the natural sciences, economics, and public policy and is driven by an interest in the sustainable management of marine resources with a particular emphasis on the commercial, sport, and subsistence fisheries of the North Pacific. In recent years, he and his students have explored topics ranging from the resilience and economic consequences of alternative management regimes for commercial, sport, and subsistence fisheries to the bio economic effects of climate change in North Pacific fisheries to the evolution of Chilean salmon aquaculture in response to requirements for traceability and assurance and implications for salmon production in Alaska. He has served a resident of the *Resource Modeling Association* and a member of the National Research Council's Ocean Studies Board.

Vladimir Laptikhovsky

Upon graduating as M.Sc. in ichthyology and fish culture at the Kaliningrad State Technical University of Fishing Industry (Russia) in 1985, V. Laptikhovsky completed his Ph.D. in hydrobiology at the same university in 1995, and D.Sc. in hydrobiology at the All-Russian Research Institute of Fisheries and Oceanography (Moscow) in 2006. In between 1995 and 1999 he has been working in the Atlantic Research Institute of Fisheries of Oceanography (Kaliningrad, Russia) as a scientist dealing with stock assessment of squids and small pelagic fish, mostly off Northwest Africa. Since 1999 until now he is working in the Falkland Islands Government Fisheries Department as the stock assessment scientist. His main duties include investigations of various aspects of population biology, fisheries, stock assessment, discard management, and licensing advice in respect to groundfish species of the Southwest Atlantic. His research activities have been focused primarily on the Patagonian toothfish, red cod, Patagonian rock cod, blue whiting, different ray species (Rajidae), and octopods. V. Laptikhovsky authored more than 140 publications, mostly in peer-reviewed journals. In the year 2010 he was appointed as an Associate Editor of the Journal of Marine Biological Association of the U.K.

Appendix 3

FAO-Based Responsible Fisheries Management Certification

Summary of the Certification of Alaska Pacific cod fisheries



Alaska Pacific cod commercial fisheries are awarded certification to the FAO-Based Responsible Fisheries Management Program.

Certification Determination

On the 17th April 2013 a positive Certification determination was awarded for the *fishery management of the U.S. Alaska Pacific cod commercial fisheries*, against the FAO-based Responsible Fisheries Management (RFM) Certification Program (Conformance Criteria version 1.2)¹. The assessment was performed at the request of the Alaska Seafood Marketing Institute (ASMI). This document provides a concise summary of the assessment information and certification decision.

The Full Assessment and Certification Report will be made available for download on request at Global Trust and ASMI's websites after the 15th May 2013: www.GTCERT.com and <http://sustainability.alaskaseafood.org>

The Unit of Certification includes the Alaska Pacific cod (*Gadus macrocephalus*) federal and state commercial fisheries, fished with bottom trawl, longline, pot and jig gear, in the Bering Sea Aleutian Islands (BSAI) and Gulf of Alaska (GOA) management regions within Alaska's jurisdiction (200 nautical miles EEZ); and subjected to a 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 regime.

The resulting certification communication for the Alaska Pacific cod commercial fisheries is: **'Certified Responsible Fisheries Management'**.

Following a 12 month assessment process, a Global Trust Certification Committee, composed of fishery, certification and accreditation experts, unanimously agreed with the Assessment Team's findings that the applicant Alaska Pacific cod commercial fisheries are responsibly managed. The assessment and certification considered the effectiveness of management system and organizations, the robustness and effectiveness of fishery management plans, stock assessment activities, stock status and the application of precautionary harvest rates and management actions, monitoring and enforcement activities and the ecosystem effects of the fishery.

¹ Version 1.2 (Sept 2011), as derived by the United Nations Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries (1995), the FAO Guidelines for the Eco-Labeling of Fish and Fishery Products from Marine Capture Fisheries (2005) as amended/extended in 2009, and the FAO Fisheries Circular No. 917 by John. F. Caddy (1996).

Background to the FAO Based Responsible Fisheries Management (RFM) Certification

This Certification delivers high confidence that reliable management systems are in place to properly assess and respond to any current and evolving issues and allow the fishery to continue on the path of responsible management. These management systems are certified as consistent with those recommended by the FAO Code of Conduct for Responsible Fisheries (1995) and FAO Guidelines for the Eco-Labeling of Fish and Fishery Products from Marine Capture Fisheries (2005) and amended/extended in 2009.

This Certification demonstrates responsible management for the sustainable use of the fisheries and is a realistic and tangible communication for this standard and process. The FAO-Based RFM Certificate lasts for five years and it involves annual surveillance assessments of the fishery. This Certification means that the Alaska Pacific cod commercial fisheries have met the criteria for certification of responsibly managed fisheries at the point in time of the assessment. Annual surveillance assessments and a full re-assessment every 5 years will be used to verify that fishery management continues to perform responsibly.

The Alaska Pacific cod commercial fisheries achieved high conformity against all but one of the clauses (6.1.3) of the FAO-Based RFM Conformance Criteria. The issue identified relates to Bering Sea/Aleutian Islands cod split, and has been addressed by a corrective action plan issued by the client providing recent information from the NPFMC supporting the current work in support of, and the upcoming closure of this issue (Dec. 2013). The assessment findings have been documented in a 250 page Full Assessment and Certification Report. The assessment was conducted by Global Trust Certification according to the International Standards Organization (ISO) Guide 65:1996 procedures for FAO-based Responsible Fisheries Management Certification. ISO Guide 65 is the international general requirements for bodies operating product and process certification systems. The ISO Guide 65 assessment, certification and decision process is governed by the accreditation bodies of the International Accreditation Forum (IAF). Global Trust Certification is accredited by the Irish National Accreditation Board (INAB) who is a member of the IAF.

Details of the Assessment

ASMI, on behalf of Alaska Pacific cod commercial fisheries, submitted an application to Global Trust Certification for a formal assessment of these fisheries to the requirements of the FAO-Based Responsible Fisheries Management (RFM) Certification Program. After the initial site visits and validation assessments an expert Assessment Team was formed to undertake the full assessment. The Assessment Team was composed of independent assessors (Table 1) with expert competency in fishery management and operation, stock assessment, and ecosystem effects of the fishery. The Assessment Team's report was peer-reviewed by two additional independent experts (Table 2) before submission to a formal Global Trust Certification Committee (Table 3) for an independent certification decision. The level of conformance of each fishery was scored against each clause of the FAO-Based Conformance Criteria (version 1.2). Conformance ratings were assigned through consensus scoring by the assessment team, based on objective evidence derived and measured from the fishery and verified through on site meetings and consultations.

A. The Fisheries Management System

Fundamental 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.

No. Supporting clauses	17
Supporting clauses applicable	9
Supporting clauses not applicable	6
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

The structure and function of the management system governing Pacific cod fisheries in Alaska:

The primary layer of governance for the Alaska Pacific cod fisheries is dictated by the Magnuson Stevens Act (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 (FMP) must be consistent. Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, an FMP and any necessary amendments, for each fishery under its authority that requires conservation and management actions, i.e. the annual setting of OFL/ABC/TAC/ACL. While the State of Alaska mostly adopts complimentary regulations, even imposing an annual State Emergency Order that adopts federal Regulations in most management areas, state regulations are used to manage 0-3 nm & inside waters (areas not subject to MSA).

