MSC Client Draft Report

for

Alaska Pacific Cod Fishery – Gulf of Alaska

MRAG Americas, Inc.

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Alaska Fishery Development Foundation
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Contents

Glossary

ABC	Acceptable Biological Catch
AFA	American Fisheries Act
AP	Advisory Panel
ADFG	Alaska Department of Fish and Game
BSAI	Bering Sea and Aleutian Islands
CDQ	Community Development Quota
CVOA	Catcher Vessel Operational Area
EAM	Ecosystem Approach to Management
EA/RIR	Environmental Assessment/Regulatory Impact Review
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEP	Fishery Ecosystem Plan
FMP	Fishery Management Plan
GHL	Guideline Harvest Level
GOA	Gulf of Alaska
HAPC	Habitat Areas of Particular Concern
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
IRFA	Initial Regulatory Flexibility Analysis
IRIU	Improved Retention/Improved Utilization
LLP	License Limitation Program
MMPA	Marine Mammal Protection Act
MRA	Maximum Retainable Allowance
MSA	Magnuson-Stevens Fishery Conservation & Management Act
MSY	Maximum Sustainable Yield
mt	Metric tons
nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
OY	Optimum Yield
POP	Pacific Ocean perch
PSC	Prohibited Species Catch
SAFE	Stock Assessment and Fishery Evaluation
SSC	Scientific and Statistical Committee
SSL	Steller Sea Lion
TAC	Total Allowable Catch

1. Executive Summary

An assessment team of Don Bowen, Jake Rice, and Robert J. Trumble conducted the assessment using CR v1.3. The assessment team met with scientists, managers, and other stakeholders from 27-30 May 2014 in person. The Gulf of Alaska fisheries for Pacific cod are exceptionally well managed and are characterized by state of the art stock assessments and harvest strategies. The stock is in good condition. The management system implements high levels of control over the fisheries to minimize environmental impacts. The overarching legislation and regulation affecting Principle 1 and Principle 2 are highly developed, and applied specifically to the fisheries. On the basis of this re-assessment of the fisheries, the Assessment Team recommends that the Gulf of Alaska fisheries for Pacific cod maintain certification. The fisheries received no conditions.

The fisheries scored equal to or greater 90 for all principles, and no performance indicators scores less than 80.

Final Principle Scores	
Principle	**Score**
Principle 1 – Target Species	95.6
Principle 2 – Ecosystem	Trawl – 90.3 Longline – 91.3 Pot – 91.0 Jig – 93.0
Principle 3 – Management System	96.5

2. Authorship and Peer Reviewers

3. 1 Assessment Team

The assessment team consists of Dr. Don Bowen, Dr. Jake Rice, and Dr. Robert J. Trumble. Dr. Trumble serves as assessment team leader. Qualifications of the team are:

Dr. Don Bowen. William Don Bowen is a Ph.D. graduate of the University of British Columbia, Vancouver, B.C. He has been a research scientist at the Bedford Institute of Oceanography, Dartmouth and an Adjunct Professor of Biology at Dalhousie University, Halifax, Nova Scotia for more than 25 years. He is best known for his research on the ecology, energetics and population dynamics of North Atlantic phocid seals, based largely on his collaborative studies at Sable Island. His interests also include mammalian life histories, population assessment, ecological interactions with fisheries, conservation and ecosystem change. Has published over 200 scientific papers, including 155 journal articles and book chapters and two books. He has served on the USA recovery team of the Hawaiian monk seal, and as chair of the UK Special Committee on Seals. He has broad national (Natural Science and Engineering Research Council, DFO) and international (National Academy, NSF, NRC, NMFS, NERC, NRPB) experience as a science advisor and served as member of the Board and Editor of Marine Mammal Science for five years. He has considerable experience as an MSC assessor having been involved with a number of groundfish fisheries certifications (e.g., pollock, Pacific cod) in the Bering Sea and Gulf of Alaska.

Dr. Jake Rice. Dr. Jake Rice is Chief Scientist for the Department of Fisheries and Oceans, Canada. He previously served as Director of Peer Review and Science Advice and held senior DFO Science positions in Pacific and Newfoundland Regions. He received BSc. from Cornell (1970 Conservation) and Ph. D. from University of Toronto (1974 - Ornithology). He has more than 270 publications in the scientific and technical literature, primarily on the ecosystem approach to integrated management. He is a member of the Group of Experts for the UN Regular Process for Global Marine Assessments, and a Lead Authors for the chapter on Drivers, Trends and Mitigation, for the next IPCC Assessment Report. He has been active as an expert or delegate to many UN meetings and agencies (FAO, CBD, GEF, UNEP, UNESCO-IOC, ICP, BBNJ etc.).

Dr. Robert J. Trumble joined MRAG Americas in 2000 as a senior research scientist and became Vice President in 2005. He has wide-ranging experience in marine fish science and management, fishery habitat protection, and oceanography. He has overseen all MRAG pre-assessments and full assessments. He has received MSC training on numerous occasions, including the Risk-based Framework, and has led an RBF on three occasions. Previously, he served as Senior Biologist of the International Pacific Halibut Commission in Seattle, Washington, in various research and management positions at the Washington Department of Fisheries, and with the US Naval Oceanographic Office. Dr. Trumble has extensive experience working with government agencies, commercial and recreational fisheries groups, Indian tribes, and national and international advisory groups. He received appointments to the Scientific and Statistical Committees of the South Atlantic Fishery Management Council and the Pacific Fishery Management Council, the Groundfish Management Team of the North Pacific Fishery Management Council, the affiliate faculty of Fisheries at the University of Washington, and the Advisory Committee of the Washington Sea Grant Program. Dr. Trumble received a Ph.D. in Fisheries from the College of Fisheries, University of Washington.

These individuals collectively have knowledge of the stock status and assessment, ecosystem impacts, and management systems applicable to this fishery.

3. 2 Peer Reviewers

Tom Jagielo has a wide breadth of experience in marine fish science, habitat studies, and oceanography. He formed his own firm in 2008 to provide consulting services in quantitative fisheries science. Previously he served for 24 years with the Washington Department of Fish and Wildlife, and 6 years with the Fisheries Research Institute at the University of Washington in Seattle. He has specialized in groundfish stock assessment and survey design, adapting state of the art tools and methods to assess marine fish populations for sustainable fisheries management. He has produced numerous groundfish stock assessments used by the Pacific Fishery Management Council, including analysis of lingcod, black rockfish, and yelloweye rockfish populations. Tom has extensive experience working with government agencies, commercial and recreational fisheries groups, Indian tribes, community organizations, and both national and international advisory groups. His recent projects have included 1) the design and implementation of a novel aerial survey used for management of west coast Pacific sardine, 2) a methodological review of Annual Catch Limits for the NOAA Fisheries Pacific Islands Regional Office, and 3) various habitat and marine fish science projects for the Environmental Defence Fund, the Alliance of Communities for Sustainable Fisheries, the At Sea Processors Association, the Freezer-Longline Coalition, and other organizations. He has received appointments to the Scientific and Statistical Committee of the Pacific Fishery Management Council, the Technical Subcommittee of the US-Canada Groundfish Committee, the Pacific Coast Ocean Observation System, and various other workshop panels and review bodies. He has published in peer-reviewed journals and symposium proceedings, and has presented papers at national and international meetings. Tom received a B.S. degree in Biology from the Pennsylvania State University, and a M.S. degree in Fisheries from the University of Washington, where he also conducted post M.S. graduate studies in fisheries population dynamics and parameter estimation. He has considerable experience with MSC reviews on the West Coast (Pacific hake, Limited Entry groundfish), Canada (dogfish shark, sablefish) and Alaska (Sablefish, Pacific halibut).

Susan Hanna is professor emeritus of marine economics at Oregon State University. Her research and publications are in the area of marine economics and policy, with an emphasis on fishery management, ecosystem-based fishery management, property rights and institutional design. Dr. Hanna has served as a scientific advisor to the U.S. Commission on Ocean Policy, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Minerals Management Service, Northwest Power and Conservation Council and the Pacific Fishery Management Council. She served on the Ocean Studies Board of the National Research Council (NRC), National Academy of Sciences, and several NRC Committees, including the Committee to Review Individual Quotas in Fisheries and the Committee on Protection and Management of Pacific Northwest Anadromous Salmonids. She has conducted reviews for the Center for Independent Experts (CIE) and has participated in MSC reviews of West Coast Dungeness crab, Oregon pink shrimp, West Coast groundfish, Fogo Island shrimp, Alaska Pollock, Alaska flatfish, and Alaska Pacific cod fisheries.

3. Description of the Fishery

3.1 Unit(s) of Certification and scope of certification sought

The MRAG Americas assessment team determined that the fishery is within scope as required by the MSC. It is not conducted under a controversial unilateral exemption to an international agreement; is not subject to unresolvable controversy; has not failed or had a certificate withdrawn; and does not use out of scope fishing methods. The fishery involves neither enhanced stocks nor introduced species.

The units of certification consist of Pacific cod and four gears:

Species	Pacific Cod (*Gadus macrocephalus*)
Geographical range of fishing operations	US federal EEZ and State waters of the Gulf of Alaska
Method of capture	Trawl
Stock	Gulf of Alaska Pacific Cod
Management	Alaska Pacific Cod are managed under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, MSA), with management recommendations from the North Pacific Fishery Management Council (NPFMC) and implementation through the National Marine Fisheries Service (NMFS). Alaska manages a portion of the fishery that occurs in state waters.
Client group	The client group, the Alaska Fisheries Development Foundation, represents the entire fishery.

Species	Pacific Cod (*Gadus macrocephalus*)
Geographical range of fishing operations	US federal EEZ and State waters of the Gulf of Alaska
Method of capture	Longline
Stock	Gulf of Alaska Pacific Cod
Management	Alaska Pacific Cod are managed under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, MSA), with management recommendations from the North Pacific Fishery Management Council (NPFMC) and implementation through the National Marine Fisheries Service (NMFS). Alaska manages a portion of the fishery that occurs in state waters.
Client group	The client group, the Alaska Fisheries Development Foundation, represents the entire fishery.

Species	Pacific Cod (*Gadus macrocephalus*)
Geographical range of fishing operations	US federal EEZ and State waters of the Gulf of Alaska
Method of capture	Pot
Stock	Gulf of Alaska Pacific Cod
Management	Alaska Pacific Cod are managed under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, MSA), with management recommendations from the

	North Pacific Fishery Management Council (NPFMC) and implementation through the National Marine Fisheries Service (NMFS). Alaska manages a portion of the fishery that occurs in state waters.
Client group	The client group, the Alaska Fisheries Development Foundation, represents the entire fishery.
Species	Pacific Cod (*Gadus macrocephalus*)
Geographical range of fishing operations	US federal EEZ and State waters of the Gulf of Alaska
Method of capture	Jig
Stock	Gulf of Alaska Pacific Cod
Management	Alaska Pacific Cod are managed under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, MSA), with management recommendations from the North Pacific Fishery Management Council (NPFMC) and implementation through the National Marine Fisheries Service (NMFS). Alaska manages a portion of the fishery that occurs in state waters.
Client group	The client group, the Alaska Fisheries Development Foundation, represents the entire fishery.

These units of certification represent the range of Pacific Cod in the Gulf of Alaska, and include all eligible fishermen of the US with authorization to fish for Pacific Cod.

On January 25, 2010, the Marine Stewardship Council (MSC) certified the pot, jig, trawl and longline fisheries for Pacific Cod (*Gadus macrocephalus*) in the Bering Sea and Aleutian Islands (BSAI) and the Gulf of Alaska (GOA) as sustainable under MSC standards. As part of the ongoing MSC certification, each fishery and gear types are required to undergo annual surveillance audits, followed by full assessment for Re-certification. This report provides the information on the stock relative to the four gear types used to harvest Pacific Cod in the Gulf of Alaska.

3. 2 Overview of the fishery

The GOA Alaska Pacific cod (*Gadus macrocephalus*) fishery is conducted in the U.S. EEZ waters of the Gulf of Alaska under federal management and in Alaska state waters under state management. Historically, with implementation of the Magnuson-Stevens Fishery Conservation and Management Act in the U.S., annual Pacific cod quotas (or catch targets) had been used to limit the catch by foreign and domestic fisheries (A'mar and Palsson 2013).

The Gulf of Alaska Groundfish Fishery Management Plan (NPFMC 2014) summarized the history of the Gulf of Alaska groundfish fisheries. The first commercial groundfish fishery in the GOA was a setline fishery for cod by U.S. nationals in 1867. Later U.S. fisheries developed on halibut, sablefish, and other groundfish. The Asian trawl fisheries on GOA groundfish began in 1962 when a Soviet fleet of 70 trawlers and support ships targeted on Pacific ocean perch (POP, *Sebastes alutus*), an abundant groundfish of the outer continental shelf and upper slope. The next year a smaller fleet of Japanese fishing vessels entered the GOA and began directed fisheries on POP and sablefish. The Asian trawl fisheries

expanded rapidly in the 1960s. POP was the first major species targeted by foreign fisheries. The combined effort of the Asian fisheries on POP stocks accounted for approximately 152,000 mt in 1966. The GOA foreign catch of POP steadily decreased through the 1970s, and by 1979 decreased to nearly 7,300 mt. By 1983, the catch decreased further to approximately 5,400 mt and in 1985 only bycatch amounts were allocated to the foreign fleets. In addition to POP, foreign fisheries have targeted pollock, sablefish, flounder, rockfish, Pacific cod, Atka mackerel, and squid. 1986 was the last year of directed foreign harvests, which were limited to pollock and Pacific cod. Japan, U.S.S.R., and Republic of Korea were the major foreign participants in the GOA fisheries, although Canada, Poland, and Mexico also harvested relatively insignificant levels of catch (NPFMC 2014).

During the two decades prior to passage of the Magnuson Fishery Conservation and Management Act (MFCMA) in 1976, the fishery for Pacific cod in the GOA was small, averaging around 3,000 t per year. Most of the catch during this period was taken by the foreign fleet, whose catches of Pacific cod were usually incidental to directed fisheries for other species. By 1976, catches had increased to 6,800 t.

With the advent of the Magnuson Fishery Conservation and Management Act (MFCMA) of 1976 (later amended to the Magnuson-Stevens Fishery Conservation and Management Act (MSA)), the exploitation and management of the fisheries resources of the GOA began to change. Domestic commercial groundfish fisheries steadily increased after 1978. Between 1978 and 1990, joint venture partnerships between U.S. catcher vessels and foreign processing vessels helped to build up U.S. capacity. Since 1991, the entire GOA groundfish harvest and processing has been entirely domestic. Pacific cod have been landed domestically since the late 1950s and early 1960s; however, the fishery did not really begin to develop until 1978. Unlike most species, which are harvested predominately by one type of gear accounting typically for 90 percent or more of the catch, Pacific cod is taken by trawl, hook-and-line, and pot gear. Jig gear currently receives an allotment of the Pacific cod harvest. Since 1998, full retention of Pacific cod is required in the GOA. The federal fisheries require federal fishing permits and license limitation permits[1], but the fishery has not undergone development of a catch share system (often referred to in Alaska as 'rationalization'); the Council has scheduled consideration of rationalization for future meetings (NPFMC 2014).

The MSA established eight fishery management councils to initiate management for federal waters of the United States. The North Pacific Fishery Management Council has responsibility for the Exclusive Economic Zone (EEZ) of the North Pacific and Arctic oceans adjacent to Alaska, including the Bering Sea, Aleutian Islands, and Gulf of Alaska.

Pacific cod in Alaska waters is managed under three distinct systems: The Federal fishery occurs in federal waters (EEZ; 3–200 nmi) guided by NPFMC process; the Alaska State fishery in state waters (0–3 nmi) managed as a "parallel" fishery to the adjacent federal fishery and generally adopt federal regulations and management measures as guided by the Alaska Board of Fisheries process; and the Alaska State guideline harvest level fishery (GHL) in State waters (0-3 nmi) guided by the Alaska Board Of Fisheries process. Under federal Pacific cod management, the harvest limit (Total Allowable Catch (TAC) in the EEZ is based on 75-85% of Pacific cod Acceptable Biological Catch (ABC), with gear sectors of trawl, longline, pot and jig gears. The federal fishery has A and B seasons starting Jan 1 and Sept 1, respectively.

The state parallel fishery opens by state Executive Order concurrent to federal fishery and shares the TAC with federal fishery. The parallel fishery also has trawl, longline, pot and jig gear sectors, but without federal gear limits and without requirements for federal fishing

[1] This does not apply in the GOA to a catcher vessel or catcher/processor vessel that does not exceed 26 ft (7.9 m) LOA; or to a vessel that uses a maximum of five jig machines, one line per jig machine, and a maximum of 30 hooks per line.

permits and license limitation permits. The parallel fishery falls in the federal A and B seasons and requires observers for federally permitted vessels.

The state fishery occurs in state waters with a GHL based on 15-25% of Pacific cod ABC (3% Aleutian Island) and opens to pot and jig gear (plus longline in Prince William Sound and longline and trawl in the Aleutian Islands) after federal/parallel fisheries closes. Gear is limited to 60 pots or 5 jig machines. The fishery is open access but has exclusive registration, and has no observer requirements.

Pacific cod is authorized for subsistence harvest under Section 5 AAC 01.001 of the Alaska Administrative Code: "… subsistence fishing for salmon, herring, bottomfish, smelt, halibut and other types of finfish or their parts …." However, the subsistence harvest is a small portion of the commercial catch in the Gulf of Alaska.

Pacific cod is a transoceanic species, occurring at depths from shoreline to 500 m. The southern limit of the species' distribution is about 34° N latitude, with a northern limit of about 63° N latitude. Pacific cod is distributed widely over Gulf of Alaska (GOA), as well as the eastern Bering Sea (EBS) and the Aleutian Islands (AI) area. Tagging studies (e.g., Shimada and Kimura 1994) have demonstrated significant migration both within and between the EBS, AI, and GOA. Recent research indicates the existence of discrete stocks in the EBS and AI. Pacific cod is not known to exhibit any special life history characteristics that would require it to be assessed or managed differently from other groundfish stocks in the GOA. Pacific cod in the GOA is managed as one stock (A'Mar and Palsson 2013).

Presently, the Pacific cod stock is exploited by a multiple-gear fishery, including trawl, longline, pot, and jig components (Table 1). Trawl gear took the largest share of the catch in every year but one from 1991-2002. Since 2003 pot gear has taken the largest share (not counting 2013, for which data are not yet complete). In the first year of management under the MFCMA (1977), the catch limit for GOA Pacific cod was established at slightly less than the 1976 total reported landings of 6,800t. 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. In two of those 11 years (1992 and 1996), catch exceeded TAC. To understand the relationships between ABC, TAC, and catch for the period since 1997, it is important to understand that a substantial fishery for Pacific cod has been conducted during these years inside state waters, mostly in the Western and Central Regulatory Areas. To accommodate the State managed fishery, the federal TAC was set well below ABC (15-25% lower) in each of those years. Thus, although total (federal plus state) catch has exceeded the Federal TAC in all but three years since 1997, this is basically an artifact of the bi-jurisdictional nature of the fishery and is not evidence of overfishing. At no time since the separate State waters fishery began in 1997 has total catch exceeded ABC, and total catch has never exceeded OFL.

Table 1 Pacific Cod Catch by Sector (After table 2.1, A'Mar and Palsson 2013)

	Federal					State				
Year	Trawl	Longline	Pot	Other	Subtotal	Longline	Pot	Other	Subtotal	Total
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

Year	Trawl	Longline	Pot	Other	Subtotal	Longline	Pot	Other	Subtotal	Total
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	25,443	11,660	17,351	54	54,508	0	10,388	1,643	12,031	66,560
2001	24,383	9,910	7,171	155	41,619	0	7,836	2,084	9,920	51,542
2002	19,810	14,666	7,694	176	42,345	0	10,423	1,714	12,137	54,483
2003	18,885	9,525	12,740	161	41,311	60	7,966	3,242	11,267	52,579
2004	17,513	10,329	14,965	400	43,206	51	10,602	2,765	13,418	56,625
2005	14,549	5,732	14,749	203	35,234	26	9,653	2,673	12,351	47,585
2006	13,131	10,228	14,795	118	38,272	47	8,890	646	9,582	47,854
2007	14,774	11,512	13,477	40	39,803	165	10,886	574	11,625	51,428
2008	20,293	12,125	11,230	62	43,710	233	13,438	1,568	15,239	58,949
2009	13,981	13,879	11,573	199	39,632	503	10,295	2,500	13,298	52,931
2010	21,791	16,463	20,114	427	58,795	583	14,604	4,045	19,231	78,027
2011	16,365	16,377	29,228	721	62,691	857	16,668	4,625	22,150	84,841
2012	20,184	14,514	21,248	723	56,668	797	15,915	4,608	21,319	77,987
2013	19,544	10,526	13,246	472	43,789	773	14,296	1,216	16,284	60,073

Changes in ABC over time are typically attributable to three factors: 1) changes in resource abundance, 2) changes in management strategy, and 3) changes in the stock assessment model. Assessments conducted prior to 1988 were based on survey biomass alone. From 1988-1993, the assessment was based on stock reduction analysis. From 1994-2004, the assessment was conducted using the Stock Synthesis 1 modeling software with length-based data. The assessment was migrated to Stock Synthesis 2 in 2005 (Methot 2005b), at which time age-based data began to enter the assessment. Several changes have been made to the model within the SS2 framework (renamed "Stock Synthesis," without a numeric modifier, in 2008) each year since then.

3. 3 Principle One: Target Species Background

3.3.1 The Target Species: Pacific Cod (Gadus macrocephalus)

3.3.1.1 Stock Delineation

Pacific cod (*Gadus macrocephalus*) is a transoceanic species, occurring at depths from shoreline to 500 m. The southern limit of the species' distribution is about 34° N latitude, with a northern limit of about 63° N latitude. Pacific cod is distributed widely over the Gulf of Alaska (GOA), as well as the eastern Bering Sea (EBS) and the Aleutian Islands (AI) area. Tagging studies (e.g., Shimada and Kimura 1994) have demonstrated significant migration both within and between the EBS, AI, and GOA. Recent research indicates the existence of discrete stocks in the EBS and AI (Canino et al. 2005, Cunningham et al. 2009, Canino et al. 2010, Spies 2012). Pacific cod is not known to exhibit any special life history characteristics that would require it to be assessed or managed differently from other groundfish stocks in the GOA. The Pacific cod stock in the GOA is managed as one stock.

GoA Pacific cod are not known to exhibit any special life history characteristics that would require them to be assessed or managed differently from other groundfish stocks in the EBS or AI areas.

3.3.1.2 Distribution

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. Average

depth of occurrence tends to vary directly with age for at least the first few years of life (A'Mar and Palsson 2013).

3.3.1.4 Migration

Pacific cod are known to undertake seasonal migrations, the timing and duration of which may be variable (Savin 2008).

3.3.1.5 Review of Life History

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 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.

Little is known about the distribution of Pacific cod larvae, which undergo metamorphosis at about 25 to 35 mm. 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. 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. Average depth of occurrence tends to vary directly with age for at least the first few years of life. However, in the GOA trawl survey, the percentage of fish residing in waters less than 100 m tends to increase with length beyond about 90 cm. The GOA trawl survey also indicates that fish occupying depths of 200-300 m are typically in the 40-90 cm size range.

It is conceivable that mortality rates, both fishing and natural, may vary with age in Pacific cod. In particular, very young fish likely have higher natural mortality rates than older fish (note that this may not be particularly important from the perspective of single-species stock assessment, so long as these higher natural mortality rates do not occur at ages or sizes that are present in substantial numbers in the data). For example, Leslie matrix analysis of a Pacific cod stock occurring off Korea estimated the instantaneous natural mortality rate of 0-year-olds at 910% per year (Jung et al. 2009). This may be compared to a mean estimate for age 0 Atlantic cod (*Gadus morhua*) in Newfoundland of 4.17% per day, with a 95% confidence interval ranging from about 3.31% to 5.03% (Gregory et al. in prep.); and age 0 Greenland cod (*Gadus ogac*) of 2.12% per day, with a 95% confidence interval ranging from about 1.56% to 2.68% (Robert Gregory and Corey Morris, *pers. commun.*).

Although little is known about the likelihood of age-dependent natural mortality in adult Pacific cod, it has been suggested that Atlantic cod may exhibit increasing natural mortality with age (Greer-Walker 1970). At least one study (Ueda et al. 2006) indicates that age 2 Pacific cod may congregate more, relative to age 1 Pacific cod, in areas where trawling efficiency is reduced (e.g., areas of rough substrate), causing their selectivity to decrease. Also, Atlantic cod have been shown to dive in response to a passing vessel (Ona and Godø 1990), which may complicate attempts to estimate catchability or selectivity. It is not known whether Pacific cod undertake a similar response.

In the 1993 BSAI Pacific cod assessment (Thompson and Methot 1993), the natural mortality rate *M* was estimated using SS1 at a value of 0.37. All subsequent assessments of the BSAI and GOA Pacific cod stocks (except the 1995 GOA assessment) have used this value for *M*, until the 2007 assessments, at which time the BSAI assessment adopted a value of 0.34 and the GOA assessment adopted a value of 0.38. Both of these were accepted by the respective Plan Teams and the Scientific and Statistical Committee (SSC).

The new values were based on Equation 7 of Jensen (1996) and ages at 50% maturity reported by (Stark 2007).

3.3.1.6 Reproduction, Growth, and Maturity

Reproduction

Pacific Cod form dense spawning aggregations between 40-290 m deep (NMFS 2004; Shimada and Kimura 1994). Major aggregations occur between Unalaska and Unimak Islands, southwest of the Pribilof Islands, and near the Shumagin group in the western GOA (NMFS, 2004). It has not been possible to demonstrate a strong dependence of reproduction on spawning biomass. However, studies of other Pacific cod stocks have found reproductive potential of stocks is influenced by age composition of the spawning biomass, with older females contributing proportionately much more to reproduction per kg of spawner than do younger but mature females (Narimatsu et al. 2010).

Overall, year-class strengths appear to fluctuate widely (Figure 1), and occur in runs of several years of relatively poorer or stronger recruitment (A'Mar and Palsson 2013).

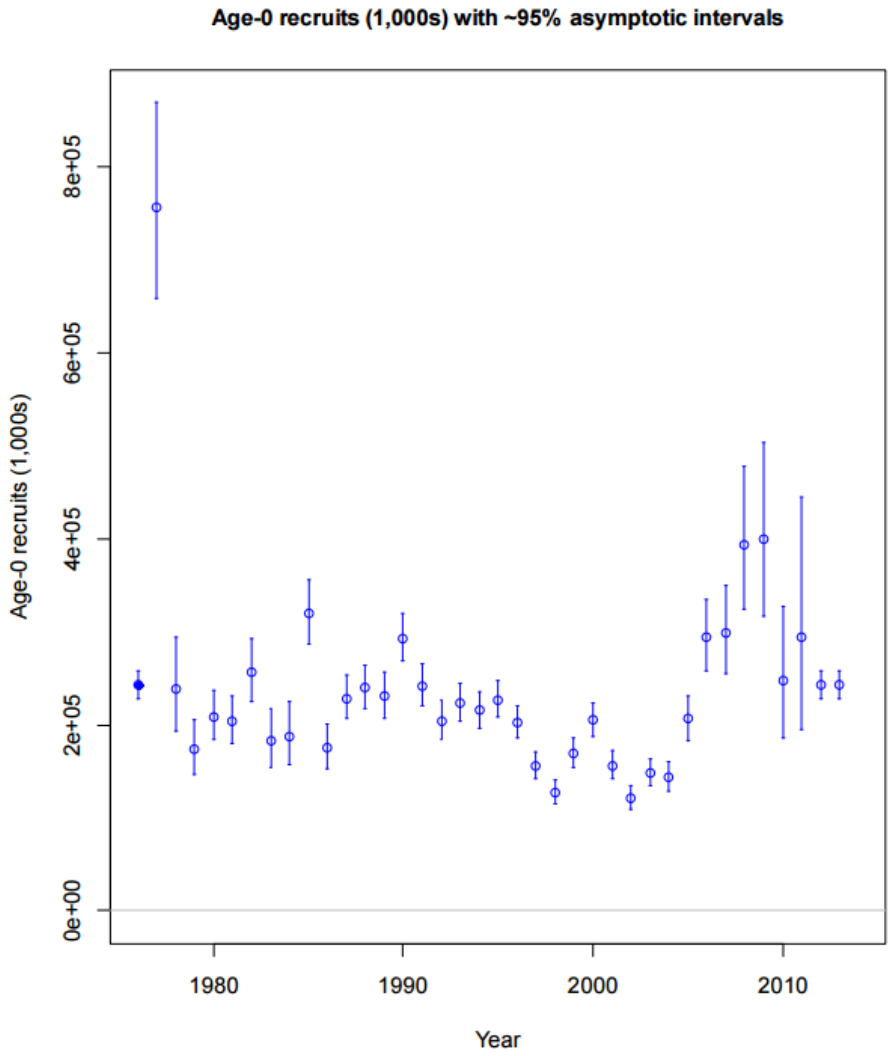

Figure 1 Estimates of age-0 Pacific cod recruits (A'Mar and Palsson 2013)

A comparative study of *Gadus* productivity found that oceanographic covariates such as sea-surface temperature did not improve predictability of recruitment or production of EBS Pacific cod, but there was a strong effect of including trophodynamic covariates, particularly ones related to food supply Holsman et al 2012). The 0-groups larvae and juveniles do not appear to show significant effects of temperature regime (Hurst et al. 2012), so effects of ocean conditions on reproduction are primarily expressed through other mechanisms.

Adults form spawning aggregations from January to May in the BS. Females are highly fecund and can produce more than 1 million eggs (Figure 2, Table 2).

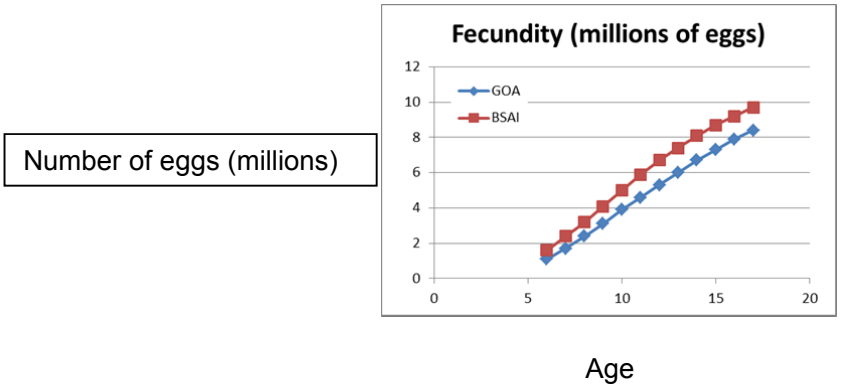

Figure 2 Pacific cod fecundity at age (Source: Ormseth 2007.)

Table 2 Fecundity Page for Pacific cod. (Ormseth, 2011.)

	fecundity				relative fecundity (eggs/g)	
age	mean	N	se		mean	N
3	2.E+06	1	NA		710.7	1
4	1.E+06	1	NA		782.1	1
5	2.E+06	6	229,320		726.0	6
6	3.E+06	13	283,621		794.6	13
7	4.E+06	10	322,996		774.8	10
8	6.E+06	11	243,754		905.2	11
9	6.E+06	8	796,753		934.6	8
10	5.E+06	4	494,880		825.1	4

Mortality

Natural mortality is estimated at M=0.34. Mortality rates, both fishing and natural, vary with age in Pacific cod. In particular, based on many studies of larval and juvenile members of the genus *Gadus* (res) very young fish have higher natural mortality rates than older fish. For example, Leslie matrix analysis of a Pacific cod stock occurring off Korea estimated the instantaneous natural mortality rate of 0-year-olds at 2.49% per day (Jung et al. 2009). This may be compared to a mean estimate for age 0 Atlantic cod (*Gadus morhua*) in Newfoundland of 4.17% per day, with a 95% confidence interval ranging from about 3.31% to 5.03% (Gregory et al. in prep.); and age 0 Greenland cod (*Gadus ogac*) of 2.12% per day, with a 95% confidence interval ranging from about 1.56% to 2.68% (Robert Gregory and Corey Morris, *pers. commun.*). However, these elevated rates of natural mortality occur at ages before recruitment to the fishery, and for at least several years after recruitment to the fishery, natural mortality is considered a constant and is estimated in within the assessment models. For older cod it is difficult to disentangle a possible increase in natural mortality from a variety of factors that may affect catchability in commercial and survey gears. Annual

assessments generally explore the sensitivity of the advice to different assumptions about the fate of older Pacific cod.

Growth

Pacific cod are a relatively fast growing and short lived fish. Longevity can extend to 19 years. The size at 50% maturity is 58 cm (about 5 years). Weight and eggs per kg at age increase throughout the life of the fish (Figure 3).

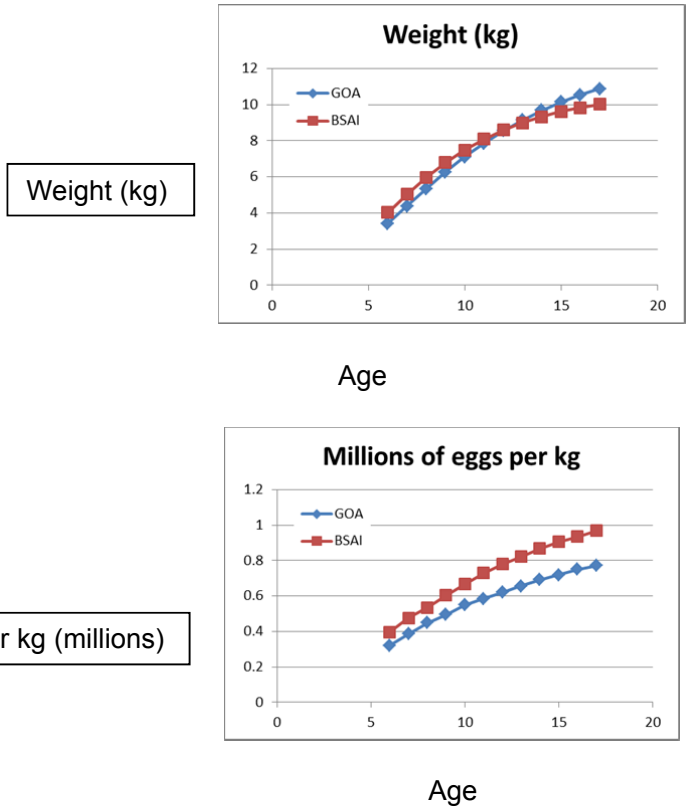

Figure 3 ***Pacific cod growth. a. weight (kg) at age; b. eggs per kg (millions) at age (Source: Ormseth 2007).***

3.3.2 Stock Assessment

3.3.2.1 Introduction

Assessments of Gulf of Alaska and Bering Sea and Aleutian Islands (BSAI) groundfish stocks are prepared by scientists at the National Marine Fisheries Service (NMFS), Alaska Fisheries Science Center (AFSC) in Seattle.

3.3.2.2 Stock Assessment Methods

The assessments are reviewed annually by the GOA Groundfish Plan Team, which is composed of biologists, economists, and mathematicians from various government agencies and academic institutions. The Plan Teams compiles the individual species assessments into a Stock Assessment and Fishery Evaluation (SAFE) document. The SAFE contains information on historical catch trends, biomass estimates, preliminary estimates of ABC, assessments of harvest impacts, and alternative harvesting strategies. The Plan Team's recommendations are then passed on to the Council and its advisory committees. To

understand the basis for these recommendations, it is necessary to have some basic knowledge of fishery biology and assessment methodology.

This section describes data used in the current assessment model (Table 3). It does not attempt to summarize all available data pertaining to Pacific cod in the GOA.

Table 3 Data used in the current assessment model. This table does not attempt to summarize all available data pertaining to Pacific cod in the GOA.

Data	Source	Type	Years included
Federal and state fishery catch, by gear type and month	AKFIN	metric tonnes	1977 – 2013
Federal fishery catch-at-length, by gear type and month	AKFIN / FMA	number, by cm bin	1977 – 2013
State fishery catch-at-length, by gear type and month	ADF&G	number, by cm bin	1997 – 2013
GOA NMFS bottom trawl survey biomass and abundance estimates	AFSC	metric tonnes, numbers	1984 – 2013
GOA NMFS bottom trawl survey length composition	AFSC	number, by cm bin	1984 – 2013
GOA NMFS bottom trawl survey age composition	AFSC	number, by age	1987 – 2011
GOA NMFS bottom trawl survey mean length-at-age	AFSC	mean value and number	1987 – 2011

3.3.2.3 Catch

Presently, the Pacific cod stock is exploited by a multiple-gear fishery, including trawl, longline, pot, and jig components (Table 4). Trawl gear took the largest share of the catch in every year but one from 1991-2002, although pot gear has taken the largest single-gear share of the catch in each year since 2003 (not counting 2013, for which data are not yet complete).