The federal Fishery Management Plans (FMPs), more specifically, 1) the GOA Groundfish FMP, and 2) the BSAI Groundfish FMP govern the management of the Pacific cod federal fisheries. In federal waters (3-200 nm), Alaska Pacific cod fisheries are managed by the NPFMC and the NMFS Alaska Region. The Council submits their recommendations/plans to the NMFS for review, approval, and implementation. The 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, NMFS Alaska Regional Office conducts biological studies, stock survey and stock assessment reports. The US Coast Guard (USCG) is responsible for enforcing these FMPs at sea, in conjunction with NMFS enforcement ashore. Also, the USCG enforce 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.

In state waters (0-3 nm), Alaska Pacific cod fisheries are managed by the ADFG and the Alaska Board of Fisheries (BOF). There are seven state-managed Pacific cod regions: Kodiak, Chignik, South Alaska Peninsula, Aleutian Islands, Southeast Alaska, Prince William Sound, and Cook Inlet. Each area, apart from Southeast Alaska, supports two distinct Pacific cod fisheries. The first fishery is managed concurrent to the federal BSAI or GOA fishery, and is referred to as the parallel fishery. The parallel fishery is managed by the State adopting most of the NMFS rules and management actions (5 AAC 28.087), including seasons, and catch in this fishery is counted towards federal quotas. The second fishery in each area is referred to as the state-waters (or state-managed) fishery. The state-waters fishery is managed independently of the federal/parallel fishery by the ADFG under guidelines developed by the BOF (Guiding principles for groundfish fishery regulations 5 AAC 28.089 and BOF groundfish FMP 5 AAC 28.081). Six of the seven state-water fisheries are subject to an annual Guideline Harvest Level (GHL) calculated as a percentage of federal fishery quotas. The Alaska Wildlife Troopers enforce fishery state waters regulations from 0-3 nm. More than 90% of Alaska Pacific cod is harvested in the federal BSAI and GOA fisheries, and is therefore studied, managed, and enforced under the federal Groundfish FMPs.

Current management measures consider the whole stock biological unit (i.e. structure and composition contributing to its resilience over its entire area of distribution, the area through which the species migrates during its life cycle and other biological characteristics of the stock). Recent studies on genetic structure of P. Cod in the North Pacific Ocean demonstrate a clear isolation by distance (IBD) pattern, suggesting restricted gene flow, and thus a substantial amount of self-recruitment, among putative stock components at spatial scales relevant to current fisheries management and conservation practices (e.g. EBS, AI and GOA). Samples from the coast of Washington State and British Columbia were distinct from those in Alaska and, to a lesser degree to each other. Also, these samples were significantly different from those of China, Korea and Japan indicating a deep genetic subdivision between populations from Asia and North America. Moreover, the empirical evidence for discrete stocks of Pacific cod between the Russian and US EEZs (Eastern/Western Bering Sea) is also available.

A. The Fisheries Management System

Fundamental 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.

No. Supporting clauses	16
Supporting clauses applicable	15
Supporting clauses not applicable	1
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence

Participation in coastal zone institutional frameworks, decision making processes and activities:

The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes, a socio-economic and biological/environmental impact assessment of various proposed scenarios, before the path of action is decided. This occurs whenever resources under their management may be affected by other developments and each time they create, renew or amend regulations. 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 significant 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 can be and are accounted for.

The state is a cooperating agency in the NEPA process for federal actions, so that gives the State of Alaska a seat at the table for federal actions. This includes decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users.

Overall, the NEPA process, existing agencies and processes (e.g. ADFG, the Alaska Department of Environmental Conservation, the Department of Natural Resources (DNR), US Fish and Wildlife Service, the Alaska National Interest Lands Conservation Act, the DNR’s Office of Project Management and Permitting and Bureau of Ocean Energy Management), and the existing intimate and routine cooperation between federal and state agencies managing Alaska’s coastal resources (living and non-living) is capable of planning and managing coastal developments in a transparent, organized and

sustainable way, that minimizes environmental issues while taking into account the socio-economic aspects, needs and interests of the various stakeholders of the coastal zone.

The Alaska Board of Fisheries (BOF) main role is to conserve and develop the fishery resources of the state. The board is charged with making allocative decisions, and ADFG is responsible for management based on those decisions. The BOF meets four to six times per year in communities around the state to consider proposed changes to fisheries regulations around the state. Advisory committees are the local "grass roots" groups that meet to discuss fish and wildlife issues and to provide recommendations to the boards. There are 82 committees throughout the state each with expertise in a particular local area. This process ensures that the local communities' customary uses and practices are considered.

The NPFMC system was designed so that fisheries management decisions were made at the regional level to allow input from affected stakeholders which assures that the rights of coastal communities and their historic access to the fishery is included in the decision process. Council meetings are open, and public testimony - both written and oral - is taken on each and every issue prior to deliberations and final decisions. Public comments are also taken at all Advisory Panel and Scientific and Statistical Committee meetings. Each Council decision is made by recorded vote in public forum after public comment. Final decisions then go to NMFS for a second review, public comment, and final approval. Decisions must conform to the MSA, the NEPA, Endangered Species Act, Marine Mammal Protection Act, and other applicable law including several executive orders. The Council meets five times each year, usually in February, April, June, October and December, with three of the meetings held in Anchorage, one in a fishing community in Alaska and one either in Portland or Seattle. Most Council meetings take seven days, with the AP and SSC usually following the same agenda and meeting two days earlier

The Alaska BOF and the NPFMC have signed a joint protocol agreement to help coordinate compatible and sustainable management of fisheries within each organization's jurisdiction. A committee was formed, the Joint Protocol Committee, which includes three members from each group that meets at least once a year to identify and discuss issues of mutual interest. The entire board and council meet jointly once a year to consider proposals, committee recommendations, the analyses, and other topics of mutual concern. The joint meeting is typically held in Anchorage in February, depending upon council and board meeting schedules.

The Community Development Quota (CDQ) Program is a federal fisheries program that involves 65 communities within a fifty-mile radius of the Bering Sea coastline who participate in the BSAI crab and groundfish fisheries and are allocated 10% of the harvest privileges for the species, including Pacific cod.

A. The Fisheries Management System

Fundamental 3

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

No. Supporting clauses	6
Supporting clauses applicable	6
Supporting clauses not applicable	0
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Fishery management plans and their objectives:

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. The GOA and BSAI Groundfish FMPs, under which Pacific cod in the federal waters of Alaska is managed, define nine management and policy objectives that are reviewed annually. These 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, 9) Improve Data Quality, Monitoring and Enforcement. The national standards and management objectives defined in GOA and BSAI FMPs provide adequate evidence to demonstrate the existence of long-term objectives clearly stated in management plans. Management measures detailed in the two Groundfish FMPs include quotas, allocated by region and by gear type; permit requirements, seasonal restrictions and closures, geographical restrictions and closed areas, gear restrictions, prohibited species requirements, retention and utilisation requirements, recordkeeping and reporting requirements, and observer requirements.

Each of the state-managed Pacific cod fisheries is subject to an annually-published FMP. These FMPs include details of Guideline Harvest Levels, gear restrictions, seasonal restrictions, vessel restrictions that limit and control access, buoy marking, pot storage and landing requirements, permissible bycatch proportions and reporting requirements. (5 AAC 28.081.) Gulf of Alaska Pacific Cod Management Plans sets the regulations for the directed state pacific cod fishery. This section applies to the management plans for Pacific cod as set out for the Prince William Sound Area (5 AAC 28.267), Cook Inlet Area (5 AAC 28.367) , Kodiak Area (5 AAC 28.467) , Chignik Area (5 AAC 28.537) , Aleutian Islands Area (5 AAC 28.647) and the South Alaska Peninsula Area (5 AAC 28.577).

B. Science and Stock Assessment Activities

Fundamental 4

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

No. Supporting clauses	14
Supporting clauses applicable	9
Supporting clauses not applicable	5
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Data collection, aggregation and use:

The annual age-based assessment used to determine stock status and harvest recommendations for BSAI and GOA Pacific cod uses data collected from commercial landings and transshipment reports, port and at-sea observer sex, length and age data from fishery independent surveys in the EBS, the AI and the GOA. The Resource Assessment and Conservation Division (RACE) of the Alaskan Fisheries Science Center (AFSC) are responsible for federally managed fisheries (3-200 nm) while the ADFG undertake coastal surveys and gather and collect data from state managed fisheries (0-3 nm). It is noted that the overall data collection program is probably one of the most extensive in the world. At-sea (processor and catcher-processor vessels) are legally required to report commercial and non-commercial catch data on a daily basis, while catch and auxiliary information from a very extensive observer program, in many cases covering 100% of the fleet activity (e.g. in the EBS) is also transmitted on a daily basis. Landings data from shore based processing facilities are also transmitted on a daily basis and the processing facilities subject to a high level of observer coverage, in many cases amounting to 100% coverage. For all operations under Federal jurisdiction, all US vessels catching Pacific cod within the US EEZ, land based and stationary floating processor and factory (motherships) receiving catches of Pacific Cod are legally obliged to maintain accurate records of all transactions. Landing data are routinely cross checked for overall accuracy, and verified during US Coast Guard and Alaska Wildlife Troopers boardings.

The Fisheries Monitoring and Analysis Division (FMA) of the NMFS monitor groundfish fishing activities in the US EEZ. FMA is responsible for the biological sampling of commercial fishery catches, estimation of catch and bycatch mortality, and analysis of fishery-dependent survey data. The Division is responsible for training and oversight of at-sea observers who collect catch data onboard fishing vessels and at onshore processing plants. Data and analysis are provided to the Sustainable Fisheries Division of the Alaska Regional Office for the monitoring of quota uptake and for stock assessment, ecosystem investigations and research programs.

To facilitate reporting of commercial catch from both state and federally managed fisheries, data

from a wide range of sources is gathered in the Catch Accounting System (CAS), a multi-agency (NMFS, IPHC and ADFG) system that centrally collates landings data from shore based processing and landings operations as well as retained catch observations from individual vessels. The CAS system also provides a centralized data platform for the collation of catch (landings and discards) data from the extensive observer program.

Data gathered under the auspices of the North Pacific Groundfish Observer Programme (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. As well as providing demographic data for scientific purposes, the observer programme is also used extensively in- and post-season management. Daily reports are electronically transmitted via the CAS system. This 'real-time' data is used as the basis to trigger area as well as fisheries closures e.g. if maximum catch allocations of target or Prohibited Species are caught. Financing of the NPGOP is based on a cost recovery formula where individual vessel operators must pay the daily observer costs as a condition of license.

The level of coverage is variable between area, gear type and vessel length category. In general, coverage of catch and landings by vessels >125' is 100%, irrespective of gear category or area. Based on the annual observer data from 2004 to 2007, coverage is generally greater in the Aleutian Islands (95%) and the Bering Sea (86%), while coverage in the Central GOA (35%), Eastern GOA (47%) and Western GOA (31%) is lower. Although, by international standards this is a very high coverage rate. Starting January 1st 2013, the restructured observer program changed substantially to remedy the potential sources of bias, as identified in the "old" program. As well as increased observer coverage on all vessels >40' (vessels <40' are exempted for the first year) and the introduction of full coverage in fleets previously subject partial coverage criteria, vessels remaining within the partial coverage grouping are selected based on a random draw system with a mandatory obligation to carry an observer.

The NOAA biennial GOA groundfish survey data is used for the assessment for Pacific cod in the GOA. All three surveys (EBS, AI and GOA) collect demographic data (length and age) as well as stomach content data for potential use in multi-species assessment models. The annual EBS survey program follows systematic stratified design with two geographic strata: NW (arctic area) and SE (sub-arctic area) three depth strata (inner shelf < 50 m; mid-shelf between 50 and 200 m; and outer shelf > 200 m). On average 376 survey stations are completed annually in the EBS survey, with tow duration of 30 minutes at a speed of 3 knots. The nominal survey abundance index is standardized with the area swept. The GOA survey follows the same stratification as the EBS survey, a random stratified survey design. The survey is biennial, with the NOAA survey schedule alternating each year between the GOA and the AI survey area. For each survey year, on average 825 stations surveyed by three boats in the GOA, and 420 stations surveyed by two boats in the AI.

In terms of socio-economic data collection, the Regulatory Flexibility Act (RFA) requires agencies (NPFMC, ADFG) to consider the impact of their rules (Fishery Management Plans, Fishing Regulations) on small entities (fishermen communities) and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities. Economic analyses are also required to

varying degrees under the MSA, the NEPA, the Endangered Species Act, and other applicable laws.

NOAA's Resource Ecology and Fisheries Management (REFM) Division produces an annual Economic Status Report of the Groundfish fisheries in Alaska. The figures and tables in the report provide 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 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. In addition, broader macro-economic external factors, such as exchange rates, consumer trends in seafood consumption, seafood imports, had impact on of pricing, volume, supply and demand.

B. Science and Stock Assessment Activities

Fundamental 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.

No. Supporting clauses	11
Supporting clauses applicable	9
Supporting clauses not applicable	2
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Stock assessment activities:

The Resource Assessment and Conservation Engineering (RACE) Division comprises scientists from a wide range of disciplines whose function is to conduct quantitative fishery surveys and related ecological and oceanographic research to describe the distribution and abundance of commercially important fish and crab stocks in the region, and to investigate ways to reduce bycatch, bycatch mortality and the effects of fishing on habitat. Information derived from both regular surveys and associated research are analyzed by AFSC stock assessment scientists and supplied to fishery management agencies and to the commercial fishing industry. The Resource Ecology and Fisheries Management (REFM) Division conducts research and data collection to support an ecosystem approach to management of fish and crab resources. More than twenty-five groundfish and crab stock assessments are developed annually and used to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. The Fisheries Monitoring and Analysis Division (FMA) monitors groundfish fishing activities and conducts research associated with sampling commercial fishery catches and estimation of catch and bycatch mortality, and analysis of fishery-dependent data.

The three surveys (EBS, AI and GOA) collect demographic data (length and age) as well as stomach content data for potential use in multi-species assessment models. The EBS survey is conducted annually, while the GOA and the AI surveys are conducted biannually, alternating with each other.