Table 4 Catch (t) for 1991 through 2013 by jurisdiction and gear type (as of 22 October 2013) (After Table 2.1 A'Mar and Palsson 2013)

	Federal					State				
Year	Trawl	Longline	Pot	Other	Subtotal	Longline	Pot	Other	Subtotal	Total
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	25,443	11,660	17,351	54	54,508	0	10,388	1,643	12,031	66,560
2001	24,383	9,910	7,171	155	41,619	0	7,836	2,084	9,920	51,542
2002	19,810	14,666	7,694	176	42,345	0	10,423	1,714	12,137	54,483
2003	18,885	9,525	12,740	161	41,311	60	7,966	3,242	11,267	52,579
2004	17,513	10,329	14,965	400	43,206	51	10,602	2,765	13,418	56,625
2005	14,549	5,732	14,749	203	35,234	26	9,653	2,673	12,351	47,585
2006	13,131	10,228	14,795	118	38,272	47	8,890	646	9,582	47,854
2007	14,774	11,512	13,477	40	39,803	165	10,886	574	11,625	51,428
2008	20,293	12,125	11,230	62	43,710	233	13,438	1,568	15,239	58,949
2009	13,981	13,879	11,573	199	39,632	503	10,295	2,500	13,298	52,931
2010	21,791	16,463	20,114	427	58,795	583	14,604	4,045	19,231	78,027
2011	16,365	16,377	29,228	721	62,691	857	16,668	4,625	22,150	84,841
2012	20,184	14,514	21,248	723	56,668	797	15,915	4,608	21,319	77,987
2013	19,544	10,526	13,246	472	43,789	773	14,296	1,216	16,284	60,073

The history of ABC and TAC levels is summarized and compared with the time series of aggregate commercial catches in Table 5. For the first year of management under the MFCMA (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.

To understand the relationships between ABC, TAC, and catch for the period since 1997, it is important to understand that a substantial fishery for Pacific cod has been conducted during these years inside state of Alaska waters, mostly in the Western and Central Regulatory Areas. To accommodate the State managed fishery, the federal TAC was set well below ABC (15-25% lower) in each of those years. Thus, although total (federal plus state) catch has exceeded the federal TAC in all but three years since 1997, this is basically an artifact of the bi-jurisdictional nature of the fishery and is not evidence of overfishing. At no time since the separate state waters fishery began in 1997 has total catch exceeded ABC, and total catch has never exceeded OFL.

Table 5 History of Pacific cod catch (t, includes catch from State waters), Federal TAC (does not include State guideline harvest level), ABC, and OFL. ABC was not used in management of GOA groundfish prior to 1986. Catch for 2013 is current through 22 October. The values in the column labeled "TAC" correspond 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 of the range. Source: NPFMC staff.

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	51,428	52,264	68,859	97,600
2008	58,949	50,269	64,493	88,660
2009	52,931	41,807	55,300	66,000
2010	78,027	59,563	79,100	94,100
2011	84,841	65,100	86,800	102,600
2012	77,987	65,700	87,600	104,000
2013	60,073	60,600	80,800	97,200

3.3.2.4 Stock Status and Reference Points

The spawning stock biomass trajectory shows an increase to a peak in the mid 1980s, a gradual decrease to a minimum value at the end of the 2000s, and increases since

2010 (Figure 4). The pattern in general follows the trajectory of recruitment (

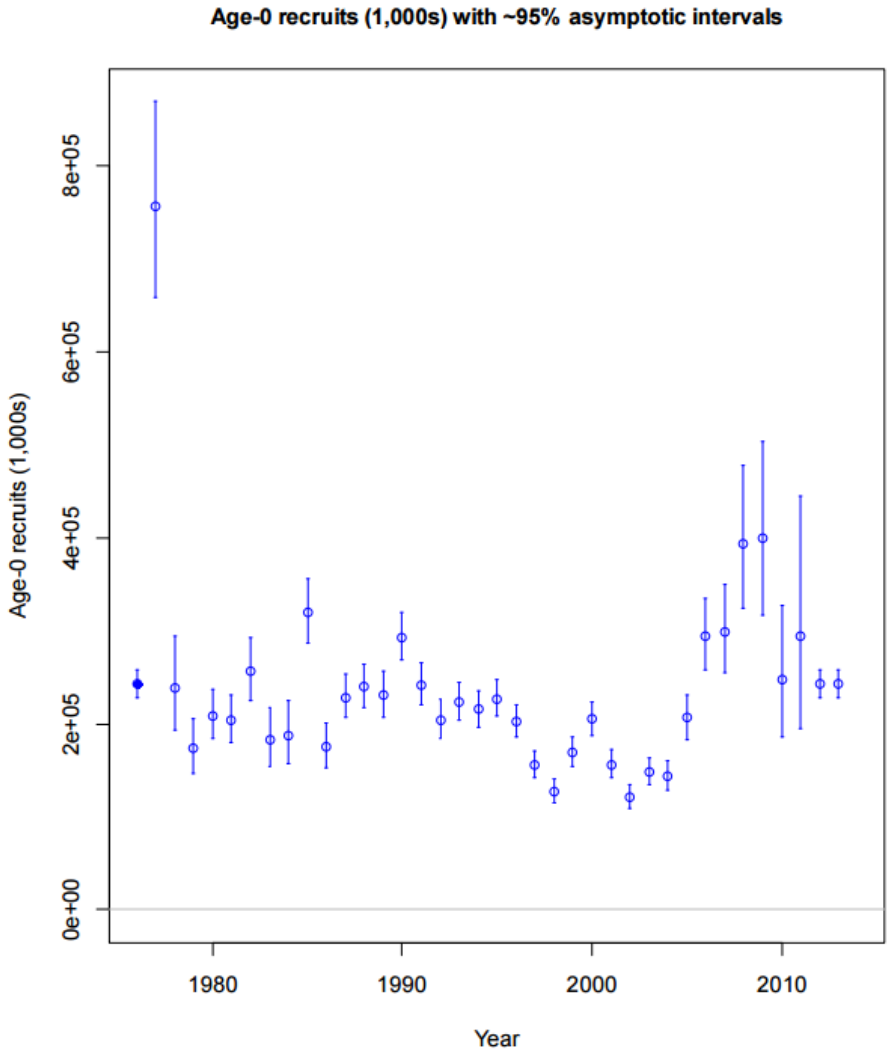

Figure 1), which also shows high recruitment in the 1970s, subsequent declines, and recent increases. Although the spawning biomass dipped below the values of reference points

estimated (B35%) and target abundance (B40%) (

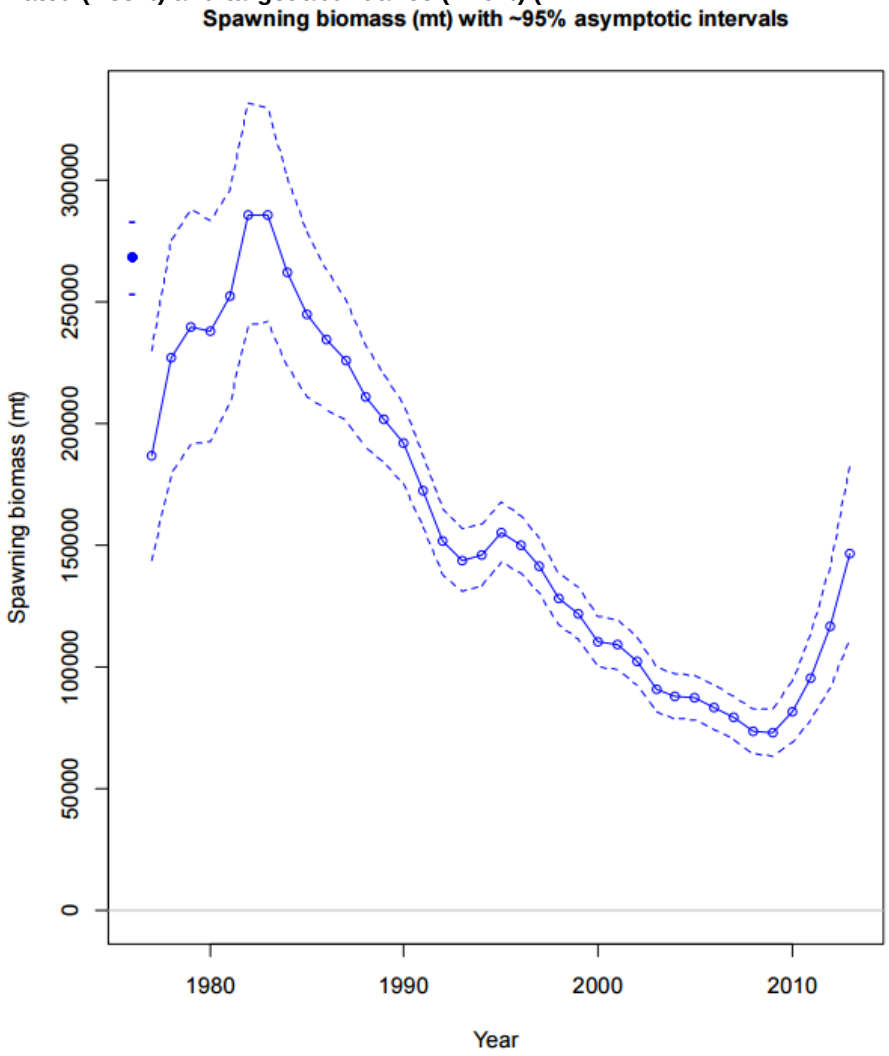

Figure 4 Estimates of female spawning biomass, GOA Pacific cod (A'Mar and Palsson 2013)

Table 6) for a few years in the late 2000s, biomass, and the lower 90% confidence limit of biomass, was substantially above these reference points.

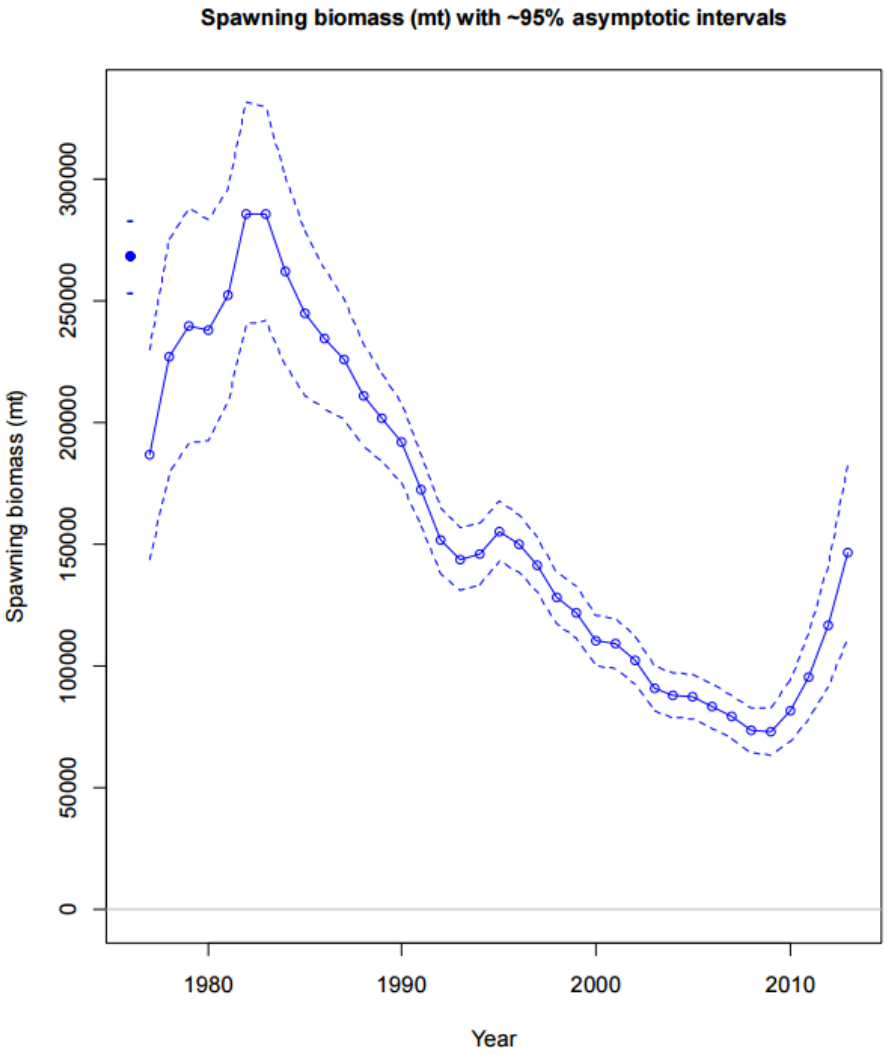

Figure 4 Estimates of female spawning biomass, GOA Pacific cod (A'Mar and Palsson 2013)

Table 6 Summary of stock status and reference points

Quantity	As estimated or *specified last* year:		As estimated or *specified this* year by the alternate model:	
	2013	2014	2014	2015
M (natural mortality rate)	0.38	0.38	0.38	0.38
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	449,300	440,300	422,000	397,000
Female spawning biomass (t)				
Projected	111,000	112,900	120,100	111,500
Upper 95% confidence interval			142,800	132,500
Lower 95% confidence interval			97,500	90,500
$B_{100\%}$	234,800	234,800	227,800	227,800
$B_{40\%}$	93,900	93,900	91,100	91,100
$B_{35\%}$	82,100	82,100	79,700	79,700
F_{OFL}	0.61	0.61	0.69	0.69
$maxF_{ABC}$	0.49	0.49	0.54	0.54
F_{ABC}	0.49	0.49	0.54	0.54
OFL (t)	97,200	101,100	107,300	101,800
maxABC (t)	80,800	84,200	88,500	84,100
ABC (t)	80,800	84,200	88,500	84,100
Status	As determined *last* year for:			
	2011	2012	2012	2013
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

Amendment 56 Reference Points

Amendment 56 to the GOA Groundfish Fishery Management Plan (FMP) defines the "overfishing level" (OFL), the fishing mortality rate used to set OFL (*FOFL*), the maximum permissible ABC, and the fishing mortality rate used to set the maximum permissible ABC. The fishing mortality rate used to set ABC (*FABC*) may be less than this maximum permissible level, but not greater. Because reliable estimates of reference points related to 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 GOA have generally been managed under Tier 3 of Amendment 56 (with the exception of the current year, when the stock is being managed under Tier 5). Tier 3 uses the following reference points: *B40%*, equal to 40% of the equilibrium spawning biomass that would be obtained in the absence of fishing; *F35%*, equal to the 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 *F40%*, 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 following formulae apply under Tier 3:

3a) Stock status: B/B40% > 1
FOFL = F35%
FABC < F40%
3b) Stock status: 0.05 < B/B40% < 1
FOFL = F35% x (B/B40% - 0.05) x 1/0.95
FABC < F40% x (B/B40% - 0.05) x 1/0.95
3c) Stock status: B/B40% < 0.05
FOFL = 0
FABC = 0

Other useful biomass reference points that can be calculated using this assumption are *B100%* and *B35%*, defined analogously to *B40%*. These reference points are estimated as follows, based on this year's model:

Reference point:	*B35%*	*B40%*	*B100%*
Spawning biomass:	81,400 t	93,000 t	232,700 t

For a stock exploited by multiple gear types, estimation of *F35%* and *F40%* requires an assumption regarding the apportionment of fishing mortality among those gear types. For this assessment, the apportionment was based on this year's model's estimates of fishing mortality by gear for the five most recent complete years of data (2008-2012). The average fishing mortality rates for those years implied that total fishing mortality was divided among the three main gear types according to the following percentages: trawl 25%, longline 23%, and pot 52%. This apportionment results in estimates of *F35%* and *F40%* equal to 0.689 and 0.544, respectively.

3.3.2.5 Harvest Allocations

For the past several years, ABC has been allocated among regulatory areas on the basis of the three most recent surveys. The previous proportions of 35% Western, 62% Central, and 3% Eastern were based on the average (across years) of the area-specific biomass estimates from the 2005-2009 surveys. If the same methodology were applied to the 2009-2013 surveys, the proportions would be 33% Western, 64% Central, and 3% Eastern.

3. 4 Principle Two: Ecosystem Background

3.4.1 GOA Ecosystem

The characteristics of the GOA ecosystem are described in the following documents: Final Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement (PSEIS) (NOAA 2004); Final Environmental Impact Statement (EIS) for Essential Fish Habitat (EFH) (NOAA 2005), and Appendix C, Ecosystem Considerations for 2013 (Zador [ed.] 2013). Several models to describe and understand the structure and functioning of these ecosystems have also been developed (Aydin et al. 2007, Gachias and Francis 2008, Gachias et al. 2011, 2012). The following text is based on these sources.

The GOA is a relatively open marine system with land masses to the east and the north and a continental shelf area (160,000 km) which is less than 25 percent of that in the eastern Bering Sea. Commercially harvested species are more diverse in the GOA than in the eastern Bering Sea.

Oceanography and bottom sediments

The dominant circulation in the GOA is characterized by the cyclonic flow of the Alaska gyre, consisting of the eastward-flowing Subarctic Current system at approximately 50º N and the Alaska Coastal Current (Alaska Stream) system along the northern GOA. Large seasonal variations in the wind-stress affect the location of the Alaska Stream and nearshore eddies. The variations in these nearshore flows and eddies affect much of the region's biological variability.

The GOA seabed includes gravels, silty mud, and muddy to sandy gravel, as well as areas of boulders and hardrock. The shelf, between Cape Cleare (148º W) and Cape Fairweather (138º W), is relatively wide (up to 100 km). The dominant shelf sediment is clay silt that comes primarily from either the Copper River or the Bering and Malaspina glaciers. Sand predominates nearshore. Most of the western GOA shelf (west of Cape Igvak) consists of steep and sharply dissected slopes. The shelf consists of many banks and reefs with numerous coarse rocky bottoms and patchy bottom sediments. Near Kodiak Island the shelf consists of flat relatively shallow banks cut by transverse troughs of bedrock outcrops and coarsely fragmented sediment interspersed with sand bottoms.

Climate

Sea surface temperatures in the GOA indicate a relatively warm period in the late 1950s, followed by cooling (especially in the early 1970s), and then by a rapid temperature increase in the latter part of that decade. Subsurface temperature anomalies for the coastal GOA also show a change from the early 1970s into the 1980s, similar to that observed in the sea surface. Climate regime shifts seem to have occurred in 1977 and 1989 in the North Pacific. Ecosystem responses to these shifts in the GOA were strong after the 1977 shift, but weaker after the 1989 shift. Variation in the strength of biological responses to climate shifts may be due to the geographical location of the GOA in relation to the spatial pattern of climate variability in the North Pacific. Prior to 1989, climate forcing varied in an east-west pattern, and the GOA was exposed to extremes in this forcing. After 1989, climate forcing varied in a north-south pattern, with the GOA as a transition zone between the extremes in this forcing. The 1989 regime shift did not, therefore, result in strong signals in the GOA. After 1989 water temperatures were cooler and more variable in the coastal GOA, suggesting production may have been lower and more variable.

There were both physical and biological responses to both regime shifts in the GOA; however, the primary reorganization of the GOA ecosystem occurred after the 1977 shift. After 1977, the Aleutian Low intensified resulting in a stronger Alaska current, warmer water temperature, increased coastal rain, and increased water column stability. High latitude

temperature responses to El Niño southern oscillation events can be seen in the GOA, especially at depth, in 1977, 1982, 1983, 1987, and the 1990s. The 1997/98 El Niño southern oscillation event, one of the strongest recorded this century, significantly changed the distribution of fish stocks in Alaska and further south. The strong 1997/98 El Niño southern oscillation event significantly changed the distribution of fish stocks off Alaska. There were marked changes in diet composition of five seabird species collected in the GOA from 1975 to 1978 (capelin dominated) and from 1988 to 1991(capelin virtually absent) (Piatt and Anderson 1996).

Food web

A number of models have been developed to better understand the structure and functioning of the GOA ecosystem. Gachias and Francis (2008) applied graph theory and network analysis to explore how the GOA ecosystem might respond to climate change and the effects of fishing. Subsequently, Gachias et al. (2011) developed a dynamic ecosystem model to evaluate the relative effects of fishing history, climate change, and predator–prey interactions in determining biomass trajectories for 12 species groups ranging from marine mammals through commercially exploited fish and invertebrates.

Aydin et al. (2007) presented the first comprehensive mass balance models for the GOA. The GOA food web quantified biomass flow over 2,969 pathways between its 138 total groups. The model suggested that the GOA ecosystem appears balanced between benthic and pelagic pathways, but is notable in having a relatively smaller “biomass” of fisheries (catch) relative to the BSAI, and a high biomass of fish predators above trophic level 4; e.g., arrowtooth flounder and halibut. Thus, in the GOA, consumption of plankton and detritus are nearly balanced. In the GOA the primary forage fish, capelin and myctophids (lanterfish), are both given protected status by the NPFMC forage fish FMP amendment, which prohibits directed fishing for all species in the forage fish category. Although there are large biomasses of both piscivorous and invertivorous animals, overall consumption of fish and large invertebrates amounts to less than 5% of total consumption. Piscivory is a small proportion of total ecosystem consumption in all three ecosystems, but is the highest proportion of the total in the AI (0.7%), followed by the GOA (0.5%), and then the EBS (0.2%). In the GOA, the vast majority of early 1990s adult pollock predation mortality was caused by three groundfish predators: arrowtooth flounder (32% of total mortality), halibut (22%), and cod (15%) according to the food web model.

Pacific cod are commercially important and are also important predators in GOA. Cod have relatively more fishing mortality than predation mortality in all three ecosystems. Pacific cod have an extremely varied diet in all three ecosystems, feeding on a variety of fish and invertebrates. In the GOA, pollock are a major diet item for cod followed by Pandalid and non-Pandalid shrimp and various crabs. Commercially important crab species such as snow crab (*C. opilio*) and Tanner crab (*C. bairdi*) make up 9% of cod diets in the GOA, reflecting the strong benthic energy flow in the GOA. After fishing, pollock and halibut predation rank next as sources of predation mortality for cod. Flatfish trawl fisheries, halibut predation and skate predation round out the large cod mortality sources in that ecosystem. In the GOA, sperm whales, sea lions, and dogfish, along with flatfish and halibut fisheries, account for most remaining cod mortality. Therefore, a mixture of groundfish and marine mammal predation account for mortality on cod in the GOA.

Cod fisheries are extremely specialized predators of cod, and thus fisheries are most sensitive to changes in the survival of cod in each ecosystem. None of the other predators of cod showed a significant sensitivity to a 10% decrease in cod survival. Pollock, halibut, and sea lions ranked highest as non-fishery mortality sources of cod in the GOA, but none of these species were predicted to have significant changes in biomass in any ecosystem in this analysis. While these predators may cause significant cod mortality in each system, Aydin et al (2007) found that none of them are dependent on cod to the extent that small changes in cod survival affect their biomass in a predictable manner.

The effects of fishing on the GOA ecosystem have been explored in several studies. For example, Gachias et al (2012) conducted thousands of ecosystem model simulations to explore the interacting effects of the form of functional response of predators to changes in prey density and simulated fishing. They found that the model ecosystems were robust to a wide range of functional responses, but there was an abrupt threshold effect between moderate and heavy exploitation rates, beyond which a much lower proportion of model ecosystems persisted. Beyond this fishing threshold, extinction was more likely, and system attributes differed greatly from moderately fished model ecosystems. Another important finding was that the precipitous drop in success rate of ecosystems happened whether heavy fishing was applied to all groups in the system or was targeted on a single group with sensitive life history parameters.

Management of the GOA ecosystem falls principally to the NPFMC. The Council has adopted measures to promote a precautionary, adaptive management approach by several means, including ecosystem-based management principles that protect managed species from overfishing, and increase habitat protection and bycatch constraints (NPFMC 2014). The establishment of catch limits, identification of essential fish habitat (EFH), and areas of particularly sensitive habitat are key components of the Council ecosystem-based management strategy.

3.4.2 Non-target Interactions.

Detailed information on the nature and amount of retained species and the bycatch of the fishery, including marine mammals and seabirds is collected by The North Pacific Groundfish and Halibut Observer Program (Observer Program) operated by the NMFS (for details see Section 3.5.11). Data are collected by well-trained, independent observers to enable the North Pacific Fishery Management Council and NMFS to comply with the Magnuson-Stevens Fishery Conservation and Management Act, the Marine Mammal Protection Act, the Endangered Species Act, and other applicable Federal laws and treaties. In 2013, the Council and the NMFS restructured the Observer Program to place all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two categories: (1) the full-coverage category, where vessels and processors obtain observers by contracting directly with observer providers, and (2) the partial-coverage category, where NMFS has the flexibility to deploy observers when and where they are needed based on an annual deployment plan. The purpose of restructuring the Observer Program was to: (1) reduce the potential for bias in observer data, (2) authorize the collection of observer data in fishing sectors that were previously not required to carry observers, (3) allow fishery managers to provide observer coverage to respond to the management needs and circumstances of individual fisheries, and (4) assess a broad-based fee to more equitably distribute the costs of observer coverage (NMFS 2014a). Data collected from the Observer Program are stored and processed within the NMFS's Catch Accounting System, which produces annual reports of species or species complexes available online and in SAFE documents. The 2014 Annual Deployment Plan documents how the NMFS intends to assign at-sea and shore-side observers to operations fishing under the authority of the GOA FMP (NMFS 2013).

Observer coverage of the 2013 Pacific cod fisheries in the GOA is summarized in the Table 7 (NMFS 2014a). These data indicate that only about 10% of the catch had 100% observer coverage. Observer coverage was particularly low for catcher vessels fishing with pot gear, given that this fleet took about a third of total catch.

Table 7 Observer coverage and the proportion of the catch observed in 2013 in the GOA Pacific cod fisheries.

Gear	Type	Observed (%)	Proportion catch (%)
Longline	Catcher/Processor	100	6.2

Gear	Type	Observed (%)	Proportion catch (%)
	Catcher vessel	12.5	19.2
Trawl	Catcher/Processor	100	3.5
	Catcher vessel	11.4	37.7
Pot	Catcher/Processor	-	-
	Catcher vessel	1.8	33.3

Prohibited species identified in the GOA FMP are Pacific halibut, Pacific herring, Pacific salmon, steelhead trout, king crab, and Tanner crab. Prohibited species must be avoided while fishing groundfish and when caught must be immediately returned to the sea with a minimum of injury. All catch of pollock, Pacific cod, and shallow water flatfish must be retained during the directed fishing season for those species. When directed fishing for pollock, Pacific cod, or shallow water flatfish is prohibited, retention of those species is required up to any maximum retainable amount in effect for these species. No discarding of whole fish of these species is allowed, except as permitted in the regulations. At-sea discarding of any processed product from pollock, Pacific cod, or shallow water flatfish is also prohibited (NPFMC 2014).

For the GOA fisheries as a whole, the annual discard rate for groundfish decreased from 19% in 1994 (total discards, 43,350 mt) to 13% in 2008 (total discards, 24,600 mt). Although there has been an overall reduction in groundfish discards in GOA, there can be large interannual variation (http://access.afsc.noaa.gov/reem/ecoweb/ecochaptdataselect.cfm?ID=60).

3.4.3 Marine Mammals

About 20 species of marine mammals, from the orders Pinnipedia (seals, sea lions, fur seals and walrus), Carnivora (sea otter), and Cetacea (whales, dolphins, and porpoises) inhabit the GOA. They occupy diverse habitats, including deep oceanic waters, the continental slope and shelf. Several species (e.g., harbor seal, Steller sea lion, sea otter, beluga whales, and Dall's porpoise) are resident in the area throughout the year. Other species (e.g., gray, fin, blue, and humpback whales) migrate into the GOA during summer months to feed on a wide array of species and at several different trophic levels. Most phocid seals and sea lions feed principally on fishes, with invertebrates making up a relatively small part of the diet. Toothed whales feed principally on pelagic squids and fishes. Baleen whale diets consist largely of planktonic crustaceans or small squid and have no overlap of prey with species that are targeted or taken as bycatch in the groundfish fisheries. Allen and Angliss (2013) present the most recent population assessments of marine mammal species in Alaskan waters.

Commercial fisheries effects on the availability of prey to marine mammals have been addressed by examining the potential for food competition (i.e., effects of fishery removals) and indirect or cascading effects of the fisheries on the food web of the mammals. For marine mammals whose diets overlap to some extent with the target or bycatch species of the fisheries, fishery removals could potentially decrease the density of prey fields or cause changes in the distribution of prey such that the foraging success of the marine mammals is affected. If alternate prey is not available or is of poorer nutritional quality than the preferred species, or if the animal must spend more time and energy searching for prey, reproductive success and/or survival can be compromised. In the case of marine mammals that do not feed on fish or feed on different species than are taken in the fisheries, the removal of a large number of target fish from the ecosystem may alter the predator and prey dynamics and thus the abundance of another species that is eaten by marine mammals. The mechanisms and causal pathways for many potential food web effects are currently poorly understood, but some of these effects have been explored in ecosystem models (Aydin et al. 2007).

Marine mammals are rarely taken incidentally in the Pacific cod fishery. During the period 2007-2010 (most recent data), two Steller sea lions were taken in the longline fishery, one habour seal was taken in the trawl fishery (Allen and Angliss 2013). The annual Potential Biological Removal (PBR) levels for the western stock of Steller sea lions and harbour seals (north and south Kodiak, Cook Inlet/Shelikof) are 275 and 2209, respectively (Allen and Angliss 2013). The jig fishery is not observed so there are no data for this gear. However, very little cod is taken with this gear and, by its nature (single hooked lines), seems unlikely to result in the bycatch of marine mammals.

3.4.4 Seabirds

About 70 species of seabirds occur over waters off Alaska and could potentially be affected by direct and indirect interactions with the BSAI and GOA groundfish fisheries. Thirty-eight of these species regularly breed in Alaska and waters of the EEZ. More than 1,600 seabird colonies have been documented, ranging in size from a few pairs to 3.5 million birds. Breeding populations of seabirds are estimated at approximately 50 million birds and non-breeding migrant birds probably account for an additional 30 million birds. Most of the migrant birds are present only during the summer months (May through September) although some non-breeding albatross have been sighted at all months of the year. The distributions of species that breed in Alaska are well known in summer but in some species winter distributions are poorly documented or completely unknown (http://www.fws.gov/alaska/mbsp/mbm/seabirds/species_list.htm).

The US Fish and Wildlife Service compiles data collected for seabirds at breeding colonies throughout Alaska to monitor the condition of the marine ecosystem and to evaluate the conservation status of species. Their most recent report (Dragoo et al. 2014) covers the period through 2013. Statewide, productivity was below average in 25% of species, average in 69% and above average in 6% of species in 2013. Pelagic cormorants had high productivity, whereas glaucous-winged gull, thick-billed murre, parakeet auklet and crested auklet success was low in 2013. Across Alaska, 12% of species showed declining trends, 69% were stable and 19% exhibited an increasing trend between 2004 and 2013. Between 2004 and 2013, northern fulmars declined in all regions where they were monitored.

The Alaska Fishery Science Center (AFSC) is currently increasing its research emphasis on seabird fishery interactions, and incorporating seabirds into ecosystems models being developed for the Bering Sea and Gulf of Alaska (e.g., Aydin *et al.* 2007). The AFSC is engaged in a series of studies designed to gain a better understanding of seabird interactions with the Alaska Groundfish trawl and longline fisheries and the factors that affect those interactions. A summary of seabird and fishery interactions research is at: www.afsc.noaa.gov/refm/reem/Seabirds/Default.php.

Seabirds are caught incidentally in all types of fishing operations. Many factors contribute to the abundance and distribution of birds at sea, but many species are attracted to fishing vessels in order to forage on bait, offal, discards, and prey disturbed by the fishing operation. The AFSC Fishery Monitoring and Analysis Division undertakes an extensive 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 produces annual estimates of total seabird bycatch from these fisheries each year (http://www.afsc.noaa.gov/Quarterly/ond2013/divrptsREFM2.htm). Estimates are based on data provided by NMFS-certified fishery observers deployed to vessels and floating or shoreside processing plants and industry reports of catch and production. During the period 2007-12, seabirds taken in groundfish fisheries include Short-tailed albatross (*Phoebastria albatrus*), Laysan albatross (*Phoebastria immutabilis*), Black-footed albatross (*P. nigripes*), unidentified albatross, Northern Fulmars (*Fulmaris glacialis*), gulls, shearwaters, unidentified tubenoses, alcids, other bird species, and unidentified seabirds

(those not identified to one of the other ten groups)(Table 4). Estimates are produced from the NMFS, Alaska Regional Office Catch Accounting System.

The 2012 estimated bycatch for the combined groundfish fisheries are 40% below 5-year average of 8,295 for 2007-11 (Table 8). Albatross bycatch was lower in 2012 by 27% compared to the previous 5 years, with the greatest decrease in Laysan and Black-footed albatross (36% and 11% declines, respectively). Northern fulmar bycatch, down by 39% compared to the 5-year average and 52% from the year before, remained the highest proportion in the catch at 61%. Average annual mortality for fulmars since 2007 has been about 4,600. Nevertheless, when compared to estimates of total population size in Alaska of 1.4 million, this bycatch represents an annual 0.3% mortality due to groundfish fisheries.

Table 8 Total estimated seabird bycatch in Alaskan federal groundfish fisheries, all gear types and Fishery Management Plan areas combined, 2007 through 2012. Source: AFSC

Species/ Species Group	Year					
	2007	2008	2009	2010	2011	2012
Unidentified Albatross	16	0	0	0	0	0
Short-tailed Albatross	0	0	0	15	5	0
Laysan Albatross	17	420	114	267	189	128
Black-footed Albatross	176	290	52	44	206	136
Northern Fulmar	4,581	3,426	7,921	2,357	6,214	3,016
Shearwater	3,602	1,214	622	647	199	510
Storm Petrel	1	44	0	0	0	0
Gull	1,309	1,472	1,296	1,141	2,208	885
Kittiwake	10	0	16	0	6	5
Murre	7	5	13	102	14	6
Puffin	0	0	0	5	0	0
Auklet	0	3	0	0	0	7
Other Alcid	0	0	105	0	0	0
Other Bird	0	0	136	0	0	0
Unidentified	509	40	166	18	259	284
Total	10,228	6,914	10,441	4,596	9,298	4,977

The demersal longline fishery in Alaska constitutes about 91% of seabird bycatch annually. Bycatch in the longline fishery showed a marked decline beginning in 2002 due to the deployment of streamer lines as bird deterrents. Since then, annual bycatch has remained below 10,000 birds, dropping as low as 3,704 in 2010. Numbers increased to 8,914 in 2011, the second highest in the streamer line era, but fell back to 4,544 in 2012. The increased numbers in 2011 were due to a doubling of gull (*Larus* spp.) bycatch and a 3-fold increase in fulmars, from 1,782 to 5,848.

3.4.5 Retained species

About 19 species or species groups were incidentally caught and retained in the 2013 GOA Pacific cod fishery (A'mar unpublished data, Table 9). FMP's have been developed for each of these species or groups.

Table 9 Retained species in the Federal GOA Pacific cod fisheries, 2013. Species or groups about or greater than 2% are shown in bold.

Taxon	Trawl	Longline	Pot	Other	Total
Arrowtooth Flounder	459.3				459.3
Atka Mackerel	0.1				0.1
Flathead Sole	163.2		0.1		163.2
GOA Deep Water Flatfish	2.6				2.6
GOA Demersal Shelf Rockfish		0.4			0.4
GOA Dusky Rockfish	4.7	0.6		0.6	5.9
GOA Rex Sole	82.2				82.2
GOA Rougheye Rockfish	0.2	2.2			2.3
GOA Shallow Water Flatfish	698.7				698.7
GOA Shortraker Rockfish		3.5			3.5
GOA Skate Big	147.1	**272.8**			419.9
GOA Skate Longnose	25.3	**232.5**			257.8
GOA Skate Other	0.3	10.6			10.9
GOA Thornyhead Rockfish	3.1	0.2			3.3
Northern Rockfish	61.9				61.9
Octopus	0.1	1.3	128.4		129.8
Other Rockfish	1.6	32.8			34.4
Pacific Ocean Perch	4.8				4.8
Pollock	593.0	64.2	9.1	1.1	667.4
Sablefish	14.1	1.3			15.4
Sculpin	3.8	0.2	0.4		4.4
Grand Total	2266.5	641	138.0	1.7	3047.2

The main bait species used in the GOA longline fishery are sardines, herring, and squid (J. Browning pers. comm.) Some of the herring is obtained from local stocks, but most is from the US east coast. Some longliners use Alaskan by-caught squid, but most squid comes from Argentina or the US east coast. Sardines are purchased from Washington State. The jig fishery is so small that the quantity of squid used is insignificant to the stock status of these bait species. For other gears, the bait usage is such a small proportion of the quotas for these species and so small relative to the retained catch that the Assessment team considered them as minor species and did not score them. Table 10 provides estimates of the quantities used and stock status.

Table 10 Bait species, quantity, fishery source and status for the Pacific cod longline, pot and jig fisheries in the BSAI (Source J. Browning per comm).

Fishery	Bait	Quantity	Fishery Source	Status
Longline	Pacific Squid (Humbolt) *Dosidicus gigas*	Minimal	US West Coast	Undeterminable

	East Coast Squid *Illex illecebrosus*	**36 t** Alaska usage of 15,800 t produced in 2011*	US East Coast	Undeterminable
	Argentine Squid *Illex argentines*	**349 t** usage of 76,700 t produced in 2011	South Atlantic	Undeterminable
	Pacific Herring *Clupea harengus*	**used, but not preferred in the P. cod fishery.	US West Coast	Stable
	Pacific Sardine *Sardinops sagax*	**680 t** Alaskan usage of 11,300 t produced in 2011.	Canada West Coast	Stable
Pot	East Coast Squid *Illex illecebrosus*	Usage level in this fishery is included in the amount reported above.	US East Coast	Undeterminable
	Argentine Squid *Illex argentines*	Usage level in this fishery is included in the amount reported above.	South Atlantic	Undeterminable
	Pacific herring		Alaska	Well managed

Table footnotes: Where usage weights are given, figures specified are considered state-wide Alaska usage estimates as reported by bait house representatives characterizing the Alaska market to AFDF executive director. *: Usage = 2.3 X 10^{-3} per cent of production: **: Usage = 4.6 X 10^{-3} per cent of production.

Information on stock status indicates that the use of pollock (MSC certified) and sardine as bait is sustainable. The Pacific sardine has been growing at about 30% per year for the last 15 years, from only 6,000 tons to over a million tons https://swfsc.noaa.gov/textblock.aspx?Division=FRD&id=1120. The most recent stock assessment (2014) concluded that Pacific sardines are not overfished, and overfishing is not occurring. Populations tend to vary over periods of roughly 60 years – population declines last an average of 36 years and recoveries last an average of 30 years. Abundance increased rapidly through the 1980s and 1990s, peaking at 1.45 million metric tons in 1999, and 1.27 million metric tons in 2006. Scientists estimated the 2014 abundance to be 369,506 metric tons http://www.fishwatch.gov/seafood_profiles/species/sardine/species_pages/pacific_sardine.htm. This increase, and geographical expansion, occurred during one particular state of the Pacific/North American Pattern, an index of large-scale climate. The sardine population is the most abundant forage fish from Baja California to British Columbia; and sardine larvae have been found as far north as the Aleutian chain. Pacific sardines used as bait in the pot sector of the Alaska Pacific cod fishery come from the Pacific Northwest and British Columbia. The Pacific Fishery Management Council and the Department of Fisheries and Oceans Canada have both established conservative harvest regimes (F_{15} Rule). In 2012, 99,859 metric tons were harvested. The 680t reportedly used in the Pacific cod fishery in Alaska would equate to less than 1% of the harvest from the Pacific Northwest fishery alone. The Pacific sardine resource off California, Oregon, and Washington is managed under the Coastal Pelagic Species (CPS) Fishery Management Plan (FMP) (http://www.pcouncil.org/coastal-pelagic-species/background-information/). For the 2014-2015 season, the Council approved an OFL of 39,210 mt and an ABC of 35,792 mt. The Council set the ACL and ACT equal to 23,293 mt, and adopted a 500 mt incidental set aside for each of the three fishing periods (PFMC 2014).

Although information on the population status of squid species used as bait in not available, the harvest of *Illex argentines* reported for 2013 was 191,721 t and for 2014 (preliminary) was 166,881 t. (http://www.minagri.gob.ar/site/pesca/pesca_maritima/02-desembarques/index.php). This would indicate that <1% of the Argentine squid catch is used for bait in the Pacific cod fisheries. At this level, the use of Argentine squid as bait is highly unlikely to have negative impacts on squid abundance. About 10% of the squid used is east coast *Illex*. NOAA Fisheries, based on the recommendations of the MAFMC, sets the overfishing limit (OFL), allowable biological catch (ABC), annual catch limit (ACL), annual catch target (ACT), initial optimum yield (IOY), domestic annual harvest (DAH), domestic annual processing (DAP), research set aside (RSA) (from 0 to 3 percent of the overall quota for each species) for each species if applicable http://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/msbinfosheet.pdf. Longfin and Illex squid are exempt from the ACL/AM requirements because they have annual life cycles. The Acceptable Biological Catch of Illex squid in the northeastern United States was 24,000 mt in 2013 with a DAH of 22,915 mt. Therefore, the amount of *Illex* squid used for bait (about 36 mt) is highly unlikely to be of conservation concern.

The main bait species used in the pot fishery is herring. Most of the herring is obtained from local Alaskan stocks (J. Browning per comm). Harvest policies used for herring in Alaska set the maximum exploitation rate at 20% of the exploitable or mature biomass, consistent with other herring fisheries on the west coast of North America. The 20% exploitation rate is lower than commonly used biological reference points for species with similar life history characteristics (Funk 1991). Herring used as bait, including that used in the Pacific cod fishery, represents a small fraction of the annual managed catch (Table 11, from http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisheryherring.herringcatch), indicating that the Pacific cod pot fishery is unlikely to pose a serious risk to Alaskan herring stocks.

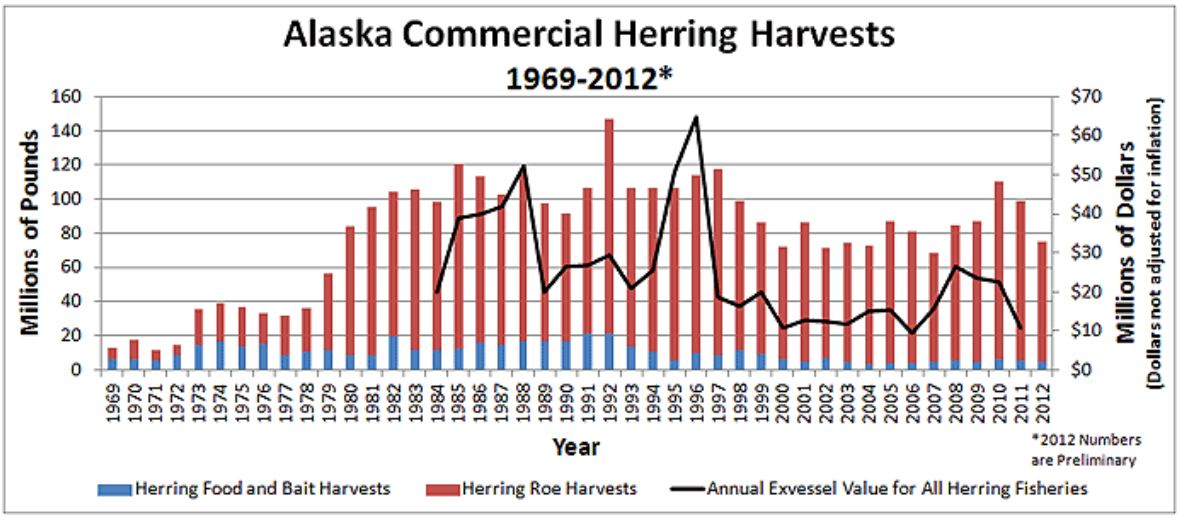

Table 11 Alaska commercial Pacific herring harvest and value.

Of the 19 species or species groups retained, none exceed 5% of the catch of any gear type, and only six exceed 0.05% of the catch of any gear group. The remaining 13 species or groups are considered *di minimis* and not considered further. Only arrowtooth flounder, GOA shallow water flatfish, and pollock exceed 2% of the trawl catch; these species are not vulnerable so are not considered main species. Arrowtooth and pollock are MSC certified, and northern and southern rock sole (which make up approximately 70% of the shallow water flatfish) are MSC certified. Of the remaining species, only flathead sole (MSC certified) and Big skates (*Raja binoculata*) and longnose skates (*Raja rhina*) exceed 0.05%, so are also considered minor species. Similarly, all of the retained species in the longline fishery

account for <5% of the catch, but Big skates and longnose skates are considered vulnerable because of their low reproductive rate and these species each represent about 2% of the longline catch and therefore are considered main species. No other species reach 2% of the longline catch, and only pollock is considered a minor species. None of the retained species taken in pot gear is considered main species; octopus is considered a minor species.

Big skates and longnose skates each have separate harvest specifications, with acceptable biological catches (ABCs) specified for each GOA regulatory area (western, central, and eastern). A single Gulf-wide overfishing level is specified for each stock (Ormseth 2013). The retained catches of Big and Longnose skates in the longline fishery account for about 7% and 9% of the 2013 ABC for these species. The cumulative mortality of the trawl and longline fisheries only accounted for 11% of the ABC for Big skate.

3.4.6 Bycatch species

Fish and invertebrates
Some 24 species or species groups are taken as bycatch in GOA Pacific cod fisheries (Table 12). Taxa typically accounting for more than 100 t in the GOA are sea stars, Giant Grenadier, miscellaneous fishes, and halibut (A'mar and Palsson 2013, Table 2.5, reported for the first time in 2013). The FMP establishes catch limits for halibut, classified as a prohibited species and MSC certified. Attainment of the catch limit shuts down an area or a fishery for the remainder of the year or season. Other management measures that address prohibited species bycatch include seasonal closure areas, gear modifications, and the modification of fishing patterns as a result of share-based programs such as IFQs or cooperatives.

Table 12 Bycatch (t) in the GOA Pacific cod fishery between 2009 and 2013.

Taxa	2009	2010	2011	2012	2013
Brittle stars	0.0	0.1	2.1	0.0	0.1
Corals Bryozoans	1.7	0.0	0.7	4.0	0.1
Dark Rockfish	2.7	12.3	2.4	1.5	1.0
Eelpouts	0.0	0.1	0.0	0.3	0.1
Eulachon	0.0	0.6	0.0	0.0	0.0
Giant Grenadier	51.3	140.9	60.4	171.3	126.4
Greenlings	1.3	0.8	0.8	1.9	1.0
Grenadier	6.6	0.0	8.2	0.0	21.3
Hermit crabs	3.9	2.1	0.8	0.8	1.9
Invertebrate unidentified	0.1	1.1	8.9	4.5	0.4
Misc crabs	1.5	3.4	2.5	2.2	3.0
Misc fish	99.0	87.6	133.7	224.7	72.8
Scypho jellies	0.2	10.8	0.8	0.6	1.1
Sea anemones	6.6	7.3	8.8	6.1	5.6
Sea pens whips	3.3	3.1	1.4	0.8	1.6
Sea stars	471.9	869.4	717.2	463.6	555.7
Snails	2.5	0.7	1.3	3.7	2.4
Sponges	1.6	0.4	0.5	0.4	0.4
Urchins dollars cucumbers	1.3	0.5	2.2	3.6	1.1

Bycatch of the dominant taxa fluctuates considerably from year to year, with no clear trend. None of the bycatch species or groups is considered a main species, as they accounted for <5% of the cod catch on the GOA. All species except giant grenadier, misc. fish, and sea stars fall below 0.5% of the cod catch of any gear, so are considered de minimis and not considered further.

Prohibited species identified in the GOA FMP are Pacific halibut, Pacific herring, Pacific salmon, steelhead trout, king crab, and Tanner crab. About 146 t of halibut were taken in

2013 (none reported prior to this; A'mar and Palsson 2013, Table 2.6). Pacific herring and salmon species are also not reported as taken in the GOA cod fishery. Very small amounts of miscellaneous crabs are also taken (Table 12). Prohibited species must be avoided while fishing groundfish and must be immediately returned to the sea with a minimum of injury when caught. All catch of pollock, Pacific cod, and shallow water flatfish must be retained when directed fishing for those species is open. When directed fishing for pollock, Pacific cod, or shallow water flatfish is prohibited, retention of those species is required up to any maximum retainable amount in effect for these species. No discarding of whole fish of these species is allowed, except as permitted in the regulations. At-sea discarding of any processed product from pollock, Pacific cod, or shallow water flatfish is also prohibited, unless required by other regulations.

3.4.7 ETP species

The endangered, threatened, and protected (ETP) species inhabiting the GOA are mainly under the responsibility of NMFS (Table 5). The US Fish and Wildlife Service (FWS) are responsible for sea otters and for threatened and endangered seabird species. Assessments of the effects of the Alaska groundfish fisheries on many ETP species are provided in the Alaska Groundfish Harvest Specifications Environmental Impact Statement (NOAA 2007). NMFS annually categorizes all U.S. commercial fisheries under the Marine Mammal Protection Act (MMPA) List of Fisheries according to the levels of marine mammal mortality and serious injury. Category III fisheries interact with marine mammal stocks with annual mortality and serious injury ≤ 1% of the marine mammal's Potential Biological Removal (PBR) level and total fishery-related mortality < 10% of PBR. Any fishery in Category III is considered to have achieved the target levels of mortality and serious injury. Category II fisheries have a level of mortality and serious injury that > 1% but is < 50% of the stock's PBR level, if total fishery related mortality is ≥ 10% of the PBR. Category I fisheries have frequent mortality and serious injury of marine mammal resulting in annual mortality ≥ 50% of PRB. No Alaska groundfish fisheries, including Pacific cod, are included in Category I. The GOA Pacific cod trawl and pot fisheries are category III. The jig fishery is not classified as it does not interact with MMPA listed species (http://www.nmfs.noaa.gov/pr/interactions/lof/final2014.htm).

Most cetacean and pinniped species in Table 5 have little direct interaction with the GOA Pacific cod fishery due to their lack of overlap in distribution, diet, or frequency of the incidental take (Perez 2006; Allen and Angliss 2013). There were no report mortalities of the listed cetaceans species as a result of incidental interaction with gear used in the GOA Pacific cod fishery during the period 2007-2010 (most recent data). The mean annual mortality of Steller sea lions was 1.3/yr in the cod trawl fishery and none were taken on the longline fishery (Allen and Angliss 2013). This compares with the PBR for the western stock of Steller sea lions of 275 annually.

Of the ETP species in Table 13, only Steller sea lions, Short-tailed albatross, Steller's eider and the salmon stocks might interact with cod fisheries in the GOA.

Steller sea lions - The western U. S. stock of Steller sea lion (SSL) (*Eumetopias jubatus*) is currently listed as "endangered" under the ESA, and designated as "depleted" under the MMPA as result of a dramatic decline in numbers. Steller sea lions are widely distributed in the North Pacific, but are most abundant in the GOA and Aleutian Islands. Although not migratory, individuals disperse widely outside of the breeding season (late May-early July), thus potentially intermixing with animals from other areas. They are the largest member of the Otariid (eared seal) family and are highly size-dimorphic. Adult males may be up to 325 cm in length and can weigh up to 1,100 kg, whereas, females range from 240 to 290 cm in length and up to 350 kg. There is an extended period of pup dependence. Weaning takes place gradually during the winter and spring prior to the following breeding season but it is

not uncommon to observe 1- or 2-year-old sea lions still suckling. Steller sea lions feed on wide variety of fishes and cephalopods. Prey varies geographically and seasonally. Some of the more important prey species in Alaska include walleye pollock (*Theragra chalcogramma*), Atka mackerel (*Pleurogrammus monopterygius*), Pacific herring (*Clupea harengus*), Capelin (*Mallotus villosus*), Pacific sand lance (*Ammodytes hexapterus*), Pacific cod (*Gadus macrocephalus*), and salmon (*Oncorhynchus* spp.) (Sinclair and Zepplin 2002).

The number of SSLs in the western stock declined by 75% between 1976 and 1990. Many factors could have contributed to the decline of the western SSL stock in the 1980s and 1990s. These include incidental take in fisheries, illegal and legal shooting, predation or certain diseases, as well as other factors that indirectly would lead to population declines by reducing productivity, such as competition with groundfish fisheries. These factors have been most recently evaluated in the current SSL Biological Opinion (NMFS 2014b).

Table 13 Endangered, threatened, and protected species in the BSAI and GOA based on listing of Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA).

ESA Endangered (E) Threatened (T)	MMPA Depleted
Beluga whale (E-Cook Inlet)	Killer whale (Transient)
Blue whale (E)	
Bowhead whale (E)	
Fin whale (E)	
Humpback whale (E)	
North Pacific right whale (E)	
Sei whale (E)	
Sperm whale (E)	
Steller sea lion (E-Western)	Northern fur seal (Eastern Pacific)
Short-tailed albatross (E)	
Spectacled eider (T)	
Steller's eider (T)	
Northern sea otter (T-Southwest AK)	
Pacific leatherback turtle (E)	
Chinook salmon (T-Lower Columbia River)	
Chinook salmon (T-Upper Willamette River)	
Chinook salmon (T-Upper Columbia River, Spring)	

In the GOA, estimates of the numbers SSL pups and non-pups (adults and juveniles) have been regularly determined by aerial and ship-based surveys conducted by the National Marine Mammal Laboratory, mostly recently in June-July 2013. During the period 2000-2013, these surveys indicate that in the GOA pups and non-pups have increased at average rates of from 2-4% and 2-5% per year, respectively (Fritz et al. 2013). Thus, since about 2000, there has been a sustained increase in population size of SSLs in all areas of the GOA.

A number of management actions were implemented between 1990 and 1998 to promote the recovery of the western stock of SSLs, such as the establishment of critical habitat. Critical habitat included 3 nm no-entry zones around rookeries, prohibition of groundfish trawling within 10-20 nm of certain rookeries, and three special aquatic foraging areas in Alaska; the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area. There were also measures that changed the spatial and temporal allocation of Aleutian Island Atka mackerel total allowable catch. Modifications finalized in 2002 involved a complex set of regulations that changed the temporal and spatial distribution of the pollock, Pacific cod and Atka mackerel fisheries throughout the range of the western stock in U.S waters, but also

removed the blanket prohibition of fishing with trawl gear within 10 (or 20) nmi of rookeries in the western stock in U.S. waters. These measures were reviewed by NMFS (2003). NMFS completed a Final Revised Steller Sea Lion Recovery Plan (NMFS 2008), which summarizes current information on the ecology and population dynamics of the western stock, threats to known or potential to recovery and management measures that have been taken to reduce potential fishery effects on recovery. There have been a number of attempts to evaluate the efficacy of SSL management measures with respect to reducing competition with fisheries. These are reviewed in Bernard et al. 2011, three CIE reviews (available on the NMFS website), Conn et al. (2013) and NMFS 2014b.

Seabirds - Two species of seabirds found in the GOA region are listed as threatened or endangered. The Short-tailed albatross is a long-lived species with a low reproductive rate and is listed as endangered. Torishima Island and Minami-Kojima Island, Japan are the only two breeding colonies that remain active today. Short-tailed albatrosses forage widely across the temperate and subarctic North Pacific, and forage in the Gulf of Alaska, along the Aleutian Islands, and in the Bering Sea. The world population is currently estimated to be about 1200 birds and is increasing. There are no records of Short-tailed albatross having been taken in the GOA Pacific cod fishery. The recovery plan states that the major threat of over-exploitation that led to the species' original endangered status no longer occurs and that the most notable existing threat to the species' recovery is the possibility of an eruption of Torishima, their main breeding site (USFWS 2008).

In 1997, the Alaska-breeding population of Steller's eiders (*Polysticta stelleri*) was listed as threatened under the ESA based on abandonment of significant portions of their former nesting range and a reduction in the number of Steller's eiders nesting in Alaska (particularly the Yukon-Kuskokwim, or Y-K Delta) (http://www.fws.gov/alaska/fisheries/endangered/pdf/Stei_Gen_Factsheet_03-04-14.pdf). Population sizes are only imprecisely known. The Russian Pacific population likely contains between 50,000 to 100,000 individuals. The threatened Alaska breeding population is thought to include only hundreds on the Arctic Coastal Plain, and possibly dozens on the Y-K Delta. Steller's eiders are diving ducks that spend most of the year in shallow, near-shore marine waters and overwinter in the eastern Aleutians and Kenai Peninsula. Shooting, lead poisoning and predation are listed as the major threats to recovery. Based on observed data this species appears to rarely interact with the cod fishery as none have been recorded by the AFSC seabird bycatch program (http://www.afsc.noaa.gov/Quarterly/ond2013/divrptsREFM2.htm).

Salmon - Three ESA-listed threatened salmon stocks migrate to Alaskan waters: Chinook salmon from the Lower Columbia River (LCR), Upper Willamette River (UWR), and Upper Columbia River (UCR), Spring. The GOA Pacific cod trawl fishery took from 1,909 to 7,750 Chinook salmon each year during the period 2004-2011. Since 1984, coded wire tags (CWTs) have been recovered from 23 LCR, 97 UWR, and 1 UCR Chinook salmon in the GOA trawl fishery (including cod). By applying mark expansion factors, the estimated numbers increase to 112 LCR, 275 UWR, and 1 UCR Chinook salmon. Most of the CWT recoveries in the GOA are from hatchery fish, with only 3% from wild fish. Results from collected samples should be considered as minimum estimates of the number of ESA-listed ESUs in the GOA groundfish fisheries until adequate numbers of CWTs are recovered from inside the observers' samples, where the total number of fish sampled is known. New observer sampling protocols implemented in 2011 should provide reliable estimates of the stock of origin (from both CWT and genetic stock assignment) of the Chinook bycatch from the groundfish fisheries (Balsiger 2012). A recent supplementary Biological Opinion concluded that groundfish fisheries in the GOA where not likely to jeopardize the continued existence of these threatened Chinook stocks (NMFS 2012). In addition to measures taken in June 2013 to reduce the bycatch of Chinook salmon in the pollock fishery, the NPFMC recommended a hard cap of 7,500 Chinook salmon bycatch in the non-pollock trawl fisheries in the GOA. Given the range of 1,909 to 7,750 salmon taken, it is likely that the non-pollock trawl fisheries would rarely breach this limit if implemented.

3.4.8 Habitat

NMFS and the NPFMC recognize that habitat is essential for maintaining productivity of fishery resources. Because fishing gear has the potential to disturb habitat, regulations have been implemented to protect areas that could be irreversibly damaged by fishing. Large areas of the North Pacific have been permanently closed to groundfish trawling to reduce potential adverse impacts on sensitive habitat and to protect benthic invertebrates. Fishery closures established in nearshore areas to reduce interactions with Steller sea lions may also have ancillary benefits of reducing habitat impacts (see GOA FMP, NPFMC 2014).

In 2005, NMFS published the Final Environmental Impact Statement (EIS) for Essential Fish Habitat (EFH) in Alaska which identified EFH for fisheries managed by the NPFMC, recommended an approach to identify Habitat Area of Particular Concern (HAPC), and specified an objective to minimize to the extent practicably possible the adverse effects of fishing on EFH (NMFS 2005; http://alaskafisheries.noaa.gov/habitat/seis/efheis.htm). As a result, all FMPs now include a description and identification of essential fish habitat, adverse impacts, and actions to conserve and enhance habitat. In 2010, NOAA Fisheries conducted a 5-yr review of EHF (http://alaskafisheries.noaa.gov/habitat/efh/review.htm). That review concluded that “while recent research provided incremental improvements to our understanding of habitat types, sensitivity and recovery of seafloor habitat features, these new results were consistent with the sensitivity and recovery parameters and distributions of habitat types used in the prior analysis of fishing effects for the EFH EIS. None of this new information revealed significant errors in the parameters used in that analysis; rather, it marginally increased support for their validity.” (NMFS 2010, p.66). The second 5-yr review is scheduled for 2015.

HAPCs are specific sites within EFH that are of ecological importance to the long-term sustainability of managed species, are rare, or are susceptible to degradation or development. HAPC proposals may be solicited every 5 years, coinciding with the EFH 5-year review, or may be initiated at any time by the NPFMC. The following HAPCs have been designated in the GOA management area: Alaska Seamount Habitat Protection Areas and the GOA Coral Habitat Areas of Particular Concern. Three HAPCs were established for coral area (see Figure 3-7, GOA FMP, NPFMC 2014). NOAA’s Deep Sea Coral Research and Technology Program is also funding research in Alaska to examine the location, distribution, ecosystem role, and status of deep-sea coral and sponge habitats to identify additional areas with may need protection.

3.5 Principle Three: Management System Background

3.5.1 Area of operation of the fishery and under which jurisdiction it falls

The GOA Alaska Pacific cod fishery is conducted in the U.S. EEZ waters of the Gulf of Alaska under federal management and in Alaska state waters under state management. Historically, with implementation of the U.S. Magnuson-Stevens Fishery Conservation and Management Act, annual Pacific cod quotas (or catch targets) had been used to limit the catch by foreign and domestic fisheries.

The principle legislative instrument for fisheries management in the US is the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (MSA 2007). The MSA contains ten National Standards (NSs) which fishery managers must consider when preparing a Fishery Management Plan (FMP) or Amendment. These NSs are:

1. Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the U.S. 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 U.S. fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonable calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of 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 the 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; and,
10. Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Pacific cod catch in the U.S. EEZ is under the jurisdiction of the NPFMC, guided by the Gulf of Alaska Groundfish Fishery Management Plan (GOAGFMP), and the MSA. In Alaska state waters, authority falls to the Alaska Board of Fisheries and the Alaska Department of Fish and Game. The geographical extent of the FMP management area is the U.S. EEZ of the northeast Pacific Ocean that lies north of the U.S.-Canada border and westward along the Alaska Peninsula to 170^{o}W; State management occurs inside State waters (0-3 miles) in this region. The North Pacific Fishery Management Council management area (Figure 5) is divided into subareas designated:

- Reporting Areas 650, 659, 640, and 649 (Eastern Regulatory Area)
- Reporting Areas 630 and 620 (Central Regulatory Area)
- Reporting Area 610 (Western Regulatory Area)

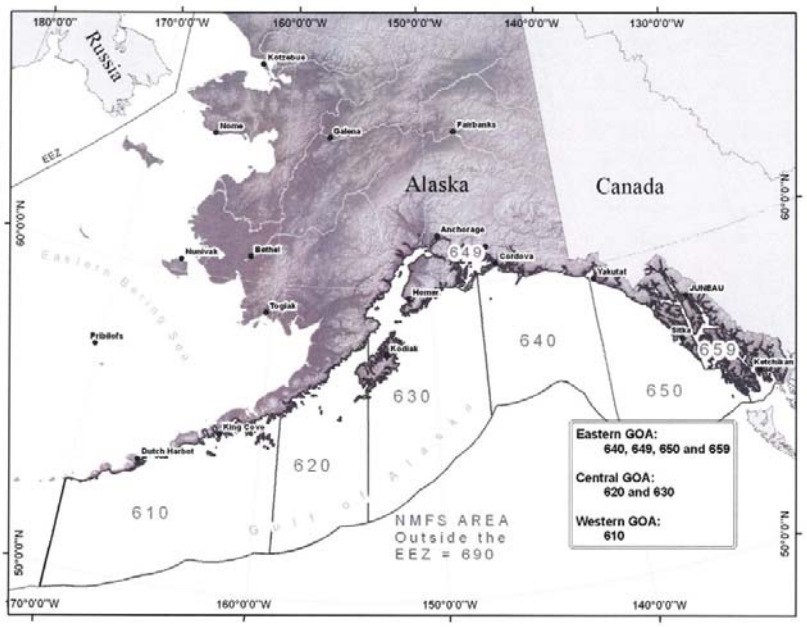

Figure 5 Federal reporting areas in the Gulf of Alaska

State waters (Figure 6) for Pacific cod management are divided into:

- Prince William Sound Area
- Cook Inlet Area
- Kodiak Area
- Chignik Area
- South Alaska Peninsula
- Aleutians Islands Area

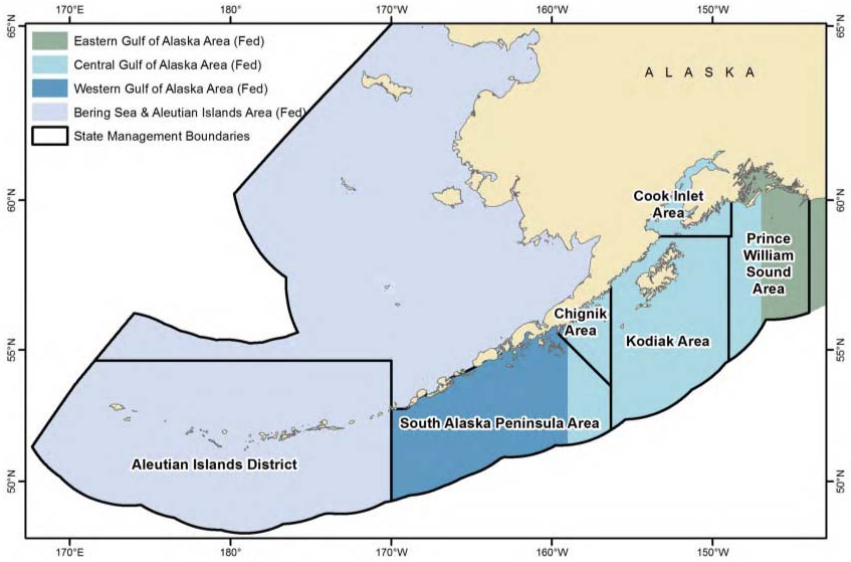

Figure 6 State reporting areas in the Gulf of Alaska

Federal management falls under the jurisdiction of the North Pacific Fishery Management Council (NPFMC). The NPFMC recommends management and enforcement measures to NMFS, the agency charged with implementation. The NMFS implements the MSA and the National Standard Guidelines (NSG). The procedures on how NMFS follows the NSs are

published in the US Federal Register at 50 CFR Part 600 subpart D. National Standard 1 has been interpreted as being being consistent with international agreements and criteria for precautionary approaches. Proposed guidelines for implementing the legislation have been translated into scientific and technical guidance for developing limit and target control rules, with some suggestions for defaults (Restrepo et al 1998). The control rules specify management actions (fishing mortality rate), based upon current stock status (Restrepo and Powers 1999).

The NPFMC (Council) is one of eight regional councils established by the MSA in 1976 to manage fisheries in the 200-mile Exclusive Economic Zone (EEZ). The Council primarily manages groundfish fisheries in the Gulf of Alaska, Bering Sea, and Aleutian Islands that target cod, pollock, flatfish, mackerel, sablefish, and rockfish species using trawl, longline, jig, and pot gear (NPFMC 2009). The Council conducts public hearings so as to allow all interested persons an opportunity to be heard in the development of FMPs and amendments, and reviews and revises, as appropriate, the assessments and specifications with respect to the optimum yield from each fishery (16 U.S.C. 1852(h)). The Council has developed a management policy and objectives to guide its development of management recommendations to the Secretary of Commerce. The Council also makes allocation decisions for halibut, in concert with the International Pacific Halibut Commission that biologically manages the resource for U.S.-Canada waters. Other large Alaska fisheries for salmon, crab, and scallops are managed jointly with the State of Alaska. The Council also works very closely with the Alaska Department of Fish and Game (ADFG) and the Alaska Board of Fisheries (BOF) to coordinate management programs in federal and state waters (0-3 nm from shore). Many fishery resources are harvested in waters under both state and federal jurisdiction. As such, the Council and state work together to address habitat concerns, catch limits, allocation issues, and other management details through coordination meetings and delegation of management oversight to one agency or the other.

For Pacific cod, a parallel state fishery operates in state waters (0–3 nmi) concurrent with adjacent federal fishery and generally adopts federal regulations and management measures as guided by BOF process. Pacific cod fisheries in state waters not concurrent with the federal fishery operate under guidance of the BOF process. The TAC of the federal fishery is based on 75% of the Pacific cod ABC for the Gulf of Alaska and 97% in the Aleutian Islands. The parallel state fishery operates within the federal TAC, but participants do not need to follow federal gear limits, carry federal observers, or obtain federal fishing permits or license limitation permits. The state fishery operates on the remaining ABC after the federal and state parallel fisheries close, which is specified as a guideline harvest level rather than a TAC. The state fishery requires exclusive registration to state management areas, and does not require federal registration.

Since the issuance of President Clinton's 2000 Executive Order (E.O.) 13175 "Consultation and Coordination with Indian Tribal Governments", federal agencies have been required to consult with Alaska Native Corporations on the same basis as Federally-recognized Tribes. In 2012 the Department of Commerce (DOC) issued Administrative Order 218-8 providing guidance to NOAA and other DOC agencies on implementing the coordination and consultation. The Consolidated Appropriation Act of 2004 contains language relating to consultation with Alaska Native Corporations (NOAA 2013). The following section is taken from NOAA 2013. The relationship between Federally-recognized Indian Tribes and the Federal government is one of sovereign to sovereign. It has been described at length by the federal judiciary and referred to in federal law promoting tribal self-determination and self-governance. Many Presidential memoranda have recognized and this unique legal and political relationship between governments. Through government-to-government consultation and informal staff-to-staff collaboration, the United States acknowledges Federally-recognized tribal governments as separate sovereign governmental entities, under the protection of the United States whose unique political historical and religious characteristics are reflected in their governmental priorities, concerns, and needs. Consultation recognizes and distinguishes the views and policies of American Indian and Alaska Native tribal governments from those of the general public and considers those views

in the context of the responsibilities of Federally-recognized Tribes to their people and tribal members. Through government-to-government consultation and informal staff-to-staff collaboration, the United States acknowledges Federally-recognized tribal governments as separate sovereign governmental entities, under the protection of the United States whose unique political historical and religious characteristics are reflected in their governmental priorities, concerns, and needs. Consultation recognizes and distinguishes the views and policies of American Indian and Alaska Native tribal governments from those of the general public and considers those views in the context of the responsibilities of Federally-recognized Tribes to their people and tribal members.

Regional fishery management council meetings are a critical part of the fishery management planning process and are the first and earliest point of development of fishery management policy (NOOAQ 2013). It is most beneficial to Tribes, Councils, and NOAA if there is early and active participation in these fora, and NOAA strongly encourages Councils to discuss and work with tribes to address their concerns while developing fishery conservation and management measures under the MSA. Thus, while it is NOAA's – and not the Councils' – responsibility to consult with Federally-recognized Tribes under Executive Order 13175, the Councils' early engagement with potentially affected Indian Tribes will facilitate and enhance NOAA's rulemaking process.

In coastal waters off the United States, Pacific cod catch is under the jurisdiction of the Gulf of Alaska Groundfish Fishery Management Plan (FMP) and the MSA. The geographical extent of the FMP management area is the U.S. EEZ of the Gulf of Alaska. The NPFMC GOA management area is divided into several districts (Figure 5).

Implementation comes under federal law CFR › Title 50 › Chapter VI › Part 660 › Subpart D › Section 660.131. Under this jurisdiction, the NPFMC recommends management and enforcement measures to NMFS, the agency charged with implementation.

The management system process includes proactive response from the decision-making agencies to legal actions brought against the management system. The Office of General Counsel (OGC), which represents NMFS, provides legal advice and counsel for NOAA within the U.S. Department of Commerce. The OGC provides legal service and guidance for all matters that may arise in the conduct of NOAA's missions. Under the Administrative Procedures Act, NOAA (and other) agencies must maintain a full administrative record that's supports agency actions (Schiffer 2012). Courts have determined what the administrative record must contain. The NOAA OGC has established a formal guideline for maintaining the agency administrative record. While this record serves to increase efficiency of the agency, it also increases the efficiency for any plaintiffs and for the court. This helps lead to a transparent and effective system for resolving legal disputes (Schiffer 2012).

The Council Coordination Committee (Director-level representatives of the regional fishery management councils) periodically receives litigation updates from NOAA OGC (e.g., CCC 2012). For example, a representative of NOAA OGC reviewed significant litigation, and the members of the CCC discussed with NOAA OGC the lessons learned and the actions to take to better comply with laws and regulations, and thereby reduce to opportunity for legal challenges (CCC 2012). In that example, the most contentious issues came from identify mechanisms to consistently include Council consultation in negotiated settlements resulting from litigation under the ESA. NOAA OGC summarized legal issues regarding ACLs, which basically revolved around the need to use the best available science in determining such limits, and noted the need to show the justification for decision making and not to oversimplify the information. Between the scientific expertise of the Councils and their many committees and advisory bodies and the expertise of NMFS and the review of issues and FMPs, there is a tremendous amount of technical expertise to which the courts will defer if proper documentation supports how conclusions have been arrived. Thus, the agency administrative record becomes an important aspect of justifying decisions and avoiding lawsuits (CCC 2012).

The NOAA OGC has summarized recent litigation over MSA national standard 1 issues (Issenberg 2013) into a series of topics and the cases affecting each:

- Stocks in Fishery:
  - Flaherty v. Bryson (D.D.C.) – Herring Am. 4
  - Oceana v. Locke (D.D.C.) – New England Amendment 16
  - Oceana v. Blank (D.D.C.) - Mid-Atlantic Omnibus
- OY
  - Western Seas Fishing Co. v. Locke (D. Mass.) – NE Atlantic Herring
  - Oceana v. Blank (N.D. Cal.) – CPS Amendment 13
- Mixed Stock Fisheries
  - New Bedford/Lovgren v. Locke (1st Cir.) – NE Am 16
  - Mass. v. Gutierrez (D. Mass.) – NE FW 42
- Rebuilding Plans
  - NRDC v. Locke (N.D. Cal.) – Pacific groundfish specs
- Accountability Measures
  - Oceana v. Locke (D.D.C.) – NE Am 16
  - NRDC v. NMFS (D.D.C.) – S. Atlantic Snapper-Grouper Reg Am 11
- ABC Control Rule
  - Oceana v. Locke (D.D.C.) – NE Amendment 16
  - Flaherty v. Locke (D.D.C.) – Herring Am. 4

NOAA gets sued for issues other than NS1, for example habitat or threatened and endangered species, and maintains an administrative record for each case.

3.5.2 Recognized groups with interests in the fishery

Pacific cod is harvested by commercial demersal trawl, longline, pot, and jig gear. The fleet consists of catcher vessels delivering to shore, catcher vessels delivering to motherships that process the catch, or at-sea catcher/processor vessels.