Stock Assessment and Fishery Evaluation (SAFE) Reports are produced annually for Pacific cod in the BSAI and GOA Regions. These reports contains all the details of the assessments including data collected and used, stock assessment models trialed,

Beginning with the 1994 GOA SAFE report a model using the Stock Synthesis 1 (SS1) assessment program and based largely on length-structured data formed the primary analytical tool used to assess the GOA Pacific cod stock. Similarly, SS1 was first applied to the EBS Pacific cod in the 1992 stock assessment. This first application used age-structured data and SS1 continued to be used, but based largely on length structured data since 2004. It should be emphasized that the model has

always been intended to assess only the EBS portion of the BSAI stock. Conversion of model estimates of EBS biomass and catch to BSAI equivalents has traditionally been accomplished by application of an expansion factor based on the relative survey biomasses between EBS and AI. The AI stock is quantified by inflating and extrapolating the results of the EBS assessment and the last available biomass ratios from each surveys used to scale up the assessment of the EBS stock to the BSAI area. Sub-samples of length and age taken from the survey are used for assessments. There is significant progress in the development of an age-disaggregated assessment for the Aleutian Islands Pacific cod, with independent adoption of OFL, ABC and TAC recommendations planned for the 2014 fishing season.

The adequacy and appropriateness of the stock assessments are ensured by extensive peer review. For BSAI and GOA groundfish assessments, the review process begins with an internal review of assessments by the AFSC. Following that review, assessments are reviewed annually by the groundfish plan teams who provide comments to the assessment authors on revisions to the assessment as well as to make recommendations to the SSC regarding OFL and ABC levels for each stock. The majority of the plan team members have expertise in stock assessment and fisheries biology with some additional members bringing in expertise in fishery management, in-season catch accounting, seabirds, marine mammals, and economics. The assessments as well as the plan team recommendations are then subsequently reviewed by the SSC who make the final OFL and ABC recommendations to the Council. The SSC may modify the recommendations from the Plan Team based upon additional considerations. The Council sets TAC at or below the ABC recommendations of the SSC.

The AFSC periodically requests a more comprehensive review of groundfish stock assessments by the Center of Independent Experts (CIE). These reviews are intended to lay a broader groundwork for improving the stock assessments outside the annual assessment cycle. Three external reviewers from the Center of Independent Experts (CIE) were contracted to review assessments of BSAI and GOA Pacific Cod in 2011. The terms of reference covered several aspects of the assessments including the use of fishery dependent and fishery independent data, gaps in modeling, accounting for assessment uncertainties, ageing issues, variation in survey trawl catchability. NMFS responded to the review and incorporated it into the 2012 assessment cycle.

C. The Precautionary Approach

Fundamental 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 target. Remedial actions shall be available and taken where reference point or other suitable proxies are approached or exceeded.

No. Supporting clauses	5
Supporting clauses applicable	5
Supporting clauses not applicable	0
Overall level of conformity	HIGH
Non Conformances	1 Minor Non Conformance (clause 6.1.3)
Item for surveillance	Adoption of Aleutian Islands Pacific cod independent OFL and ABC determinations at the December 2013 NPFMC meeting.

Summarized evidence:

Status determination criteria for Pacific cod stocks, reference points and relative biomass:

The BSAI and GOA groundfish fishery management plans management plans define a series of target and limit reference points for Pacific cod and other groundfish covered by these plans. Each SAFE report describes the current fishing mortality rate, stock biomass relative to target and limit reference points. Both management plans specify the Overfishing Limits (OFL) and the Fishing mortality rate (F_{OFL}) used to set OFL, Acceptable Biological Catch (ABC) and the fishing mortality rate (F_{ABC}) used to set ABC, the determination of each being dependent on the knowledge base for each stock. The overall objectives of the management plans are to prevent overfishing and to optimize the yield from the fishery through the promotion of conservative harvest levels while considering differing levels of uncertainty. The management plan classifies each stock based on a tier system (Tiers 1-6), with Tier 1 having the greatest level of information on stock status and fishing mortality relative to MSY considerations.

In general terms the harvest control rules become progressively precautionary with increasing tier classification and catch options are automatically adjusted depending on the status of stocks relative to B_{msy} or the biomass $B_{x\%}$ corresponding to the percentage of the equilibrium spawning biomass that would be obtained in the absence of fishing (tier 1-2; 3). For Pacific cod, there are no reliable estimates of MSY, but reliable estimates of reference points relative to spawning per recruit are: $B_{40\%}$ which equates to 40% of the equilibrium spawning biomass that would be obtained in the absence of fishing and $F_{35\%}/F_{40\%}$ - the fishing mortality rate that reduces the equilibrium level of spawning per recruit to 35%/40% of the level that would be obtained in the absence of any fishing.

This places both BSAI and GOA Pacific cod into Tier 3. Both stock are above their target reference point B40.

Stock	Target Reference Point (TRP)	Biomass at TRP	Biomass at present
BSAI	B40%	355.000 t	410.000 t
GOA	B40%	104.000 t	121.000 t

AI Pacific cod stock status. The combined BSAI Pacific cod unit has been extrapolated from the Pacific cod EBS model. In light of recent evidence that Pacific cod in the EBS and AI should be viewed as separate stocks, in 2010 the SSC requested that a separate assessment be prepared for Pacific cod in the AI. In response, the 2011 assessment contained an initial exploration of age-structure modeling for the AI Pacific cod. The initial exploration of age-structured modeling for Pacific cod in the AI indicates a sharp trend of decreasing of all the estimated amounts since the 1990's. Especially, the total (age 0+) biomass and the relative spawning biomass have the lowest values for the last two years. The relative spawning biomass could be approaching the limit reference point ($B_{17.5\%}$). Therefore the current approach of setting a single ABC for the entire BSAI area raises potentially serious conservation concerns for Pacific cod in the AI. This issue was identified as a non conformance against requirements 6.1.3 of the conformance criteria.

6.1.3 Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the level of fishing permitted shall be commensurate with the current state of the fishery resources.

A corrective action plan was provided to the assessment team in April 2013, responding to the issued non conformance. This provided reference to a discussion paper available at the Council website (Apr 2013) relating to the EBS - AI Pacific cod split that provided substantiation to the corrective action plan provided. The evidence reported that 'given the heightened conservation concern, the SSC intends to set separate ABC/OFL for EBS Pacific cod and AI Pacific cod for the 2014 fishing season based on the best available information at that time, regardless of whether the age-structured model is adequate for stock status determinations. SSC recommendation advised the Council to initiate preparation of any background supporting documents such as a supplemental NEPA document that may be required for specification of separate ABCs/OFLs in 2014'. The assessment team will verify the adoption of separate OFL/ABC/TAC at the December 2013 Council meeting and re-evaluate this issue accordingly.

C. The Precautionary Approach

Fundamental 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.

No. Supporting clauses	6
Supporting clauses applicable	3
Supporting clauses not applicable	3
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

The FAO Guidelines for the Precautionary Approach (PA) are satisfied:

The precautionary approach is applied widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment. The MSA, as amended, sets out ten national standards for fishery conservation and management. The BSAI and GOA Groundfish FMP is consistent with MSA requirements in applying the Precautionary Approach to fisheries. The FAO Guidelines for the Precautionary Approach (PA) (FAO 1995) advocate a comprehensive management process that includes data collection, monitoring, research, enforcement, and review, prior identification of desirable (target) and undesirable (limit) outcomes, and measures in place to avoid and correct undesirable outcomes, the action to be taken when specified deviations from operational targets are observed and an effective management plan. Lastly, the FAO guidelines advocate that the absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species as well as non-target species and their environment. The overall management for the Pacific cod in Alaska comprises all the elements as specified above in the FAO guidelines for the PA.