The Council adopted Amendment 80 to the GOA FMP in 2006, and NMFS implemented the Amendment in 2007. Amendment 80 establishes GOA groundfish sideboard limits for pollock, Pacific cod, Pacific Ocean perch, northern rockfish, and pelagic shelf rockfish, as well as GOA halibut PSC. GOA sideboard restrictions are based on historic participation during 1998-2004 (http://www.npfmc.org/amendment-80-cooperatives/).

Pacific cod is authorized for subsistence harvest under Section 5 AAC 01.001 of the Alaska Administrative Code: "… subsistence fishing for salmon, herring, bottomfish, smelt, halibut and other types of finfish or their parts …." However, the subsistence harvest is a small portion of the commercial catch in the Gulf of Alaska.

The Pacific cod management process has many stakeholders: Pacific cod license holders, fishermen and crew), processors, the states of Alaska, Washington, and Oregon, fishermen's organizations, CDQ groups, and several environmental groups.

3.5.3 Consultations leading to the formulation of the management plan

To comply with its decision-making responsibility (see section 3.5.6) in an open and transparent manner, the NPFMC established a wide-ranging consultation process. The process used by the NPFMC to manage groundfish is described in a brochure explaining the overall Council process (NPFMC 2009) and the Council Operating Procedures (NPFMC 2012a). The Council participates in international negotiations concerning any fishery matters

under the cognizance of the Council. The Council also consults during preliminary discussions leading to U.S. positions on international fishery matters, including the allocation of fishery resources to other nations within its area of authority.

Each regular meeting and each emergency meeting is open to the public. Interested persons may present oral or written statements regarding the matters on the agenda at meetings, within reasonable limits established by the Chair. Current Council policy on oral testimony limits individuals to three minutes, and organizations to six minutes, per agenda item. All written information submitted to a Council by an interested person shall include a statement of the source and date of such information. Any oral or written statement shall include a brief description of the background and interests of the person in the subject of the oral or written statement (NPFMC 2009; NPFMC 2012a).

Proposals for management measures may come from the public, state and federal agencies, advisory groups, or Council members. For those proposals the Council chooses to pursue it directs the National Marine Fisheries Service (NMFS) and/or Council staff to prepare an analysis considering a range of alternatives. The Council reviews the analysis and selects a range of alternatives within which a preliminary preferred alternative may be identified. The analysis is then made available for public review, and the Council makes a final decision at the next meeting the item is scheduled. After considering Council recommendations and public comments, NMFS publishes the adopted regulations. For non-routine and annual management decisions, NMFS publishes a *Federal Register* notice and provides a public comment period before finalizing the recommendations (NPFMC 2009; NPFMC 2012a).

The Council may hold public hearings in order to provide the opportunity for all interested individuals to be heard with respect to the development of fishery management plans or amendments, and with respect to the administration and implementation of other relevant features of the Act. Notice of each hearing must be received by NMFS for publication in the *Federal Register* at least 23 calendar days prior to the proposed hearing. The Council will also issue notices to announce the time, location, and agenda for each hearing in a manner sufficient to assure all interested parties are aware of the opportunity to make their views known. If it is determined a hearing is appropriate, the Council Chair will designate at least one voting member of the Council to officiate. An accurate record of the participants and their views will be made available to the Council at the appropriate Council meeting and maintained as part of the Council's administrative record (NPFMC 2009; NPFMC 2012a).

The procedure for changing Federal fishing regulations follows a standardized process, set forth by a combination of laws, regulations, operational guidelines, policies, as well as adjustments and adaptations developed by the Council to increase efficiency, provide public participation, and produce quality outcomes (NPFMC 2009; 2014; Figure 7). All documents are posted on the website in advance of the meeting, and public comment is taken by the Council and advisory bodies before any decisions are made.

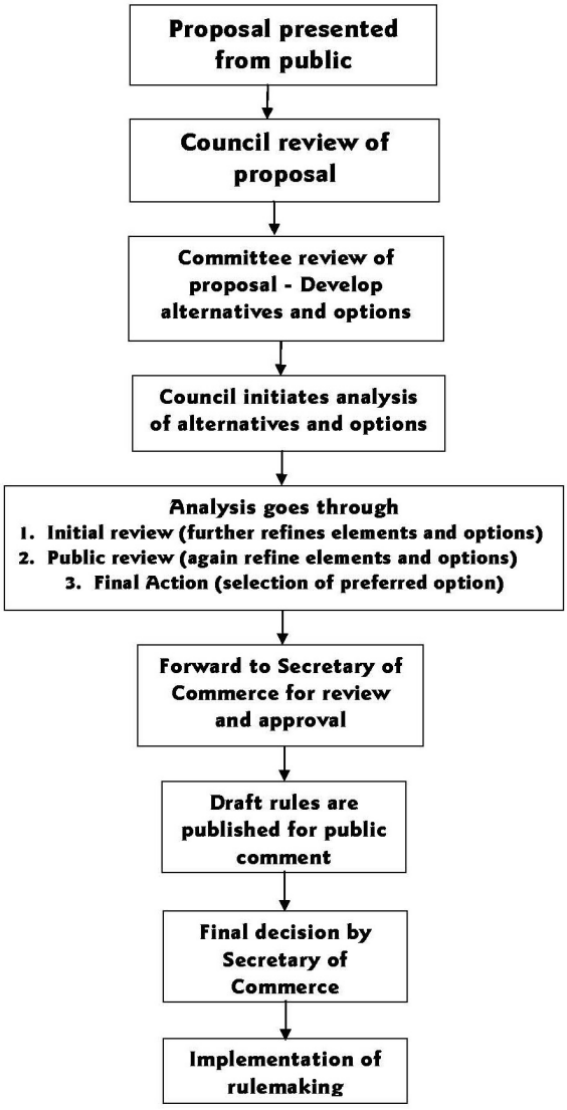

Figure 7 Process for regulatory change, NPFMC (Source NPFMC 2009)

Proposal for Change. Concerns and proposals for change are brought to the Councils attention by the public through the industry advisory panel or other committee, or directly to the Council via written or verbal public comment during the 'Staff Tasking' agenda item at each Council meeting.

Discussion Paper. A discussion paper is frequently prepared by staff as a first step to flesh out the scope of the problem identified, and discuss issues that may be of concern in the development of alternatives. For very complex issues, several discussion papers may be necessary to explore the full scope of an issue before reasonable alternatives can be developed. For relatively simple changes, where the problem and alternatives are self-evident, a discussion paper may not be necessary, and the issue can go straight to analysis, even without developing an official problem statement and range of alternatives. The AP (and other committees if appropriate) provides recommendations to the Council at this stage regarding if the issue should proceed further in the process, if an expanded discussion paper is needed, or if the issue is ready for analysis (and recommend alternatives to be evaluated) (NPFMC 2009).

Initial Review of Analysis. Normally, the Council adopts a problem statement (or thoroughly described the problem) and identifies alternatives to be considered, and then

staff prepares a draft analysis that integrates analytical requirements of applicable laws and executive orders. The analysis is released for review about 2 weeks (or more) before the meeting. The analysis is reviewed by the Scientific and Statistical Committee (SSC) for scientific merit, and by the AP to make recommendations regarding any missing information and the suite of alternatives and options evaluated. If the SSC has deemed the analysis inadequate and not ready for public review, or if the Council determines that additional alternatives or other substantial changes to the analysis are required, another initial review may be scheduled before the issue is scheduled for final action. If the analysis is to be released, the Council may designated a preliminary preferred alternative to focus comments on their indicated course of action (NPFMC 2009; NPFMC 2012a).

Final Review of Analysis. After initial review, staff revises the analysis based on SSC, AP, and Council comments, and the analysis is posted on the Council website about 3 to 4 weeks before the meeting. The AP makes a recommendation to the Council regarding a preferred alternative. The Council makes a final decision by roll call vote on the motion (NPFMC 2009; NPFMC 2012a).

Proposed Rule. The NMFS region prepares draft regulations based on Council action, and once cleared by the region and OMB, a proposed rule is published in the Federal Register. The public is provided time to comment on the proposed rule (NPFMC 2009; NPFMC 2012a).

Final Rule. NMFS region staff summarizes comments, and may make adjustments to the rule based on these comments. The response to comments, the revised final rule, and final approval decision is published in the Federal Register (NPFMC 2009; NPFMC 2012a).

3.5.4 Arrangements for on-going consultations with interest groups

See Section 3.5.3 above and 3.5.6 below.

3.5.5 Non-fishery users or activities, which could affect the fishery, and arrangements for liaison and co-ordination

Should any entity want to dredge or fill in areas that could affect the fisheries, they would be subject to the Clean Water Act, Section 404, and the proponent would be required to prepare and Environmental Assessment (EA) or environmental impact statement (EIS) to be considered for a permit.

Other applicable law applies to non-users and users alike that is directly relevant to the management of marine fisheries includes (Buck 1995):

- National Environmental Policy Act (NEPA): requires an EIS for actions with a federal nexus and compliance with other laws and executive orders.
- Endangered Species Act (ESA): prohibits actions that are expected to jeopardize the continued existence of any endangered or threatened species under NMFS' jurisdiction or result in harmful effects on critical habitat. Consultations, including a Biological Assessment are required.
- Marine Mammal Protection Act (MMPA): requires protection of marine mammals. NMFS is responsible for whales, dolphins, porpoise, seals, sea lions and fur seals. The U.S. Fish and Wildlife Service (USFWS) is responsible for walrus, sea otters, and the West Indian manatee (PFMC 2011g).
- Migratory Bird Treaty Act (MBTA): a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect migratory birds, prohibiting their taking, killing, or possession. The directed take of seabirds is prohibited.
- Coastal Zone Management Act (CZMA): requires all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable

- Administrative Procedures Act (APA): provides for public participation in the rulemaking process
- Paperwork Reduction Act (PRA): regulates the collection of information from the public
- Regulatory Flexibility Act (RFA): requires assessment of the regulatory impact on small entities through a regulatory flexibility analysis. The analysis is combined with the regulatory impact review (RIR) and NEPA analyses.
- EO 12866 (Regulatory Planning and Review): establishes guidelines for promulgating new regulations and reviewing existing regulations and requires agencies to assess the costs and benefits of all regulatory action alternatives.
- EO 12898 (Environmental Justice): requires federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of an environmental impact analysis associated with an action.
- EO 13175 (Consultation and Coordination with Indian Tribal Governments): requires regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications and the avoidance of unfunded mandates imposed on tribes.
- EO 13132 (Federalism): requires federal agencies to consider the implications of policies that may limit the scope of or pre-empt states' legal authority. Such actions require a consultation process with the states and may not create unfunded mandates for the states.
- EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds): supplements the MBTA by requiring Federal agencies to work with the U.S. Fish and Wildlife Service (USFWS) to develop memoranda of agreement to conserve migratory birds and to evaluate the effects of their actions on migratory birds in NEPA documents.

3.5.6 Details of the decision-making process or processes, including the recognized participants

Decision-making for North Pacific groundfish occurs primarily within the NPFMC process. \ NMFS, the states of Alaska, Washington and Oregon, and numerous industry, academic, and NGO stakeholders participate in the process. See Section 3.5.2 for details on the procedures for changing management rules, which is an important part of the decision-making process. The process used by the NPFMC for decision-making is described in the guide for navigating the Council process (NPFMC 2009) and the Council operating procedures (NPFMC 2012a). The North Pacific Fishery Management Council (NPFMC) is the regional council responsible for managing North Pacific Ocean fisheries in the Federal EEZ off the coast of Alaska (NPFMC 2009). The Council's geographic area of authority includes the Exclusive Economic Zone (EEZ) of the Arctic Ocean and Pacific Ocean seaward of Alaska, including the Bering Sea, Aleutian Islands, and Gulf of Alaska.

The North Pacific fisheries comprise numerous species managed under five fishery management plans (NPFMC 2009; NPFMC 2012a):

- Bering Sea/Aleutian Islands Groundfish FMP: This FMP includes all species of groundfish (pollock, cod, flatfish, sablefish, rockfish, etc.) and management measures for vessels using trawl, longline, pot, and jig gear. In-season management of these fisheries is conducted by NMFS in Juneau.
- Gulf of Alaska Groundfish FMP: The GOA Groundfish FMP also includes the major groundfish target species except for a few that are managed by the State of Alaska. Many management measures mirror the BSAI groundfish FMP.
- Bering Sea/Aleutian Islands King and Tanner Crab FMP: This FMP includes fisheries for king and Tanner crab (red, blue, and brown king crab, Tanner crab, and snow crab). In-season management of these fisheries is provided by ADFG in Kodiak.

- Alaska Scallop FMP: This FMP was developed to control fishing effort in the weathervane scallop fishery. Only 9 vessels are permitted under a license limitation program. In-season management of the fishery is provided by ADFG in Kodiak.
- Alaska Salmon FMP: The Salmon FMP was developed to prohibit fishing for salmon in the EEZ except by a limited number of vessels using troll gear in Southeast Alaska. All other salmon fisheries are conducted in State waters and are managed by the State of Alaska

North Pacific Fishery Management Council

The Council has eleven voting members and four non-voting members (NPFMC 2009; NPFMC 2012a). Council members must balance competing interests while trying to make decisions for the overall benefit of the nation. Council members are advised by the Council's advisory panels and committees, Council staff, the public, states, academia, and NMFS. The states of Alaska, Washington, and Oregon are represented on the Council.

The eleven voting members include:
- The director of the Alaska Department of Fish and Game or a designee.
- The director of the Washington Department of Fish and Wildlife, or a designee
- The director of the Oregon Department of Fish and Wildlife, or a designee
- The Regional Administrator of the National Marine Fisheries Alaska Regional Office or a designee.
- 7 private citizens who are familiar with the fishing industry, marine conservation, or both. These citizens (5 members from Alaska and 2 from Washington) are appointed by the Secretary of Commerce from lists submitted by the Governors of Alaska and Washington.

There are also four non-voting members who assist the Council in decision making. They represent:
- The Pacific States Marine Fisheries Commission (data and research)
- The U.S. Fish and Wildlife Service (seabirds, ecosystems, otters and walrus)
- The U.S. Department of State (decisions that have international implications)
- The U.S. Coast Guard (enforcement and safety issues)

The following description of Council activities is extracted from NPFMC 2012. The Council has established two formal advisory groups: a Scientific and Statistical Committee (SSC) and an Advisory Panel (AP). Subject to the availability of appropriations, stipends are available to members of committees formally designated as SSCs or APs who are not employed by the Federal Government or a state marine fisheries agency. For purposes of this section, a state marine fisheries agency includes any state or tribal agency that has conservation, management, or enforcement responsibility for any marine fishery resource.

The Council also maintains Plan Teams for each fishery management plan, and appoints standing and ad hoc committees necessary to advise the Council on particular conservation and management issues. Stipends are not available to members of plan teams or other committees.

As required by the Act at Sec. 302(g)(1), the Council shall establish, maintain, and appoint the members of a SSC to assist it in the development, collection, and peer review of such statistical, biological, economic, social, and other scientific information as is relevant to the Council's development and amendment of any of its fishery management plans. The SSC is composed of experts in biology, statistics, economics, sociology, and other relevant disciplines from the federal, state, and private scientific communities and other appropriate sources. Members appointed by the Council to the SSC shall be federal employees, state employees, academicians, or independent experts and shall have strong scientific or

technical credentials and experience. Independent experts on the SSC cannot be employed by an interest group or advocacy group.

The SSC will provide the peer review process for scientific information used to advise the Council about the conservation and management of the fishery. The review process, which may include existing committees or panels, is deemed to satisfy the requirements of the guidelines issued pursuant to section 15 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106– 554—Appendix C; 114 Stat. 2763A–153).

The Council has established an advisory panel (AP) under Sec. 302(g)(3), as required by the Act. The North Pacific Fishery Management Council appoints an Advisory Panel (AP) of recognized experts from the fishing industry and several related fields, and represents a variety of gear types, industry and related interests as well as a spread of geographic regions of Alaska and the Pacific Northwest having major interest in the fisheries off Alaska.

The Council relies on the AP for comprehensive advice on how various fishery management alternatives will affect the industry and local economies, on potential conflicts between user groups of a given fishery resource or area, and on the extent to which the United States will utilize resources managed by the Council's fishery management plans. The AP will consist of approximately 20 members. However, the Council will not necessarily keep all seats filled. This arrangement should allow sufficient flexibility in funding so the Council can invite as necessary other individuals with particular expertise to work with the AP on an ad hoc basis. It is expected that as the issues and concerns of the Council change and evolve so, too, will the profile of the membership of the AP. AP members will serve for three-year terms beginning with the first meeting each calendar year. All members will be appointed by and serve at the pleasure of the Council and may be reappointed to two subsequent consecutive terms. Appointments will be staggered to provide for the appointment of 1/3 of the membership of the AP each year.

The Council appoints plan teams for each of the major fishery management plans (FMPs). Members of each team are selected from those agencies and organizations having a role in the research and/or management of fisheries. At a minimum, teams shall be composed of one member from agencies having responsibility for management of the fishery resources under the jurisdiction of the Council. Nominations of these individuals are at the discretion of the agencies. Other individuals may be nominated by members of the Plan Team, Council, SSC or AP. Appointments to the team will be made by the Council with recommendations from the SSC.

The Plan Teams review stock assessment information and assist in the preparation of the annual Stock Assessment and Fishery Evaluation (SAFE) documents including formulation of recommendations on annual Acceptable Biological Catch (ABC) levels for groundfish, crab, and scallop species under jurisdiction of the Council. The Teams may also prepare and/or review plans, amendments and supporting analytical documents for the Council, SSC and AP; aggregate and evaluate public/industry proposals and comments; summarize and evaluate data related to the biological, economic and social conditions of the fishery; conduct and evaluate analyses pertaining to management of the fisheries; evaluate the effectiveness of management measures in achieving the plan's objectives; and recommend when and how management measures need to be changed.

The Council may appoint standing and ad hoc committees from among the voting and non-voting members and knowledgeable members of the public, as it deems necessary for the conduct of Council business. The Council Chair may also appoint standing or ad hoc Committees that include industry representatives or other participants to address specific management issues or programs.

Under MSA, each council must reflect the expertise and interests of its constituent States, with membership that is knowledgeable about conservation, management, commercial or recreational harvest, of the fishery resources within the council area. The Secretary of Commerce is charged with ensuring each council has membership that fairly represents the commercial and recreational fisheries under that Council's jurisdiction. Each year the Secretary submits a report on council membership to the Senate Committee on Commerce, Science, and Transportation that list the fisheries under the jurisdiction of each Council and their characteristics, assesses council membership in terms of the apportionment of the active participants in each council's fisheries, and states a plan and schedule for actions to achieve a fair and balanced apportionment on each council (MSA 2007).

The Council normally meets five times each year, in conjunction with its AP and SSC. Each meeting normally lasts around 10 days and begins on Wednesday of the meeting week. The Council's SSC and AP generally meet concurrently with the Council, starting two days prior to the Council. Each regular meeting and each emergency meeting is open to the public, except for a short closed Council session in which the Council deals with personnel, administrative, or litigation issues, and interested persons may present oral or written statements regarding the matters on the agenda at meetings. The Council schedules time for public testimony on most agenda and sets aside a public testimony period for non-agenda items. The Council provides for publishing in the Council briefing book written comments on any agenda received by regular mail or by FAX one week prior to the start of the Council plenary session, and 5 days prior to the start of the AP and SSC meetings (the specific deadline will be copied and distributed to Council members prior to the meeting. Written comments received after that deadline will not be copied and distributed to Council members, but will be collected in a 'Late Comment' folder, held by the Council Secretary, archived as part of the Council Record, and made available for Council member review. Starting in 2013, the Council briefing book for all agenda items is published if full on the Council website.

The specific timing of each meeting shall be coordinated by the Executive Director in consultation with the Chair. The Council generally holds Council meetings in locations which reach fishery constituents, including remote locations not typically on the Council meeting schedule. Additional Council outreach activities are conducted in remote, rural locations within Alaska, as appropriate on an issue-by-issue basis. The Council keeps detailed minutes of each meeting, except for any closed session, that contain a record of the persons present, a complete and accurate description of matters discussed and conclusions reached, and copies of all statements filed, verified by the Council Chair. The Council makes minutes available to the public, subject to confidentiality procedures, and posts minutes of the meetings on the Council's website.

The Council also holds public hearings to provide for participation for interested individuals in the development of fishery management plans or amendments, and with respect to the administration and implementation of other relevant features of the MSA. Advance notice of hearings includes the time, location, and agenda for each hearing. The Council Chair may designate at least one voting member of the Council to officiate. The Council maintains an accurate record of the participants and their views, as part of the Council's administrative record.

The Council maintains on its website documents related to fishery management plans and their amendments for the fisheries for which the Council is responsible, drafts of fishery management plan amendments under consideration, analysis of actions the Council has under review, minutes or official records of past meetings of the Council and its committees, materials provided to Council members in preparation for meetings, and other Council documents of interest to the public.

The Council considers and implements actions over a multi-meeting schedule. Issues for consideration come to the Council via recommendations from Council members, advisory

group members, or members of the public. The Council normally meets five times each year. Each meeting normally lasts from six to seven days and begins on Wednesday of the meeting week. The Council's SSC and AP generally meet concurrently with the Council, starting two days prior to the Council. All meetings are open to the public, except for a short closed Council session in which the Council deals with personnel, administrative, or litigation issues. Meeting locations rotate among member state cities. Advisory bodies also meet at various times between Council meetings.

Management measures developed by the Council are recommended to the Secretary of Commerce through the National Marine Fisheries Service (NMFS). Management measures are implemented by NMFS Alaska Regional Office and enforced by the NOAA Office of Law Enforcement, the U.S. Coast Guard, and local enforcement agencies.

Alaska Board of Fisheries

The BOF consists of seven members serving three-year terms. Members are appointed by the governor and confirmed by the legislature. Members are appointed on the basis of interest in public affairs, good judgment, knowledge, and ability in the field of action of the board, with a view to providing diversity of interest and points of view in the membership (see Alaska Statute 16.05.221).

The BOF's main role is to conserve and develop the fishery resources of the state. This involves setting seasons, bag limits, 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. The description of the BOF relies on http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main.

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 board uses the biological and socioeconomic information provided by the Alaska Department of Fish and Game, 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.

The BOF is established under Alaska Statute 16.05.221 for the purposes of the conservation and development of the fisheries resources of the state. The BOF has the authority to adopt regulations described in AS 16.05.251 including: establishing open and closed seasons and areas for taking fish; setting quotas, bag limits, harvest levels and limitations for taking fish; and establishing the methods and means for the taking of fish. The regulations the BOF has authority over are 5 AAC Chapters 1- 77.

The BOF conducts regular reviews of groundfish fisheries within state waters of Alaska, in which external parties (i.e., consultants contracted by various user groups, experts that department staff has asked for input, etc.) have full opportunity for critical comment. The Board's review of FMPs, amendments and other regulatory changes include input from ADF&G staff, Regional Fish & Game advisory committees, non-ADF&G scientists, industry, environmental non-governmental organizations, stakeholders and the general public.

ADF&G staff participates in the NPFMC Plan Team process soliciting peer reviews of stock assessments, and its meetings consider outside views regarding its analyses. As a participant in the Plan Team process, a panel of biologists, from various state and federal agencies and recognized as having considerable expertise in the field of groundfish population dynamics are consulted on an annual basis to review the most recent groundfish survey information from the NMFS. If new data points for biomass estimates suggest a higher or lower ABC, then the outside experts have equal input with assessment authors relative to adjusting these parameters.

Legislative committees have conducted oversight and legislative hearings regarding the BOF's actions in a region's fisheries. The BOF and ADF&G frequently turn to outside sources for technical advice, particularly regarding scientific matters and monitoring issues. If there are socio-economic or other ecosystem concerns expressed, the BOF can adjust time or area openings commensurate with the adjusted ABC. When the Plan Team recommends these adjusted ABCs to the NPFMC, and the BOF makes regulatory adjustments based on the adjusted ABCs, the process again gets external review and discussion from commercial fishing groups, sport fishing groups, tourism representatives, etc. This process of external review is repeated in the BOF meeting schedule every 3 years.

For the State of Alaska as a whole, legal challenges to BOF and ADF&G staff management decisions through the court system have often required managers to explain and justify their management actions.

3.5.7 Objectives for the fishery

The MSA contains ten national standards with which all fishery management plans (FMPs) must conform (MSA 2007). The national standards, listed in abbreviated form below, provide the primary guidance for the management of US fisheries. Conservation and management measures shall:

1. Prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery.
2. Be based upon the best scientific information available.
3. Manage a fish stock as a unit throughout its range; manage interrelated stocks as a unit or in close coordination.
4. Not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among U.S. fishermen, such allocation shall be: fair and equitable; reasonably promote conservation; and avoid accumulation of excessive shares.
5. Consider efficiency in the utilization of fishery resources; no measure shall have economic allocation as its sole purpose.
6. Allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
7. Minimize costs and avoid unnecessary duplication.
8. Take into account the importance of fishery resources to fishing communities in order to provide for their sustained participation and minimize adverse community economic impacts.
9. Minimize bycatch and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
10. Promote the safety of human life at sea.

The North Pacific Fishery Management Council's policy is to apply judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations (NPFMC 2009, NPFMC 2012). The productivity of the North Pacific ecosystem is acknowledged to be among the highest in the world. For the past 25 years, the Council management approach has incorporated forward looking conservation measures that address differing levels of uncertainty. This management approach has in recent years been labeled the precautionary approach. Recognizing that potential changes in productivity may be caused by fluctuations in natural oceanographic conditions, fisheries, and other, non-fishing activities, the Council intends to continue to take appropriate measures to insure the continued sustainability of the managed species. It will carry out this objective by considering reasonable, adaptive management measures, as described in the Magnuson-Stevens Act and in conformance with the National Standards, the Endangered Species Act (ESA), the National Environmental Policy Act, and other applicable law. This management approach takes into account the National Academy of Science's recommendations on Sustainable Fisheries Policy.

Adaptive management requires regular and periodic review. Objectives identified in this policy statement will be reviewed annually by the Council. The Council will also review, modify, eliminate, or consider new issues, as appropriate, to best carry out the goals and objectives of this management policy. To meet the goals of this overall management approach, the Council and NMFS will use the Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement (PSEIS) (NMFS 2004) as a planning document. To help focus consideration of potential management measures, the Council and NMFS will use the following objectives from the PSEIS as guideposts, to be re-evaluated, as amendments to the FMP are considered over the life of the PSEIS:

Prevent Overfishing:
1. Adopt conservative harvest levels for multi-species and single species fisheries and specify optimum yield.
2. Continue to use the 2 million mt optimum yield cap for the BSAI groundfish fisheries. [Continue to use the existing optimum yield cap for the GOA groundfish fisheries.]
3. Provide for adaptive management by continuing to specify optimum yield as a range.
4. Provide for periodic reviews of the adequacy of *F40* and adopt improvements, as appropriate.
5. Continue to improve the management of species through species categories.

Promote Sustainable Fisheries and Communities:
6. Promote conservation while providing for optimum yield in terms of the greatest overall benefit to the nation with particular reference to food production, and sustainable opportunities for recreational, subsistence, and commercial fishing participants and fishing communities.
7. Promote management measures that, while meeting conservation objectives, are also designed to avoid significant disruption of existing social and economic structures.
8. Promote fair and equitable allocation of identified available resources in a manner such that no particular sector, group or entity acquires an excessive share of the privileges.
9. Promote increased safety at sea.

Preserve Food Web:
10. Develop indices of ecosystem health as targets for management.
11. Improve the procedure to adjust acceptable biological catch levels as necessary to account for uncertainty and ecosystem factors.
12. Continue to protect the integrity of the food web through limits on harvest of forage species.
13. Incorporate ecosystem-based considerations into fishery management decisions, as appropriate.

Manage Incidental Catch and Reduce Bycatch and Waste:
14. Continue and improve current incidental catch and bycatch management program.
15. Develop incentive programs for bycatch reduction including the development of mechanisms to facilitate the formation of bycatch pools, vessel bycatch allowances, or other bycatch incentive systems.
16. Encourage research programs to evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available.
17. Continue program to reduce discards by developing management measures that encourage the use of gear and fishing techniques that reduce bycatch which includes economic discards.
18. Continue to manage incidental catch and bycatch through seasonal distribution of total allowable catch and geographical gear restrictions.
19. Continue to account for bycatch mortality in total allowable catch accounting and improve the accuracy of mortality assessments for target, prohibited species catch, and noncommercial species.
20. Control the bycatch of prohibited species through prohibited species catch limits or other appropriate measures.

21. Reduce waste to biologically and socially acceptable levels.

Avoid Impacts to Seabirds and Marine Mammals:
22. Continue to cooperate with U.S. Fish and Wildlife Service (USFWS) to protect ESA-listed species, and if appropriate and practicable, other seabird species.
23. Maintain or adjust current protection measures as appropriate to avoid jeopardy of extinction or adverse modification to critical habitat for ESA-listed Steller sea lions.
24. Encourage programs to review status of endangered or threatened marine mammal stocks and fishing interactions and develop fishery management measures as appropriate.
25. Continue to cooperate with NMFS and USFWS to protect ESA-listed marine mammal species, and if appropriate and practicable, other marine mammal species.

Reduce and Avoid Impacts to Habitat:
26. Review and evaluate efficacy of existing habitat protection measures for managed species.
27. Identify and designate essential fish habitat and habitat areas of particular concern pursuant to Magnuson-Stevens Act rules, and mitigate fishery impacts as necessary and practicable to continue the sustainability of managed species.
28. Develop a Marine Protected Area policy in coordination with national and state policies.
29. Encourage development of a research program to identify regional baseline habitat information and mapping, subject to funding and staff availability.
30. Develop goals, objectives and criteria to evaluate the efficacy and suitable design of marine protected areas and no-take marine reserves as tools to maintain abundance, diversity, and productivity. Implement marine protected areas if and where appropriate.

Promote Equitable and Efficient Use of Fishery Resources:
31. Provide economic and community stability to harvesting and processing sectors through fair allocation of fishery resources.
32. Maintain the license limitation program, modified as necessary, and further decrease excess fishing capacity and overcapitalization by eliminating latent licences and extending programs such as community or rights-based management to some or all groundfish fisheries.
33. Provide for adaptive management by periodically evaluating the effectiveness of rationalization programs and the allocation of access rights based on performance.
34. Develop management measures that, when practicable, consider the efficient use of fishery resources taking into account the interest of harvesters, processors, and communities.

Increase Alaska Native Consultation:
35. Continue to incorporate local and traditional knowledge in fishery management.
36. Consider ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge in fishery management where appropriate.
37. Increase Alaska Native participation and consultation in fishery management.

Improve Data Quality, Monitoring and Enforcement:
38. Increase the utility of groundfish fishery observer data for the conservation and management of living marine resources.
39. Develop funding mechanisms that achieve equitable costs to the industry for implementation of the North Pacific Groundfish Observer Program.
40. Improve community and regional economic impact costs and benefits through increased data reporting requirements.
41. Increase the quality of monitoring and enforcement data through improved technology.
42. Encourage a coordinated, long-term ecosystem monitoring program to collect baseline information and compile existing information from a variety of ongoing research initiatives, subject to funding and staff availability.
43. Cooperate with research institutions such as the North Pacific Research Board in identifying research needs to address pressing fishery issues.

44. Promote enhanced enforceability.
45. Continue to cooperate and coordinate management and enforcement programs with the Alaska Board of Fish, Alaska Department of Fish and Game, and Alaska Fish and Wildlife Protection, the U.S. Coast Guard, NMFS Enforcement, International Pacific Halibut Commission, Federal agencies, and other organizations to meet conservation requirements; promote economically healthy and sustainable fisheries and fishing communities; and maximize efficiencies in management and enforcement programs through continued consultation, coordination, and cooperation.

3.5.8 Outline the fleet types or fishing categories participating in the fishery

There are four sectors comprising the GOA Pacific cod fishery: longline, trawl, pot, and jig. The Council sets a TAC for managed species in the GOA (NPFMC 2014). The Pacific cod TAC shall be 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 (NPFMC 2014).

3.5.9 Individuals or groups granted rights of access to the fishery, and the nature of those rights

See section 3.5.2 and 3.5.8 above.

3.5.10 Description of the measures agreed upon for the regulation of fishing in order to meet the objectives within a specified period

3.5.11 Arrangements and responsibilities for monitoring, control and surveillance and enforcement

Observers. The mission of the Federal North Pacific Groundfish Observer Program is to collect data on fishing effort, total catch by species, and biological data; characterize marine mammal and sea bird interactions during the fisheries for Pacific cod.

The MSA and the MMPA authorize NMFS to place observers on Alaska groundfish vessels. The action is mandatory. The GOA Groundfish FMP (NPFMC 2014) requires that 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. In 2013, the Council and the NMFS restructured the Observer Program to place all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two categories: (1) the full coverage category, where vessels and processors obtain observers by contracting directly with observer providers, and (2) the partial coverage category, where NMFS has the flexibility to deploy observers when and where they are needed based on an annual deployment plan. The purpose of restructuring the Observer Program was to: (1) reduce the potential for bias in observer data, (2) authorize the collection of observer data in fishing sectors that were previously not required to carry observers, (3) allow fishery managers to provide observer coverage to respond to the management needs and circumstances of individual fisheries, and (4) assess a broad-based fee to more equitably distribute the costs of observer coverage (NMFS 2014). Data collected from the observer Program are stored and processed within the NMFS's Catch Accounting

System which produces annual reports available in SAFE reports of species or species complexes and online. The 2014 Annual Deployment Plan documents how the National Marine Fisheries Service intends to assign at-sea and shoreside observers to operations fishing under the authority of the GOA FMP (NMFS 2013).

Observer coverage of the Pacific cod fisheries in the GOA in 2013 is summarized in the Table 7 (NMFS 2014a). These data indicate that about 10% of the catch had 100% observer coverage, 57% of the catch had more than 10% coverage and 33% of the catch had <5% coverage. The small jig fishery is not observed.

NMFS is responsible for funding and overall administration of the program including observer training, debriefing and data management (NMFS 2013). The fishing industry is responsible for making arrangements with contracting companies that meet the North Pacific Observer Program NMFS-certification requirements for placement of NMFS-trained observers aboard their vessels and paying contractors for direct observer costs. The observer contractors are responsible for observer recruiting, deployment, logistics, and insurance/benefits.

Observer coverage responsibilities are shared among the fishing industry and independent observer contractors (who are certified by NMFS). The contractors hire and deploy observers. The NMFS also provides other observer support services (sampling gear and training documents) and is responsible for maintaining information systems for scientific and operational data, and administrative support (NMFS 2013).

Compliance. At-sea and shore-side enforcement is carried out by the Alaska Wildlife Troopers, NMFS Office of Law Enforcement (OLE), and the US Coast Guard (USCG). State and federal fisheries enforcement officers make use of USCG vessels and aircraft to assist in surveillance and enforcement.
At-sea and shore-side enforcement activities include:

- Monitoring of commercial fishing activities to ensure compliance with fishery laws and regulations;
- Actions to close commercial fisheries once catch limits have been reached;
- Educating participants in the fishery on the laws and regulations; NMFS Management, NMFS OLE, and the USCG all conduct extensive outreach and education programs that seek not only to explain the regulations, but also to help the fishing industry understand the rationale for those regulations. Outreach to the Alaska groundfish fleet was conducted throughout the process of program development and implementation (M. Killary, OLE, pers. comm. 2014).
- Penalizing violators. OLE agents and officers can assess civil penalties directly to the violator in the form of a summary settlement or can refer the case to NOAA's OGC for Enforcement and Litigation who can impose a sanction on the vessels permit or further refer the case to the U.S. Attorney's Office for criminal proceedings. Penalties may range from severe monetary fines, boat seizure and/or imprisonment (NMFS 2011c).

NOAA's OLE protects marine wildlife and habitat by enforcing domestic laws and international treaty requirements designed to ensure these global resources are available for future generations http://www.nmfs.noaa.gov/aboutus/our_mission.html. OLE special agents and enforcement officers ensure compliance with the nation's marine resource laws and take enforcement action when these laws are violated. All OLE work supports the core mission mandates of NOAA Fisheries—maximizing productivity of sustainable fisheries and fishing communities and protection, recovery, and conservation of protected species. OLE in Alaska focuses on outreach to help prevent or minimize infractions.

The USCG serves as the primary agency for at- sea fisheries enforcement (USCG 2014a). The USCG, in coordination with other federal and state agencies, enforces marine resource management and protection regimes to preserve healthy stocks of fish and other

living marine resources. The USCG objectives are to prevent encroachment of the U.S. EEZ, ensure compliance with domestic fisheries regulations, and ensure compliance with international agreements. The USCG makes an annual report to the NPFMC on resources applied to fishery enforcement in the previous year, including numbers of boardings. It also details numbers of violations by year, lives lost at sea, safety issues, and any changes in regulations. The USCG conducts a wide range of activities for education and prevention; law enforcement; emergency response and containment; and disaster recovery. These activities lead to projecting federal law enforcement presence over the entire U.S. Exclusive Economic Zone, covering nearly 3.4 million square miles of ocean; ensure compliance with fisheries and marine protected species regulations on domestic vessels; and preventing over-fishing, reducing mortality of protected species, and protecting marine habitats by enforcing domestic fishing laws and regulations. The Seventeenth Coast Guard District is responsible for the largest amount of coastline and one of the largest areas of responsibility within the Coast Guard. It is also home to one of the most productive fisheries in the world. The D17 Response division is responsible for search and rescue, maritime law enforcement, and incident/pollution response within the Seventeenth District's area of responsibility.

The primary responsibility for enforcing fish and wildlife-related statutes and regulations in Alaska lies with the Alaska Department of Public Safety, through its Division of Alaska Wildlife Troopers (ADFG 2014). The division also enforces other types of regulations passed by the Board of Game and the Board of Fisheries. This includes those designed to protect Alaska's native species from harmful invasive species, prevent importation of exotic pets, and prevent illegal export of animal parts from Alaska. Biologists and other staff of the ADFG sometimes participate in enforcement activities and assist the Wildlife Troopers as needed; however, law enforcement is not a primary function of ADFG.

The NMFS Alaska Region OLE reports few major compliance issues. In a conversation with staff member of the OLE, he observed that as fishery abundance declines, infractions increase (M. Killary, OLE pers comm 2014). Alaska has stocks in good condition, and this tends to lead to fewer compliance issues. As an example, OLE reports to the Council at six month intervals on notices of violation or written warnings; OLE reported at the February 2014 Council Meeting that it issued eight from July 1, 2013, through December 31, 2013 (OLE 2014). Of these, three were issued under the Northern Pacific Halibut Act, and five were issued under the MSA. Of the MSA violations or warnings, two applied to the Pacific cod fishery; one in the BSAI for fishing for Pacific cod with pots set within the boundaries of the Bogoslof area and one for using pot gear within the Steller Sea Lion Protection Area adjacent to Marmot Island, Alaska.

The USCG also report a low proportion of infractions discovered during at-sea boarding. From 2009-2013, the number of boardings ranged from 477-716 (USCG 2014b) with a proportion of infractions ranging from 5-9%. The 27 infractions noted in 2013 (USCG 2014b) were:

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

The high level of compliance is supported by published sanction schedules (NOAA GC 2014) requested during prosecutions: for inadvertent and many first-time violations, prosecution requests small sanctions such as warning or summary settlements. This acts as a reminder of the need to comply, and OLE finds this approach very effective (M. Killary, OLE, pers. comm.). This approach is 70-80% effective in preventing repeat

offenders. Repeat offenders are prosecuted through the criminal statutes, which have sanctions of fines, vessel forfeiture, and jail, and often remove the violators from the fishery.

3.5.12 Details of any planned education and training for interest groups

The NPFMC provides a range of opportunities for stakeholder education and input into management required by federal statute and implemented through its standard operating procedures (NPFMC 2012). Descriptions of stakeholder consultation procedures available on the NPFMC website identify several elements of NPFMC procedures that enable the distribution of information to stakeholders and the provision of public comment to management.

3.5.13 Date of next review and audit of the management plan

The annual management cycle and activities related to groundfish, including Pacific cod, management contain extensive points of review detailed in the Council Operating Procedures (NPFMC 2012). These involve specific review actions taken by the SSC, Plan Teams and Advisory Panel. Management measures are implemented annually with harvest specifications (ABCs and OYs) identified for each year. The GOA Groundfish Fishery Management Plan has had over 75 amendments, indicating a high level of review (Appendix 1 to GOA Groundfish FMP, NPFMC 2014).

3.5.14 Description of fishery's research plan

The NPFMC has identified priorities for research, over the next 1 to 5 years, as those activities that are the most important for the conservation and management of fisheries in the Gulf of Alaska, Aleutian Islands, eastern Bering Sea, and the Arctic. This listing of priorities has two purposes: 1) to meet the requirements of the revised MSA for the councils to identify research that is needed in the next 5 years, and 2) to provide guidance on research priorities to the research community and funding agencies. Research priorities are organized into four categories (critical, high, medium, and low), but within each category, are in no particular order of importance. The NPFMC currently has a list of 127 research topics, of which six are considered critical and 54 as high priority. The Pacific States Marine Fisheries Commission (PSMFC) has developed a searchable online listing of the research priorities (PSMFC 2014).

The SSC considers the research plan annually, and adjusts the topics and priorities as necessary. The plan teams also provide recommendations of research that would benefit stock assessments within species report in the annual SAFE document (NPFMC 2012).

4. Evaluation Procedure

4.1 Harmonized Fishery Assessment

The GOA Pacific Cod fishery partially overlaps with the GOA Alaska flatfish and Alaska Pollock fisheries. The stocks are different and the same management applies for all three fisheries. The Alaska flatfish and Alaska pollock fisheries do not use longline, pot, or jig gear, so have minimal overlap for harmonization of P2, but the P2 species of one assessment are harmonized against the P1 species of other assessments. Alaska flatfish fisheries also use demersal trawl gear similar to that used for Pacific Cod. As the assessment team has conducted re-assessment of the three fisheries, it has considered and reported where overlap would require harmonization.

4.2 Previous assessments

The GOA Pacific Cod fishery is in its first re-assessment. At the time of the original assessment, the Conformity Assessment Body (CAB) Intertek Fishery Certification (IFC) determined during the third annual surveillance that all conditions were closed. The MRAG Americas surveillance team did not find any justification for reopening conditions or requiring new conditions. Therefore, the fishery enters the re-assessment with no conditions.

4.3 Assessment Methodologies

This report used CR V1.3 with no change to the default assessment tree, and used MSC Full Assessment Reporting Template V1.3.

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits and Consultations

The surveillance team of Robert Trumble (Lead Assessor), Don Bowen, and Jake Rice met with the staff of: the Alaska Regional Office and Alaska Fisheries Science Center of the US National Marine Fisheries Service (NMFS), the North Pacific Fishery Management Council, the World Wildlife Fund (WWF), and the Yukon River Drainage Association, and the fishery client from 27-30 May 2014. The client close-out meeting was held 30 May. The team met in person in Seattle with those organizations and individuals that requested a meeting and by teleconference with others. MRAG posted a notice of the site visit on the MSC website and on the IntraFish website, and invited stakeholders to present information and to meet with the team. The table below summarizes the participation, location, and topics of the meetings.

The assessment team combined topics for the fourth surveillance with topics for the fishery re-assessment. The assessment process included discussions with NMFS and North Pacific Council staff members on key issues of Principles 1, 2, and 3; changes in science and management; and likely future changes or changes underway. The clients had provided substantial documentation in advance of the site visit, and the NMFS and Council staffs provided additional material to document the information presented at the visits. Two other stakeholder meetings occurred during the site visit: WWF, and a consortium of Yukon River Drainage Fisheries Association, Tanana Chiefs Conference, Kawerak, Inc., Association of Village Council Presidents, and Bering Sea Fishermen's Association.

Date 2014	Location	Name/Affiliation	Topic
27 May	Seattle and conference call	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment Team; David Gaudet – DG Fisheries Services; Amanda Stern-Pirlot – APA; James Browning – XFG BioConsulting; Jason Anderson – AKSC; Mike Killary - OLE	• Changes to Enforcement framework • Summary of compliance, enforcement issues
27 May	Seattle and conference call	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment Team; David Gaudet – DG Fisheries Services; Amanda Stern-Pirlot – APA; James Browning – XFG BioConsulting; Jason Anderson – AKSC; Mary Furuness - AKRO	• Changes to the fishery management framework • Changes to mgmt. tools • Upcoming changes
27 May	Seattle	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment	• 2013 stock assessments – BSAI stocks

Date 2014	Location	Name/Affiliation	Topic
		Team; David Gaudet – DG Fisheries Services; Amanda Stern-Pirlot – APA; James Browning – XFG BioConsulting; Jason Anderson – AKSC; Sandra Lowe, Steve Barbeaux, Ingrid Spies, Tom Wildebuer, Carey McGilliard, Pat Livingston – AFSC; Dan Averill - MSC	
28 May	Seattle	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment Team; David Gaudet – DG Fisheries Services; Amanda Stern-Pirlot – APA; James Browning – XFG BioConsulting; Jason Anderson – AKSC; Sandra Lowe, Carey McGilliard, Martin Dorn, Teresa A'Mar, Farron Wallace, Stephanie Zador, Shannon Fitzgerald, Lowell Fritz – AFSC, Jennifer Cahalan – PSMFC/AFSC	• 2013 stock assessments – GOA • Observer program – GOA focus • Ecosystem considerations • Seabirds • Marine mammal interactions
29 May	Seattle and conference call	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment Team; David Gaudet – DG Fisheries Services; Amanda Stern-Pirlot – APA; James Browning – XFG BioConsulting; Jason Anderson – AKSC; David Witherell – NPFMC	• Management considerations • Revised observer program • Planning for GOA rationalization • Research Planning • Ecosystem issues – salmon, canyons, structure and function, seabirds
29 May	Seattle	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment Team; Becca Robbins-Gisclair – Yukon River Drainage Fisheries Association	• Yukon Chinook and BSAI pollock
29 May	Seattle and conference call	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment Team; Heather Brandon, Bruce Robson – WWF	• Western Alaska salmon and pollock fishing • Pollock catch by Russia fisheries • Subsistence users affected by BSAI pollock • ETP interactions in BSAI pollock fishery • Habitat considerations for BSAI pollock fishery
30 May	Seattle and conference call	Bob Trumble, Jake Rice, Don Bowen – MRAG Assessment Team; David Gaudet – DG Fisheries Services; John Gauvin – Groundfish Forum, James Browning – XFG BioConsulting; Jason Anderson – AKSC; Amanda Stern-Pirlot – APA, Julie Bonnie – Alaska Groundfish Data Bank	• Changes to the fishery • Nearshore and AK territorial fisheries • Halibut and salmon bycatch, mitigation • Marine mammals

4.4.2 Evaluation Techniques

MRAG published an announcement of the re-assessment of the fishery on IntraFish.com, and the MSC posted the announcement on its re-assessment downloads page. Together, these media presented the announcement to a wide audience representing industry, agencies, and stakeholders.

The assessment team and the clients set up meetings with science, management, and enforcement personnel, and the team set up a meeting with all other stakeholders who requested one.

Scoring followed a consensus process in which the assessment team discussed the information available for evaluating performance indicators to develop a broad opinion of performance of the fishery against each performance indicator. Review of sections 3.2, 3.3, 3.4 and 3.5 by all team members assured that the assessment team was aware of the issues for each performance indicator. Subsequently, the assessment team member responsible for each principle filled in the scoring table and provided a provisional score. The assessment team members reviewed the rationales and scores, and recommended modifications as necessary, including possible changes in scores. The team members agreed on the final scores. This process followed the MSC CR V1.3 section 27.10. The MSC has 31 'performance indicators', seven in Principle 1, 15 in Principle 2, and nine in Principle 3. The performance indicators are grouped in each principle by 'component.' Principle 1 has two components, Principle 2 has five, and Principle 3 has two. Each performance indicator consists of one or more 'scoring issues;' a scoring issue is a specific topic for evaluation. 'Scoring guideposts' define the requirements for meeting each scoring issue at the 60 (conditional pass), 80 (full pass), and 100 (state of the art) levels.

Note that some scoring issues may not have a scoring guidepost at each of the 60, 80, and 100 levels. The scoring issues and scoring guideposts are cumulative; this means that a performance indicator is scored first at the SG60 levels. If not all of the SG scoring issues meet the 60 requirements, the fishery fails and no further scoring occurs. If all of the SG60 scoring issues are met, the fishery meets the 60 level, and the scoring moves to SG80 scoring issues. If no scoring issues meet the requirements at the SG80 level, the fishery receives a score of 60. As the fishery meets increasing numbers of SG80 scoring issues, the score increases above 60 in proportion to the number of scoring issues met; performance indicator scoring occurs at 5-point intervals. If the fishery meets half the scoring issues at the 80 level, the performance indicator would score 70; if it meets a quarter, then it would score 65; and it would score 75 by meeting three-quarters of the scoring issues. If the fishery meets all of the SG80 scoring issues, the scoring moves to the SG100 level. Scoring at the SG100 level follows the same pattern as for SG80.

Principle scores result from averaging the scores within each component, and then from averaging the component scores within each Principle. If a Principle averages less than 80, the fishery fails.

Table 4.3 Scoring elements [Add or delete rows as needed]

Component	Scoring elements	Main/not main	Data-deficient or not
P1 Outcome	Pacific cod	Target	Not
P2 Retained	Bignose skate	Main (LL)	Not
	Longnose skate	Main (LL)	Not
	Bignose skate	Not main (others)	Not
	Longnose skate	Not main (others)	Not
	Arrowtooth flounder	Not main	Not
	Flathead sole	Not main	Not
	N&S rock sole	Not main	Not
	Pollock	Not main	Not

Component	Scoring elements	Main/not main	Data-deficient or not
	Octopus	Not main	Not
	Bait	Not main	Not
P2 Bycatch	Giant grenadier	Not main	Not
	Misc. Fish	Not main	Not
	Sea stars	Not main	Not
	Pacific halibut	Not main	Not
	Pacific herring	Not main	Not
	Pacific salmon	Not main	Not
	Steelhead trout	Not main	Not
	King crab	Not main	Not
	Tanner crab	Not main	Not
P2 ETP	Steller sea lions	NA	Not
	Short-tailed albatross	NA	Not
	ESA salmon	NA	Not
	Steller's eider	NA	Not
P2 Habitat	Gulf of Alaska	Main	Not
P2 Ecosystem	Gulf of Alaska	Main	Not

5 Traceability

5.1 Eligibility Date

The fishery is currently certified. The target eligibility date is the date of re-certification.

5.1 Traceability within the Fishery

NOAA Fisheries, Alaska Region, manages U.S. fisheries in the Exclusive Economic Zone (EEZ) of the waters off Alaska. Management includes Recordkeeping and Reporting procedures to promote the goals and objectives of fishery management plans, the Magnuson-Stevens Fishery Conservation and Management Act, and other applicable laws. Traceability of broad-scale fishing activity within this fishery is provided by the statutory requirements to record all fishing in logbooks or through eLandings and through monitoring of vessel activity by fisheries enforcement bodies and satellite monitoring equipment (VMS). Further traceability is provided by the client's own internal systems that record the date and time of fishing activities, and the date and time of packaging. All of the fish landed from this fishery can be traced back to particular fishing activities. All shoreside landings are recorded on eLandings records as the start of rigorous monitoring and traceability of the Pacific cod landings; eLandings is the Interagency Electronic Reporting System for reporting commercial fishery landings in Alaska. eLandings is used to report landings and/or production data for groundfish, IFQ/CDQ halibut and sablefish, and IFQ/CDQ crab and Community of Adak golden king crab. At-sea landings consist of catcher vessels delivering to motherships, and catcher-processors that handle their own catch. Flow scales on all at-sea processors result in a high accuracy of total landings. Observers provide round weight species composition of the catch, and the processing records document the product weights (e.g., fillets, blocks, H&G, oil and meal). Product recovery rates convert processed fish to round weight equivalents. At-sea landings must be recorded on logbooks. About 89% of the catch had observer coverage in 2013, with similar coverage in earlier years. With the exception of the catcher vessels fishing with pot gear and longline, observer coverage was high. The small jig fishery is not observed. As all landings must be recorded, observer coverage is high, and all licensed fishing vessels may participate in the fishery, the likelihood of vessels fishing outside the unit of certification or the opportunity for substitution of certified fish with non-certified fish is low.

5.2 Eligibility to Enter Further Chains of Custody

Traceability of product is excellent, and GOA Pacific cod may enter the MSC certified chain of custody. Product is generally processed at sea and landed as headed and gutted, frozen fillet blocks and individually frozen fillets; unprocessed fish may be landed at on-shore processing facilities. Chain of custody for at-sea processors starts on board at delivery to the factory. Chain of custody for unprocessed onshore landings starts upon landing to a processing facility. All licensed Pacific cod fishing vessels in the GOA may participate in the fishery. The following companies are participants in the MSC Pacific cod GOA fishery:
Trawl: Alaska Whitefish Trawlers Association, Alaska Seafood Cooperative, Copper River Seafoods, Fishing Company of Alaska, F/V Golden Fleece, Icicle Seafoods, International Seafoods of Alaska, North Pacific Processors, Ocean Beauty Seafoods, Pacific Seafood Group (DBA Island Seafoods), Peter Pan Seafoods, Sui Alaska, Trident Seafoods, Unisea, Westward Seafoods.

Longline: Alaska Longline Company, Alaskan Leader Fisheries, Aleutian Spray, Blue North Trading Company, Cape Romanzof Fisheries, Clipper Fisheries, Coastal Villages Seafoods, Copper River Seafoods, Deep Sea Fisheries (F/V Alaska Mist), F/V Alpine Cove, Icicle Seafoods, International Seafoods of Alaska, Kachemak Bay Fishermen's Association, North Pacific Seafoods, Ocean Beauty Seafoods, Pacific Seafood Group (DBA Island Seafoods), Peter Pan Seafoods, Shelford's Boat Ltd, Snug Harbor Seafoods, Trident Seafoods, Unisea, Westward Seafoods.

Pot: Copper River Seafoods, F/V Alpine Cove, Great Pacific Seafoods, Icicle Seafoods, International Seafoods of Alaska, North Pacific Seafoods, Ocean Beauty Seafoods, Pacific Seafood Group (DBA Island Seafoods), , Peter Pan Seafoods, Shelford's Boat Ltd., Snug Harbor Seafoods, Tatoosh Seafoods (F/V Sea Venture) Trident Seafoods, Unisea, Westward Seafoods.

Jig: Alaska Jig Association, Copper River Seafoods, Icicle Seafoods, International Seafoods of Alaska, North Pacific Seafoods, Ocean Beauty Seafoods, Pacific Seafood Group (DBA Island Seafoods), Peter Pan Seafoods, Snug Harbor Seafoods, Trident Seafoods, Unisea, Westward Seafoods.

5.3 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody

No IPI stocks will enter the MSC chain of custody.

6 Evaluation Results

6.1 Principle Level Scores

Table 6.1: Final Principle Scores

Final Principle Scores	
Principle	**Score**
Principle 1 – Target Species	95.6
Principle 2 – Ecosystem	Trawl – 90.3 Longline – 91.3 Pot – 91.0 Jig – 93.0
Principle 3 – Management System	96.5

6.2 Summary of Scores

Longline

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle			Score	Contribution to Principle Score	
						Either		Or			Either	Or
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	90	22.50	15.00
				1.1.3	Stock rebuilding			0.333	0.1667			0.00
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125			85	10.63	10.63
				1.2.2	Harvest control rules & tools	0.25	0.125			100	12.50	12.50
				1.2.3	Information & monitoring	0.25	0.125			100	12.50	12.50
				1.2.4	Assessment of stock status	0.25	0.125			100	12.50	12.50
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			85	5.67	5.67
				2.1.2	Management	0.333	0.0667			95	6.33	6.33
				2.1.3	Information	0.333	0.0667			80	5.33	5.33
		Bycatch species	0.2	2.2.1	Outcome	0.333	0.0667			80	5.33	5.33
				2.2.2	Management	0.333	0.0667			95	6.33	6.33
				2.2.3	Information	0.333	0.0667			80	5.33	5.33
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667			95	6.33	6.33
				2.3.2	Management	0.333	0.0667			95	6.33	6.33
				2.3.3	Information	0.333	0.0667			95	6.33	6.33
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.4.2	Management	0.333	0.0667			95	6.33	6.33
				2.4.3	Information	0.333	0.0667			85	5.67	5.67
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.5.2	Management	0.333	0.0667			95	6.33	6.33
				2.5.3	Information	0.333	0.0667			95	6.33	6.33
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			100	12.50	12.50
				3.1.2	Consultation, roles & responsibilities	0.25	0.125			100	12.50	12.50
				3.1.3	Long term objectives	0.25	0.125			100	12.50	12.50
				3.1.4	Incentives for sustainable fishing	0.25	0.125			80	10.00	10.00
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1			90	9.00	9.00
				3.2.2	Decision making processes	0.2	0.1			100	10.00	10.00
				3.2.3	Compliance & enforcement	0.2	0.1			100	10.00	10.00
				3.2.4	Research plan	0.2	0.1			100	10.00	10.00
				3.2.5	Management performance evaluation	0.2	0.1			100	10.00	10.00

Overall weighted Principle-level scores		Either	Or
Principle 1 - Target species	Stock rebuilding PI not scored	95.6	
	Stock rebuilding PI scored		
Principle 2 - Ecosystem		91.3	
Principle 3 - Management		96.5	

Trawl

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle			Score	Contribution to Principle Score	
						Either		Or			Either	Or
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	90	22.50	15.00
				1.1.3	Stock rebuilding			0.333	0.1667			0.00
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125			85	10.63	10.63
				1.2.2	Harvest control rules & tools	0.25	0.125			100	12.50	12.50
				1.2.3	Information & monitoring	0.25	0.125			100	12.50	12.50
				1.2.4	Assessment of stock status	0.25	0.125			100	12.50	12.50
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			95	6.33	6.33
				2.1.2	Management	0.333	0.0667			95	6.33	6.33
				2.1.3	Information	0.333	0.0667			80	5.33	5.33
		Bycatch species	0.2	2.2.1	Outcome	0.333	0.0667			80	5.33	5.33
				2.2.2	Management	0.333	0.0667			95	6.33	6.33
				2.2.3	Information	0.333	0.0667			80	5.33	5.33
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667			95	6.33	6.33
				2.3.2	Management	0.333	0.0667			95	6.33	6.33
				2.3.3	Information	0.333	0.0667			95	6.33	6.33
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667			80	5.33	5.33
				2.4.2	Management	0.333	0.0667			95	6.33	6.33
				2.4.3	Information	0.333	0.0667			80	5.33	5.33
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.5.2	Management	0.333	0.0667			95	6.33	6.33
				2.5.3	Information	0.333	0.0667			95	6.33	6.33
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			100	12.50	
				3.1.2	Consultation, roles & responsibilities	0.25	0.125			100	12.50	
				3.1.3	Long term objectives	0.25	0.125			100	12.50	
				3.1.4	Incentives for sustainable fishing	0.25	0.125			80	10.00	
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1			90	9.00	
				3.2.2	Decision making processes	0.2	0.1			100	10.00	
				3.2.3	Compliance & enforcement	0.2	0.1			100	10.00	
				3.2.4	Research plan	0.2	0.1			100	10.00	
				3.2.5	Management performance evaluation	0.2	0.1			100	10.00	

Overall weighted Principle-level scores		Either	Or
Principle 1 - Target species	Stock rebuilding PI not scored	95.6	
	Stock rebuilding PI scored		
Principle 2 - Ecosystem		90.3	
Principle 3 - Management		96.5	

Pot

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle			Score	Contribution to Principle Score	
						Either		Or			Either	Or
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	90	22.50	15.00
				1.1.3	Stock rebuilding			0.333	0.1667			0.00
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125			85	10.63	10.63
				1.2.2	Harvest control rules & tools	0.25	0.125			100	12.50	12.50
				1.2.3	Information & monitoring	0.25	0.125			100	12.50	12.50
				1.2.4	Assessment of stock status	0.25	0.125			100	12.50	12.50
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			80	5.33	5.33
				2.1.2	Management	0.333	0.0667			95	6.33	6.33
				2.1.3	Information	0.333	0.0667			80	5.33	5.33
		Bycatch species	0.2	2.2.1	Outcome	0.333	0.0667			80	5.33	5.33
				2.2.2	Management	0.333	0.0667			95	6.33	6.33
				2.2.3	Information	0.333	0.0667			80	5.33	5.33
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667			95	6.33	6.33
				2.3.2	Management	0.333	0.0667			95	6.33	6.33
				2.3.3	Information	0.333	0.0667			95	6.33	6.33
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.4.2	Management	0.333	0.0667			95	6.33	6.33
				2.4.3	Information	0.333	0.0667			85	5.67	5.67
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.5.2	Management	0.333	0.0667			95	6.33	6.33
				2.5.3	Information	0.333	0.0667			95	6.33	6.33
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			100	12.50	
				3.1.2	Consultation, roles & responsibilities	0.25	0.125			100	12.50	
				3.1.3	Long term objectives	0.25	0.125			100	12.50	
				3.1.4	Incentives for sustainable fishing	0.25	0.125			80	10.00	
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1			90	9.00	
				3.2.2	Decision making processes	0.2	0.1			100	10.00	
				3.2.3	Compliance & enforcement	0.2	0.1			100	10.00	
				3.2.4	Research plan	0.2	0.1			100	10.00	
				3.2.5	Management performance evaluation	0.2	0.1			100	10.00	

Overall weighted Principle-level scores		Either	Or
Principle 1 - Target species	Stock rebuilding PI not scored	95.6	
	Stock rebuilding PI scored		
Principle 2 - Ecosystem		91.0	
Principle 3 - Management		96.5	

Jig

Prin-ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle			Score	Contribution to Principle Score	
						Either		Or			Either	Or
One	1	Outcome	0.5	1.1.1	Stock status	0.5	0.25	0.333	0.1667	100	25.00	16.67
				1.1.2	Reference points	0.5	0.25	0.333	0.1667	90	22.50	15.00
				1.1.3	Stock rebuilding			0.333	0.1667			0.00
		Management	0.5	1.2.1	Harvest strategy	0.25	0.125			85	10.63	10.63
				1.2.2	Harvest control rules & tools	0.25	0.125			100	12.50	12.50
				1.2.3	Information & monitoring	0.25	0.125			100	12.50	12.50
				1.2.4	Assessment of stock status	0.25	0.125			100	12.50	12.50
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.1.2	Management	0.333	0.0667			95	6.33	6.33
				2.1.3	Information	0.333	0.0667			80	5.33	5.33
		Bycatch species	0.2	2.2.1	Outcome	0.333	0.0667			80	5.33	5.33
				2.2.2	Management	0.333	0.0667			95	6.33	6.33
				2.2.3	Information	0.333	0.0667			80	5.33	5.33
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667			95	6.33	6.33
				2.3.2	Management	0.333	0.0667			95	6.33	6.33
				2.3.3	Information	0.333	0.0667			100	6.67	6.67
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.4.2	Management	0.333	0.0667			95	6.33	6.33
				2.4.3	Information	0.333	0.0667			85	5.67	5.67
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667			100	6.67	6.67
				2.5.2	Management	0.333	0.0667			95	6.33	6.33
				2.5.3	Information	0.333	0.0667			100	6.67	6.67
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125			100	12.50	
				3.1.2	Consultation, roles & responsibilities	0.25	0.125			100	12.50	
				3.1.3	Long term objectives	0.25	0.125			100	12.50	
				3.1.4	Incentives for sustainable fishing	0.25	0.125			80	10.00	
		Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1			90	9.00	
				3.2.2	Decision making processes	0.2	0.1			100	10.00	
				3.2.3	Compliance & enforcement	0.2	0.1			100	10.00	
				3.2.4	Research plan	0.2	0.1			100	10.00	
				3.2.5	Management performance evaluation	0.2	0.1			100	10.00	

Overall weighted Principle-level scores		Either	Or
Principle 1 - Target species	Stock rebuilding PI not scored	95.6	
	Stock rebuilding PI scored		
Principle 2 - Ecosystem		93.0	
Principle 3 - Management		96.5	

6.3 Summary of Conditions

No conditions assigned.

6.4 Determination, Formal Conclusion and Agreement

(REQUIRED FOR FR AND PCR)

1. The report shall include a formal statement as to the certification determination recommendation reached by the Assessment Team about whether or not the fishery should be certified.

(Reference: CR 27.16)

(REQUIRED FOR PCR)

2. The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

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Appendices

Appendix 1 Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Evaluation Table for PI 1.1.1

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The B40% value is considered a biologically appropriate reference point for this stock, reflecting a spawning biomass where productivity of the stock is high (see next scoring issue). The B35% benchmark is considered a close approximate of Bmsy, taking account of the uncertainties about stable natural mortality in a variable environment such that a B40% would provide additional protection against uncertainties of estimation of Bmsy. It would also provide high confidence that stocks are at or somewhat above B40% would lie in the neighborhood of highest spawner per recruit and be much larger than any biomass where recruitment would be impaired due to inadequate spawner biomass. The Executive Summary of the 2013 assessment of Gulf of Alaska Pacific cod (A'Mar and Palsson 2013) estimates the B40% to be 91,100 mt. and the lower 95% confidence interval for current biomass as 90.500 mt. The overlap of confidence interval with benchmark for B40% is less than 1%. The minimum 90% confidence interval does not approach the B20% level (45,560 mt) over the course of the biomass estimates, since the mid 1970s. Therefore, the stock meets the 60, 80 and 100 SG guidelines. There is substantial contrast in the recruitment data, but a plot of the stock recruit estimates from the 2013 assessment (Fig 2.15 of A'Mar and Palsson 2013) indicate the largest year-classes ever observed (except for the highly anomalous 1977 year class) and some of the smallest year-classes were produced at spawning biomasses under 150,000 t. Thus a stock recruit relationship is poorly determined for this stock, and environmental conditions likely play a role in productivity. Accepting the interpretation of B40% as a benchmark above Bmsy for the stock the conclusion is that there is a high degree of certainty that the stock is above a level where recruitment would be impaired. Therefore the stock is considered to meet the SG 100 guideline. However given the poorly defined dependence of recruitment on spawning biomass for this stock, it is possible that very strong year-classes could be produced by smaller biomasses than presently observed, if the environmental conditions were favorable, and good year-classes would not be assured at even larger spawning biomasses, if environmental conditions were unfavorable for recruitment.		

PI 1.1.1		**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing**		
b	**Guidepost**		The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.
	Met?		(Y/N) Y	(Y/N) Y
	Justification	Tables 2.18 and Figure 2.9 of the 2013 assessment (A'Mar and Palsson 2013) indicate that the stock has been above the current estimate of $B_{35\%}$ (79,700 mt) for all but three years (2007-2009) since the late 1970s, and above the bottom 95% asymptotic interval for all but eight years (2004-2011). The spawning biomass has been above the current estimate of B40% (91,000 mt) for all but seven years (2003-2011) since the late 1970s and above the bottom 95% asymptotic interval for all but 10 years (2002-2011). Over the past 10 years, the stock has not been fluctuating around the target with a high degree of certainty, but has shown a long-term trend and been above the target reference point since 2010. Seven of the eight year-classes produced between 1997 and 2004 were lower than any other year-classes in the time series, although the spawning biomass over most of that period was at or about a B35% or even B40% target for the stock. As these year-classes recruited to the stock and fishery, spawning biomass declined to a nadir in 2008 and 2009. Recruitment has improved markedly since 2005, however, with the two largest year-classes since 1977 produced in 2008 and 2009. As those larger year-classes have matured, the spawning biomass has consistently improved. The projected spawning biomass in 2014 would be just about the median spawning biomass for the entire time series and 160% of the 2013 B40% target. Therefore there is high confidence that the stock is now and has been for a few years above its target reference point, and meets the SG 80. The multiyear trends in recruitment and subsequently in spawning biomass do not constitute a "fluctuation" in the usual sense of the word, but there is a high degree of certainty that these near-decadal scale biomass trends (and the bottom 95% asymptotic interval of estimated biomass) show a long-term pattern above the target reference point. The SG100 level is met.		
References		A'mar, T., and W. Palsson. 2013. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 159-266. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501		
Stock Status relative to Reference Points				
		Type of reference point	**Value of reference point**	**Current stock status relative to reference point**
Target reference point		SB40%	In the executive Summary of A'mar and Palsson (2013) the value B40% is presented as 91,100 t for 2014. (other estimates	The same source lists the median estimate of current (2014) stock as 120,100 t, which is 132% of the B40% target.