Absence of adequate scientific information is not used as a reason for postponing or failing to take conservation and management measures. The BSAI and GOA Pacific cod stocks are managed under a tier system rule based on stock knowledge. Status determination criteria for groundfish stocks are annually calculated using a six-tier system that accommodates varying levels of uncertainty of information. The six-tier system incorporates new scientific information and provides a mechanism to continually improve the status determination criteria as new information becomes available. The lower the tier, the less conservative the determination of OFL/ABC and ACL are. This is because more conservative determinations are at the higher tier levels (where less stock information is available). This system is intrinsically precautionary in nature and the results involve catches always lower than the overfishing level. Stock assessment results indicate that the BSAI and GOA Pacific

cod stock biomass is above B40 and that the stocks are neither overfished nor undergoing overfishing.

Another limit reference point used in managing groundfish in the BSAI and GOA is the optimum yield (OY). The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within a given range. The upper range for BSAI is 2.0 million Mt while for the GOA is 800 thousand Mt, acting as an ecosystem cap. In practice, only the upper OY limit in the BSAI has been a factor in altering and limiting harvests. In addition, for groundfish species identified as key prey of Steller sea lions (i.e., walleye pollock, Pacific cod, and Atka mackerel), directed fishing is prohibited in the event that the spawning biomass of such a species is projected in the stock assessment to fall below B20% in the coming year.

D. Management Measures

Fundamental 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.

No. Supporting clauses	10
Supporting clauses applicable	10
Supporting clauses not applicable	0
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Management measures:

The Alaska Pacific cod commercial fishery is managed according to a modern management plan that attempts to balance long-term sustainability of the resources with optimum utilization. Conservation and management measures are outlined in the BSAI and GOA FMPs for Groundfish. Along with yearly stock assessment surveys and reports (SAFEs), evaluation of the fisheries stock status, determination of OFL (consistent with MSY), ABC, ACL and TAC accounting for scientific uncertainty and ability and precision in catch control. Part of the assessment procedure is an extensive ecosystem assessment that shows development towards ecosystem-based management.

Management measures in the FMPs include (i) permit and participation, (ii) authorized gear, (iii) time and area, and catch restrictions, (iv) measures that allow flexible management authority, (v) designate monitoring and reporting requirements for the fisheries, and (vi) describe the schedule and procedures for review of the FMP or FMP component.

For every change/amendment or new development affecting fisheries management and therefore modifying the FMPs, there is an evaluation of alternative conservation and management measures, including considerations of their cost effectiveness and social impact. The Regulatory Flexibility Act (RFA) requires agencies to consider the impact of their rules (Fishery Management Plans, Fishing Regulations) on small entities (fishermen communities) and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities.

In addition to the federal FMPs, regulations for the state-managed fisheries are set out in annual region-specific FMPs (regulations for parallel fisheries in state waters are generally identical to federal regulations). The board uses the biological and socio-economic information provided by ADFG, public comment received from inside and outside the state, as well as guidance from the Alaska Department of Public Safety and the Alaska Department of Law when creating regulations that are sound and enforceable. These exist for Kodiak, South Alaska Peninsula, Chignik, the

Aleutian Islands, Cook Inlet and Prince William Sound. The state fisheries are managed by allocation of a portion of the federal TAC to the state fishery (depending on biomass abundance in the various areas). Overall, state managed fisheries removals are eventually accounted for in the federal ACL requirements.

The BSAI cod fishery is a limited entry fishery (i.e. non AFA catcher trawlers, "amendment 80" trawl fleet, jiggers, CP and CV longliners, pot vessels). The GOA groundfish fisheries are among the few remaining limited access (not rationalized) fisheries in Alaska.

In the BSAI, after subtraction of the CDQ allowance for Western Alaska communities, the remaining TAC is allocated 1.4% for vessels using jig gear, 2.3% for catcher processors using trawl gear listed in Section 208(e)(1)-(20) of the AFA, 13.4% for catcher processors using trawl gear as defined in Section 219(a)(7) of the Consolidated Appropriations Act, 2005 (P.L. 108-447), 22.1% for catcher vessels using trawl gear, 48.7% for catcher processors using hook-and-line gear, 0.2% for catcher vessels $\geq 60'$ LOA using hook-and-line gear, 1.5% for catcher processors using pot gear, 8.4% for catcher vessels $\geq 60'$ LOA using pot gear, and 2.0% for catcher vessels $< 60'$ LOA that use either hook-and-line gear or pot gear. Allocations may be seasonally apportioned.

TACs in the GOA are apportioned by regulatory area, and by district for some stocks. Areas or districts may also be managed together. For the Central and Western areas Pacific cod TAC is allocated 90% to the inshore sector and 10% to the offshore sector only for the Gulf of Alaska. TAC is then allocated to the harvest sectors (catcher vessels and catcher processors using trawl, pot, hook-and-line, and jig gear). The Western and Central GOA harvest sector allocations superseded the inshore and offshore processing sector allocations. No trawling is allowed in the Eastern GOA, so harvest is restricted to fixed gear and jig.

The 50 C.F.R. § 679.27 Improved Retention/Improved Utilization Program program has been approved in 1997 requiring 100% retention of pollock and Pacific cod in all BSAI and GOA federal fisheries beginning on January 1, 1998. State regulations to extend these requirements to onshore processing plants have also been implemented. The regulation was modified in an amendment(s) published April 6, 2006, in 71 FR 17381; effective January 20, 2008. Also, in State waters, when a directed season is open for Pacific cod or pollock, regulations for improved retention and improved utilization (IR/IU) of groundfish (5 AAC 28.070 & 5 AAC 28.075) require that all captured Pacific cod or pollock be retained by the fisherman and accepted by a buyer. Similarly, all Pacific cod or pollock harvested must be retained up to the maximum retainable bycatch amounts when a bycatch season is open for these species.

Trawl sweeps modifications that 1) decrease significantly habitat interaction of trawl gear and 2) reduce the bycatch of crabs, and mortality rates of crabs that slip under the gear without being caught, have been implemented in the BSAI in 2011 and the Council has allowed in December 2012 for trials to be conducted in the GOA Region during 2013 and 2014. Longline gear is regulated as for seabird avoidance measures (e.g. use of streamer lines, sink baited hooks, circle hooks, line shooters, lining tubes, night settings etc.). False tunnel modifications for pot gear allow a higher catch of cod and a considerable decreased bycatch of tanner crab (otherwise the highest bycatch species in cod pots), and biodegradable escape mechanisms are required to minimize bycatch associated with so-called ghost fishing of lost gear. No fish size limits are implemented for Pacific cod because there is a depth separation between young and adult cod. Market forces assure that

fishermen target adult cod as it fetches a higher price per pound.

Regulations implementing the FMP include conservation measures that temporally and spatially limit fishing effort around areas important to marine mammals. NMFS uses Steller sea lion protection measures (SSLPM) to ensure the groundfish fisheries off Alaska are not likely to jeopardize the continued existence of the western population of Steller sea lions or adversely modify their critical habitat. The management measures disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species near rookeries and important haulouts.

D. Management Measures

Fundamental 9

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

No. Supporting clauses	11
Supporting clauses applicable	8
Supporting clauses not applicable	3
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Management measures to maintain the Pacific cod stocks at maximum sustainable levels:

The Pacific cod stocks in Alaska are not depleted or threatened with depletion. Presently and as projected for 2013 stock biomass levels are well above B35% in both management areas.

Council and BOF guidelines, state and federal regulations and MSA with its National Standards all define to management agencies what must be done if a stock becomes depressed. The US Congress established new statutory requirements under the MSA in 2006 to end and prevent overfishing by the use of annual catch limits (ACLs) and accountability measures. These new requirements were implemented in 2010 for all stocks subject to overfishing and in 2011 for all stocks not subject to overfishing. A new provision of the MSA requires that the respective scientific and statistical committees (SSC) of the eight fishery management councils determine scientific benchmarks, while the councils continue to recommend quotas subject to these scientific benchmarks. This separation of authorities represents a major step forward in trying to eliminate overfishing and to enhance recovery of overfished stocks nation-wide.

Assuming that catch is measured accurately, ACLs provide a transparent measure of the effectiveness of management practices to prevent overfishing. They cannot exceed the fishing level determined by the SSC, but catch thresholds can also be established that trigger accountability measures to prevent overfishing. Accountability measures might include: (1) seasonal, area, and gear allocations; (2) bycatch limits; (3) closed areas; (4) gear restrictions; (5) limited entry; (6) catch shares; (7) in-season fishery closures; and (8) observer and vessel monitoring requirements. Accountability measures allow close monitoring of overall catch levels, as well as seasonal and area apportionments. They might close designated areas, or fisheries, if bycatch limits for prohibited species are attained. They also allow monitoring of any endangered or threatened mammals or seabirds and provide a database for evaluating likely consequences of future management actions.

The Council has consistently adopted the annual OFL and acceptable biological catch (ABC)

recommendations from its SSC and set the total allowable catch (TAC) for each of its commercial groundfish stocks at or below the respective ABC. The NPFMC first defined OFL in 1991 as a catch limit that never should be exceeded. The NPFMC adopted more conservative definitions of OFL in 1996 and again in 1999, to comply with revised national guidelines. In 1999, the NPFMC prescribed that OFL should never exceed the amount that would be taken if the stock were fished at FMSY (or a proxy for FMSY), 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 could be set lower than catch at FMSY at the discretion of the SSC. OFL can be then virtually defined as an upper limit reference point.

In 1996, the NPFMC capped the rate of fishing mortality used to calculate ABC by the rate used to calculate OFL. These rates were prescribed through a set of six tiers defining more and more conservative catch levels as the tiers increased. Harvest rates used to establish ABCs were reduced at low stock size levels, thereby allowing rebuilding of depleted stocks. If the biomass of any stock falls below BMSY, or a proxy for BMSY, the fishing mortality is reduced relative to the stock status.

Both target and non-target species are regularly assessed and bycatch limits and PSC caps are in place to control impacts. Also, Essential Fish Habitat (EFH), as defined in MSA, are described and evaluated to assure that fishing impacts are not more than minimal or more than temporary. Some areas have been closed to protect dependent species, this includes SSL protection areas around rookeries and haulouts (10 & 20 nm closures).

During the last EFH review in 2010 it has been shown that fishing effects on the habitat of Pacific cod in the BSAI and GOA do not appear to have impaired either stocks' ability to sustain itself at or near the MSY level. When weighted by the proportions of habitat types used by Pacific cod, the long-term effect indices are low, particularly those of the habitat features most likely to be important to Pacific cod (infaunal and epifaunal prey). The fishery appears to have had minimal effects on the distribution of adult Pacific cod. Effects of fishing on weight at length, while statistically significant in some cases, are uniformly small and sometimes positive. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.

D. Management Measures

Fundamental 10

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

No. Supporting clauses	3
Supporting clauses applicable	3
Supporting clauses not applicable	0
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Training opportunities and facilities. The North Pacific Fishing Vessel Owners association (NPFVO) provides a large and diverse training program that many of the professional 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. 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. Also, 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. MAP also conducts sessions of their Alaska Young Fishermen's Summit. Each Summit is an intense course in all aspects of Alaska fisheries, from fisheries management & regulation (e.g. MSA), to seafood marketing. The 2012 AYFS was held February 13th and 14th in Juneau, AK. The two-day conference aimed at providing crucial training and networking opportunities for fishermen entering the business or wishing to take a leadership role in their industry. The event took advantage of the Juneau location by introducing participants to the legislative process, and introducing the fish caucus of the legislature to the issues and concerns of Alaska's emerging fishermen. In addition to this, MAP provides training and technical assistance to fishermen and seafood processors in Western Alaska. A number of training courses and workshops were developed in cooperation with local communities and CDQ groups. Additional education is provided by the Fishery Industrial Technology Center, in Kodiak, Alaska.

E. Implementation, Monitoring and Control

Fundamental 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.

No. Supporting clauses	6
Supporting clauses applicable	2
Supporting clauses not applicable	4
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Enforcement agencies and framework:

Effective mechanisms are established for fisheries monitoring, surveillance, control and enforcement measures including, an observer program (although it is designed for biological data collection rather than enforcement), inspection schemes such as US Coast Guard (USCG) boardings, dockside landing inspections and vessel monitoring systems, to ensure compliance with the conservation and management measures for the Pacific cod fishery.

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce federal fisheries laws and regulations, especially 50CFR679. 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.

On January 8, 2002, an emergency interim rule (67 FR 956) was issued by NMFS to implement Steller sea lion protection measures. All vessels using pot, hook-and-line or trawl gear in the directed fisheries for pollock, Pacific cod or Atka mackerel are now required [Section 679.7(a)(18)] to have an operable vessel monitoring system (VMS) on board. This requirement is necessary to monitor fishing restrictions in Steller sea lion protection and forage areas. Also, when the vessels are fishing Pacific cod in the state parallel fishery, they would use their VMS as directed by their federal fishing permit.

Boardings and Violations

Pacific cod in the Gulf of Alaska and Bering Sea Aleutian Islands is targeted by many different gear types including non-pelagic trawl, longline, pot, and jig gear. In the GOA the active size of these fleets is approximately 643 vessels, and the Coast Guard attempts to board approximately 52 vessels each year. From fiscal year 2008 through the end of fiscal year 2012, the Coast Guard conducted 291 boardings on Gulf of Alaska Pacific cod vessels, noting 25 violations on 19 vessels resulting in a detected violation rate for this fleet of 6.53%. Significant violations include failure to meet observer coverage rates as required, failure to use seabird avoidance gear, closed area incursions, illegal retention or unsafe release of bycatch species, and failure to use VMS as required.

In the BSAI, the active size of these fleets is approximately 263 vessels, and the Coast Guard attempts to board approximately 48 vessels each year. From fiscal year 2008 through the end of fiscal year 2012, the Coast Guard conducted 160 boardings on Bering Sea Pacific cod vessels, noting 31 violations on 25 vessels resulting in a detected violation rate for this fleet of 15.63%. Significant violations noted below include MRA bycatch overages, failure to meet observer coverage rates as required, IR/IU violations, and not using VMS.

The Alaska Wildlife Troopers enforce regulations for the state Pacific cod fisheries. Additionally, ADFG field staff is properly trained and deputized and can, if required, enforce regulations and make arrests.

Fishing permit requirements:

No foreign fleet is allowed to fish in the Alaska's EEZ. Every fishing vessel targeting Pacific cod in Alaska is required to have a federal or state permit. The permit programs are managed by the Restricted Access Management (RAM) federal division and by the Commercial Fisheries Entry Commission for state waters.