PI 1.1.1	**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing**		
		occur at various places in the assessment document, but correspond to particular assessment runs. The material in the Executive Summary is taken to reflect final conclusions of the assessment.)	
Limit reference point	The limit reference point for US stocks is usually taken as the B25% level of spawner per recruit analyses, although in some circumstances a B20% may be used for stocks expected to show high turnover rates. The corresponding values in 2013 assessment are 56,900t and 45,560t for 2014.		The current assessment estimates the 2014 spawning biomass to be 211% and 263% of the B25% and the B20% values for this stock.
OVERALL PERFORMANCE INDICATOR SCORE:			**100**
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.1.2

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	(Y/N) Y	(Y/N) Y	
	Justification	See scoring issue b.		
b	**Guidepost**		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		(Y/N) Y	(Y/N) N

PI 1.1.2		Limit and target reference points are appropriate for the stock		
	Justification	The limit reference point of B25% is institutionally set for spawner-per-recruit assessments, based on more than a decade of research (Clark 1993. 2002, Gabriel et al 1998, Gabriel and Mace 1995, Morgan et al. 2009, Murawski et al. 2001, NMFS 1996). However, limit reference points are sometimes set at a somewhat lesser value in cases where there is little evidence of a dependency of recruitment on spawning biomass. In the case of Gulf of Alaska Pacific cod, not only does figure 2.15 of A'mar and Palsson (2013) show little evidence of such a relationship, the second and third largest year class ever observed for this stock were produced when the SSB was at the lowest value ever observed for the time series. Hence the spawning biomass associated with an appreciable risk of impaired recruitment is poorly known for this stock. However the B25% limit reference point is about 22% lower than the spawning biomass associated with the largest recruitments on record. With very strong year-classes produced by this stock in 2008 and 2009, when it was in the vicinity of the limit reference point, and very weak curvature (but high contrast) in the stock recruit relationship over the full range of spawning biomasses, it cannot be concluded that there is high certainty that it is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues. However, based on the general analyses of stocks with life histories similar to Pacific cod referenced above, the lack of significant curvature in the stock recruit relationship for this stock, and the apparent strong influence of environmental considerations on stock productivity (see 1.1.2 c) it can be concluded that the limit reference point is likely to be set above the level at which there is an appreciable risk of impairing reproductive capacity. Thus the stock meets the SG 60 and SG 80 guidelines. However, that cannot be known with high certainty as long as the spawning biomass is never estimated to be in or below the neighborhood for the limit reference point. Thus the limit reference point falls short of being set at a level where there is high certainty that it is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.		
c	Guidepost		The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	Met?		(Y/N) Y	(Y/N) Y

PI 1.1.2		Limit and target reference points are appropriate for the stock		
	Justification	The theoretical correspondence between B35% for spawner per recruit data and Bmsy has been firmly established through simulations and comparative studies (NOAA 1996, Gabriel and Mace 1999). However considering the data from tables 2.18 and 2.19, and figure 2-15 of the present assessment (A'mar and Palsson 2013), the stock is hard to score on this criterion. The lack of curvature in the stock recruit relationship makes Bmsy or any of its proxies poorly determined. To illustrate, considering all the spawning biomasses for 200,000 mt or more (the dozen largest observations in the time series) 10 of the 12 years produced year-classes that were slightly to substantially below average. Yet only 15,000 mt lower, at about 185,000 mt, the stock produce a year class more than 3 times larger than any year class until the late 2000s. On the other hand, when the spawning biomass was estimated to be less than 100,000 mt, between 2003 and 2011, the stock produced six of nine year-classes above average, and the second and third largest year-classes ever observed. Thus the target reference point certainty meets SG 80 for the stock, It is likely, and supported by research findings (Hollowed et al. 2001, Megrey et al. 2009, Laurel et al. 2009, Martinson 2012) that environmental conditions play an important role in Gulf of Alaska stock productivity. The strong autocorrelation in year class strengths, where SSB follows rather than leads recruitment, is consistent with this hypothesis. Thus no positioning of a target reference point can be expected to either make above-average recruitment highly likely to be achieved or below-average recruitment highly likely to be avoided. Nonetheless the current target reference point is well positioned to make the stock at least able to produce good recruitments when environmental conditions are suitable. The positioning of the reference point does take precautionary considerations into account, and to the extent that Bmsy can be defined by the data, the target reference point would likely be above that estimate. All of these considerations of the influence of environmental conditions on recruitment would have similar effects on estimates of Bmsy or any other surrogate for Bmsy, making them hard to determine with accuracy and precision. However estimates of Bmsy may shift as environmental conditions are taken into account, the method for estimating B40% should always keep the target at or above the corresponding Bmsy estimate. Thus, even if Bmsy may be ill-specified for this stock, the *relative* position of the target reference point to the best (if uncertain) estimates of Bmsy would give high confidence that the SG 100 was met, taking precautionary issues into account.		
d	Guidepost		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	Met?		Not relevant	
	Justification	[NA]		
References		Clark, W.G., 1993. The effect of recruitment variability on the choice of a target level of spawning biomass per recruit. In: Kruse, G, Marasco, R.J.,		

PI 1.1.2	Limit and target reference points are appropriate for the stock
	Pautzke, C., Quinn, T.J. (Eds.), Proceedings of the International Symposium on Management Strategies for Exploited Fish Populations. Alaska Sea Grant College Program Report, 93-02, University of Alaska, pp. 233–246. Clark W.G. 2002. F35% revisited ten years later North Am. J. Fish. Manage., 22 (2002), pp. 251–257 Gabriel, W.L. and P.M. Mace 1999. A Review of Biological Reference Points in the Context of the Precautionary Approach Proceedings, 5th NMFS NSAW. 1999. NOAA Tech. Memo. NMFS-F/SPO-40. Pp 34-45. Gabriel, W.L., M.P. Sissenwine, and W.J. Overholtz. 1989. Analysis of spawning stock biomass per recruit: an example for Georges Bank haddock. North Am. J. Fish. Manage., 9:. 383–391. Hollowed, A.B.; Hare, S.R. and Wooster, W.S, 2001, Pacific Basin climate variability and patterns of Northeast Pacific marine fish production. Progress In Oceanography 49 Special Issue: SI : 257-282 Laurel, B. J.; Ryer, C.H.; Knoth, B. et al. 2009 Temporal and ontogenetic shifts in habitat use of juvenile Pacific cod (Gadus macrocephalus) Journal Of Experimental Marine Biology And Ecology Volume: 377: 28-35 Megrey, B.A.; Hare, J.A.; Stockhausen, W.T. et al. 2009. Cross-ecosystem comparison of spatial and temporal patterns of covariation in the recruitment of functionally analogous fish stocks. Progress In Oceanography. 81 Special Issue: SI : 63-92 Martinson, E. C.; Stokes, H. H., and Scarnecchia, D. L. 2012. Use of juvenile salmon growth and temperature change indices to predict groundfish post age-0 yr class strengths in the Gulf of Alaska and eastern Bering Sea Fisheries Oceanography 21: 307-319. Morgan, M.J., H. Murua, G. Kraus, Y. Lambert, G. Marteinsdottir, C.T. Marshall, L. O'Brien, and J. Tomkiewicz 2009. The evaluation of reference points and stock productivity in the context of alternative indices of stock reproductive potential. Can. J. Fish. Aquat. Sci., 66: 404–414 Murawski, S.A., P.J. Rago, and E.A. Trippel 2001. Impacts of demographic variation in spawning characteristics on reference points for fishery management ICES J. Mar. Sci., 58:002–1014 National Marine Fisheries Service (NMFS). 1996. Environmental Assessment/Regulatory Impact Review for Amendment 44 to the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area and Amendment 44 to the Fishery Management Plan for the Groundfish Fishery of the Gulf of Alaska to Redefine Acceptable Biological Catch and Overfishing, Appendix B. Alaska Fisheries Science Center, National Marine Fisheries Service, 7600 Sand Point Way NE., Seattle, WA 98115-0070.
OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 1.1.3

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	(Y/N)		(Y/N)
	Justification	Not Applicable		
b	Guidepost	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification	Not Applicable		
c	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	
	Met?	(Y/N)	(Y/N)	

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe
	Justification	Not Applicable
References		
OVERALL PERFORMANCE INDICATOR SCORE:		
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.1

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Justification	The harvest strategy for Gulf of Alaska Pacific cod has been explored in past assessments, with some simulations including many of the main sources of uncertainty (Thompson et al. 2007. 2009. 2012. A'mar at al. 2012) However, most of the testing has been fairly generic, with details of fleet structure and specific environmental drivers of stock productivity not explored in depth. The general framework used by NMFS and the NPFMC is to set Overfishing levels (OFL) and an Allowable Biological Catch (ABC) less than OFL (to take account of uncertainties and introduce greater precaution in decision-making). This framework is considered to control harvests effectively. This is codified in Amendment 56 to the GOA Groundfish Fishery Management Plan (FMP) which defines the OFL, the fishing mortality rate used to set OFL (FOFL), the maximum permissible ABC, and the fishing mortality rate used to set the maximum permissible ABC. The fishing mortality rate used to set ABC (FABC) may be less than this maximum permissible level, but not greater. Reliable estimates of reference points related to spawning per recruit are available, so Pacific cod in the GOA have generally been managed under Tier 3 of Amendment 56 (with the exception of the current year, when the stock is being managed under Tier 5). Tier 3 uses the following reference points: B40%, equal to 40% of the equilibrium spawning biomass that would be obtained in the absence of fishing; F35%, equal to the 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 F40%, 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. These values have been tested in general for groundfish-like stocks (NMFS 1996 and subsequent reports). Hence the harvest control rule, although general for groundfish with life histories similar to those of Pacific cod, has performed well in both simulated and field conditions. We conclude that it is definitely responsive to stock conditions, should prevent the stock from being fished to the point where the corresponding limit reference point is violated, and should move the stock towards the target reference point when it is between the target and limit reference points and receiving average or better recruitment. Thus SG 60 and SG 80 Guidelines are met with high certainty. When it is receiving poor recruitment the stock will lose some ground relative to the target reference point but fishing should cease before the limit is passed. However the harvest strategy cannot be counted on to fully achieve the goal represented by the target reference point in periods of poor productivity, so it does not meet the SG 100.		
b	Guidepost	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Justification	The harvest control rule has been evaluated in a general way (NMFS 1995), and characteristic of the Pacific cod stock were considered explicitly (Thompson 1999) However extensive simulations using parameters matched to exactly the most recent estimates of Pacific cod biology and the Gulf of Alaska spatial environmental conditions have not been made available, if they have been conducted. Nevertheless the exploration of scenarios in the annual assessments (A'Mar and Palsson 2013, A'mar et al. 2012, other preceding ones) is considered adequate to document that control rule should perform in a precautionary matter relative to target and limit reference points. Important for this evaluation, in addition, the Gulf of Alaska Pacific cod stock suffered nearly a decade on continuous poor recruitments until the late 2000s, for reasons considered to be linked to unfavorable environmental conditions (Laurel et al. 2009, Megrey et al. 2009, Martinson 2012). As the stock correspondingly declined, the harvest control rule to reduce exploitation rate linearly between B35% and B20% was applied. It successfully managed to reduce exploitation during this period such that the stock never reached a level where recruitment would be likely to be impaired due to limited spawning biomass. When environmental conditions became favorable the stock soon produced the second and third strongest year classes on the record, and more than twice the strength of any year classes produced during the sequence of poor recruitments in the first part of the decade. Thus the harvest role performed in practice in a precautionary manner when challenged, although it did not succeed in maintaining the stock at or above the target spawning biomass in every single year. Thus the SG 60 guideline is met. Even though the harvest strategy did not maintain the stock at the target level in the short term after several years of particularly poor recruitment, the longer term performance of the stock provides clear evidence that the stock varied at or above the target reference point, so SG 80 is also met. However, the stock is not able to clearly be maintained at or above the target reference point under all possible plausible conditions, so the SG 100 is not met. A permanent change in Gulf of Alaska environmental conditions might result in permanent changes in life history parameters of Pacific cod (e.g. Hurst et al 2010, 2012b), and require re-testing of the harvest Control rules for the new conditions (Barange et al. 2010). However, that is speculative at this point, and under present conditions there is high confidence that the control rules function in a precautionary manner. However, with multi-year environmental conditions strongly effecting stock productivity, the stock may occasionally fall below the B40% or other Bmsy surrogate, even in the absence of harvesting, and that has to be taken into account even evaluating harvesting strategies.		
c	**Guidepost**	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	(Y/N) Y		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Justification	Full at-sea monitoring of the offshore fleet is conducted by the observer program for the trawl fleet and dockside monitoring for all gears. Hence the catch documentation is considered very reliable. Discards are managed and included in the reporting scheme for the fisheries. A substantial fishery for Pacific cod has been conducted since 1997, and these catches are monitored by the State of Alaska. Dockside monitoring is considered effective for both the State and federally managed fishery. Research surveys are generally conducted bi-annually on the Gulf of Alaska, although coverage of parts of the Gulf varies from survey to survey. The annual data on catches and from surveys are combined in the assessment to provide annual time series of stock status. The trajectory of stock status and exploitation rate, measures by B (age 0+, age 3+ and female spawning) and F provide sufficient feedback to evaluate whether the harvest control rules are working. The SG 60 guideline is clearly met and greatly exceeded.		
d	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			(Y/N) Y
	Justification	Because the harvest strategy is embedded in the annual assessment process, each assessment involves reconsidering the harvest strategy at least indirectly. Moreover the North Pacific Fisheries Management Council process also includes extensive consultation with clients, who are encouraged to question the effectiveness of the harvest strategy as well as all other relevant aspects of the assessment and fisheries management. Importantly the Center for Independent Experts conducted a review of Alaska groundfish stock assessments, and this review included explicit consideration of the harvest strategy for all major Alaska groundfish stocks. However these reviews are all opportunistic and there is no structured process to review the harvest strategy on a regular basis for this stock. However, the harvest strategy is tied structurally to the tier of assessment for which the stock qualifies; in this case a Tier 3 spawner per recruit stock (NOAA 2001). Therefore the harvest strategy for the class of stocks on that Tier would all be affected by reviews of the overall NOAA Tier process, which are undertaken at regional or national levels on a periodic basis. Thus the SG 100 guideline is considered to be met.		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	(Y/N/Not relevant)	(Y/N/Not relevant)	(Y/N/Not relevant)
	Justification	Not Applicable		
References		A'mar, T., Thompson, G., Martin, M., and W. Palsson. 2012. Assessment of		

PI 1.2.1	There is a robust and precautionary harvest strategy in place
	the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 183-322. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501. Laurel, B. J.; Ryer, C.H.; Knoth, B. et al. 2009 Temporal and ontogenetic shifts in habitat use of juvenile Pacific cod (Gadus macrocephalus) Journal Of Experimental Marine Biology And Ecology Volume: 377: 28-35 Martinson, E. C.; Stokes, H. H., and Scarnecchia, D. L. 2012. Use of juvenile salmon growth and temperature change indices to predict groundfish post age-0 yr class strengths in the Gulf of Alaska and eastern Bering Sea Fisheries Oceanography 21: 307-319. Megrey, B.A.; Hare, J.A.; Stockhausen, W.T. et al. 2009. Cross-ecosystem comparison of spatial and temporal patterns of covariation in the recruitment of functionally analogous fish stocks. Progress In Oceanography. 81 Special Issue: SI : 63-92 NMFS. 2001. Marine Fisheries Stock Assessment Improvement Plan. Report of the National Marine Fisheries Service National Task Force for Improving Fish Stock Assessments. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-56, 69 p., 25 appendices. Thompson, G., J. Ianelli, M. Dorn, and M. Wilkins. 2007. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 169-194. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501. Thompson, G., J. Ianelli, M. Dorn, and M. Wilkins. 2009. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 165-352. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501. Thompson, G., J. Ianelli, M. Dorn, and M. Wilkins. 2010. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 157-328. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 1.2.2

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	
	Met?	(Y/N) Y	(Y/N) Y	
	Justification	See b		
b	**Guidepost**		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.
	Met?		(Y/N) Y	(Y/N) Y

PI 1.2.2		There are well defined and effective harvest control rules in place		
	Justification	The main features of the harvest control rule for Gulf of Alaska Pacific cod have been discussed above, and are generic for NMFS Tier three stocks. The performance of the control rule hinges on the factors considered in the assessment, since the rule itself is simple and triggered by the results of the annual assessment process. If the assessment concludes that that stock is below the B35% reference point, exploitation automatically begins to be reduced. The assessment itself considers a wide range of uncertainties, including recruitment uncertainty and uncertainty in growth rate and natural mortality, the major components of stock productivity. A relatively large number of scenarios are required to be explored. An elaborate set of performance criteria are used to guide final decisions about stock status, before the control rule is applied to the results. These are considered by the experts conducting the assessments, the NMFS Plan Team, and the NPFMC SSC, so many views contribute to decisions on how the harvest control rules are included in each assessment. Some scenarios in the annual assessment process are explicitly linked to specific parts of the harvest control rules, whereas other parts of the harvest control strategy the rules that implement it are informed by multiple scenarios. These can be different scenarios in differ years, depending on their performance in the assessment, and again are a collective decision by the assessors, the Plan Team, and sometimes subsequent reviewers. All the participants in these discussions fully understand the harvest strategies associated with the assessment tiers, and how the harvest control mechanisms are built into the OLF and ABC calculations. Environmental uncertainty itself is not a parameter in the harvest control rules, but its manifestation through possible impacts on the stock productivity parameters, which are reconsidered in each assessment are fully considered. Hence the design of the harvest control rule does take account of a wide range of uncertainties; uncertainties in life history parameters explicitly, and uncertainty in environmental conditions generally more indirectly but adequately (see Schrippa et al. 2009). Thus the SG 100 scoring guideline is met, as the harvest control rule takes into a wide range of uncertainties, particularly with regard to uncertainties about stock productivities and environmental conditions.		
c	Guidepost	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	Met?	(Y) Y	(Y) Y	(Y) Y

PI 1.2.2		There are well defined and effective harvest control rules in place
	Justification	The strongest evidence that the harvest control rules are effective in achieving the exploitation levels required under the harvest control rules is that stock survived the environmental challenges of the 2000s in a condition to be able to take advantage of more favorable environmental conditions when they returned to the Gulf of Alaska in the latter 2000s. As a sequence of nine below average to poor recruitments from the late 1990s and early 2000s entered the stock in the mid to late 2000s, the quota was reduced not just at a rate that kept constant exploitation of the stock as biomass decreased, but the quota decreased at a rate sufficient to reduce exploitation rate on the stock as spawning biomass decreased. A decline in the stock could not be prevented by management during this period, but the range of decline was managed sufficiently well that even at its nadir it did not reach a size where productivity of the stock was impaired by inadequate spawning biomass. A series of strong year classes, including the two strongest since 1997 were produced in the late 2000s, and their entry to fishery and spawning biomass in the early 2010s has led to a substantial increase in spawning biomass (A'mar and Palsson 2013, A'mar et al. 2012, and preceding assessments). During the period of reduction in quota, catch monitoring remained strong enough that the catch and discard figured are considered reliable. Thus not only has the spawning biomass increased during the recent period of strong recruitment, but the biomass estimates that suggest the stock never fell to lower than 125% of the limit refer point, despite nearly a decade of autocorrelated weak recruitment are considered robust, with small confidence limits on the annual biomass estimates. Hence the available evidence does convincingly indicate that not only is the quota setting process effective in setting harvest levels that should reduce exploitation as stock productivity decreases, the fishery compliance with the management plan is high enough that the intended reductions are realized. Not only the harvest control rule work in simulations of Tier 3 stocks in general, it was tested and performed well in this stock during a period of the poorest recruitment on record. Noting that the harvest control rules focus on managing exploitation in a precautionary way as stock productivity varies, rather than on the impossibility of ensuring the stock never falls below B40% when a long period of low productivity occurs, the evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules, and the SG 100 guideline is met, as well as the SG 60 and SG 80.
References		A'mar, T., and W. Palsson. 2013. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 159-266.. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501 A'mar, T., Thompson, G., Martin, M., and W. Palsson. 2012. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 183-322. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501. Schirripa, M. J., Goodyear, C. P., and Methot, R. M. 2009. Testing different methods of incorporating climate data into the assessment of US West

PI 1.2.2	**There are well defined and effective harvest control rules in place**	
	Coast sablefish. ICES J. Mar. Sci., 66: 1605–1613.	
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The information used in the annual assessment includes data from catches by all fleet sectors, and for both the State of Alaska fisheries inshore and the federally managed fisheries further offshore. Data are available from the limited fisheries, largely as bycatches of foreign vessels, prior to 1977, but they have little impact on most aspects of the assessment. Since 1977 domestic federal catches have been disaggregated by jurisdiction, gear type, and month, and since 1991 discard data by gear type are also available for the federally managed fisheries. Catch data from the state-managed fishery are available since 1997. Catch at length and, as requested, other biological sampling may be done at dockside, and by on-board observers when they are allocated to offshore vessels. Effort data are available by jurisdiction, season and gear type, allowing fishery-dependent CPUE values to be calculated. Port sampling, and in some cases observer sampling, also provides annual length and aging structures from the commercial catches. The assessment uses a time series of commercial catches starting in 1991, by which time consistency of reporting was considered high. The bi-annual GOA trawl survey provides fishery independent catch data in numbers and biomass, and length composition and length at age data since 1987. Maturity data, stomachs for diet analyses, and other biological data are also collected from the survey catches, although at different intensities in difference survey years. Intensity of sampling depends on the research interests of scientists studying Pacific cod. There have been directed studies of life history parameters for Pacific cod in GOA, including growth rates and maturity (Stark 2007, 2009, DiMaria 2010, Hurst et al 2012), reproduction (Martinson et al 2012), age-specific habitat use (Laural et al 2009, DiMaria et al 2010), and position in the food web (Doyle et al. 2009, Van Kirk et al 2010, Marsh et al 2012, Urban 2012) Stock structure has been investigated using both genetic methods (Cunningham et al 2009) and stable isotope analyses (Gao et al 2005) although studies focused primarily on the Bering Sea Pacific cod stocks. A great deal of additional information on life history aspects of Pacific cod has been presented to this assessment panel and is used in the assessments, but not yet is available primary publications. In summary, substantial information is available for assessment of the status of Gulf of Alaska Pacific Cod. SG 60 and SG 80 are met. All the classes of information listed illustratively in SG 100 are also available, so it can be concluded that SG 100 is also met.		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
b	Guidepost	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The justification for scoring issue a applies with equal relevant to scoring issue b. In addition to all the biological information and fishery dependent data on catches that are discussed above, the size of all fleet components is generally known and updated annually. Throughout the assessment very high confidence is given to the data on the federally managed fishery and lesser but still high confidence in the data from the state-managed commercial fleet. All the biological information from commercial and survey catch sampling are also available annually, with uncertainties in the data sets quantified and usually small. Thus SG 60 and SG 80 guidelines are met. The spatial distribution of effort is known on very precise space and time scales for the federally managed fleet, and again with somewhat less certainty for the state-managed inshore fleet. There is a good understanding of the uncertainties associated with the data sources, and the uncertainties are taken into account in the assessments which trigger the application of the harvest control strategy. Redesign of the federal observer program should increase the quantification of uncertainties in all federal catch records and in fleet behavior, which can improve what is already good performance of the system. Thus all information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty, so the SG 100 Guideline is met.		
c	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		(Y/N) Y	

PI 1.2.3		Relevant information is collected to support the harvest strategy	
	Justification	Table 2.8 of A'mar and Palsson (2013) includes data on all known non-target removals of Pacific cod in the Gulf of Alaska greater than 1 mt Pacific cod taken in mixed catches with flatfish are fully recorded in the catch or discard estimates for Pacific cod, and are not considered as different fisheries for purposes of the assessment. Since all federal and state fisheries are monitored effectively it is legitimate to assume there is good information on other fishery removals from the stock. Harvests by other international or transboundary fisheries are also considered negligible for this stock. Thus the SG 80 guideline is fully met.	
References		A'mar, T., and W. Palsson. 2013. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 159-266.. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501	
OVERALL PERFORMANCE INDICATOR SCORE:			**100**
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	Met?		(Y/N) Y	(Y/N) Y
	Justification	The assessment has been done with the Stock Synthesis 2 platform (Methot 2005, Methot and Wetzel 2013) since 2005, as an age-structured assessment. The model continues to be adapted with details specific to the stock being added or revised each year. It operates on the ADMB modeling foundation (Fournier et al. 2012). Stock Synthesis 2 estimates model parameters and statistically characterizes the uncertainty associated with parameter estimates and derived quantities such as spawning biomass. The assessment is considered near state-of-the-art for assessment methods (see 1.2.4d) and is appropriate for age or size-structured assessments when there are multiple ages or size classes in the fished population. The assessment does spawner-per-recruit analyses using the core biomass and recruitment values directly estimated in the assessment. The reference points used to trigger the harvest control rule are spawner-per-recruit levels that serve as surrogates for Bmsy and as limit reference points, and are directly estimated as part of the core assessment approach. Stock Synthesis 2 can combine information from multiple sources, such as monitoring and reporting data from multiple fishing fleets and surveys, and can take account of different quantitative uncertainties in different data sources. Hence the assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. The SG 80 and 100 Guidelines are both met.		
b	**Guidepost**	The assessment estimates stock status relative to reference points.		
	Met?	(Y/N) Y		
	Justification	See c)		
c	**Guidepost**	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

PI 1.2.4		There is an adequate assessment of the stock status		
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	Stock Synthesis 2 has the ability to take into account uncertainty in almost any of the input data sources, and can estimate the uncertainty of almost any output, depending on the specifications set by the assessment team. Annual meetings with the Plan Team decide on which formulations are worth exploring in any given year, so not all possible sources of uncertainty are considered in every year. However, important uncertainties in Pacific cod biology, the nature of the fishery and environmental conditions are generally either included in the assessment or brought in as externalities. Recent past assessments have explored alternative formulations and are considered adequate sources of input parameters, including uncertainties in the parameters, for the recent years' assessment. In recent assessments of Gulf of Alaska sources of uncertainty addressed explicitly in models either as inputs or outputs of the assessment included: Seasonality of catch data by gear Selectivity of commercial gear types Size composition of commercial catch by gear type Selectivity of the survey gear Size composition of catches in the bottom trawl survey Growth and natural mortality Aging error Maturity at age Output Numbers at age, including 0-age Output length and weight at age. The assessment model produces probability distributions for current numbers and biomass in aggregate and by catch, and for fishing mortality. Thus the assessment does take into account uncertainty and evaluates stock status relative to reference points in a probabilistic way and the SG 100 guideline is fully met.		
d	**Guidepost**			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			(Y/N) Y

PI 1.2.4		There is an adequate assessment of the stock status		
	Justification	The assessment has been tested with various simulation studies in most years since the last 2000s, as reported in the annual SAFE documents cited below. In each assessment since the mid 2000s alternate hypotheses have been explored. The full history of alternative formulations of different aspects of the model structure are presented in the section of the 2013 assessment (A'mar ad Palsson 2013) on "Analytical approaches, and include: Formulation of Pacific cod growth (Thompson et al 2006, Thompson et al 2011), Selectivity of fleets, including survey selectivity (Thompson et al. 2008), Blocks of years with similar fleet behavior (Thompson et al 2008), Relative importance of numbers at age numbers at length in estimating model fit (Thompson et al 2008), Inclusion or exclusion of aging data from different fleets (Thompson et al 2009), Internal or external constraints of how vector uncertainties were treated (Thompson 2009), Blocks of years with similar and dissimilar fleet catchabilities (Thompson 2009), Degree of bias in aging data (Thompson et al. 2009, Thompson et al 2011), Seasonality of parameters of fleet operations (Thompson et al 2010), and Formulation and Degree of disaggregation of numbers at length (Thompson 2010, Thompson et al. 2011). In any one year not all these sources of uncertainty are investigated with different model formulations. However, the consultations among the assessment team, the NMFS Plan Team and the NPFMC SSC mean that in any given year sources of uncertainty of most current concern are investigated in the assessment, and investigations include alternative formulations whenever appropriate. As with Bering Sea – Aleutian Island Pacific cod it may be the case that complete alternatives to Stock Synthesis have not been explored in recent years. However, the flexibility of Stock Synthesis as a modeling platform and the number of inter-comparisons of stock synthesis with other modeling approaches indicate that there would be little advantage and great opportunity costs to running the assessment on completely different modeling frameworks (Patterson and Kirkwood 1995, Nation Academy of Science 1998, Restrepo et al. 2000, Patterson et al. 2001, Methot, 2009). Thus the SG 100 guidelines are met, in that the alternative hypotheses are exploited within the Stock Synthesis framework.		
e	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		(Y/N) Y	(Y/N) Y

PI 1.2.4		There is an adequate assessment of the stock status
	Justification	The assessments receive peer review at three levels. The first is internal, in that the NMFS Plan Team meets with the assessment staff before, possibly during, and after the assessment is prepared. The first meeting is to scope the options and scenarios that should be explored in the annual assessment, based on the assessment of the previous year(s) and feedback about how the previous year's fishery has unfolded. Meetings between the assessment staff and the Plan Team occur in a somewhat ad hoc manner, depending on what issues may arise during preparation of the assessment. As the assessment nears completion a meeting with the Plan Team is held to review results and presentation material, to be sure that the assessment is ready for presentation to the NPFMC – SSC. In a narrow sense only the final meeting of the Plan Team and assessment staff might be considered "peer review" of the assessment, but in fact just as "assessment" is both a process and a product, in a slightly broader sense all the meetings between the Plan Team and the assessment staff can be considered part of an internal peer review process, since all of the meetings have the coverage and quality of the assessment as their primary concern. Once the assessment document is complete, it receives a thorough and largely external review by the NPFMC SSC. All technical aspects of the assessment, and the coverage of issues by alternative model formulations and scenarios, are reviewed by the SSC. The SSC can request re-runs or deletion or addition of analyses, as they consider necessary to have a sound assessment as a basis for subsequent consultation and decision-making. The make-up of the SSC includes both employees of NMFS and independent experts in ecological, economic and social sciences. However, none has a direct involvement is preparation of the assessment, and all participants are expected to act in their expert capacities rather than as institutional representatives. Thus the SSC review can be considered an external review of the assessment. Finally the Center for Independent Experts (CIE) conducted a major review of Bering Sea and Gulf of Alaska assessments for all the major stocks in 2011 (CIE 2012). That review, with over 100 recommendations potentially affecting the Pacific cod assessment, was wholly at arm's length to both NMFS and NPFMC as the producer of and client of the assessments. It was conducted by leading international experts in stock assessment in an ecosystem context, and is a recent and wholly external review of the assessments. Thus the SG 100 scoring guideline is met for this stock.
References		A'mar, T., and W. Palsson. 2013. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 159-266.. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501 A'mar, T., Thompson, G., Martin, M., and W. Palsson. 2012. Assessment of the Pacific cod stock in the Gulf ofAlaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 183-322. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501 CIE 2012. Center for Independent Experts (CIE) Review of the November

PI 1.2.4	There is an adequate assessment of the stock status
	2010 Biological Opinion on the Bering Sea and Aleutian Islands and Gulf of Alaska Groundfish Fisheries. Available at https://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/cie/review.htm Fournier, D. A., H. J. Skaug, J. Ancheta, J. Ianelli, A. Magnusson, M. N. Maunder, A. Nielsen, and J. Sibert. 2012. AD Model Builder: using automatic differentiation for statistical inference of highly parameterized complex nonlinear models. Optimization Methods and Software 27:233-249. Methot, R. D. 2005. Technical description of the Stock Synthesis II Assessment Program. Unpubl. manuscr. National Marine Fisheries Service, Northwest Fisheries Science Center, 2725 Montlake Blvd. East, Seattle, WA 98112-2097. 54 p. Methot, R. D. 2009. Stock assessment: operational models in support of fisheries management.In The Future of Fishery Science in North America, pp. 137–165. Ed. by R. J. Beamish, and B. J. Rothschild. Fish and Fisheries Series, 31. 736 pp. Methot, R. D., and C. R. Wetzel. 2013. Stock Synthesis: a biological and statistical framework for fish stock assessment and fishery management. Fisheries Research 142:86-99. National Research Council (NRC). 1998. Improving Fish Stock Assessments. National Academy Press, Washington, D.C. 177 pp. Patterson K. R., and G. P. Kirkwood. 1995. Comparative performance of Adapt and Laurec-Shepherd methods for estimating fish population parameters and in stock management. ICES Journal of Marine Science, 52 (2): 183-196. Patterson, K. Cook, R., Darby, C., Gavaris, S., Kell, L., Lewy, P., Mesnil, B., Punt, A., Restrepo, V., Skagen, D. W., and G. Stefánsson. 2001. Estimating uncertainty in fish stock assessment and forecasting. Fish and Fisheries 2, 125–157. Restrepo, V. R., Patterson, K. R., Darby, C. D., Gavaris, S., Kell, L. T., Lewy, P., Mesnil, B., Punt, A. E., Cook, R. M., O'Brien, C. M., Skagen, D. W., and G. Stefánsson. 2000. Do different methods provide accurate probability statements in the short term? ICES CM 2000/V:08:19pp Thompson, G., T. A'mar, and W. Palsson. 2011. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 161-306. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501 Thompson, G., M. Dorn, and D. Nichol. 2006. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 147-220. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501. Thompson, G., J. Ianelli, M. Dorn, and M. Wilkins. 2008. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 169-194. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite

PI 1.2.4	There is an adequate assessment of the stock status	
	306, Anchorage, AK 99501. Thompson, G., J. Ianelli, M. Dorn, and M. Wilkins. 2009. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 165-352. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501. Thompson, G., J. Ianelli, M. Dorn, and M. Wilkins. 2010. Assessment of the Pacific cod stock in the Gulf of Alaska. In Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, p. 157-328. North Pacific Fishery Management Council, 605 W. 4th Avenue Suite 306, Anchorage, AK 99501	
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.1.1

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Trawl and longline – Partial; Pot – N; Jig – no retained (Y)
	Justification	Big and Longnose skates are the only main species in the Pacific cod fishery (longline gear) in the GOA. Based on annual assessment and the 2013 estimates of ABCs for these species (Ormseth 2013), it is highly likely that main retained species are within biologically based limits. The SG60 and SG80 levels are met for all gears. Minor species occur in the four gears. MSC-certified species are considered to be within biological limits with a high degree of certainty, so scored at SG100. **Trawl** Arrowtooth flounder 100 Flathead sole 100 N&S rock sole 100 Other SWF 80 Bignose skate 80 Longnose skate 80 Pollock 100 **Longline** Bignose skate 80 Longnose skate 80 Pollock 100 **Pot** Octopus 80 The SG100 level is not met for the pot fishery as target reference points for octopus as a group are subject to considerable uncertainty. Therefore, there is not a high degree of confidence that individual species are within biological limits. Retained species for jig gear are so small that they are included in 'other removals,' and tally less than 2 t for all sources; this is essentially no retained species, and scored as 100. About half of trawl species >0.5% of the Pacific cod catch are MSC certified (SG100), and no main species occur for trawl. Therefore, the trawl fishery falls at SG90 in the aggregate. One of the three longline species >0.5% of the cod catch is MSC certified (SG100), and no main species fall below 80. Therefore, the longline fishery falls at SG85 in the aggregate.		

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species		
b	Guidepost			Target reference points are defined for retained species.
	Met?			(Y/N) Trawl and longline – Y; Pot – N; Jig – no retained (Y)
	Justification	Target references points are defined for all species >0.05% of the Pacific cod catch in the trawl and longline fisheries. Therefore, trawl and longline meet the SG100. Target reference points are not set for octopus, so the pot fishery does not score SG100. Jig has no retained species.		
c	Guidepost	If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.	If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	(Y/N) NA	(Y/N) NA	
	Justification			
d	Guidepost	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.		
	Met?	(Y/N) Y		

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	
	Justification	Although the status of octopus species retained in the pot fishery is poorly known, a Tier 6 assessment provides estimates of the OFL and ABC for the octopus species complex based on survey estimates of biomass (Conners and Conrath 2013). These measures are expected to keep retained octopus catches within biologically based limits. The SC60 is met for the pot fishery. Other gears only take trace levels of octopus, so this scoring issue is not directly applicable.	
References		Conners, M. E. and Conrath, C. L. 2013. Chapter 22. Assessment of the Octopus Stock Complex in the Gulf of Alaska. NPFMC Gulf of Alaska SAFE, December 2013. Pp. 1063-1088. Ormseth, O. A. 2013. Chapter 18. Assessment of the skate stock complex in the Gulf of Alaska. NPFMC Gulf of Alaska SAFE, December 2013. Pp. 1037-1045.	
OVERALL PERFORMANCE INDICATOR SCORE: For trawl, half of elements for issue a scored 100, and half scored 80, for a composite 90. Scoring issue b scored 100. Therefore, trawl scored 95. For longline, one third of elements for issue a scored 100, and two thirds scored 80, for a composite 85. For pots, scoring issue a scored 80. Scoring issue b scored 100. Therefore, pot scored 90. Pot gear had no retained species, so scored 100.			**Trawl – 95; LL – 85; Pot – 80; Jig – 100**
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 2.1.2

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing retained species.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	All of the species or species complexes of retained species in the Pacific cod fishery are assessed by the NMFS. Estimated Overfishing Levels and Acceptable Biological Catch levels are reviewed annually. These measures are expected to maintain main retained species at levels that are highly likely to be within biologically based limits. FMPs have been developed for each species or species groups that constitute both a partial strategy and a full strategy for managing retained species. The SG60 and SG80 levels are met. The SG100 level is not met as fishing level targets are not available for all individual species retained in the fishery.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	Catch limits specified within FMPs are considered likely to work based on extensive experience with such limits in the GOA and elsewhere. Annual estimates of the catch composition of retained species from the Observer Program demonstrate that there is an objective basis for confidence that the partial strategy will work. Application of the control rules in other GOA fisheries indicates supports high confidence that the strategy will work. The SG60, SG80 and SG100 levels are met.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		(Y/N) Y	(Y/N) Y

PI 2.1.2		**There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species**		
	Justification	Application of annual catch limits and accountability measures required under the MSA provides evidence of successful implementation of the strategy. Levels of retained species catch in the GOA Pacific cod fishery have declined since 2008, and continued reduction provides evidence that the partial strategy and the full strategy is being implemented successfully (A'mar and Palsson 2013). The SG80 and SG100 levels are met.		
d	**Guidepost**			There is some evidence that the strategy is achieving its overall objective.
	Met?			(Y/N) Y
	Justification	The decline in retained species catch since 2008 provides evidence the strategy is working. The SC100 level is met.		
e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	(Y/N/Not relevant) Y	(Y/N/Not relevant) Y	(Y/N/Not relevant) Y
	Justification	The 2010 Shark Conservation Act requires that all sharks in the United States be brought to shore with their fins naturally attached. There has been a reduction in the catch of sharks taken in the GOA Pacific cod fishery since 2011 and none were taken in 2013. There is 100% Observer coverage of longline catcher/processors and about 12% coverage of the longline catcher vessels. This gear is responsible for most of the sharks taken in the GOA cod fishery. There are no reports of finning. The SG60, SG80 and SG100 levels are met.		
References		A'mar, T. and Palsson, W. Chapter 2. Assessment of the Pacific cod stock in the Gulf of Alaska. NPFMC Gulf of Alaska SAFE, December 2013. Pp. 159-266.		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.1.3

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	Qualitative and quantitative information on retained species in the Pacific cod fisheries is available from the Observer Program on an annual basis (see Section 3.5.11). In the restructured Observer Program all components of the cod fishery with the exception of the small jig fishery is observed. In 2014 the Observer Program proposes to deploy observers on the partial coverage category using random sampling with equal probability specific to either the trip or vessel strata. Although only about 10% of the cod catch in the GOA has 100% observer coverage, the 2014 deployment plan for the partial-coverage category should further improve the qualitative and quantitative estimates of retained species (NMFS 2013). The SG60 and SG80 levels are met. Some of the retained species in the cod fishery are lumped into species complexes making it problematic to confidently assess the consequences of catches at the individual species level. Also, observer coverage of the pot fleet is low (~2% in 2013). Thus information on retained species may be less accurate than desirable for this gear type. Therefore, the SG100 level is not completely met.		
b	**Guidepost**	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	(Y/N/Not relevant) Y	(Y/N/Not relevant) Y	(Y/N/Not relevant) N
	Justification	FMPs for each of the retained species or groups provide quantitative estimates of the OFLs and ABCs (NPFMC 2014). Therefore, there is both a qualitative and quantitative basis to assess outcome status with respect to biologically based limits. The SG60 and SG80 levels are met. The SG100 level is not completely met as not all species in the retained catch have individually determined limits with which to assess outcome status, and the suitability of limits for octopus and squids are still poorly known.		
c	**Guidepost**	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.