E. Implementation, Monitoring and Control

Fundamental 12

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

No. Supporting clauses	4
Supporting clauses applicable	2
Supporting clauses not applicable	2
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Enforcement policies and regulations, state and federal:

In Alaska waters, enforcement policy section 50CFR600.740 states:

(a) The MSA provides four basic enforcement remedies for violations, in ascending order of severity, as follows: (1) Issuance of a citation (a type of warning), usually at the scene of the offense (see 15 CFR part 904, subpart E). (2) Assessment by the Administrator of a civil money penalty. (3) For certain violations, judicial forfeiture action against the vessel and its catch. (4) Criminal prosecution of the owner or operator for some offenses. It shall be the policy of NMFS to enforce vigorously and equitably the provisions of the MSA by utilizing that form or combination of authorized remedies best suited in a particular case to this end.

(b) Processing a case under one remedial form usually means that other remedies are inappropriate in that case. However, further investigation or later review may indicate the case to be either more or less serious than initially considered, or may otherwise reveal that the penalty first pursued is inadequate to serve the purposes of the MSA. Under such circumstances, the Agency may pursue other remedies either in lieu of or in addition to the action originally taken. Forfeiture of the illegal catch does not fall within this general rule and is considered in most cases as only the initial step in remedying a violation by removing the ill-gotten gains of the offense.

(c) If a fishing vessel for which a permit has been issued under the MSA is used in the commission of an offense prohibited by section 307 of the MSA, NOAA may impose permit sanctions, whether or not civil or criminal action has been undertaken against the vessel or its owner or operator. In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator.

The “Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions” issued by NOAA Office of the General Counsel – Enforcement and Litigation on March 16, 2011, provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The purpose of this 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 this Policy, NOAA expects to improve consistency at a national level, provide greater predictability for the regulated community and the public, improve transparency in enforcement, and more effectively protect natural resources. 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.

The Marine Division of AWT and the State of Alaska Department of Law pursue a very aggressive enforcement policy. They attend the BOF and are integral into the process for regulation formulation and legislation, analogous to the USCG attendance and input in the Council process. AWT has Statutory / Regulatory legislation pertaining to their authority enabling them to fine, imprison, and confiscate equipment for violations and restrict an individual’s right to fish if convicted of a violation. These include AS 16 Fish & Game, 5AAC Fish & Game, 20 AAC Commercial Fishing, AS 11 Criminal, AS 46 Environment, AS 44 State Government, AS 02 Aeronautics, AS 18 Health & Safety. A State violation is a criminal violation (strict liability).

F. Serious Impacts of the Fishery on the Ecosystem

Fundamental 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.

No. Supporting clauses	13
Supporting clauses applicable	13
Supporting clauses not applicable	0
Overall level of conformity	HIGH
Non Conformances	0

Summarized evidence:

Ecosystem reports and studies:

The Final Programmatic Supplemental Environmental Impact Statement is an extensive review of the Alaska Groundfish Fisheries (PSEIS) (NMFS 2004). It provides information about effects of Alaska's groundfish fisheries on the ecosystem and effects of the ecosystem on the groundfish fisheries.

The North Pacific Research Board (NPRB) was created by Congress in 1997 to conduct research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean with a priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs. While the NPRB has invested millions of dollars on obtaining this objective, they have also developed two special projects that seek to understand the integrated ecosystems of the BSAI and GOA. For the Gulf of Alaska Integrated Ecosystem Research Program, more than 40 scientists from 11 institutions are taking part in the \$17.6 million Gulf of Alaska ecosystem study that looks at the physical and biological mechanisms that determine the survival of juvenile groundfish in the eastern and western Gulf of Alaska. The study includes two field years (2011 and 2013) followed by one synthesis year.

For the Bering Sea, a large multiyear ecosystem project is moving towards completion. It consists of two large projects that will be integrated. One funded by the National Science Foundation (NSF's BEST program is the Bering Ecosystem Study, a multi-year study (2007-2010)). The other funded by NPRB (BSIERP, is the Bering Sea Integrated Ecosystem Research Program (2008-2012)). The overlapping goals of these projects led to a partnership that brings together some \$52 million worth of ecosystem research over six years, including important contributions by NOAA and the US Fish & Wildlife Service. From 2007 to 2012, NPRB, NSF, and project partners are combining talented scientists and resources for three years of field research on the eastern Bering Sea Shelf, followed

by two more years for analysis and reporting.

The NMFS and the NPFMC, and other institutions interested in the North Pacific conduct assessments and research on environmental factors on cod and associated species and their habitats. Findings and conclusions are published in SAFE document, annual Ecosystem SAFE documents and other reports. SAFE documents for BSAI and GOA Pacific cod summarize ecosystem considerations for the stocks.

A primary ecosystem phenomenon affecting the Pacific cod stock seems to be the occurrence of periodic “regime shifts” in which central tendencies of key variables in the physical environment change on a scale spanning several years to a few decades. One well documented example of such regime shift occurred in 1977, and shifts occurring in 1989 and 1999 have also been suggested. An attempt was made to estimate the change in median recruitment of BSAI and GOA Pacific cod associated with the 1977 regime shift.

The prey and predators of Pacific cod have been described and reviewed extensively. The composition of Pacific cod prey varies to some extent by time and area. In terms of percent occurrence, some of the most important items in the diet of Pacific cod in the BSAI and GOA have been polychaetes, amphipods, and crangonid shrimp. In terms of numbers of individual organisms consumed, some of the most important dietary items have been euphausiids, miscellaneous fishes, and amphipods. In terms of weight of organisms consumed, some of the most important dietary items have been walleye pollock, fishery offal, yellowfin sole, and crustaceans. Small Pacific cod feed mostly on invertebrates, while large Pacific cod are mainly piscivorous. Predators of Pacific cod include Pacific cod, halibut, salmon shark, northern fur seals, Steller sea lions, harbor porpoises, various whale species, and tufted puffin. Major trends in the most important prey or predator species could be expected to affect the dynamics of Pacific cod to some extent.

Bycatch and ETP species

Gear modifications have been implemented in the BSAI and are being tested in the GOA to lift the sweep off the seafloor and hence limit detrimental effects on the seafloor. Research has demonstrated that elevated sweeps can reduce unobserved mortality of crab from interacting with the trawl sweeps. Additionally there are several regulations in place towards seabird avoidance for vessels fishing with hook-and-line gear. Further gear-related measures include (i) biodegradable panels required for pot gear, to minimize bycatch associated with so-called ghost fishing of lost gear (5 AAC 39.145 *Escape Mechanism for Shellfish and Bottomfish Pots*) and (ii) tunnel openings for pot gear are limited in size (tunnel eye openings must be 36 inches in perimeter or less) to reduce incidental catch of halibut and crabs. Gillnets for groundfish have been prohibited to prevent ghost fishing and bycatch of non-target species. Detailed bycatch reduction programs are in place for species impacted by the fishery such as crab, halibut, seabirds, as well as measures to allow sufficient cod resources for Steller sea lions predation. Sea stars and giant grenadier made up the significant part of bycatch in the BSAI and the GOA in 2010. Also, with the development of the groundfish fisheries, regulations were implemented to limit bycatch of halibut, so as to minimize impacts on the domestic halibut fisheries. Interception of juvenile halibut (~30 cm and greater) often occurs in trawl fisheries targeting other groundfish species (such as rock sole, pollock, yellowfin sole, and Pacific cod). Incidental catch of halibut also occurs in groundfish hook and line and pot fisheries. Halibut is a PSC species which limits severely the Pacific cod fishery (i.e. when PSC cap is reached the fishery is closed). Regulations require that all halibut caught incidentally must be

discarded.

Seabirds

The Alaska Fisheries Science Center's Fishery Monitoring and Analysis Division supports the world's largest seabird bycatch monitoring effort through the North Pacific Groundfish Observer Program. Between 36,000 and 39,000 coverage days are completed each year in the Alaskan groundfish fisheries (longline, pot, pelagic trawl, and non-pelagic trawl), and data are provided for analysis of seabird bycatch. The AFSC has been producing estimates of seabird bycatch in Alaskan groundfish fisheries since the late 1990s. Estimates were produced covering the period 1993 to 2006 and are available in detail in the 2009 Ecosystem Chapter of the Stock Assessment and Fishery Evaluation Report. Updates can be found in the 2012 Ecosystem SAFE report. The AFSC has recently redesigned their approach to the production of annual estimates and are working on reports that will be available in the future that note seabird bycatch numbers, rates, fishing effort, species composition, and other important information.

In 2011, a groundfish fishery observer reported to their in-season advisor that they had recovered a short-tailed albatross (***Phoebastria albatrus***) (listed as endangered under the US Endangered Species Act in 2000) while monitoring gear retrieval on a Bering Sea freezer longline vessel fishing for Pacific cod. The AFSC immediately reported this take to the U.S. Fish and Wildlife Service and also informed interested parties in NOAA, the fishing industry, and environmental non-government organizations. The Short-tailed Albatross Biological Opinion for the longline fleet allows for 4 observed birds in a two-year period. This is based on observed birds, whether within or outside of the actual sample period, and is not based on the extrapolated numbers. A new 2-year period began on 16 September 2011, making this the first take in the current period. The vessel was using paired streamer lines and had not observed any short-tailed albatross in the area prior to the take event.

Sharks

The GOA Pacific cod fisheries caught 27% of the total (e.g. Alaska) incidental catch of the spiny dogfish and 37% of the total incidental catch of the Pacific sleeper shark. Spiny dogfish (*Squalus suckleyi*) is listed under the IUCN Red list as "Vulnerable". Fisheries and population trend data indicate that the southern part of the Northeast Pacific stock has also declined through overfishing, but stocks appear stable off Alaska. There are currently no directed commercial fisheries for shark species in federally or state managed waters of the BSAI and the GOA, and most incidental catch is not retained. Spiny dogfish are allowed as retained incidental catch in some state managed fisheries, and salmon sharks are targeted by some sport fishermen in Alaska state waters. There is no evidence to suggest that overfishing is occurring for any shark species in the BSAI and the GOA because the OFL has not been exceeded.

Stellar Sea Lions

Pacific cod is one of the four most important prey items of Steller sea lions. Furthermore, the size ranges of Pacific cod harvested by the fisheries and consumed by Steller sea lions overlap, and the fishery operates to some extent in the same geographic areas used by Steller sea lion as foraging grounds. The Fisheries Interaction Team of the Alaska Fisheries Science Center has been engaged in

research to determine the effectiveness of recent management measures designed to mitigate the impacts of the Pacific cod fisheries (among others) on Steller sea lions.

Fishing's effects on the habitat of Pacific cod in the BSAI and the GOA do not appear to have impaired either stock's ability to sustain itself at or near the MSY level. When weighted by the proportions of habitat types used by Pacific cod, the long-term effect indices are low, particularly those of the habitats features most likely to be important to Pacific cod (infaunal and epifaunal prey). The fishery appears to have minimal effects on the distribution of adult Pacific cod. Effects of fishing on weight at length, while statistically significant in some cases, are uniformly small and sometimes positive. While the fishery may impose some habitat-mediated effects on recruitment, these fall below the standard necessary to justify a rating of anything other than minimal or temporary.

Further Information

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Table 1: Global Trust Assessment Team Members

Name	Role	Name	Role
Dave Garforth, Global Trust Certification Ltd. Quayside Business Park Dundalk, Co. Louth Ireland	Lead Assessor	Vito Ciccia Romito, Global Trust Certification Ltd. Quayside Business Park Dundalk, Co. Louth Ireland	Assessor
Dr. Geraldine Criquet, Global Trust Certification Ltd. Quayside Business Park Dundalk, Co. Louth Ireland	Technical Support	Dr. Norman Graham, Galway, Ireland.	Assessor
Earl Krygier, Alaska, USA.	Assessor	Dr. Christian Möllmann, Hamburg, Germany.	Assessor

<http://sustainability.alaskaseafood.org>

Table 2: Peer Reviewers

Dr. Keith Criddle	Dr. Vladimir Laptikhovsky
Keith Criddle is the Ted Stevens Distinguished Professor of Marine Policy at the University of Alaska Fairbanks where he also serves as Director of the Fisheries Division. He received a PhD in agricultural economics from the University of California Davis in 1989. His research focuses on the intersection between the natural sciences, economics, and public policy and is driven by an interest in the sustainable management of marine resources with a particular emphasis on the commercial, sport, and subsistence fisheries of the North Pacific. In recent years, he and his students have explored topics ranging from the resilience and economic consequences of alternative management regimes for commercial, sport, and subsistence fisheries to the bio economic effects of climate change in North Pacific fisheries to the evolution of Chilean salmon aquaculture in response to requirements for traceability and	Upon graduating as M.Sc. in ichthyology and fish culture at the Kaliningrad State Technical University of Fishing Industry (Russia) in 1985, V. Laptikhovsky completed his Ph.D. in hydrobiology at the same university in 1995, and D.Sc. in hydrobiology at All-Russian Research Institute of Fisheries and Oceanography (Moscow) in 2006. In between 1995 and 1999 he has been working in Atlantic Research Institute of Fisheries of Oceanography (Kaliningrad, Russia) as a scientist dealing with stock assessment of squids and small pelagic fish, mostly off Northwest Africa. Since 1999 till now he is working in the Falkland Islands Government Fisheries Department as the stock assessment scientist. His main duties include investigations of various aspects of population biology, fisheries, stock assessment, discard management, and licensing advice in respect to groundfish species of the Southwest Atlantic. His

<p>assurance and implications for salmon production in Alaska. He has served a resident of the <i>Resource Modeling Association</i> and a member of the National Research Council's Ocean Studies Board.</p>	<p>research activities have been focused primarily on the Patagonian toothfish, red cod, Patagonian rock cod, blue whiting, different ray species (Rajidae), and octopods. V. Laptikhovsky authored more than 140 publications, mostly in peer-reviewed journals. In the year 2010 he was appointed as an Associate Editor of the Journal of Marine Biological Association of the U.K.</p>
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Table 3: Certification Committee Members

<p>Bill Paterson, Legal / Technical / Certification and Accreditation Expert Global Trust Certification Ltd.</p>	
<p>Dr. Ciaran Kelly Fishery Management Expert Marine Institute. Ireland</p>	<p>Deirdre Hoare Fishery Scientist Independent. Ireland.</p>
<p>Also in Attendance</p>	
<p>Vito Ciccia Romito: Fishery Scientist Global Trust Certification Ltd. (Fishery Presentation to Certification Committee only)</p>	
<p>Dave Garforth: Fisheries and Certification Expert Global Trust Certification Ltd. (Fishery Presentation to Certification Committee only)</p>	