PI 2.1.3		**Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species**		
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	Information on the biomass and species composition of the catch from the Observer Program is adequate to support measures to manage main retained species (see Section 3.5.11). Combined with annual stock assessments and conservation measures list in the FMP, these data support a partial strategy to manage main retained species. The SG60 and SG80 levels are met. The SG100 level is not completely met as not all species in the retained catch have individually determined limits with which to assess outcome status. Also, observer coverage of the pot fleet is low (~2% in 2013). Thus information on retained species may be less accurate than desirable for this gear type.		
d	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		(Y/N) Y	(Y/N) N
	Justification	Annual Observer Program data combined with the annual assessment of biologically based limits to the catch of retained species provides sufficient data to detect an increase in risk to the populations (see Section 3.5.11). Thus the SG80 level is met. The SG100 level is not met as the catches of some retained species are not currently evaluated at the individual species level. Observer Program coverage of the pot fleet is low. Thus information on retained species may be less accurate than desirable for this gear type.		
References		NMFS 2013. 2014 Annual Deployment Plan for Observers in the Groundfish and Halibut Fisheries off Alaska. National Oceanic and Atmospheric Administration, 709 West 9th Street. Juneau, Alaska 99802. NPFMC 2014. FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501, APRIL 2014.		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.1

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	All of the species or groups taken as bycatch account for <5% of the Pacific cod catches in the GOA (Section 3.4.6). Thus, there are only minor species in the bycatch. The SG60 and SG80 levels are met. Given that much of the bycatch is not identified to the species level, the SG100 level is not met.		
b	**Guidepost**	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	(Y/N) NA	(Y/N) NA	
	Justification	No main species taken in the fishery.		
c	**Guidepost**	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	Met?	(Y/N) Y		

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups
	Justification	The status of many bycatch taxa is poorly known, but there are estimates of abundance from surveys, annual assessments, ecosystem model analyses (Aydin et al. 2007), and measures to reduce bycatch in the GOA FMP that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. In taxa such as star fish, there are no reliable estimates of abundance, but the areas experiencing trawling intensities above one event per year in small (5 by 5 km) areas are only 2 % for the GOA (NOAA 2005). Thus the fishery is not expected to result in the bycatch being outside of biological limits. The SG60 level is met.
References		Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298 p. NOAA 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. U.S. Dept. Commerce, NOAA, NMFS, Alaska Region, P.O. Box 21668, Juneau, AK.
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.2.2

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing and minimizing bycatch.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	The NPFMC has adopted a number of measures to minimize bycatch in groundfish fisheries, including Pacific cod, in the GOA (see GOA FMP, NPFMC 2014). The Observer Program resulted in fundamental changes in the nature of the bycatch program by providing good estimates of total groundfish catch and non-groundfish bycatch by species that are counted against TACs (http://alaskafisheries.noaa.gov/sustainablefisheries/observers/). The Observer Program data make it possible to enforce bycatch quotas for the non-groundfish species that by regulation had to be discarded at sea. The restructured Observer Program will improve coverage of the smaller vessels in the GOA cod fishery resulting in more accurate estimates of bycatch. Prohibited species catch limits are in place to close target fisheries once limits have been reached. Such limits apply to Red king and Tanner crab species, Pacific halibut, Pacific herring, and Chum and Chinook salmon. Together, these measures constitute a strategy for managing and minimizing bycatch. The SG60 and SG80 levels are met. The SG100 level is not met as many of the taxa taken as minor bycatch are not identified to species.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y

PI 2.2.2		**There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations**		
	Justification	Bycatch limits set by the NPFMC are considered likely to work based on extensive experience with such limits in the GOA and elsewhere. Annual estimates of the catch composition of non-targeted bycatch and prohibited species from the Observer Program indicate that there is an objective basis for confidence that the partial strategy will work (Sections 3.4.5 and 3.4.6). The restructured Observer Program will increase the proportion of the catch observed and therefore increase confidence in the strategy to avoid risk to bycatch species. Application of the bycatch reduction measures in GOA fisheries supports high confidence that the strategy will work (GOA FMP, NPFMC 2014). There are no overfished stocks and no overfishing has been identified for GOA stocks in Alaska, providing evidence that testing supports that the strategy works (GOA FMP, NPFMC 2014). The SG60, SG80 and SG100 are met.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		(Y/N) Y	(Y/N) Y
	Justification	Enforcement of prohibited species catch limits, the designation of closed areas and seasons to bottom contact, and modification of trawl gear to reduce bottom contact, all provide evidence that the strategy to reduce bycatch is being implemented. Also, no overfished stocks and no overfishing have been identified for GOA stocks in Alaska, demonstrating that testing supports that the strategy works. The SG80 and SG100 levels are met.		
d	**Guidepost**			There is some evidence that the strategy is achieving its overall objective.
	Met?			(Y/N) Y
	Justification	Overall bycatch levels in the GOA cod fisheries, including those of the dominant taxa, have fluctuated without clear trend over the past decade or so (A'mar and Palsson 2013). However, with the exception of Giant grenadiers and starfish, discard of most taxa in the bycatch is quite small, leaving little room for reduction. This suggests that the strategy to ensure the fishery does not pose a risk is achieving its overall objective. The SG100 level is met.		
References		A'mar, T. and Palsson, W. Chapter 2. Assessment of the Pacific cod stock in the Gulf of Alaska. NPFMC Gulf of Alaska SAFE, December 2013. Pp. 159-266. NPFMC 2014. FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501, APRIL 2014.		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.3

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	Qualitative and quantitative information on bycatch in the Pacific cod fisheries is available from the Observer Program on an annual basis. In 2014 the restructured Observer Program proposes to deploy observers on the partial coverage category using random sampling with equal probability specific to either the trip or vessel strata. Although only about 10% of the cod fleet in the GOA has 100% observer coverage, the 2014 deployment plan should further improve the qualitative and quantitative estimates of retained species (NMFS 2013). The SG60 and SG80 levels are met. Some of the bycatch species in the cod fishery are lumped into species complexes making it problematic to confidently assess the consequences of catches at the individual species level. Also, observer coverage of the pot fleet is low. Thus information on bycatch species may be less accurate than desirable for this gear type. Therefore, the SG100 level is not completely met.		
b	**Guidepost**	Information is adequate to broadly understand outcome status with respect to biologically based limits	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.
	Met?	(Y/N/Not relevant) Y	(Y/N/Not relevant) Y	(Y/N/Not relevant) N
	Justification	FMPs for prohibited species, such as halibut, provide quantitative estimates of the over-fishing level and an estimate of the acceptable biological catch level. For non-target bycatch taxa, survey or ecosystem-based estimates of abundance are regularly available against which to judge outcome status of the bycatch levels. Therefore, there is both a qualitative and quantitative basis to assess outcome status with respect to biologically based limits. The SG60 and SG80 levels are met. The SG100 level is not completely met as not all species in the bycatch have individually determined limits with which to assess outcome status. Observer coverage of the pot fishery is low. Thus information on bycatch species may be less accurate than desirable for this gear type.		

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
c	Guidepost	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage bycatch species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	Information on the biomass and species composition of the catch from the Observer Program is adequate to support measures to manage main bycatch species (Section 3.4.6). Combined with survey estimates of abundance, annual stock assessments, and conservation measures list in the FMP, these data support a partial strategy to manage main bycatch species (NPFMC 2014). The SG60 and SG80 levels are met. The SG100 level is not completely met as not all bycatch species have individually determined limits with which to assess outcome status. Observer coverage of the pot fleet is low. Thus information on bycatch species may be less accurate than desirable for this gear type.		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectively of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	Met?		(Y/N) Y	(Y/N) N
	Justification	Annual Observer Program data combined with regular estimates of abundance from fishery independent surveys, and annual assessment of biologically based limits for bycatch species provides sufficient data to detect an increase in risk to those populations (Section 3.4.6). For those taxa in which abundance is not routinely surveyed, ecosystem estimates of abundance provide a basis to assess risk of the bycatch (NPFMC 2014). Thus the SG80 level is met. The SG100 level is not met as the catches of some bycatch species are not currently evaluated at the individual species level.		
References		NMFS 2013. 2014 Annual Deployment Plan for Observers in the Groundfish and Halibut Fisheries off Alaska. National Oceanic and Atmospheric Administration, 709 West 9th Street. Juneau, Alaska 99802. NPFMC 2014. FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501, APRIL 2014.		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**

PI 2.2.3	Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch	
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.3.1

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	ETP species are protected under the provisions of the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). Under the ESA, endangered species are protected. Similar prohibitions usually extend to threatened species. Federal agencies may be allowed limited take of species through interagency consultations with NMFS or USFWS. Non-federal individuals, agencies, or organizations may have limited take through special permits with conservation plans. Under the MMPA, marine mammal species are not permitted to fall below their optimum sustainable population level and if they are depleted measures should be taken to replenish these species or stocks. A Potential Biological Removal is determined for depleted species to promote recovery to their optimum sustainable population level. Observer Program data provide annual estimates of takes of ETP fish (salmon), seabirds and marine mammals in the GOA Pacific cod fisheries (http://alaskafisheries.noaa.gov/sustainablefisheries/observers/). Based on allowable take specified in ETP species population assessments and recovery plans, and the performance of the fisheries staying below the limits, there is a high degree of certainty that the effects of the fishery are within limits. Observer coverage of the pot fishery is low, but this fishery is not expected to interact with ETP species. Thus the effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species (Balsiger 2012, USFWS 2008, Allen and Angliss 2013, Section 3.4). Based on the low estimated takes in relation to ETP species population assessments as specified in recovery plans, there is a high degree of certainty that the effects of the fishery are within limits. The SG60, SG80, and SG100 levels are met.		

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
b	Guidepost	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	Observer Program data coupled with population assessments of allowable takes indicate that known direct effects of the cod fishery are highly unlikely to create unacceptable impacts on ETP species (Short-tail albatross, Zador et al. 2008; Steller sea lion, Allen and Angliss 2013; salmon, Balsiger 2012). There are no records of Short-tailed albatross having been taken in the GOA Pacific cod fishery (USFWS 2008). The mean annual mortality of Steller sea lions was 1.3/yr in the cod trawl fishery and none were taken on the longline fishery (Allen and Angliss 2013). This compares with the PBR for the western stock of Steller sea lions of 275 annually. A recent supplementary Biological Opinion concluded that groundfish fisheries, including Pacific cod, in the GOA where not likely to jeopardize the continued existence of these threatened Chinook stocks (NMFS 2012). These data and assessments provide a high degree of confidence that there are no significant detrimental effects. The SG60, SG80, and SG 100 levels are met.		
c	Guidepost		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		(Y/N) Y	(Y/N) N
	Justification	Indirect effects of the trawl fishery on Short-tailed albatross have been considered (e.g., Zador and Fritzgerald 2008) and thought to be unlikely to have unacceptable impacts, as it was not identified as a current threat in the updated recovery plan (USFWS 2008). Pacific cod is a seasonally important prey in the diet of the endangered western stock of Steller sea lions, but there is little evidence that competition with the cod fishery is likely to result in unacceptable impacts on this species (e.g., Bernard et al. 2011, NMFS 2014). Indirect fishery effects are not listed as a threat to endangered salmon stocks (http://www.nmfs.noaa.gov/pr/species/fish/salmon.htm). The SG80 level is met. The SG100 level is not met. Indirect effects are difficult to measure and thus some uncertainty remains regarding indirect effect on ETP species.		
References		Allen, B. M. and Angliss, R. P. 2013. Alaska marine mammal stock assessments, 2012. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-245, 282 p. Balsiger, J. W. 2012. 2011 Annual report for the Alaska Groundfish Chinook Salmon Incidental Catch and Endangered Species Act Consultation. NMFS April5, 2012.		

PI 2.3.1	**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	Bernard, D.D.R., Jeffries, S.J., Knapp, D.G., and Trites, D.A.W. 2011. An independent , Scientific Review of the Biological Opinion (2010) of the Fisheries Management Plan for the Bering Sea / Aleutian Islands management areas, Anchorage, Alaska. NMFS. 2007. Conservation plan for the Eastern Pacific stock of northern fur seal (*Callorhinus ursinus*). National Marine Fisheries Service, Juneau, Alaska. NMFS. 2014. Endangered Species Act - Section 7 Consultation Biological Opinion: Authorization of Alaska groundfish fisheries under the proposed revised Steller sea lion measures. NOAA/NMFS, Juneau Alaska, April 2, 2014. U.S. Fish and Wildlife Service. 2008. Short-tailed Albatross Recovery Plan. Anchorage, AK, 105 pp. Zador, S.G., Punt, A.E. & Parrish, J.K. (2008) Population impacts of endangered short-tailed albatross bycatch in the Alaskan trawl fishery. *Biological Conservation,* **141,** 872-882. Zador, S. G., and S. M. Fitzgerald. 2008. Seabird attraction to trawler discards. AFSC Processed Rep. 2008-06, 26 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115.
OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.2

PI 2.3.2		The fishery has in place precautionary management strategies designed to: • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
	Justification	ETP species are protected under the provisions of the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). Under the ESA, endangered species are protected. Similar prohibitions usually extend to threatened species. Federal agencies may be allowed limited take of species through interagency consultations with NMFS or USFWS. Non-federal individuals, agencies, or organizations may have limited take through special permits with conservation plans. Establishment of critical habitat and actions identified in recovery plans are meant to promote the recovery of ETP species. There are measures and a comprehensive strategy in place to minimize mortality of Short-tailed albatross, and other seabirds, as described on the NMFS Seabird Bycatch Reduction Program website (http://alaskafisheries.noaa.gov/protectedresources/seabirds.htm). The use of seabird bycatch avoidance gear in the longline fishery since 2004 has dramatically reduced the seabird bycatch and the collection of seabird bycatch data by observers has provided reliable data to assess performance of the reduction program. There is low observer coverage in the pot fishery, but this gear is not expected to interact with seabirds to any significant degree. A number of measures have been taken to minimize mortality of Steller sea lions, including 3 nm no-entry zones around rookeries, prohibition of groundfish trawling within 10-20 nm of certain rookeries, and spatial and temporal allocation of Gulf of Alaska pollock and Aleutian Island Atka mackerel TAC (Allen and Angliss 2013). These measures are components of a comprehensive strategy of the NPFMC to manage fishery impacts. Chinook salmon are a prohibited species on the GOA cod fisheries. To reduce the bycatch of chinook salmon in GOA non-pollock groundfish fisheries, the NPFMC has recommended a hard cap bycatch limit http://www.npfmc.org/salmon-bycatch-overview/gulf-of-alaska-salmon-bycatch/. These measures, along with restructuring the Observer Program to increase observer coverage (Section 3.5.11), are elements of a comprehensive strategy for managing the fishery impact on ETP species. The SG60, SG80 and SG100 levels are met.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
	Justification	The management measures and a strategy to minimize mortalities supports high confidence that the strategy will work based on quantitative information collected from the cod fishery by the Observer Program, which is subsequently used to assess that the fisheries to not have adverse impacts on ETP species e.g., (http://www.st.nmfs.noaa.gov/Assets/Observer-Program/bycatch-report/Table_5.3.pdf.). The SG60, SG80 and SG100 levels are met.		
c	**Guidepost**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		(Y/N) Y	(Y/N) Y
	Justification	There is clear evidence that the strategy to minimize mortalities of ETP species is being successfully implemented based on annual reports and analysis of Observer Program data from the cod fishery. All interactions with ETP species are well below take limits set for the species (e.g., Allen and Angliss 2013 and AFSC seabird data, Section 3.4.4). The SG80 and SG100 levels are met.		
d	**Guidepost**			There is evidence that the strategy is achieving its objective.
	Met?			(Y/N) N
	Justification	No Short-tailed albatross have been taken in the demersal longline fleet in the GOA (http://www.afsc.noaa.gov/REFM/REEM/Seabirds/Default.php). The incidental takes of Steller sea lions over all groundfish fisheries have approached zero (Allen and Angliss 2013). Thus there is evidence that the strategy is achieving its objective. Regulations to reduce the bycatch of Chinook salmon in the non-pollock (including Pacific cod) trawl fishery in the GOA went into effect January 1, 2015 and therefore more information will be needed to determine if the strategy for reducing Chinook salmon bycatch in that region is achieving its goal, http://alaskafisheries.noaa.gov/frules/79fr71350.pdf.		
References		Allen, B. M., and R. P. Angliss. 2013. Alaska marine mammal stock assessments, 2012. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-245, 282 p.		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.3

PI 2.3.3		**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	There is sufficient qualitative and quantitative information being collected to estimate fishery related mortality of ETP species. This information comes from annual estimates derived from Observer Program data collected from the Pacific cod fisheries in the GOA. Observer coverage of the pot fishery is low, but this fishery is not expected to interact with ETP species. Although the jig fishery is not observed, it is small and not expected to impact ETP species. Along with independent estimates of population status, the Observer Program information from the trawl and longline fisheries is sufficient to quantitatively estimate outcome status e.g., (http://www.st.nmfs.noaa.gov/Assets/Observer-Program/bycatch-report/Table_5.3.pdf.). The SG60, SG80, and SG100 levels are met.		
b	**Guidepost**	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	(Y/N/Not relevant) Y	(Y/N/Not relevant) Y	(Y/N/Not relevant) Y – Jig; N – Trawl, Pot, and Longline
	Justification	Information collected by the Observer Program on ETP species that interact with the cod fishery, coupled with population assessments of those ETP species, is adequate broadly determine impacts and to assess the level of threat the fishery might pose (Section 3.4.7). Although the jig fishery is not observed, it is small and not expected to impact ETP species. The SG60, SG80 and SG100 levels are met for jig (based on no interaction with ETP species). The SG60 and SG80 levels are met for the pot, longline, and trawl fisheries. Although the information collected is accurate and verifiable with respect to direct impacts, this cannot be stated with confidence for all impacts (i.e., including indirect). Therefore, the SG100 level is not met.		

PI 2.3.3		**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
c	**Guidepost**	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The annual information collected by the Observer Program, and particularly with 2013 enhancements to observer coverage for smaller vessels, on ETP bycatch in the cod fisheries is adequate to support measures to manage impacts, to measure trends and to support a full strategy. There is a comprehensive strategy that has been adopted by the NPFMC to minimize impacts on ETP species (e.g., GOA FMP, NPFMC 2014). The SG60, SG80, and SG100 levels are met.		
References		NPFMC 2014. FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501, January 2014.		
OVERALL PERFORMANCE INDICATOR SCORE:				**Jig – 100; Trawl, Longline, Pot –95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	(Y/N/Partial) Y	(Y/N/Partial) Y	(Y/N/Partial) Y- longline, pot, jig; N- trawl
	Justification	The Environmental Impact Statement on Essential Fish Habitat (EFH) provided estimates of impact of the gear used in the GOA Pacific cod fishery that indicated that the trawl fishery was highly unlikely to result in serious or irreversible harm to habitat structure (NMFS 2005, 2010). Those analyses also indicated that longline and pot gear are expected to have negligible impact on bottom habitat. Jig gear was not considered to impact habitat and was not included in these assessments. The SG60 and SG80 levels are met for all gear types. The SG100 level is met for longline, pot and jig gear types. The SG100 level for trawl gear is not met as there are few empirical studies of the longer-term impact of the trawling for Pacific cod on bottom structure. Given the hard bottom in the GOA, long-term significant effects might be anticipated and thus further study is needed.		
References		NOAA 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. U.S. Dept. Commerce, NOAA, NMFS, Alaska Region, P.O. Box 21668, Juneau, AK. NMFS 2010. Final EFH 5-year Review Summary Report, April 2010		
OVERALL PERFORMANCE INDICATOR SCORE:				**Longline, pot, and jig – 100** **Trawl – 80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.2

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The NMFS and the NPFMC together have instituted measures and have adopted a strategy to protect sensitive habitat (GOA FMP, NPFMC 2014, Table ES-2). Nested within the EFH are habitat areas of particular concern such a corals and seamounts. These areas are closed to bottom contact. There are also closed areas/seasons, such as the Sitka Pinnacles Marine Reserve and Slope Habitat Conservation Areas, to trawling and bottom contact gear for marine mammals, herring, salmon, halibut, and crab species. Therefore, the strategy is being implemented (http://www.npfmc.org/habitat-protections/). The SG60, SG80 and SG100 levels are met for all gear types.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The measures implemented to protect sensitive habitat are likely to work and there is an objective basis for confidence that the Councils strategy will work. Closed area/season management of fishing impacts is widely practiced in other parts of the world and there is a long history of experience of such measures from the cod fishery in the GOA. VMS (Loefflad et al. 2014) and Observer data provide a basis for testing that the strategy will work. The SG60, SG80, and SG100 are met for all gear types.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		(Y/N) Y	(Y/N) Y

PI 2.4.2		**There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types**		
	Justification	VMS data and increased Observer Program coverage through the restructuring in 2013 provide evidence the Council's strategy is being successfully implemented, that is, the fishery is respecting habitat protection measures. The SG80 and SG100 are met for all gear types.		
d	**Guidepost**			There is some evidence that the strategy is achieving its objective.
	Met?			(Y/N) N
	Justification	Ecological monitoring of sensitive areas is not consistently ongoing since the HAPCs and other measures were put in place, so it is not clear that evidence exists of the strategy achieving its objective.		
References		Loefflad, M. R., F. R. Wallace, J. Mondragon, J. Watson, and G. A. Harrington. 2014. Strategic plan for electronic monitoring and electronic reporting in the North Pacific. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-276, 52 p. NPFMC 2014. FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alaska Management Area. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501, APRIL 2014.		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.3

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) N
	Justification	A comprehensive inventory of bottom habitat data in the GOA is provided in McConnaughey et al. (2009). The types, distributions and vulnerability of the main habitats in the GOA, consisting mainly of gravely sand, silty mud, and muddy to sandy gravel in the northeast, and steep hard-bottom slopes to the west, are known at the scale relevant to the fishery. The SG60 and SG80 levels are met for all gear types. The SG100 level is not met for the GOA as much of the bottom habitat is complex and more mapping work is needed to identify the distribution of vulnerable habitat types.		
b	**Guidepost**	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y- longline, pot, jig; N - trawl
	Justification	The EFH report (NMFS 2005) and 5-year review of EFH (NMFS 2010) provided information to broadly understand the nature of the main impacts of gear use on the main habitats in the GOA cod fishery. Model estimates of long-term bottom habitat impacts of trawl and longline gear used on the cod fishery provide sufficient data to allow the nature of impact and their spatial extent to be generally determined. Neither pot nor jig gear were considered to have measureable impacts. The SG60 and SG80 levels are met. The SG100 level is met for longline, pot, and jig gear, but is not met for trawl as the physical impacts of bottom trawl gear on habitat types have not been fully quantified in the GOA.		

PI 2.4.3		**Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types**		
c	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	Met?		(Y/N) Y	(Y/N) N
	Justification	Sufficient data by means of VMS and the Observer Program continue to be collected from the cod fishery to detect any change in risk to the habitat. VMS provides high resolution information on the spatial extent of the fishery, whereas the Observer Program collects detailed information on the nature and composition of the bycatch from the fishery which could signal changes in habitat impacts. The SG80 level is met for all gear types. The SG100 level is not met as changes in habitat distributions over time have not been measured.		
References		McConnaughey, R. A., J. V. Olson, and M. F. Sigler. 2009. Alaska Fisheries Science Center essential fish habitat data inventory. AFSC Processed Rep. 2009-01, 40 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115. NOAA 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. U.S. Dept. Commerce, NOAA, NMFS, Alaska Region, P.O. Box 21668, Juneau, AK. NMFS 2010. Final EFH 5-year Review Summary Report, April 2010		
OVERALL PERFORMANCE INDICATOR SCORE:				**85-for longline, pot and jig; 80-trawl**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.1

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	(Y/N/Partial) Y	(Y/N/Partial) Y	(Y/N/Partial) Y
	Justification	Based on the nature and amounts of retained and bycatch species (A'Mar and Palsson 2013; also see P2.1 and P2.2) and ecosystem analyses (e.g., Aydin et al. 2007), the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. Perturbation analyses with an ecosystem model suggest that changes in the cod survival have the largest effect on the biomass and therefore catches of cod. Responses of other ecosystem components are relatively insensitive to a 10% changes on cod survival (Aydin et al. 2007). Fluctuating or decreasing levels of retained and bycatch species (including seabirds) in cod fisheries provides some evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. The SG60, SG80, and SG100 levels are met for all gear types.		
References		A'mar, T. and Palsson, W. Chapter 2. Assessment of the Pacific cod stock in the Gulf of Alaska. NPFMC Gulf of Alaska SAFE, December 2013. Pp. 159-266. Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298 p.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.2

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	There are measures in place, as specified in the GOA FMP (NPFMC 2014), to ensure that the fishery does not pose a risk of serious and irreversible harm to the ecosystem. The stated objective of the FMP is to to "ensure the sustainability of fishery resources and associated ecosystems for the benefit of future". The NPFMC has adopted measures to accelerate ecosystem-based management principles that protect managed species from overfishing, and increase habitat protection and bycatch constraints. Thus, there is a strategy and a plan in place to control risk of ecosystem harm. The SG60, SG80 and SG100 levels are met for all gear types.		
b	**Guidepost**	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
	Justification	The measures take into account key elements of the ecosystem, such as the corals, and other sensitive habitats, marine mammals (e.g., Steller sea lions), prohibitions on the catch of highly valued species such as halibut, herring, salmon and, King and Tanner crabs, measure to reduce bycatch, restrictions on the use of non-pelagic trawls, and restrictions on bottom contact in sensitive habitat. These measures form both a partial and complete strategy to restrain all main impacts of the fishery (NMFS 2007; NPFMC 2014). The FMP is based on well-understood functional relationships, as evidenced by the extensive research to understanding the structure and functioning of both ecosystems (e.g., Aydin et al. 2007, Gachias et al. 21012). The plan provides for development of a full strategy that restrains impacts on the ecosystem as evidences by the wide range of measures in place. The SG60, SG80 and SG100 levels are met for all gear types.		
c	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The measures are considered likely to work, based on plausible argument, and the partial strategy is considered likely to work based on the direct experience from the fishery/ecosystems involved of implementing the GOA and BSAI FMPs over a period of many years. The SG60, SG80 and SG100 levels are met for all gear types.		
d	Guidepost		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	Met?		(Y/N) Y	(Y/N) N
	Justification	Evidence that the measures comprising the strategy are being implemented successfully comes from annual reports and analysis of data from the fishery collected by the Observer Program on the amount and composition of retained species, bycatch species, prohibited species and interactions with ETP species. Many of these are summarized in the Ecosystem Considerations SAFE (Zador [ed.] 2013). The SG80 is met for all gears, but SG100 level is not met as Observer Program coverage in the GOA Pacific cod fishery is low for trawl and longline catcher vessels, which take about 57% of the catch, and particularly low for vessels using pot gear. Given the small bottom footprint of the pot fishery, ecosystem effects of this gear are not anticipated to be serious.		

PI 2.5.2	There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function
References	Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298 p. Gaichas, S. K., G. Odell, K. Y. Aydin, and R. C. Francis. 2012. Beyond the defaults: functional response parameter space and ecosystem-level fishing thresholds in dynamic food web model simulations. Canadian Journal of Fisheries and Aquatic Sciences **69**:2077-2094. NMFS 2007. Alaska Groundfish Harvest Specifications, Final Environmental Impact Statement. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Region, January 2007. NPFMC 2014. FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alasks Management Area, April 2014, 144 p. Zador, S. [ed.] 2013. Ecosystem Considerations 2103. November 18, 2013 North Pacific Fishery Management Council.
OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	(Y/N) Y	(Y/N) Y	
	Justification	Information in the GOA is adequate to identify key elements of the ecosystem, as demonstrated qualitative and quantitative descriptions of the status of this ecosystem (e.g., Ecosystem considerations, Zador [ed.] 2013; EFH, NOAA 2005). Quantitative ecosystem models (e.g., Aydin et al. 2007; Gaichas et al 2012) demonstrate that information is adequate to broadly understand the key elements of the GOA ecosystem. Thus both SG60 and SG80 are met for all gear types.		
b	**Guidepost**	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.
	Met?	(Y/N/Not relevant) Y	(Y/N/Not relevant) Y	(Y/N/Not relevant) Jig – Y; trawl, longline, pot – N

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
	Justification	The four gear types used in the Pacific cod fishery impact key elements of these ecosystems differently. By the nature of the gear (off-bottom hooked lines) and small catches, the jig fishery is not considered to impact key elements of these ecosystems and was not considered in the EFH analysis. The SC100 is met for this gear. Pot gear impacts on bottom fauna are local to the area of the pot, except in cases where the pot might be dragged during recovery or inclement weather. Damage to the bottom is considered minimal as the mesh bottom of pots used in Alaska are elevated 2.5 -5.0 cm off the bottom, although this has not be quantitatively studied in Alaska. Long-term effects index for pot impacts on fish habitat features was estimated as minimal, at 0.0% in the GOA (NMFS 2005), but this again has not been empirically tested. The SG60 and SG80 are met. The SG100 is not met as relatively little is known about how long lost pots continue to fish even though biodegradable panels will eventually reduce or eliminate ghost fishing. There have been a number of studies of the impacts of trawls on bottom fauna, although fewer in Alaska. Impacts are generally less in soft-bottom substrates and are expected to be less given that trawls used in Alaska have large bobbins to reduce contact of the foot rope with the bottom. Nevertheless, the often hard and complex sea bottom in the GOA provides more opportunity for bottom impacts. Long-term effects index for non-pelagic trawl gear impacts on fish habitat features were estimated as small, at 0.2% in hard-bottom habitats of the GOA (NMFS 2005). Impacts of the trawl fishery on marine mammals and seabirds can be inferred from existing information and some have been investigated in detail. The SG60 and SG80 are met. The SG100 level is not met as further studies are needed in the GOA to determine the interaction between trawling and key bottom elements of the ecosystem. The main direct and indirect impacts of longline gear on seabirds and marine mammals have been well studied in Alaska (e.g., NOAA website - http://www.afsc.noaa.gov/refm/reem/Seabirds/Default.php; Allen and Angliss 2103). Quantitative studies on the effects of longlines on seafloor habitat features were not found (NMFS 2005). However, due to the light weight of the lines used with longline gear, effects on either infaunal or epifaunal prey organisms are considered to be limited to anchors and weights. Since these components make up less than 1/500th of the length of the gear, their effects on the bottom were considered very limited. Long-term effects index for long-line impacts on fish habitat features were estimated as minimal, at 0.0% GOA (NMFS 2005). The SG60 and SG80 are met. The SG100 level is not met as the effects of longline gear on bottom habitat have not been studies in the GOA, although the effects are not anticipated to result in serious or irreversible harm.		
c	Guidepost		The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
	Met?		(Y/N) Y	(Y/N) Y
	Justification	The main functions of and impacts on the components of the ecosystem are known through extensive biological sampling associated with regular survey conducted by NMFS through its Resource Assessment and Conservation Engineering Division, Marine Mammal Laboratory, Resource Ecology and Fisheries Management Division, and the Observer Program. The main impacts of the fishery on the target, bycatch, retained and ETP species have been identified and the main functions of these components are understood through extensive quantitative modeling of the ecosystem (e.g., Aydin et al. 2007, Gaichas et al. 2012). The SG80 and SG100 levels are met for all gear types.		
d	Guidepost		Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		(Y/N) Y	(Y/N) Y
	Justification	Analyses conducted for the EFH EIS provide sufficient information of the impacts of the fishery on bottom fauna (NMFS 2005, 2010), whereas, ecosystem modelling (e.g., Aydin et al. 2007, Gaichas et al. 2012) and data on seabird and marine mammal takes from the Observer Program have provided sufficient information of the impacts of the fishery on other components of the ecosystem. These analyses and models also allow the main consequences for the ecosystem to be inferred. The SG80 and SG100 levels are met.		
e	Guidepost		Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is sufficient to support the development of strategies to manage ecosystem impacts.
	Met?		(Y/N) Y	(Y/N) Y
	Justification	NMFS conducts a comprehensive program of surveys to monitor the abundance and key elements of the GOA ecosystem. The new Observer Program collects targeted catch, retained species, and bycatch statistics and biological samples from pot, logline and trawl fisheries for Pacific cod. Together they collect sufficient data to detect any increase in the level of risk to elements of the ecosystem and this information is sufficient to support the development of strategies to manage ecosystem impacts of the fishery, as specified in the GOA FMP (NPFMC 2014). The SG80 and SG100 levels are met.		

PI 2.5.3	There is adequate knowledge of the impacts of the fishery on the ecosystem	
References	Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298 p. Gaichas, S. K., G. Odell, K. Y. Aydin, and R. C. Francis. 2012. Beyond the defaults: functional response parameter space and ecosystem-level fishing thresholds in dynamic food web model simulations. Canadian Journal of Fisheries and Aquatic Sciences 69:2077-2094. NMFS 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. April 2005. NMFS 2010. Essential Fish Habitat (EFH), 5-year Review for 2010, Summary Report, FINAL, April 2010 NPFMC 2014. FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, January 2014. Zador, S. [ed.] 2013. Ecosystem Considerations 2103. November 18, 2013 North Pacific Fishery Management Council.	
OVERALL PERFORMANCE INDICATOR SCORE:		**Jig – 100; trawl, longline, pot – 95**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.1.1

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	Management of the Pacific cod fishery is carried out under the authority of the federal Magnuson-Stevens Fishery Conservation and Management Act (MSA; MSA 2007), first passed in 1976 and most recently reauthorized in 2006. The MSA is the principal law governing the harvest of fishery resources within the federal portion of the U.S. 200-mile zone. Under the MSA, the North Pacific Fishery Management Council (NPFMC) recommends management actions to the National Marine Fisheries Service (NMFS) for approval. In addition to the MSA, the PFMC adheres to a suite of "other applicable laws:" the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the Migratory Bird Treaty Act (MBTA); the Administrative Procedure Act (APA), Paperwork Reduction Act (PRA): Regulatory Flexibility Act (RFA): Coastal Zone Management Act (CZMA): and other relevant U.S. laws, Executive Orders and regulations. In addition, Washington coastal tribes have treaty rights that are taken into account in the management of the fishery, coordinated by NMFS. Internationally, the Pacific cod fishery is conducted in a manner consistent with provisions of the U.N. FAO Code of Conduct. The fishery is also governed by the U.S. High Seas Fishing Compliance Act of 1995. This federal legislation implements the U.N. Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas. The management of the fishery complies with the Migratory Bird Act Treaty, and the NMFS have instituted a number of regulations to further reduce seabird interactions in the fishery. Thus the fishery meets all the requirements of SG60, SG80, and SG100.		

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
b	**Guidepost**	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The NPFMC relies on a consensus approach among advisory bodies with room for minority reports should these groups fail to reach consensus (NPFMC 2009; 2014). The NPFMC resolves disputes (after weighing staff reports, advisory body reports, NMFS legal counsel advice, and public testimony) by majority vote held in public session as required in Section 302 of the MSA. All stakeholders have an opportunity for input prior to the decision by the Secretary of Commerce. Legal action may also be used by those individuals or groups dissatisfied with the decisions made by the Council and NMFS through the federal court system. There is no current litigation involving NPFMC decisions. However, several decisions of other regional Fishery Management Councils have come under court challenges (e.g., Issenberg 2013). These challenges often move to District Courts of Appeal for final decision. The NOAA Office of General Counsel represents the Councils and NMFS in court. NOAA GC has established a formal guideline for maintaining the agency administrative record (Schiffer 2012.). While this record serves to increase efficiency of the agency, it also increases the efficiency for any plaintiffs and for the court. This helps lead to a transparent and effective system for resolving legal disputes. These mechanisms have proven effective for providing resolution of challenging and controversial management issues, and setting effective precedent for future management measures, thereby meeting all the requirements of SG60, SG80, and SG100.		

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
d	**Guidepost**	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The US management system has a mechanism to formally commit to the legal rights created explicitly for First Nations and Treaty Tribes. Congress required Federal agencies to consult with Alaska Native corporations on the same basis as Federally-recognized Indian Tribes under E.O. 13175 (NOAA 2013). The relationship between Federally-recognized Indian Tribes and the Federal government is one of sovereign to sovereign and has been described at length by the federal judiciary and referred to in federal law promoting Tribal self-determination and self-governance. Regional Fishery Management Council meetings are a critical part of the fishery management planning process and are the first and earliest point of development of fishery management policy. It is most beneficial to Tribes, Councils, and NOAA if there is early and active participation in these fora, and NOAA strongly encourages Councils to discuss and work with Tribes to address their concerns while developing fishery conservation and management measures under the Magnuson-Stevens Fishery Conservation and Management Act. The requirements of SG60, SG80, and SG100 are met.		
References		Issenberg, A. 2013. Fisheries Litigation Update. Presentation of NOAA General Counsel to Council Coordinating Committee Meeting February 21, 2013. MSA. 2007. Public Law 94-265 as amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479). An Act to provide for the conservation and management of the fisheries, and for other purposes. As amended through January 12, 2007. NOAA. 2013. NOAA Procedures for Government-to-Government Consultation with Federally Recognized Indian Tribes and Alaska Native Corporations. NOAA 13175 Policy. NPFMC. 2014. Fishery Management Plan for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage AK. Schiffer, S. J. 2012. National Oceanic and Atmospheric Administration Guidelines for compiling an Agency Administrative Record. Memorandum		

PI 3.1.1	**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**	
	from Lois J. Schiffer, General Counsel.	
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.1.2

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The NPFMC process is the primary means for soliciting stakeholder information important to the Pacific cod fishery. Organizations/individuals involved in the management process are identified, including the NPFMC staff, advisory bodies such as the Groundfish Advisory Panel (GAP), Groundfish Management Team (GMT), and several ad-hoc committees (NPFMC 2009; 2012). Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction (NPFMC 2009; 2012). Management measures developed by the NPFMC are recommended to the Secretary of Commerce through the NMFS). Such measures are implemented by NMFS Alaska Regional office and enforced by the NOAA Office of Law Enforcement, the U.S. Coast Guard 17th District, and State of Alaska State Troopers (ADFG 2014; OLE 2014; USCG 2014a,b). Additional details provided in Sections 3.5.2 and 3.5.3. All participants have been well identified, and all functions, roles and responsibilities are explicitly defined and well understood, thereby meeting the SG60, SG80, and SG100.		
b	**Guidepost**	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties.** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The NPFMC process is the primary means for soliciting stakeholder consultation relevant to the Pacific Hake fishery (NPFMC 2009; 2012). The Council develops a meeting agenda and prepares a briefing book on issues of concern to Fisheries Conservation Zone (FCZ) management. Stakeholders are encouraged to prepare written and oral testimony on these issues. Written testimony submitted before briefing book deadlines is incorporated into the briefing book. Stakeholders can also provide public comment during the Council meeting. The draft and final decision documents provide the rationale for decisions made and explanations for alternatives not considered or selected. Therefore, the process seeks and accepts information and demonstrates the use of information in decisions, thereby meeting SG60, SG80, and SG100. Additional details provided in Sections 3.5.2 and 3.5.3.		
c	**Guidepost**		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		(Y/N) Y	(Y/N) Y
	Justification	The PFMC process is the primary means for soliciting stakeholder consultation relevant to the Pacific cod fishery. The Council develops a meeting agenda and prepares a briefing book on issues of concern to Fisheries Conservation Zone (FCZ) management, including trans-boundary issues. Stakeholders are encouraged to prepare written and oral testimony on these issues. Written testimony submitted before briefing book deadlines is incorporated into the briefing book. Stakeholders can also provide public comment during the Council meeting. The process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement, thereby meeting SG60, SG80, and SG100. Additional details provided in Sections 3.5.2 and 3.5.3.		
References		ADFG 2014; OLE 2014; NPFMC 2009; NPFMC 2012; USCG 2014a,b		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	Met?	(Y/N/Partial) Y	(Y/N/Partial) Y	(Y/N/Partial) Y
	Justification	The MSA has established fisheries-management objectives in the form of the 10 National Standard Guidelines. The NSG are implemented by NMFS under 50 CFR Part 600 subpart D. The NSGs have been interpreted as being consistent with international agreements and criteria for precautionary approaches. Guidelines for implementing the legislation have been translated into scientific and technical guidance for developing limit and target control reference points for assessing stock abundance reference points, with some suggestions for defaults. The control rules specify management actions (fishing mortality rate), based upon current stock status. (Restrepo and Powers 1999). The NSG provide explicit, precautionary objectives, and have been effectively implemented, thereby meeting the SG60, SG80, and SG100.		
References		50 CFR Part 600 subpart D MSA. 2007. Public Law 94-265 as amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479). An Act to provide for the conservation and management of the fisheries, and for other purposes. As amended through January 12, 2007 Restrepo, V. R. and Powers, J. E.. 1999. Precautionary control rules in US fisheries management: specification and performance. *ICES J. Mar. Sci.* 56 (6): 846-852. United Nations. 1995. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Related to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. Sixth Session, New York, 24 July – 4 August 1995, Article 6 and Annex II		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.4

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	Met?	(Y/N/Partial) Y	(Y/N/Partial) Y	(Y/N/Partial) N
	Justification	The management system provides incentives to fishers to fish sustainably, and engender a sense of stewardship of the resources. The management system provides reduced information gaps and uncertainties for fishers with an extensive consultation; strategic or statutory management planning; clear descriptions of roles, rights and responsibilities of the various stakeholders; and an opportunity to participate in management, research and other relevant processes. Proactive incentives are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise, meeting the SG60 and SG80. Although the consistently implements measures to establish sustainable fishing practices, it is not clear that the Council explicitly considers incentives in these decisions, thereby not meeting SG100.		
References		NPFMC. 2014. Fishery Management Plan for Groundfish of the Bering Sea-Aleutian Islands. North Pacific Fishery Management Council, Anchorage AK. NPFMC. 2014. Amendment 80 to the Bering Sea and Aleutian Islands (BSAI) Fishery Management Plan (FMP)		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.1

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
	Met?	(Y/N/Partial) Y	(Y/N/Partial) Y	(Y/N/Partial) Partial
	Justification	In addition to the National Standard Guidelines that provide objectives for federally managed fisheries, the Council has established nine specific objectives, each with several sub-objectives, for BSAI and Gulf of Alaska groundfish fisheries in Alaska: • 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; • Improve Data Quality, Monitoring and Enforcement. The 45 sub-objectives substantially and explicitly support the outcomes of MSC P1 and P2, thereby meeting the SG60 and SG80. While the 45 sub-objectives are well-defined and comprehensive, they are not measurable, so obtain a partial score of SG90.		
References		NPFMC. 2014. Fishery Management Plan for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage AK.		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.2

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	(Y/N) Y	(Y/N) Y	
	Justification	Decision-making for North Pacific groundfish occurs primarily within the North Pacific Fishery Management Council process. However, National Marine Fisheries Service (NMFS), the states of Alaska, Washington and Oregon, and numerous industry, academic, and NGO stakeholders participate in the process. The process used by the NPFMC for decision making is described in the Council guide for navigating the Council process (NPFMC 2009) and the Council Operating Procedures (NPFMC 2012a). The North Pacific Fishery Management Council (NPFMC) is the regional council responsible for managing North Pacific Ocean fisheries in the Federal EEZ off the coast of Alaska (NPFMC 2009). The Council's geographic area of authority includes the Exclusive Economic Zone (EEZ) of the Arctic Ocean and Pacific Ocean seaward of Alaska, including the Bering Sea, Aleutian Islands, and Gulf of Alaska. These decision-making procedures demonstrably result in conservation plans and management that meet MSC outcomes for P1 and P2, thereby meeting SG60 and SG80.		
b	**Guidepost**	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
	Justification	The Council has a comprehensive process for receiving information about the resources under its responsibility. The plan teams provide analyses on the status of stocks and the impacts of fishing; the SSC and AP provide technical and industry-based review of information relevant to the fishery; stakeholders have encouragement and opportunity to submit information to the Council. The Council deals with all of the information presented during the decision-making process. Not all issues identified or proposed for actions are accepted by the Council, but the Council explicitly deals with them in a transparent manner. In many cases, the identified issues will undergo staff review to provide a summary to assist decision-making, and the issues could move into full analysis or drop out of consideration. But in all cases the decision is transparently made and based on the considering the implications for the stock management. This meets the SG60, SG80, and SG100.		
c	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		(Y/N) Y	
	Justification	The decision-making processes use the precautionary approach (Restrepo and Powers (1999); United Nations (1995) and are based on best available information, as mandated in National Standard 2 of the MSA (2007).		
d	Guidepost	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
	Justification	Formal reporting of Council deliberations and actions occur at all stages of the process (NPFMC 2009; 2012). A detailed briefing book provides to all stakeholders all of the information available to the Council members. Draft documents (e.g., stock assessments, plan amendments, environmental assessments, and environmental impact statements) are posted on Council and government websites to allow easy access; review periods typically last at least one month. Final decisions, including comments from the public and specific responses from the decision-makers, are also posted for easy access. This provides comprehensive, formal reporting of the management system response to relevant findings and information, thereby meeting the SG60, SG80, and SGF100.		
e	Guidepost	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The Office of General Counsel (GC), which represents NMFS, provides legal advice and counsel for the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce. NOAA GC has established a formal guideline for maintaining the agency administrative record (Schiffer 2012). While this record serves to increase efficiency of the agency, it also increases the efficiency for any plaintiffs and for the court. This helps lead to a transparent and effective system for resolving legal disputes. NOAA GC summarized legal issues regarding ACLs, which basically revolved around the need to use the best available science in determining such limits, and noted the need to show the justification for decision making and not to oversimplify the information (CCC 2012). Between the scientific expertise of the Councils and their many committees and advisory bodies and the expertise of NMFS and the review of issues and FMPs, there is a tremendous amount of technical expertise to which the courts will defer if proper documentation supports how conclusions have been arrived. Thus, the agency administrative record becomes an important aspect of justifying decisions and avoiding lawsuits. Further, NOAA and NMFS consult with plaintiffs and potential plaintiffs to settle disputes. The management system process includes proactive response from the decision-making agencies to legal actions brought against the management system, and strives to prepare decisions in substantive compliance with laws and regulations to minimize the likelihood of lawsuits, thereby reaching the SG60, SG80, and SG100.		

PI 3.2.2	**The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.**
References	CCC. 2012. Council Coordination Committee. 2012 Minutes of the Meeting. MSA. 2007. Public Law 94-265 as amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479). An Act to provide for the conservation and management of the fisheries, and for other purposes. As amended through January 12, 2007. NPFMC. 2009. Navigating the North Pacific Council Process. North Pacific Fishery Management Council, Anchorage AK. NPFMC. 2009. Navigating the North Pacific Council Process. North Pacific Fishery Management Council, Anchorage AK. Restrepo, V. R. and Powers, J. E. 1999. Precautionary control rules in US fisheries management: specification and performance. Schiffer, S. J. 2012. National Oceanic and Atmospheric Administration Guidelines for compiling an Agency Administrative Record. Memorandum from Lois J. Schiffer, General Counsel.
OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	Under the Federal North Pacific Groundfish Observer Program a comprehensive monitoring, control and surveillance system has been implemented. All Pacific cod vessels are required to carry observers as requested, and most carry two observers at all times to collect data on fishing effort, total catch by species, and biological data; characterize marine mammal and sea bird interactions. Vessels carry VMS to monitor location. At-sea and shore-side enforcement is carried out by the Alaska State Troopers, NMFS Office of Law Enforcement (OLE 2014), and the US Coast Guard (USCG 2014a). Ability to enforce relevant rules is demonstrated by very low violation rates (USCG 2014b; Killary, pers comm 2014). Therefore, comprehensive MCS has been implemented and shown effective, meeting the SG60, SG80, and SG 100.		
b	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	OLE agents and officers can assess civil penalties directly to the violator in the form of a summary settlement or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation who can impose a sanction on the vessels permit or further refer the case to the U.S. Attorney's Office for criminal proceedings. Sanctions to deal with non-compliance of U.S. rules exist, are consistently applied and demonstrably provide effective deterrence. Under MSA, violations are civil, not criminal. Penalties may range from severe monetary fines, boat seizure and/or imprisonment (NMFS 2011c). The low proportion of violations encountered during at-sea or shoreside patrols demonstrates effective deterrence (USCG 2014b; M. Killary, OLE, pers. comm. 2014). Together, these aspects of MCS meet the SG60, SG80, and SG100.		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
c	Guidepost	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	There is a high degree of confidence that fishers comply with the management system under assessment (Killary 2014), including, providing information of importance to the effective management of the fishery. This is also evident from compliance with the Federal North Pacific Groundfish Observer Program and participation of fishers in the NPFMC process.		
d	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		(Y/N) Y	
	Justification	There is no evidence of systematic non-compliance in north Pacific Groundfish Fisheries (USCG 2014b; Killary, pers comm 2014). Fisher proactive involvement in the management process is high and rule violation rates are extremely low.		
References		ADFG. 2014. Enforcement of Alaska's Fish and Wildlife Laws. Alaska Department of Fish and Game. NOAA GC. 2014a. Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions. NOAA Office of the General Counsel – Enforcement and Litigation OLE. 2014. NOAA Office of the General Counsel, Enforcement Section Enforcement Actions July 1, 2013, through December 31, 2013. Office of Law Enforcement-AK Region. USCG. 2014a. Mission: Maritime Stewardship. US Coast Guard. USCG. 2014b. 17th Coast Guard District 2013 Year in Review. USCG report to NPFMC.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The Council Operating Manual (NPFMC 2012) states in item 1I that the Council, to comply with MSA requirements, will: Develop, in conjunction with the SSC, multi-year research priorities for fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes, that shall establish priorities for 5-year periods; be updated as necessary; and be submitted to the Secretary and the regional science centers of the National Marine Fisheries Service (NMFS) for their consideration in developing research priorities and budgets for the region of the Council. The Council currently has a list of 127 research topics, of which six are considered critical and 54 as high priority (NPFMC 2014). The Pacific States Marine Fisheries Commission has developed a searchable online listing of the NPFMC research priorities (PSMFC 2014). NMFS undertakes much of the research; the public listing of the research priorities also provide academic and private researchers with a rationale for research proposals that enhances the likelihood of achieving funding. Together, these actions provide a comprehensive research plan with timely and reliable information, thereby meeting SG60, SG80, and SG100.		
b	**Guidepost**	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	All research information funded by the US government is publically available; Alaska-related material is most often on the NPFMC web site. Research plans and results are disseminated by the U.S. (NPFMC 2012; 2014; PSMFC 2014) to all interested parties in a timely fashion and are widely and publicly available, thereby meeting SG60, SG80, and SG100.		
References		NPFMC. 2012. Statement of organization, practices, and procedures of the North Pacific Fishery Management Council (Draft). North Pacific Fishery Management Council, Anchorage AK. NPFMC. 2014. Research Priorities. North Pacific Fishery Management Council, Anchorage AK. PSMFC. 2014. North Pacific Fishery Management Council: Research Priorities.		

PI 3.2.4	The fishery has a research plan that addresses the information needs of management
OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.2.5

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The NPFMC meets five times a year, and has mechanisms in place to evaluate all parts of the management system. The annual management process is detailed in Council Operating Procedure 1H (NPFMC 2009; 2012). Under the annual cycle, eligible management measures are put into place and adjusted through routine in-season evaluation and actions. The comprehensive amendments to the fishery management plan, averaging about two per year since the implementation of the Council system, demonstrates the wide range of management topics evaluated by the Council. The evaluation of the management system meets the SG60, SG80, and SG100.		
b	**Guidepost**	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	(Y/N) Y	(Y/N) Y	(Y/N) Y
	Justification	The NPFMC management system undergoes extensive internal review as part of the annual harvest specification process (see scoring issue a). All aspects are available for review through the Council's Advisory Panel, SSC, public comment, and Council member discussions. All Council recommendations are externally reviewed by NMFS, NOAA, and the Department of Commerce, and NOAA GC reviews proposed actions to assure compliance with the MSA. Further external review occurs through fairly frequent legal challenges, which refine understanding of requirements under laws and regulations. The regular internal and external review meets the SG60, SG80, and SG100.		
References		NPFMC. 2009 (second edition). *Navigating the North Pacific Council Process.* North Pacific Fishery Management Council, Anchorage AK. NPFMC. 2012. Statement of organization, practices, and procedures of the North Pacific Fishery Management Council (Draft). North Pacific Fishery Management Council, Anchorage AK. NPFMC. 2014. Fishery Management Plan for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage AK.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Appendix 1.3 Conditions

No conditions raised for these fisheries.

Appendix 2. Peer Review Reports

Peer Reviewer 1 Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification:		MRAG Concurs

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**NA**	**Conformity Assessment Body Response**
Justification:		

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**NA**	**Conformity Assessment Body Response**
Justification:		

General Comments on the Assessment Report (optional)

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	Yes	NA	See comments	MRAG Concurs
1.1.2	Yes	Yes	NA	See comments	MRAG Concurs
1.1.3	NA	NA	NA		
1.2.1	Yes	Yes	NA	See comments	MRAG Concurs
1.2.2	Yes	Yes	NA	See comments	MRAG Concurs
1.2.3	Yes	Yes	NA	See comments	MRAG Concurs
1.2.4	Yes	Yes	NA	See comments	MRAG Concurs
2.1.1	Yes	Yes	NA	See comments	MRAG Concurs
2.1.2	Yes	Yes	NA	See comments	MRAG Concurs
2.1.3	Yes	Yes	NA	See comments	MRAG Concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.1	Yes	Yes	NA	Some of the bycatch is not identified to species; thus the SG100 level is not met.	MRAG Concurs
2.2.2	Yes	Yes	NA	The SG100 level is not met as many of the taxa taken as minor bycatch are not identified to species. Except for giant grenadiers and star fish, discards of most taxa in the bycatch is quite small	MRAG Concurs
2.2.3	Yes	Yes	NA	Bycatch accounting for some species is aggregated into species complexes and thus precludes assessments at the individual species level. Also, observer coverage of the pot fleet is low. Therefore, the SG100 level is not met.	MRAG Concurs
2.3.1	Yes	Yes	NA	Direct effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. Indirect effects are difficult to measure and thus some uncertainty remains regarding indirect effect on ETP species.	MRAG Concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.2	Yes	Yes	NA	There is clear evidence that the strategy to minimize mortalities of ETP species is being effectively implemented based on annual analysis of Observer Program data. Regulations to reduce the bycatch of Chinook salmon in the non-pollock (including Pacific cod) trawl fishery in the GOA went into effect January 1, 2015 and therefore more information will be needed to determine if the strategy for reducing Chinook salmon bycatch in that region is achieving its objective..	MRAG Concurs
2.3.3	Yes	Yes	NA	Annual Observer Program information supports the management of fishery impacts on ETP species. For the pot, longline, and trawl fisheries, the information collected is accurate and verifiable with respect to direct impacts,but not clearly for indirect impacts.	MRAG Concurs
2.4.1	Yes	Yes	NA	The SG100 level for trawl gear is not met as there are few empirical studies of the longer-term impact of the trawling for Pacific cod on bottom structure. Given the hard bottom in the GOA, long-term significant effects could result and thus further study is needed.	MRAG Concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.2	Yes	Yes	NA	A strategy is in place to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types, but evidence that the strategy is meeting its objectives is lacking.	MRAG Concurs
2.4.3	Yes	Yes	NA	The SG100 level is not met for the GOA as much of the bottom habitat is complex and more mapping work is needed to identify the distribution of vulnerable habitat types. The physical impacts of bottom trawl gear on habitat types have not been fully quantified in the GOA. Changes in habitat distributions over time have not been measured.	MRAG Concurs
2.5.1	Yes	Yes	Yes	Ecosystem analyses indicaate that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	MRAG Concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.2	Yes	Yes	NA	Management measures are in place to restrain main direct and indirect impacts of the fishery on ecosystem structure and function. Compelling evidence that the measures are being implemented successfully is lacking. Scoring at the SG100 level is precluded.	MRAG Concurs
2.5.3	Yes	Yes	NA	Information from EFH and ecosystem modelling studies support the scoring.	MRAG Concurs
3.1.1	Yes	Yes	NA	Relevant information was used and the rationale supports the scoring.	MRAG Concurs
3.1.2	Yes	Yes	NA	Relevant information was used and the rationale supports the scoring	MRAG Concurs
3.1.3	Yes	Yes	NA	The NSGs provide explicit, precautionary objectives, and have been effectively implemented.	MRAG Concurs
3.1.4	Yes	Yes	NA	Explicit consideration of incentives is not evident, precluding scoring at the SG100 level.	MRAG Concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.1	Yes	Yes	NA	Sub-objectives are not measurable, precluding scoring at the SG100 level.	MRAG Concurs
3.2.2	Yes	Yes	NA	Relevant information was used and the rationale supports the scoring.	MRAG Concurs
3.2.3	Yes	Yes	NA	Relevant information was used and the rationale supports the scoring.	MRAG Concurs
3.2.4	Yes	Yes	NA	MSA requirements mandate preparation and review of Research and Data Needs plans.	MRAG Concurs
3.2.5	Yes	Yes	NA	Relevant information was used and the rationale supports the scoring.	MRAG Concurs

Any Other Comments

Comments	Conformity Assessment Body Response

Peer Reviewer 1 Comments on Performance Indicator Review – GOA Pacific cod

Performance Indicator 1.1.1. The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

Scoring Issue a: Stock Status.

Relevant information was used and the rationale supports scoring at the SG 100 level.

The Assessment Team (Team) used information obtained from the December 2013 SAFE document for the GOA (A'Mar and Palsson 2013).

The terms *Likely* (P >= 70%), *Highly Likely* (P >= 80%), and *High Degree of Certainty* (P >=95%) were interpreted by the Team in a manner consistent with CB2.2.1.1, CB2.2.1.2, and CB2.2.1.3, respectively.

From 1977-2003, the GOA point estimate, as well as the full 95% CI of spawning biomass relative to B100%, were above the B20% reference point where recruitment would be expected to be impaired. Spawning biomass fell below the B20% level briefly in the late 2010s, and then exceeded B20% by a good margin (full 95% CI above B20%) since 2011. This is consistent with using the term "Highly Degree of Certainty (i.e. P >= 95%) with respect to fishing not impairing recruitment, and thus merits scoring at the SG100 level.

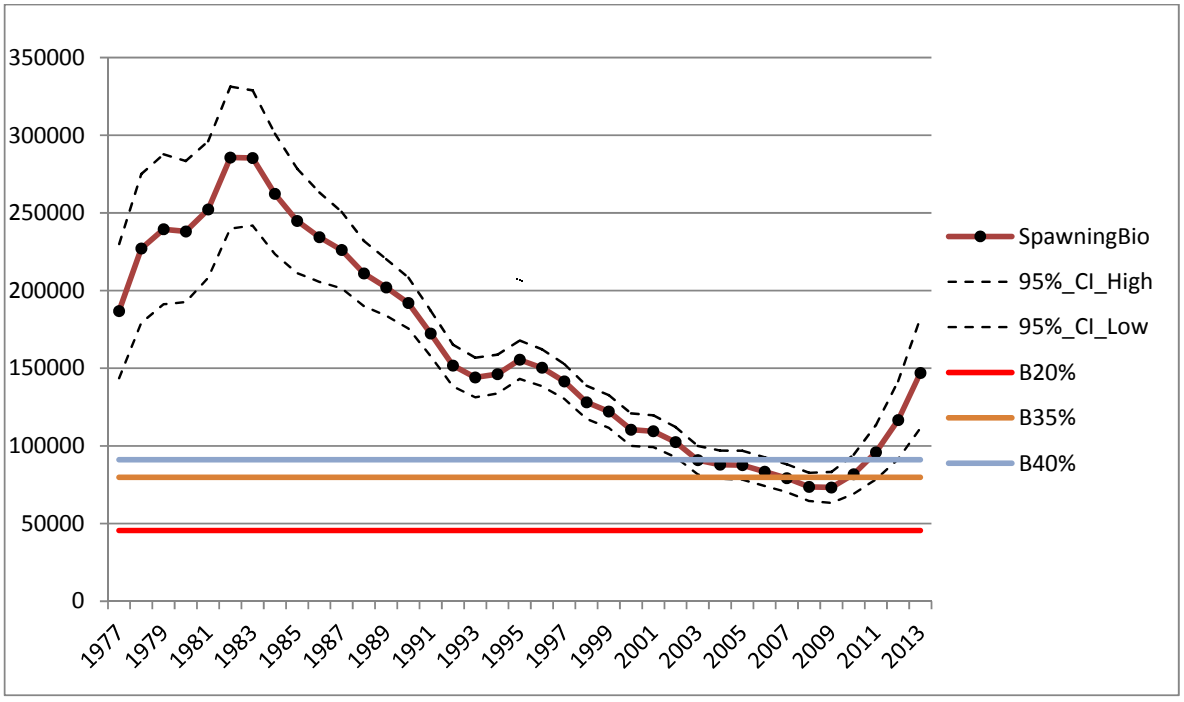

Figure 1. Gulf of Alaska Pacific cod spawning biomass relative to biological reference points. Source: Data derived from A'Mar and Palsson (2013).

Scoring Issue b: Stock Status in Relation to Target Reference Point.

Relevant information was used and the rationale supports scoring at the SG100 level assigned by the Team.

The Team used information obtained from the December 2013 SAFE document for the GOA (A'Mar and Palsson 2013).

The B40% value is considered a biologically appropriate reference point for Pacific cod, with the understanding that Pacific cod stock status is strongly influenced by environmental factors. Since 1977, the GOA time series of spawning biomass relative to B100% has oscillated above and briefly below the B40% level. The majority of the CI ranges for the spawning biomass estimate were above the B40% level from 1977-2013. Thus, for GOA Pacific cod, it is fair to say that the stock has been fluctuating around its target reference point. Thus, scoring at the SG100 level is merited.

Performance Indicator 1.1.2 Limit and target reference points are appropriate for the stock.

Scoring Issue a: Appropriateness of reference points

Relevant information was used and the rationale supports the scoring. The limit and target reference points are based on justifiable and reasonable practice (proxies). They are appropriately defined and are estimated in the stock assessment (Thompson 2013; Thompson and Palsson 2013), supporting scoring at SG80.

Scoring Issue b: Level of limit reference point.

Relevant information was used and the rationale supports the scoring.

The team concluded that scoring is not justified at the SG100 level, noting that "the limit reference point falls short of being set at a level where there is high certainty that it is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues."

Scoring Issue c: Level of Target Reference Point

Relevant information was used, and the rationale supports the scoring.

The Team concluded that scoring is warranted at the SG100 level, requiring that: "The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty." An extensive body of modelling work has supported B35% as a proxy for Bmsy for many groundfish. However; the lack of curvature in the stock recruit relationship makes Bmsy or any of its proxies poorly determined for GOA Pacific cod. The Team noted that it is likely, and supported by research findings that environmental conditions play an important role in Gulf of Alaska stock productivity. The Team concluded that "[since]… estimates of Bmsy may shift as environmental conditions are taken into account, the method for estimating B40% should always keep the target at or above the corresponding Bmsy estimate." I concur.

Performance Indicator 1.1.3. Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe.

NA. Pacific cod is not overfished.

Performance Indicator 1.2.1. There is a robust and precautionary harvest strategy in place

Scoring Issue a: Harvest strategy design.

Relevant information was used and the rationale supports the scoring.

The Team concluded that scoring is not warranted at the SG100 level, because recruitment in Pacific cod appears to be frequently driven by environmental factors, which could cause

failure to achieve management objectives in the short term. Thus, the harvest strategy is not able to clearly maintain the stock at or above the target reference point under all plausible conditions, so the SG 100 is not met.

Scoring Issue b: Harvest strategy evaluation.

Relevant information was used and the rationale supports the scoring.

Simulations and sensitivity analyses have been conducted; however, the harvest strategy has not been evaluated fully with respect to temporal and spatial variation in environmental parameters. The exploration of scenarios in the annual assessments is considered adequate to document that the harvest control rule should perform in a precautionary matter relative to target and limit reference points. Also, empirically, following a period of unfavorable environmental conditions and resultant poor recruitments in the 2000's, the stock was able to rebound when conditions improved.

Scoring Issue c: Harvest strategy monitoring.

Relevant information was used and the rationale supports the scoring.

Reliable monitoring is in place, including 1) full at-sea observer coverage, 2) dockside sampling, and 3) fishery independent surveys.

Scoring Issue d: Harvest strategy review.

Relevant information was used and the rationale supports the scoring.

The harvest strategy is reviewed or a regular basis internally by NMFS/NPFMC, and has also been reviewed by external peer-reviewers.

Performance Indicator 1.2.2. There are well defined and effective harvest control rules in place.

Scoring Issue a: Harvest control rules design and application.

Relevant information was used and the rationale supports the scoring.

The SG 100 scoring guideline is met; as noted by the Team: "The performance of the control rule hinges on the factors considered in the assessment, since the rule itself is simple and triggered by the results of the annual assessment process. If the assessment concludes that that stock is below the B35% reference point, exploitation automatically begins to be reduced."

Scoring Issue b: Harvest control rules account for uncertainty.

Relevant information was used and the rationale supports the scoring.

The SG 100 scoring guideline is met, as the harvest control rule takes into a wide range of uncertainties, particularly with regard to uncertainties out stock productivities and environmental conditions.

Scoring Issue c: Harvest control rules evaluation.

Relevant information was used and the rationale supports the scoring.

The Team scored this issue at the SG100 level. This requires evidence clearly showing that the tools in use are effective in achieving the exploitation levels required under the harvest control rule. Empirical evidence has demonstrated that the HCR-required exploitation levels were applied effectively during the period of environmentally induced stock weakness in the 2000's.

Performance Indicator 1.2.3. Relevant information is collected to support the harvest strategy.

Scoring Issue a. Range of information.

Relevant information was used and the rationale supports the scoring.

The Team scored this issue at the SG100 level. This is appropriate considering the wide and comprehensive amount of information routinely collected on Pacific cod.

Scoring Issue b. Monitoring.

Relevant information was used and the rationale supports the scoring.

The Team scored this issue at the SG100 level. Multiple indicators are monitored routinely, with a high degree of certainty.

Scoring Issue c. Comprehensiveness of Information.

Relevant information was used and the rationale supports the scoring.

The Team scored this issue at the SG80 level. There is high confidence that there is good information on Pacific cod removals in other Alaska fisheries.

Performance Indicator 1.2.4. There is an adequate assessment of the stock status.

Scoring Issue a: Appropriateness of assessment to stock under consideration.

Relevant information was used and the rationale supports the scoring.

The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

Scoring Issue b: Assessment approach.

Relevant information was used and the rationale supports the scoring.

The assessment estimates stock status relative to reference points.

Scoring Issue c: Uncertainty in the assessment.

Relevant information was used and the rationale supports the scoring.

Scoring at the SG100 level is merited. The assessment takes into account uncertainty and evaluates stock status relative to reference points in a probabilistic way.

Scoring Issue d: Evaluation of the assessment.

Relevant information was used and the rationale supports the scoring.

The assessment has been tested and shown to be robust. Simulations, sensitivity analyses, and alternate hypotheses have been explored as reported in annual SAFE documents.

Scoring Issue e: Peer Review of the assessment.

Relevant information was used and the rationale supports the scoring.

Annual NMFS/NPFMC reviews are conducted in a structured review process. Also, an external CIE review of the assessment was conducted in 2011.

Performance Indicator 2.1.1. The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.

Scoring Issues a, b, c, and d:

Relevant information was used and the rationale supports the scoring.

Target reference points are not set for octopus, and the status of octopus species retained in the pot fishery is poorly known; however, an assessment provides estimates of the OFL and ABC for the octopus species complex based on survey estimates of biomass. These measures are expected to keep retained octopus catches within biologically based limits.

Performance Indicator 2.1.2. The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.

Scoring Issues a, b, c, d, and e:

Relevant information was used and the rationale supports the scoring.

The Team noted that The SG100 level is not met as fishing level targets are not available for all individual species retained in the fishery.

Performance Indicator 2.1.3. Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.

Scoring Issues a, b, c, and d:

Relevant information was used and the rationale supports the scoring.

The Team noted that scoring at the SG100 level was not merited; catch accounting for some of the retained species in the Pacific cod fishery are aggregated into species complexes and thus assessment at the individual species level is precluded. Also, observer coverage of the pot fleet is low (~2% in 2013); thus information on retained species is of greater uncertainty for this gear type.

MRAG Response: MRAG agrees with the comments of Peer Reviewer 1.

Peer Reviewer 2 – Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No** **Yes**	**Conformity Assessment Body Response**
Justification: The assessment team has reviewed the appropriate documentation and developed a sound evidence-based conclusion for each scoring element.		MRAG Concurs

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes/No** **NA**	**Conformity Assessment Body Response**
Justification:		

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Yes/No** **NA**	**Conformity Assessment Body Response**
Justification:		

Peer Reviewer 2 General Comments on the Assessment Report (optional)

The report is well written and soundly reasoned using existing data and information. Overall, descriptions and explanations are complete, however some areas need better documentation. These areas are noted by comments in the report text.

Edits are noted in track changes on the report draft.

The citation intensity is not consistent throughout. E.g. sometimes none is given when there is a clear need to cite a source, other citations range from a general one covering the subject, to a specific document, to a document with page numbers or figure #.

Citations are missing from several areas that would normally include them. Noted in text.

Some sections read as if they have been taken verbatim from documents. Sometimes the source is not cited, and sometimes the word usage doesn't fit appropriately into the text. E.g. comments 55 and 56 page 48, and others in the report and the scoring tables.

Section 6.1 "final principle scores" are exactly the same as BSAI scores and inconsistent with the GOA scores that follow.

Various use of terms instead of a consistent single one:

- MSA, MFCMA and Magnuson-Stevens Act.
- ADFG and ADF&G
- US and U.S.
- NPFMC and Council

It's not clear how "hybrid" scores will be handled; e.g. 2.4.1

MRAG response: We have addressed the comments for citations and improved clarity throughout the report as suggested by Peer Reviewer 2. Performance indicator and Principle scores checked and updated as necessary.

Performance Indicator Review – Peer reviewer 2

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	Yes	NA	Trends and variability in year classes, recruitment and biomass are clearly described, as is the assessment method and level of uncertainty regarding the stock-recruit relationship and environmental variability.	MRAG concurs
1.1.2	Yes	Yes	NA	The explanation is detailed and well-documented.	MRAG concurs
1.1.3	NA	NA	NA	The stock is not depleted	MRAG concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.1.a	Yes	Yes/?	NA	a. Explanation is clear. See comment below.	MRAG concurs
1.2.1.b	Yes	Yes/?	NA	b. The distinction between general evaluations and evaluation specific to P. cod parameters is clear. See question about consistency of statement about the successful performance of the HCR with the conclusion about the HCR and SG100 in 1.2.1.a as well as 1.2.2.c	Text clarified to improve consistency
1.2.1.c	Yes	Yes	NA		MRAG concurs
1.2.1.d	Yes	Yes	NA	c. Explanation is clear.	MRAG concurs
1.2.1.e	NA	NA	NA	d. Explanation is clear.	
1.2.2.b	Yes	Yes	NA	b. Explanation is complete and well documented.	MRAG concurs
1.2.2.c	Yes	Yes	NA	c. Explanation is complete and well documented.	MRAG concurs
1.2.3.a,b,c,	Yes	Yes		Explanations for a, b and c are complete and well documented.	MRAG concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.4.a.b.c.d.e	Yes	Yes	NA	Explanations for a, c, d and e are complete and well documented.	MRAG concurs
2.1.1.a.b.d 2.1.1.c	Yes NA	Yes NA	NA NA	Explanations for a, b, and d are complete and well documented.	MRAG concurs
2.1.2.a.b.c.d.e	Yes	Yes	NA	Explanations for a, b, c, d and e are complete and well documented.	MRAG concurs
2.1.3. a.b.c.d	Yes	Yes	NA	Explanations are clear and complete, but an Observer Program cite is needed.	Done
2.2.1.a.c 2.2.1.b	Yes NA	Yes NA	NA NA	Explanations are clear and complete, but a bycatch cite is needed.	Done
2.2.2.a.b.c.d	Yes	Yes	NA	Explanations are clear and complete, but cites for OP and FMP are needed.	Done

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.3.a.b.c.d	Yes	Yes	NA	Explanations in all sections are clear. Need cites for OP, SAFE and FMP	Done
2.3.1.a.b.c	Partial	Yes	NA	Section a needs information on how the ETP limits conform to national and international requriements. Section c needs a cite for the statement that no indirect fishery effects are considered to impact engandered salmon stocks.	New text added to address this comment. Citation added as requested and text revised.
2.3.2.a.b.c.d	Partial	Yes	NA	Section a needs information on how the management strategies conform to national and international requriements. Section b text should use language "high confidence" instead of "considered likely" to address the SG100 language. Sections a, c and d need citations of Observer Program reports and documentation of low levels of salmon bycatch.	New text addedd. Text changed Done

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.3.a.b.c	Yes	Yes/?	NA	Cites needed from Observer Program reports as well as the relevant ETP documents Section b SG100 box for "met?": Is it "yes" for jig gear because of the earlier statement of no interaction with ETP species?	Done Yes, text added
2.4.1	Yes	Yes	NA	Explanations are complete and well documented.	MRAG concurs
2.4.2.a.b.c.d	Yes	Yes	NA	Section b needs to include "high confidence" wordingto justify 100	Done
2.4.3.a.b.c	Yes	Yes	NA	Explanations are clear and well documented	MRAG concurs
2.5.1	Yes	Yes	NA	Explanation is clear and well documented.	MRAG concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.2	Yes	Yes	NA	Overall, explanation is clear and well-documented. However, use of term "partial strategy" in sections a and d is confusing.	Removed partial
2.5.3	Yes	Yes	NA	A citation that reports work of RACE, MML, REFM and OP would be helpful.	Done
3.1.1	Yes	Yes	NA	The explanation is complete and well documented. See comment about EO in text	Comment addressed
3.1.2.a.b.c	Yes	Yes	NA	Section a: see comment in text. Section c: NPFMC 2009 would be good to cite here.	Comment addressed and citation added
3.1.3	Yes	Yes	NA	The explanation is complete and well documented.	MRAG concurs
3.1.4	Yes	Yes	NA	The explanation is complete and well documented.	MRAG concurs

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.1	Yes	Yes	NA	The explanation is complete and well documented.	MRAG concurs
3.2.2.a.b.c.d.e	Yes	Yes	NA	The explanation is complete and well documented. The reference section is missing 2 citations included in the text: NPFMC 2012 and UN 2005.	Citations added
3.2.3.a.b.c.d	Yes	Yes	NA	Sections a and c need a citation to an Observer Program report. References need modification: ADFG 2014 is not cited in text; NMFS 2011 and Killary 2014 not included in reference list.	Citations added
3.2.4.a.b	Yes	Yes	NA	The explanation is complete and well documented.	MRAG concurs
3.2.5	Yes	Yes	NA	CIE reviews could also be mentioned here. NPFMC 2014 is not cited in text.	Citations added

Any Other Comments

Comments	Conformity Assessment Body Response

Appendix 3. Stakeholder submissions

None submitted prior to PCDR.

(REQUIRED FOR FR AND PCR)

- The report shall include all written submissions made by stakeholders about the public comment draft report in full, together with the explicit responses of the team to points raised in comments on the public comment draft report that identify:

- Specifically what (if any) changes to scoring, rationales, or conditions have been made.
- A substantiated justification for not making changes where stakeholders suggest changes but the team makes no change.

(Reference: CR 27.15.4)

Appendix 4. Surveillance Frequency

(REQUIRED FOR THE PCR ONLY)

1. The report shall include a rationale for determining the surveillance score.

2. The report shall include a completed fishery surveillance plan table using the results from assessments described in CR 27.22.1

Table A4: Fishery Surveillance Plan

Appendix 5. Client Agreement

(REQUIRED FOR PCR)

The report shall include confirmation from the CAB that the Client has accepted the PCR. This may be a statement from the CAB, or a signature or statement from the client.

(Reference: CR: 27.19.2)

Appendix 5.1 Objections Process

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

The report shall include all written decisions arising from an objection.

(Reference: CR 27.19.1)